

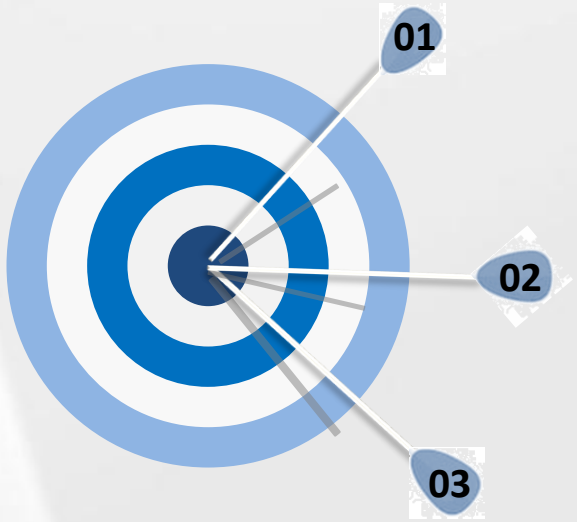
Analog IC &
Discrete Part

Introduction to Power Devices

【Power • Industrial Control • White Goods 】

August, 2026

Introduction to Power Device



1 Planar MOSFET

- MV/HV Planar
- MV/HV Super-junction
- SiC/GaN

2 Trench MOSFET

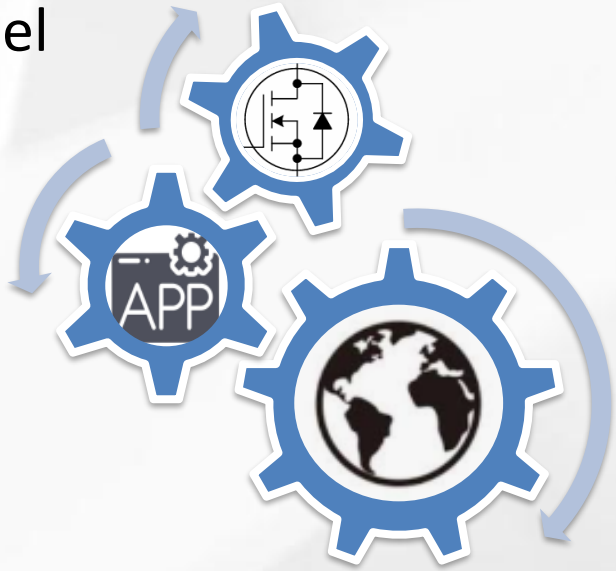
- LV/MV Trench type
- Dual channel

3 IGBT

- Trench type
- Planar type

4 Diode

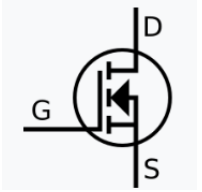
- Small-signal
- Schottky
- Fast recovery

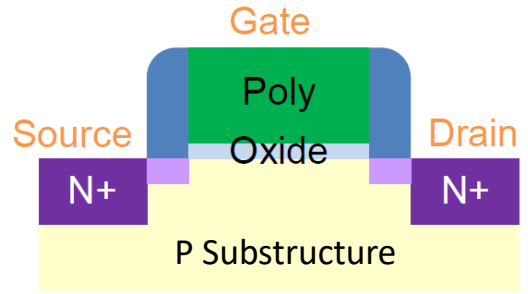


Planar MOSFET : N-ch / N-ch Fast-recovery / P-ch

N-channel Planar MOSFET

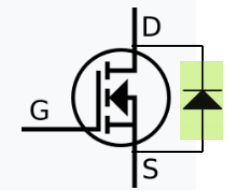
Type: Small Signal (SS) / Small Power(SP) / Power MOSFET
VDS: 60 / 100 / 200 / 600 / 650 / 700 / 1000 / 1200 / 1800V
RDS(ON): 500 ~ 0.006Ω (max)
Package: SOT-23, SOT-223, TO-252, TO-251, TO-220/F, TO-247, TO-3P

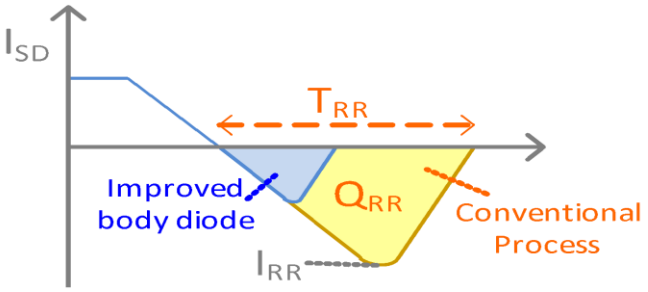




N-channel Fast Body Diode Planar MOSFET

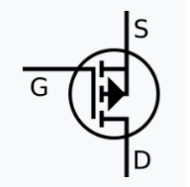
Type: Power MOSFET
VDS: 250 / 500 / 600 / 650 / 700 / 1000V
RDS(ON): 11.4 ~ 0.068Ω (max)
Package: TO-252, TO-92, TO-251, TO-220/F

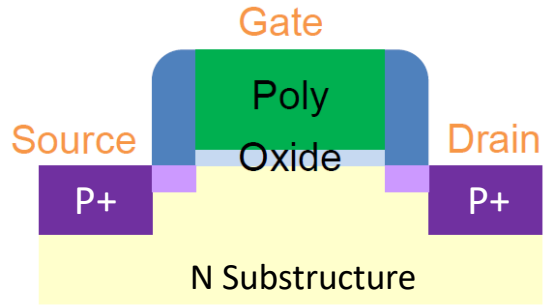




P-channel Planar MOSFET

Type: Small Signal(SS) / Small Power(SP) / Power MOSFET
VDS: 55 / 100 / 120 / 150 / 200 /300 / 350 / 400 / 500V
RDS(ON): 16 ~ 0.06Ω (max)
Package: SOT-23, TO-252, TO-251, TO-220/F





N-channel Planar MOSFET

Part Number	VDS	VGS	SOT-23	SOT-89	SOT-223	SOP-8	PDFN3x3	TOLL-8A/B	TO-252	TO-263	TO-92	TO-251	TO-220/F	TO-247	TO-3P
	[V]	[±V]	RDS(ON) max [Ω] @ 10V												
UF Series	55	20			0.07				0.043 - 0.07	0.008		0.07	0.008 - 0.072	0.008	0.008
xxN06 / UF Series	60	15 - 20				0.1			0.023 - 0.1	0.012 - 0.023		0.023 - 0.01	0.0085 - 0.10	0.006	
xxN10 / xxN15 / BSS / UF Series	100 / 150	20 - 30	6		0.2 - 0.35	0.105 - 0.2			0.036 - 0.35	0.015 - 0.1		0.08 - 0.35	0.015 - 0.13	0.015 - 0.048	0.1
xxN20 / xxN25 / UF Series	200 / 250	20 - 30			1.5 - 2	0.18 - 0.45	1.5 - 2		0.18 - 2	0.05 - 0.035		0.180 - 2	0.033 - 1.5	0.042 - 0.018	0.04 - 0.24
xxN30 / xxN35 / UF Series	300 / 350	20 - 30	5 - 7.5		2.5				0.3 - 2.5			2 - 2.5	0.25 - 5	0.045 - 0.089	
xxN40 / xxN45 / UF Series	400 / 450	20 - 30	14	5 - 14	1.8 - 5			0.175 - 0.18	0.46 - 8	0.175 - 0.55	5 - 14	0.55 - 8	0.175 - 5		

Naming Rule

F	20	N	65	Z

Fast Recovery Diode Type
- **Blank** = without FRD
- **F** = with FRD

Current Rating
ex:
- **4** = 4A
- **12** = 12A

Product Type
- **N** = Planar N ch.
- **P** = Planar P ch.

Voltage Rating
x10
ex:
- **60** = 600V
- **180** = 1800V

ESD Protection Type
- **Blank** = without ESD
- **Z** = with ESD

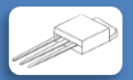
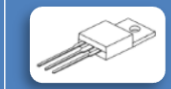
N-channel Planar MOSFET

Part Number	VDS	VGS	SOT-23	SOT-89	SOT-223	SOP-8	PDFN5x6	DFN8080-4	TO-252	TO-263	TO-92	TO-251	TO-220/F	TO-247	TO-3P
	[V]	[±V]	RDS(ON) max [Ω] @ 10V												
xxN50 / xxN55 / UF Series	500 / 550	20 - 30	12	12	1.75 - 24	7.5 - 24	1.6	0.27	0.75 - 8.5	0.27 - 0.9	4.2 - 18	0.75 - 12	0.26 - 2.5	0.125 - 0.42	0.125 - 0.5
xxN60 / xxN65 BSS Series	600 / 650	20 - 30	24 - 500	23	5 - 24	3 - 18	1.3 - 9.5		1 - 23	0.5 - 2.6	9.5 - 38	1 - 23	0.4 - 9.5	0.13 - 0.85	0.4 - 0.85
xxN70 Series	700	30		15	15		3		1.4 - 15	0.66 - 1		1.55 - 15	0.42 - 3		0.66 - 1
xxN80 / xxNK80Z Series	800	20 - 30			6.8 -13				2.2 - 17	0.78 - 3.7		2.2 - 13	0.78 - 13	0.35 - 1	0.78 - 0.95
xxN90 / xxNK90Z xxN95 / xxNK95Z Series	900 / 950	20 - 30							2.8 - 18	1.85 - 4.6		2.8 - 15	0.95 - 8	0.4 - 2.3	0.95 - 1.6
xxN100 / xxNK100Z Series	1000	20 - 30							4.1 - 18.5			7.5 - 12	1.4 - 12	1.4 - 1.9	
xxN120 / xxNK120Z Series	1200	20 - 30							6 - 10	3.5 - 7.5			3.5 - 10	1.2 - 4	2.5 - 4
xxN150 Series	1500	30			130				65 - 130	6.3 - 13			3.8 - 65	2 - 13	2.4 - 13
xxN160 Series	1600	30								5.9			4.2 - 5.9		
xxN170 Series	1700	30							22 - 160				5.5 - 17	2.7 - 5.5	
xxN180 Series	1800	30								6.5 -17.1			6.5 - 17.1		

N-channel Planar MOSFET (Fast-recovery Body Diode)

Part Number	VDS	VGS	Vth min-max	RDS(ON) max. [Ω]	Trr typ.	PDFN5x6	TO-252	TO-92	TO-251	TO-220/F
	[V]	[±V]	[V]	10V	[nS]					
F40N25-HC	250	30	2 - 4	0.068	118					•
F05N50-TD	500	30	2 - 4	11.4	57		•	•	•	
F1N50-HD	500	30	2 - 4	8.2	62		•	•	•	
F2N50-MH	500	30	2 - 4	5.2	95		•			
F2N50-TD	500	30	2 - 4	4.1	78		•	•	•	
F3N50-TD	500	30	2 - 4	3.8	83		•	•	•	
FUF830K-TC	500	30	2 - 4	1.9	82		•		•	
FUF830-ML	500	30	2 - 4	1.9	58	•	•		•	•
F5N50K-TC	500	30	2 - 4	1.8	102		•			
F5N50	500	30	1.5 - 3.5	1.6	120		•			•
F7N50-ML	500	30	2 - 4	1.45	90		•		•	
F05N60-TD	600	30	2 - 4	17	58		•	•	•	
F1N60-HD	600	30	2 - 4	11.2	66		•	•	•	
F1N60Q-TD	600	30	2 - 4	8.6	70		•	•	•	
F1N60Q-TA	600	30	2 - 4	8.2	74			•		
F2N60-TC3	600	30	2 - 4	6.8	79		•		•	
F2N60-TD	600	30	2 - 4	6	83		•	•	•	

N-channel Planar MOSFET (Fast-recovery Body Diode)

Part Number	VDS	VGS	Vth min-max	RDS(ON) max. [Ω]	Trr typ.	TO-252 	TO-92 	TO-251 	TO-220/F 
	[V]	[±V]	[V]	10V	[nS]				
F2N60-LC1	600	30	2 - 4	5.5	87	•			
F2N60-TC2	600	30	2 - 4	5.5	80			•	•
F2N60	600	30	2 - 4	5	100	•			
F3N60-TD	600	30	2 - 4	4.4	88	•	•	•	
F4N60-MHQ	600	30	2 - 4	4	100	•		•	•
F3N60-TD2	600	30	2 - 4	3.7	96	•		•	
F3N60-LC	600	30	2 - 4	3.6	98	•			
F4N60K-TC	600	30	2 - 4	3	100	•		•	
F4N60-TD1	600	30	2 - 4	3	100	•			
F4N60-TC1	600	30	2 - 4	3	93.3	•			
F4N60-ML1	600	30	2 - 4	2.7	80	•			
F4N60-ML	600	30	2 - 4	2.6	102	•		•	•
F5N60-TD1	600	30	2 - 4	2.5	112	•			
F2N65-TC	650	30	2 - 4	4.8	98	•			
F7N65-ML	650	30	2 - 4	1.65	78	•		•	•
F3N70-LC	700	30	2 - 4	4.6	97	•			
F9N100-FC	1000	30	2 - 4	2.2	97				•

P-channel Planar MOSFET

Part Number	VDS	VGS	Vth min-max	RDS(ON) max. [Ω]	SOT-23	SOT-223	SOP-8	TO-252	TO-263	TO-251	TO-220/F
	[V]	[±V]	[V]	10V							
UF9Z24	-55	20	-2 - -4	0.175				•	•	•	•
UF9Z24-F	-55	20	-2 - -4	0.15				•			•
UF9Z34	-55	20	-2 - -4	0.1				•			•
UF5305	-55	20	-2 - -4	0.06				•	•	•	•
UF01P10	-100	20	-2 - -4	10	•						
UF02P10	-100	20	-2 - -4	6	•						
UF9520S	-100	20	-2 - -4	0.6							•
UFR9120	-100	20	-2 - -4	0.48				•			
12P10	-100	30	-2 - -4	0.29		•	•	•	•	•	•
13P10	-100	30	-2 - -4	0.25						•	
UF9530	-100	20	-2 - -4	0.2				•		•	•
16P10	-100	30	-2 - -4	0.2				•			•
17P10-Q	-100	30	-2 - -4	0.19				•			•
17P10	-100	25	-2 - -4	0.18			•	•		•	•
17P10-HC	-100	20	-2 - -4	0.15			•	•		•	•
UF5210	-100	20	-2 - -4	0.06							•
UF03P15	-150	20	-2 - -4	6	•						
UF07P15	-150	20	-2 - -4	3.1	•						

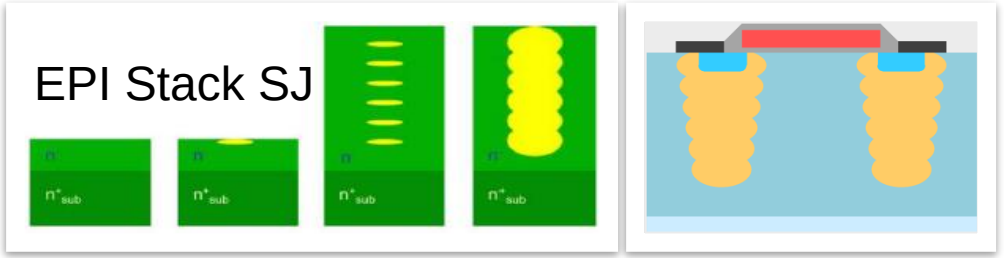
P-channel Planar MOSFET

Part Number	VDS	VGS	Vth min-max	RDS(ON) max. [Ω]	SOT-23	SOT-223	TO-252	TO-263	TO-92	TO-251	TO-220/F
	[V]	[±V]	[V]	10V							
UF01P20	-200	20	-2 - -4	16	•						
UF02P20	-200	20	-2 - -4	10	•						
UF03P20	-200	20	-2 - -4	9	•						
UF07P20	-200	20	-2 - -4	4	•						
7P20	-200	30	-2 - -4	0.69			•				
UF9640	-200	20	-2 - -4	0.5			•	•			•
UF9640Z	-200	20	-2 - -4	0.5							•
1P30	-300	30	-2 - -4	12	•				•		
7P30	-300	30	-2 - -4	1.2			•				•
02P35Z	-350	20	-2 - -4	15	•						
1P40	-400	30	-2 - -4	11.6		•	•				
2P40	-400	30	-2 - -4	6.1		•	•				•
3P40	-400	30	-2 - -4	3.8							•
1P50	-500	30	-2 - -4	14		•	•				
2P50	-500	30	-2 - -4	8.5		•	•	•			
4P50H	-500	30	-2 - -4	5.5			•				
4P50	-500	30	-2 - -4	4.3			•			•	•
7P50	-500	20	-2 - -4	2			•	•			•

SJ N-ch / N-ch Fast-Recovery MOSFET

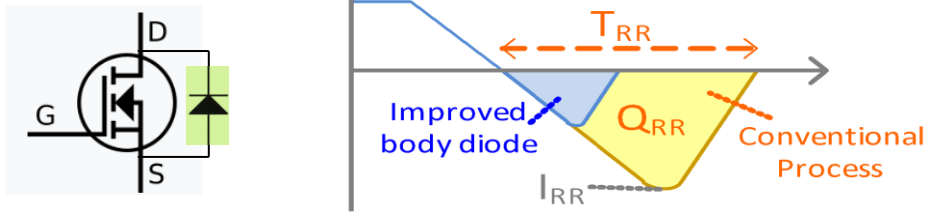
N-ch Super Junction MOSFET

Type: Power MOSFET
VDS: 450 / 500 / 600 / 650 / 700 / 800 / 900 / 950 / 1000 / 1200V
RDS(ON): 19.2 ~ 0.042Ω (max)
Package: SOT-223, PDFN3x3, PDFN5x6, DFN8080-4, TOLL-8A/B, TO-252, TO-251, TO-220/F, TO-247, TO-3P



N-ch Fast Body Diode SJ MOSFET

Type: Power MOSFET
VDS: 500 / 600 / 650 / 700 / 900V
RDS(ON): 0.92 ~ 0.035Ω (max)
Package: DFN8080-4, TOLL-8A/B, TO-252, TO-263, TO-220/F, TO-247



N-ch Super-junction MOSFET

Part Number	VDS	VGS	SOT-23	SOT-89	SOT-223	SOP-8	PDFN3x3	PDFN5x6	DFN8080-4	TOLL-8A/B	TO-252	TO-263	TO-92	TO-251	TO-220/F	TO-247	TO-3P
	[V]	[±V]	RDS(ON) max [Ω] @ 10V														
xxNM45	450	30									0.55 - 1.42						
xxNM50	500	30			0.6 - 12						0.24 - 5	0.28 - 0.4	0.9 - 1.3	0.28 - 1.3	0.09 - 5	0.055 - 0.24	
xxNM60 / USJ60Rxx xxNM65 / USJ65Rxx	600 / 650	20 - 30	8.8 - 17	4.5 - 7	0.75 - 17	2.52		0.43 - 0.95	0.066 - 0.95	0.06 - 0.22	0.21 - 19	0.06 - 0.9	3.8 - 17	0.22 - 4.6	0.06 - 3.1	0.042 - 0.43	0.06 - 0.35
xxNM70	700	20 - 30		7.2 - 19.2	1.2 - 19.2	0.6	3		0.17 - 1.2		0.35 - 4	0.19 - 0.7	3.5 - 19.2	0.35 - 19.2	0.17 - 5.4	0.08 - 0.26	
xxNM80	800	20 - 30			1.5 - 4.3				0.19 - 0.6		0.43 - 3.7	0.19 - 3		0.52 - 4.3	0.19 - 3.7	0.1 - 0.52	
xxNM90 / xxNM95	900 / 950	20 - 30			2.3 - 14			6.1	0.22 - 1.5	0.22 - 1.5	0.72 - 6.1	0.22 - 2.3		1 - 5.3	0.22 - 5.3	0.13 - 1.5	0.22 - 1.5
xxNM100	1000	20 - 30			3.5						0.9 - 4.6	0.6			0.45 - 1.35	0.6	
xxNM100	1200	30									1.7 - 6.2	0.69 - 2.1			0.69 - 6.2	0.69 - 1.9	

■ Naming Rule - 1

U	SJ	F	60	R280	Z

Company
U = UTC

Product Type
SJ = Super Junction MOS

Fast Recovery Diode Type
Blank = without FRD
F = with FRD

Voltage Rating
x10 ex:
60 = 600V
65 = 650V

Rds(on) Value mΩ, ex:
190 = 190mΩ
3K4 = 3.4Ω

ESD Protection Type
Blank = No ESD
Z = with ESD

■ Naming Rule - 2

F	21	NM	65	Z

Fast Recovery Diode Type
Blank = without FRD
F = with FRD

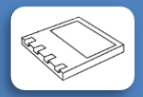
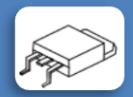
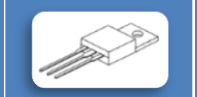
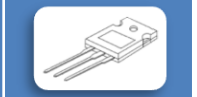
Current Rating ex:
4 = 4A
12 = 12A

Product Type
NM = Super Junction MOSFET

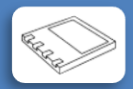
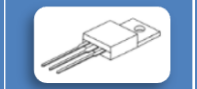
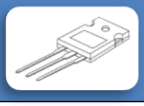
Voltage Rating x10 ex:
60 = 600V
120 = 1200V

ESD Protection Type
Blank = without ESD
Z = with ESD

N-ch SJ MOSFET (Fast-recovery Body Diode)

Part Number	VDS	VGS	Vth min-max	RDS(ON) max. [Ω]	Trr typ.	DFN8080-4	TO-252	TO-263	TO-220/F	TO-247
	[V]	[±V]	[V]	10V	[nS]					
F21NM50	500	30	2.5 - 4.5	0.23	204.5					•
USJF60R580S	600	30	2.5 - 4.5	0.53	< 200		•			
F11NM60	600	30	2.5 - 4.5	0.41	175		•		•	
USJF60R360S	600	30	2.5 - 4.5	0.32	< 200		•			
USJF60R280S	600	30	2.5 - 4.5	0.25	< 200		•			
USJF60R280SZ	600	30	2.5 - 4.5	0.237	< 200		•			
USJF60R190S	600	30	2.5 - 4.5	0.17	< 200		•			
USJF60R190SZ	600	30	2.5 - 4.5	0.163	< 200		•			
F24NM60	600	30	2.5 - 4.5	0.16	290			•	•	•
USJF60R160S	600	30	2.5 - 4.5	0.144	< 200				•	
F30NM60	600	30	2.5 - 4.5	0.13	190	•		•	•	•
USJF60R150S	600	30	2.5 - 4.5	0.13	< 200				•	
USJF60R070S	600	30	2.5 - 4.5	0.06	< 200					•
F75NM60Z	600	30	2.5 - 4.5	0.046	205					•
USJF60R055S	600	30	2.5 - 4.5	0.045	< 200					•
F80NM60Z	600	30	2.5 - 4.5	0.035	397					•

N-ch SJ MOSFET (Fast-recovery Body Diode)

Part Number	VDS	VGS	Vth min-max	RDS(ON) max. [Ω]	Trr typ.	DFN8080-4	TOLL-8A/B	TO-252	TO-263	TO-220/F	TO-247
	[V]	[±V]	[V]	10V	[nS]						
F7NM65	650	30	2.5 - 4.5	0.9	120	•		•			
F9NM65	650	30	2.5 - 4.5	0.58	110			•			
F15NM65-U2	650	30	2.5 - 4.5	0.4	244					•	
F18NM65	650	30	2.5 - 4.5	0.33	172	•			•	•	
F21NM65	650	30	2.5 - 4.5	0.22	170	•				•	
F30NM65	650	30	2.5 - 4.5	0.15	232	•	•		•	•	•
F65NM65	650	30	2.5 - 4.5	0.06	176		•		•	•	•
F75NM65Z	650	30	2.5 - 4.5	0046	205						•
F80NM65Z	650	30	2.5 - 4.5	0.035	397						•
F18NM70	700	30	2.5 - 4.5	0.35	145					•	
F21NM70	700	30	2.5 - 4.5	0.25	123					•	
F11NM90-Q	900	30	2.5 - 4.5	0.92	220			•			
F50NM90-Q	900	30	2.5 - 4.5	0.13	280			•			

N-ch SJ MOSFET (Fast-recovery Body Diode)

Part Number	VDS	VGS	Vth min-max	RDS(ON) max. [Ω]	DFN8080-4	TOLL-8A/B	TO-252	TO-263	TO-220/F	TO-247
	[V]	[±V]	[V]	10V						
USJF65R280SZ*	650	30	2.5 - 4.5	0.28			•	•	•	•
USJF65R190SZ*	650	30	2.5 - 4.5	0.19				•	•	•
USJF65R580S*	650	30	2.5 - 4.5	0.58			•	•	•	•
USJF65R360S*	650	30	2.5 - 4.5	0.36				•	•	•
USJF65R280S*	650	30	2.5 - 4.5	0.28				•	•	•
USJF65R190S*	650	30	2.5 - 4.5	0.19				•	•	•
USJF65R160S*	650	30	2.5 - 4.5	0.16				•	•	•
USJF65R150S*	650	30	2.5 - 4.5	0.15				•	•	•
USJF65R130SZ*	650	30	2.5 - 4.5	0.13	•	•		•		•
USJF65R070SZ*	650	30	2.5 - 4.5	0.07	•	•				•
USJF65R055SZ*	650	30	2.5 - 4.5	0.055	•	•				•
USJF65R105SZ*	650	30	2.5 - 4.5	0.105	•	•			•	•
USJF65R099S*	650	30	2.5 - 4.5	0.099	•	•			•	•

TRR < 200nS "*" : Release in Q3, 2026

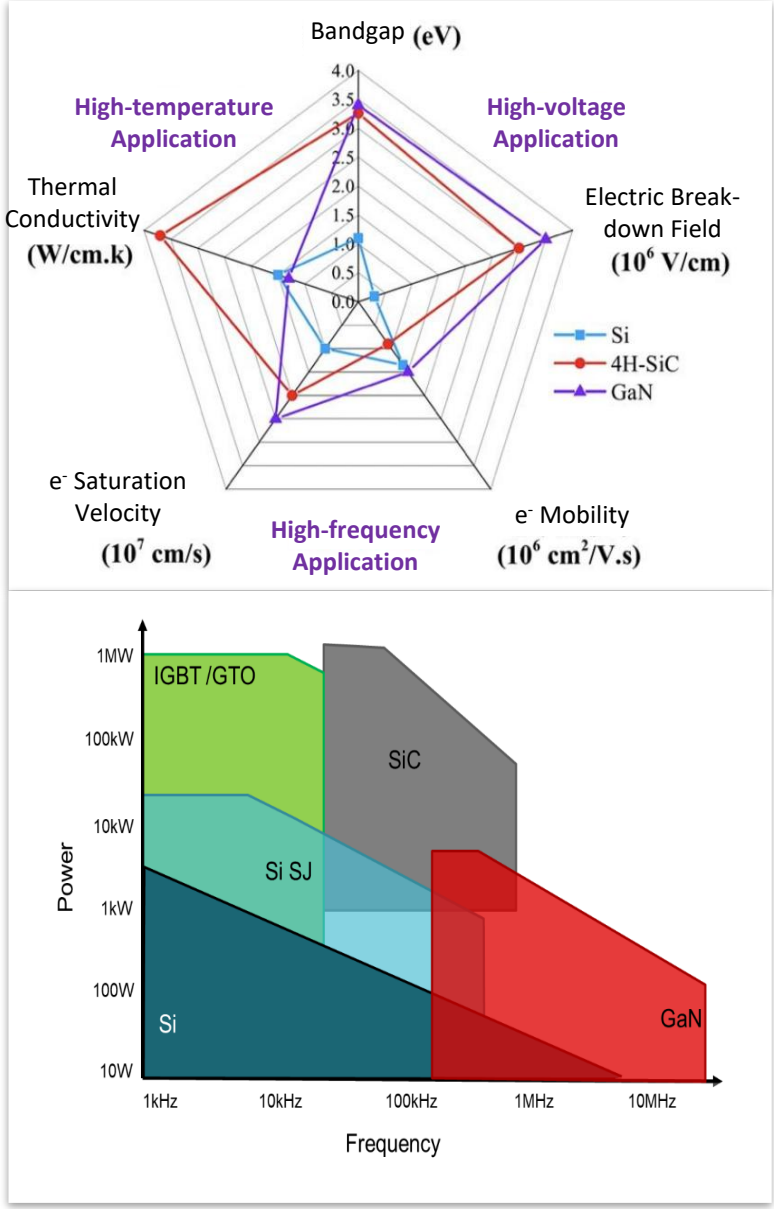
Wide Bandgap Transistor : N-ch SiC/ N-ch GaN FET

N-ch SiC MOSFET

Type: Power MOSFET
VDS: 650 / 750 / 1200 / 1700V
RDS(ON): 0.77 ~ 0.015Ω (max)
Package: PDFN5x6, TO-252, TO-263-7, TO-247-4

N-ch GaN FET

Type: Power MOSFET
VDS: 650 / 700V
RDS(ON): 0.6 ~ 0.065Ω (max)
Package: PDFN5x6, DFN8080-4, DFN8080-8, TOLL-8N, TO-252, TO-220/F



N-ch SiC MOSFET

Part Number	VDS	VGS	VGS (Operate)	ID	RDS(ON) max. [mΩ]		CISS typ.	COSS typ.	CRSS typ.	QG typ.	QGD typ.	Vth min-max	Trr typ.	Qrr typ.	PDFN5x6	TO-252	TO-263-7	TO-247-4
	[V]	[±V]	[±V]	[A]	18V	15V	[pF]	[pF]	[pF]	[nC]	[nC]	[V]	[nS]	[nS]				
USC065R600B	650	-10 / 22	0 / 15	7		600	149	11	0.8	6.7	1.1	3 – 5	7.9	20	•	•		
USC065R440B	650	-10 / 22	0 / 15	10		440	223	21	3.6	9	1.2	3.2 - 5	9.2	25	•	•		
USC065R300B	650	-10 / 22	0 / 15	15.5		300	294	25	4	12.5	1.6	3.2 - 5	9.9	32.6	•	•		
USC065R215B	650	-10 / 22	0 / 15	19.5		215	418	33	4.3	15.3	2.6	3.2 - 5	26	68	•	•		
USC065R053A	650	-8 / 22	-4 / 18	51	71		1301	138	14	68	22	2 - 4	18	104				•
USC065R033A	650	-8 / 22	-4 / 18	72	33		2200	196	12	105	30	2- 4	19	233				•
USC065R023A	650	-8 / 22	-4 / 18	111	31		2162	195	14	100	28	2- 4	22	343				•
USC075R055A	750	-10 / 23	-4 / 18	37	70		1265	81	5	57	23	2 - 3.6	13	86				•
USC075R040A	750	-10 / 23	-4 / 18	53	53		1610	108	6	75	28	2 - 3.6	10	111				•
USC075R025A	750	-10 / 23	-4 / 18	74	33		2535	162	13	112	40	2 - 3.6	15	120				•
USC075R011A	750	-10 / 23	-4 / 18	145	15		4465	335	28	217	83	2 - 3.7	19	390				•

Naming Rule

U	SC	065	R023	A

Company
U = UTC

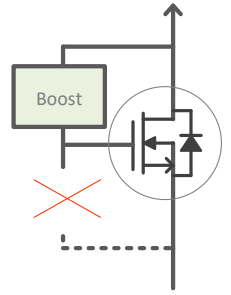
Product Type
SC = SiC MOS

Voltage Rating
x10 ex:
065 = 650V
170 = 1700V

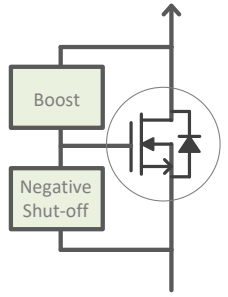
Rds(on) Value
mΩ ex:
015 = 15mΩ
560 = 560mΩ

Characteristic
A = Negative Turn-Off
B = Zero Volt Turn-Off

0V Turn-off SiC FET



Ordinary SiC FET



N-ch SiC MOSFET

Part Number	VDS	VGS	VGS (Operate)	ID	RDS(ON) max. [mΩ]		CISS typ.	COSS typ.	CRSS typ.	QG typ.	QGD typ.	Vth min-max	Trr typ.	Qrr typ.	PDFN5x6	TO-252	TO-263-7	TO-247-4
	[V]	[±V]	[±V]	[A]	18V	15V	[pF]	[pF]	[pF]	[nC]	[nC]	[V]	[nS]	[nS]				
USC120R040A	1200	-10 / 23	-4 / 18	57	53		1950	88	8	93	35	2 - 3.7	13	175				•
USC120R030A	1200	-10 / 23	-4 / 18	64	40		2570	106	9	117	44	2 - 3.7	15	210				•
USC120R020A	1200	-10 / 23	-4 / 18	88	28		3700	158	14	175	63	1.8 - 3.7	18	320				•
USC120R015A	1200	-10 / 23	-4 / 18	126	18		4300	214	19	222	88	2 - 3.7	21	470				•
USC120R014A	1200	-8 / 19	-4 / 15	136	18		6385	255	17	255	96	2 - 3.7	22	530				•
USC170R560A	1700	-8 / 22	-4 / 18	8	770		294	20.5	3.2	20	10	2 - 4	25	39			•	•
USC170R022A	1700	-8 / 22	-4 / 18	123	22		5133	187	8	207	49	2 - 4	16	228				•

N-ch GaN FET

Part Number	VDS	VGS	ID	RDS(ON) max. [mΩ]				CISS typ.	COSS typ.	CRSS typ.	QG typ.	QGD typ.	Vth min-max	PDFN5x6	DFN8080-4	DFN8080-8	TOLL-8N	TO-252	TO-220/F
	[V]	[±V]	[A]	12V	10V	8V	6V	[pF]	[pF]	[pF]	[nC]	[nC]	[V]						
UGN65R360	650	7	4.3	-	-	-	480	59	16	0.9	1.6	0.8	1.4 - 3.2	•		•			
UGN65R350	650	7	6.9	-	-	-	448.5	70	13	1	2	17.2	1.1 - 2	•		•			
UGN65R200	650	7	7.5	-	-	-	260	97.6	25.7	0.8	2.5	0.9	1.4 - 3.2	•		•			
UGN65R150	650	20	14.9	-	178	-	-	825	21.6	3.85	8.6	32.8	1.8 - 3		•				•
UGN65R050	650	20	38	65	-	-	-	519	117	2.7	12	4.7	3 - 5				•		
UGN70R480	700	20	4.1	600	-	600	-	294	8.5	0.8	5.8	2.1	1.1 - 2.5	•				•	
UGN70R320	700	20	5	-	-	400	-	304	11	1	5.8	2.1	1.1 - 2.5	•					
UGN70R240H	700	20	8.8	300	-	-	-	512	15	1	16	4.4	3 - 5					•	
UGN70R240	700	7	9.1	-	-	-	305	88	16.3	1.25	2.5	21.4	1.1 - 2	•					
UGN70R180	700	20	10.4	225	-	-	-	506	22	0.8	15.8	5.5	3 - 5			•			

Naming Rule

U	GN	65	R200

Company
U = UTC

Product Type
GN = GaN MOSFET

Voltage Rating
x10
ex:
65 = 650V
70 = 700V

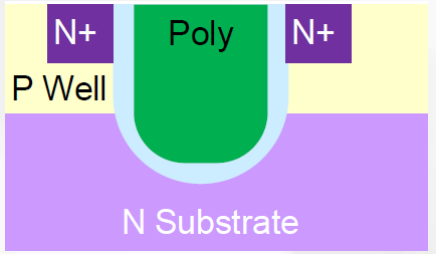
Rds(on) Value
mΩ
ex:
050 = 50mΩ
150 = 150mΩ

Trench MOSFET– N-ch / P-ch / Dual

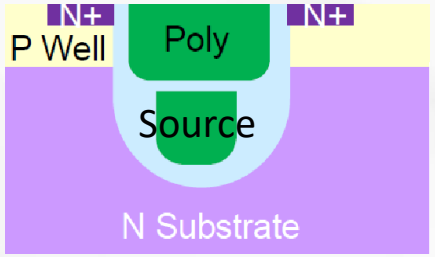
N-ch Trench & SGT MOSFET

Type: Small Signal(SS) / Small Power(SP) / Power MOSFET
VDS: 12 / 15 / 20 / 30 / 40 / 60 / 80 / 100 / 120 / 150V
RDS(ON): 13.5Ω - 1mΩ
Package: SOT-523, SOT-323, SOT-223, DFN3x3, DFN5x6, SOP-8, TO-252, TO-263

N-ch Trench



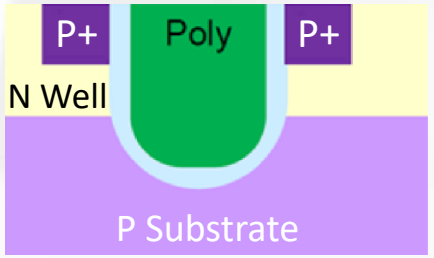
N-ch SGT



P-ch Trench MOSFET

Type: Small Signal(SS) / Small Power(SP) / Power MOSFET
VDS: 12 / 20 / 30 / 40 /50 / 100 / 120 / 150V
RDS(ON): 15.4 Ω - 5mΩ
Package: SOT-523, SOT-323, SOT-23, SOT-26, DFN2x2,DFN3x3,DFN 5x6, SOP-8, TO-252

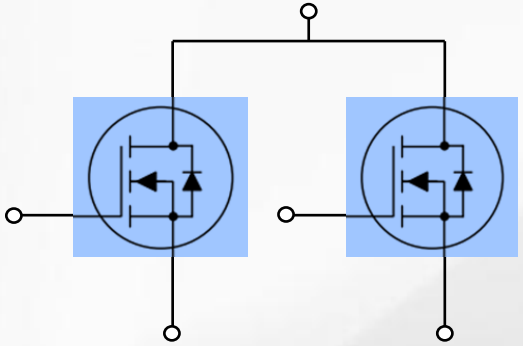
P-ch Trench

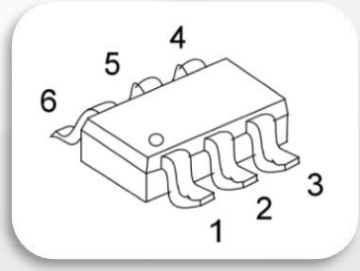


Dual Trench MOSFET

Polarity : N+N, P+P, N+P
VDS: 20 / 30 / 40 / 60 / 80 / 100V
RDS(ON) : 5Ω - 15mΩ
Package: SOT-563, SOT-363, SOT-26, SOP-8, PDFN3x3, PDFN5x6

Dual Die into one package

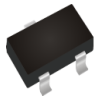
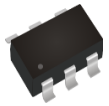
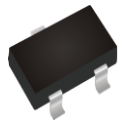
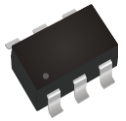




Low/Mid-voltage MOSFET– Package Expansion

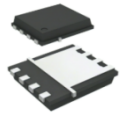
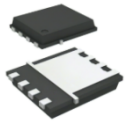
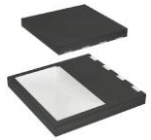
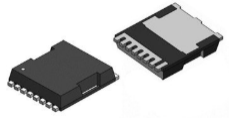
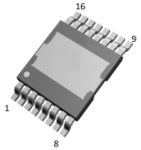
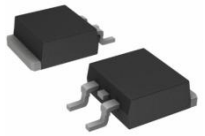
20-60V Trench MOSFET Line Up:

- N-ch. SS MOS RDS(ON)(max) : 4 ~ 1Ω
- P-ch. SS MOS RDS(ON)(max) : 6 ~ 1 Ω
- N.ch. SP MOS RDS(ON)(max) : 400 ~ 25mΩ
- P-ch. SP MOS RDS(ON)(max) : 300 ~ 30mΩ

DFN1006-3	SOT-523	SOT-563	SOT-323	SOT-363	SOT-23	SOT-26
1.0 x 0.6 x 0.5	1.6x 1.6x 0.55	1.6x 1.6 x 0.55	2.0 x 2.1 x 1.0	2.0 x 2.1 x 1.0	2.9 x 2.4 x 1.0	2.9 x 2.8 x 1.4
						

30-60V SGT MOSFET Line Up:

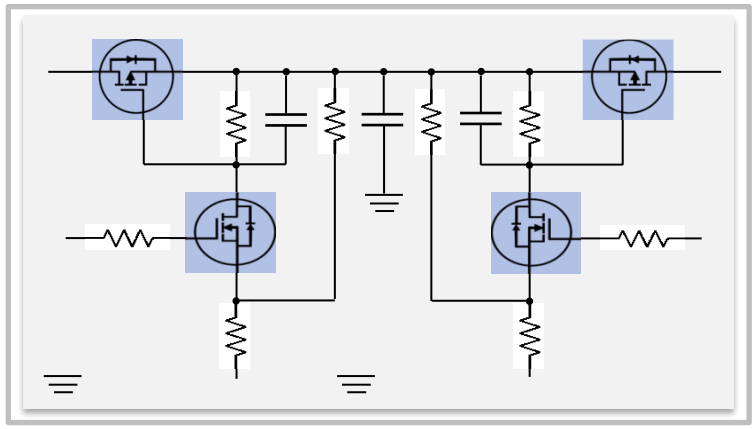
- N-ch. Power MOS RDS(ON)(max) : 20~1mΩ

WDFN2x2-6B	PDFN3x3	PDFN5x6	TO-252	DFN8x8	TOLL	TOLT	TO-263
2 x 2 x0.8	3.3 x 3.3 x0.8	5 x 6 x 1	6.5 x 9.9 x 2.3	8 x 8 x 0.75	9.8 x11.7x2.3	9.9x15x2.3	10.2 x 15 x 4.4
							

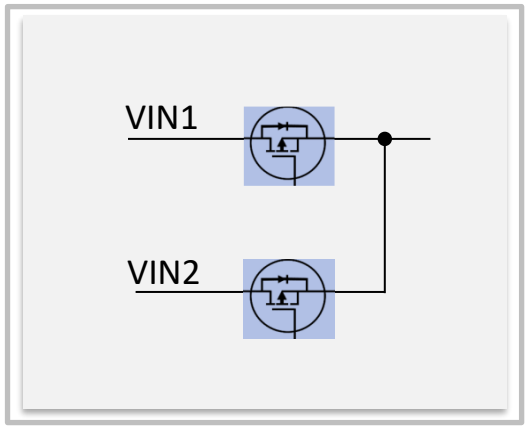
SS: Small Signal ; SP: Small Power

Low/Mid-voltage MOSFET Applications

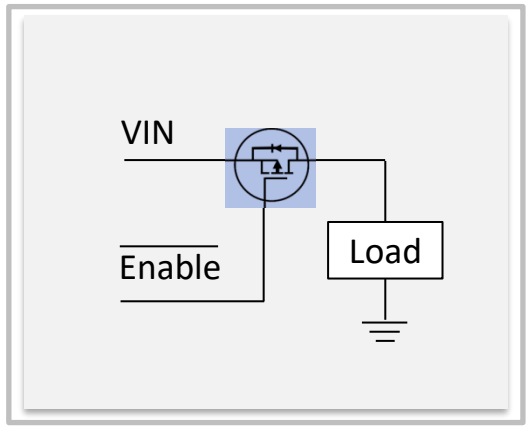
Small Power Switch



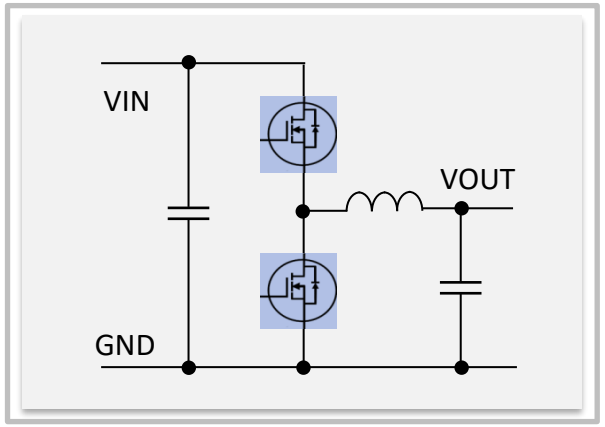
Oring Function



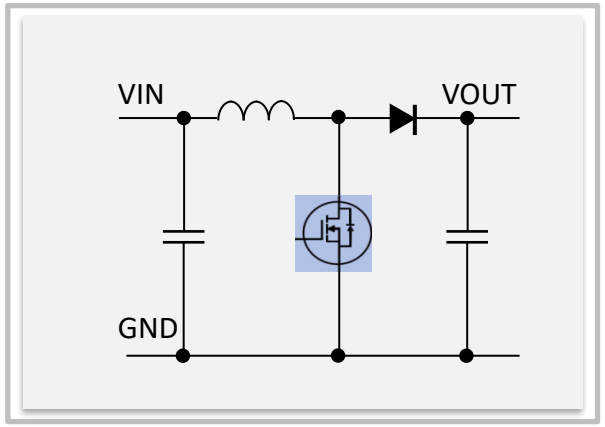
Load Switch



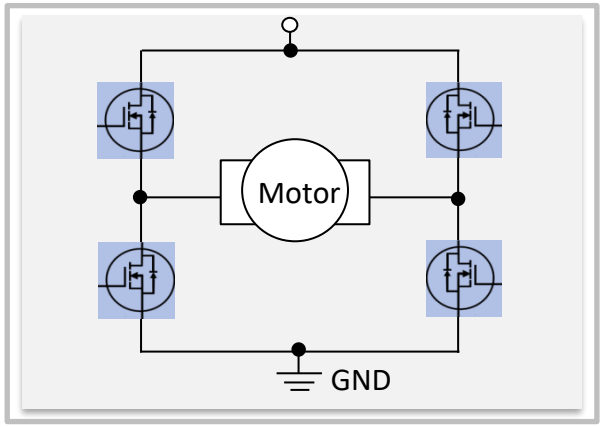
Buck Converter



Boost Converter



Motor



N-ch MOSFET - 1.8 / 2.5 / 3.3V Drive

Part Number	VDS	VGS	SOT-523	SOT-323	SOT-23	SOT-223	DFN2020-6	PDFN3x3	PDFN5x6	SOP-8	TO-252
	[V]	[±V]	RDS(ON) max [mΩ] @ 4.5V								
UF7476	12	12							8	8	
100N02	15	8									7.5
UT / UTTxx	20	8	200 - 312	50 - 312	22 - 312		20	5 - 50	5 - 50	9 - 35	9
UT / UMLxx	20	10/12		140	40 - 140			45 - 80	2 - 80	7.1 - 12	50
UTxx	30	10/12	1800	70 - 1800	33 - 1800		16.5 - 1800	5.3 - 1800	2.2 - 1800	12.5 - 30	30
	40	12							3.3	50 - 112	
UT02N06VZ	60	8	4000	4000	4000						
UT2N10	100	10			380	380					380

N-ch MOSFET - 5/12V Drive

Part Number	VDS	VGS	SOT-523	SOT-323	SOT-23	SOT-89	SOT-223	DFN2020-6	PDFN3x3	PDFN5x6	SOP-8	TO-252	TO-263	TOLL-8A
	[V]	[±V]	RDS(ON) max [mΩ] @ 10V											
UT / UTT / UK / UTMxx	20/25	16/20			40	40		13	3.6 - 90	3.6 - 90		5.6 - 90		
	30	20/25	1500	1500	23 - 1500	26 - 117	65	11.5 - 20	4 - 160	2.8 - 160	4 - 65	3 - 65	2.4 - 25	
	40	20			45 - 100		30 - 33	20	5.3 - 30	3 - 30	4 - 33	3.2 - 33	3 - 7	
BSSxxxx UT / UTTxx	50/55	20		3500	1800 - 3500		38			18 - 40	55	11 - 40	5	
2N7002 BSSxx UT / UTTxxx	60	20/25	4000 - 13500	1800 - 13500	65- 5000	65 - 235	40 - 110	2400 - 4000	12 - 4000	5.9 - 4000	5.9 - 90	5.2 - 140	3.5 - 50	3.5
UT / UTTxx	70/75	20/25								9 - 11	9	9 - 19	3.6 - 11	
	80/85	20/25							35	8.5 - 120	12 - 16.5	8.5 - 120	4 - 14	
	90	20								11.5 - 18.7	13.5 - 18.7	15		
	100/120	16/20			130 - 680	130 - 680	96 - 220		40 - 280	12.5- 280	18 - 140	12.5 - 500	5.5- 44	
	150	20/25					60 - 320		150 - 320	42	42 - 320	42 - 300	17 - 57	
	200/250	20/30					625 - 1050			90 - 330	65	90 - 1050	32 - 70	

Low/Mid-voltage MOSFET Split-gate Trench

Part Number	VDS	VGS	Vth min-max	RDS(ON) max. [mΩ]		PDFN5x6	TO-252	TO-263	TOLL-8A	TO-220
	[V]	[±V]	[V]	10V	4.5V					
USG03R014M	30	20	1 - 3	1.4	2.2	•				
USG04R012M	40	20	1 - 2.5	1.25	2				•	
USG06R030M	60	20	1 - 2.5	3	4.3	•	•			
USG06R029M	60	20	1 - 2.5	2.9	3.8					•
USG06R024M	60	20	1 - 2.5	2.4	3.4					•
USG08R085M	80	20	1 - 2.5	8.5	13		•			
USG08R055M	80	20	1 - 2.5	5.5	7.8		•			
USG08R090H	80	20	2 – 4	9			•			
USG08R060H	80	20	2 - 4	6			•			
USG08R044H	80	20	2 – 4	4.4		•		•		
USG085R035H	85	20	2 - 4	3.5		•		•		
USG085R031H	85	20	2 - 4	3.1						•
USGR028N85	85	20	2 - 4	2.8						•

■ Naming Rule

U	SG	10	R088	M

Company
U = UTC

Product Type
SG = SGT MOSFET

Voltage Rating
x10
ex:
03 = 30V
10 = 100V

Rds(on) Value
mΩ
ex:
012 = 1.2mΩ
100 = 10mΩ

Characteristic
M = Logic level
H = Standard level

Mid-voltage MOSFET Split-gate Trench

Part Number	VDS	VGS	Vth min-max	RDS(ON) max. [mΩ]		PDFN3x3	PDFN5x6	SOP-8	TO-252	TO-263	TOLL-8A	TO-220	TO-247
	[V]	[±V]	[V]	10V	4.5V								
USG40N10	100	20	1 - 2.5	16	28	•	•		•			•	
USG10R145DM	100	20	1 - 2.5	14.5	18		•						
USG10R130M-T	100	20	1.2 - 2.5	13	16	•	•						
USG10R120M	100	20	1 - 2.5	12	17		•		•			•	
USG10R100M	100	20	1 -2.5	10	14		•					•	
USG60N10	100	20	1 – 3	10.5	15		•	•	•	•			
USG10R088M	100	20	1 - 2.5	8.8	11		•		•			•	
USG10R068M	100	20	1 - 2.5	6.8	9		•						
USG10R080M	100	20	1 - 2.5	8	10		•		•			•	
USG80N10	100	20	1 - 2.5	8	12		•	•	•			•	
USG10R072M	100	20	1 - 2.5	7.2	9.5		•		•	•		•	
USG10R052M	100	20	1 - 2.5	5.2	7.3		•						
USG135N10	100	20	1 – 3	5	7.2		•		•	•		•	
USG10R050M	100	20	1 - 2.5	5	6					•		•	•
USG10R044M	100	20	1 - 2.5	4.4	5.9		•		•				•
USGR026N10	100	20	1 - 2.5	3.6	4.6								•

Mid-voltage MOSFET Split-gate Trench

Part Number	VDS	VGS	Vth min-max	RDS(ON) max. [mΩ]	SOT-23	DFN2020	PDFN3x3	PDFN5x6	SOP-8	TO-252	TO-263	TOLL-8A	TOLL-8B	TO-220	TO-247
	[V]	[±V]	[V]	10V											
USG10R800H	100	20	2 – 4	80	•		•	•							
USG10R555H / USG10R550H	100	20	2 – 4	55		•	•								
USG10R415H	100	20	2 – 4	42			•							•	
USG10R230H	100	20	2 – 4	23			•	•						•	
USG10R160H	100	20	2 – 4	16			•	•							
USG10R135H	100	20	2 - 4	13.5			•								
USG10R072H	100	20	2 - 4	8				•		•				•	
USG10R068H	100	20	2 – 4	6.8				•			•			•	
USG10R060H	100	20	2 - 4	6				•		•				•	
USG135N10	100	20	2 – 4	5.5				•		•	•			•	
USG10R050M-T	100	20	2 – 4	5				•						•	
USG10R044H	100	20	2 – 4	4.4				•		•	•			•	
USG10R035H / USG170N10	100	20	2 -4	3.5							•			•	
USG10R033H	100	20	2 – 4	3.3										•	
USG10R030H / USG10R029H	100	20	2 – 4	3							•	•		•	
USGR026N10	100	20	2 - 4	2.6							•	•	•	•	•

P-ch MOSFET-1.8 / 2.5 / 3.3V Drive

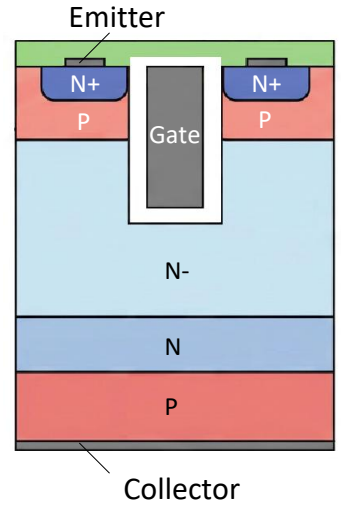
Part Number	VDS	VGS	SOT-523	SOT-323	SOT-23	SOT-26	DFN2020	PDFN3x3	PDFN5x6	SOP-8	TO-252
	[V]	[±V]	RDS(ON) max [mΩ] @ 4.5V								
UT / UTT Series	-12	8			58				5	5	
	-20	10	500 - 1200		40 - 500		103	16 - 40		16	
	-20	12		98 - 800	55 - 600	65 - 170	65 - 600	55 - 600	55 - 600		150
	-20 ~ -30	8	500	130 – 500	2.6 - 500	23 - 65	23 - 85	8.5 - 130	15 - 130	8.5 - 15	
	-30	10	15400	15400	15400		15400	15400	15400		
	-30	12		200	57 - 200	57 - 65	180 - 200	45 - 200	57 - 200	57 - 65	

Part Number	VDS	VGS	SOT-323	SOT-23	SOT-26	DFN2020	PDFN3x3	PDFN5x6	SOP-8	TO-252	TO-220/F
	[V]	[±V]	RDS(ON) max [mΩ] @ 10V								
BSS84x UP/ UT/ UTT Series	-25	20						20		20	
	-30 ~ -35	20	130	42 - 2100	45 - 75	50 - 200	12 - 200	3.7 - 200	7 - 55	6 - 55	4.5 - 7
	-30 ~ -40	25		180			20 - 180	20 - 180	11 - 28	28	
	-40	20		45 - 110	110		16 - 82	5.2 - 55	15 - 64	9 - 64	11 - 20
	-50 ~ -55	20		6000		6000	6000	6000		33 - 58	58
	-60	15						75		75	75
	-60	20		100 - 4000	100 - 160	175	35 - 175	14 - 175	30 - 120	14 - 230	6.5 - 70
	-60	25								48 - 75	48 - 75
	-100	20						98 - 200			25 - 200
	-100	25								95 - 260	95 - 260
	-120 ~ -150	20								110 - 250	110 - 250

IGBT– Trench-type / Planar-type

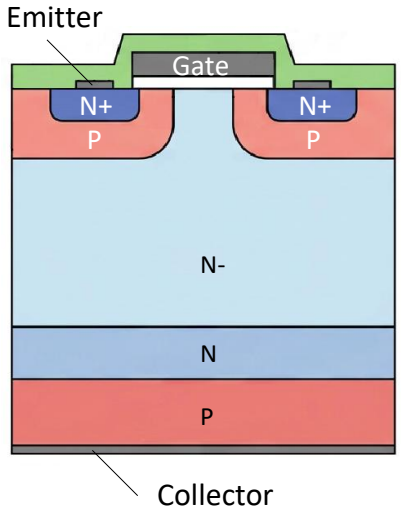
Trench IGBT

Type: Trench
VCES: 650 / 1200 / 1350V
IC: 4 ~ 80A (Tc = 100 ℃)
VCE(SAT): 1.9 ~ 2.6V (max)
Package: TOLL-8A/B, TOLT-16A, TO-252, TO-263, TO-220/F, TO-247, TO-264, TO-3P



Planar IGBT

Type: Planar
VCES: 330 / 600 / 650 /1200V
IC: 5 ~ 155A (Tc = 100 ℃)
VCE(SAT): 1.9 ~ 2.8V (max)
Package : TO-252, TO-263, TO-251, TO-220/F, TO-247, TO-264, TO-3P



IGBT

Type	Part Number	BVCES	VGES	IC (TC=100℃)	IF (TC=100℃)	VCE(SAT) max.	VGE(th) min-max	QG typ.	tR typ.	tF typ.	tSC Max.	TO-252	TO-263	TO-220/F	TO-247
		[V]	[±V]	[A]	[A]	[V]	[V]	[nC]	[uS]	[uS]	[uS]				
Trench IGBT	UTG4N65-S	650	20	4	4	2.1	4 - 6.5	41.2	0.019	0.29	3	•			
	UTG5N65-S	650	20	5	5	2.1	4 - 6.5	45.4	0.022	0.22	3	•		•	
	UTG6N65-S	650	20	6	6	2.1	4 - 6.5	49.4	0.019	0.29	3	•	•	•	
	UTG7N65-S	650	20	7	7	2	4 - 6.5	49	0.013	0.091	3	•		•	
	UTG7N65Q-S	650	20	7	7	2.1	3 - 6.5	38.3	0.0114	0.209	3	•		•	
	UTG8N65-S	650	20	8	8	2.1	4 - 6.5	54.4	0.011	0.206	3			•	
	UTG10N65LLS1	650	20	10	10	2.1	4.5 - 7.5	40	0.018	0.188	8			•	•
	UTG10N65LLS2	650	20	10	10	2.1	3.5 - 6.5	42	0.015	0.203	8		•	•	•
	UTG10N65LSS1	650	20	10	10	2.1	3.5 - 7	42.6	0.013	0.2	3	•	•	•	
	UTG10N65LSS2	650	20	10	10	2.1	3.5 - 7	41	0.013	0.103	3			•	
	UTG10N65-S	650	20	10	10	2.1	4.5 - 7.5	42.6	0.013	0.146	3	•	•	•	•

■ Naming Rule

U	TG	40	N	65	L	N	H	1

Company
U = UTC

Product Type
T = Trench Field Stop IGBT
P = Planar IGBT

Current Rating
ex:
10 = 10A
40 = 40A

Channel Type
N = N ch.

Voltage Rating
x10
ex:
65 = 650V
135 = 1350V

Frequency Type
L = Low Frequency
H = High Frequency

Characteristic
R = RC IGBT
X = Single IGBT
C = SiC SBD
M = trr > 100nS
N = trr = 50 - 80nS
U = trr = 35 - 50nS

Diode Rated Current Type
D = Full Current Diode
H = Half Current Diode

Internal Control Code
ex: 1 , 2 , 3...

IGBT

Type	Part Number	BVCES	VGES	IC (TC=100℃)	IF (TC=100℃)	VCE(SAT) max.	VGE(th) min-max	QG typ.	tR typ.	tF typ.	tSC Max.	TOLT-16A	TO-263	TO-220/F	TO-247	TO-3P
		[V]	[±V]	[A]	[A]	[V]	[V]	[nC]	[uS]	[uS]	[uS]					
Trench IGBT	UTG7N65ND-S	650	20	14	x	2.1	3 - 6.5	39	0.012	0.209	-			•		
	UTG30N65LNS1	650	20	15	15	2.4	4 - 7.5	54	0.024	0.174	-			•	•	
	UTG15N65LLD1	650	20	15	7.5	2.2	3.5 - 6.5	46	0.019	0.135	8			•		
	UTG16N65LLS1	650	20	16	16	2.1	4 - 7	47.5	0.018	0.188	8	•	•	•	•	
	UTG16N65-S	650	20	16	16	2.1	4.5 - 6.5	47.5	0.0166	0.1801	3		•	•	•	
	UTG16N65LSS1	650	20	16	16	2.3	4 - 7	47.5	0.017	0.141	3		•	•	•	
	UTG20N65-S	650	20	20	20	2.1	4.6 - 6.5	53.5	0.0176	0.124	8		•	•	•	
	UTG25N65LLS1	650	20	25	25	2.2	4 - 7	66	0.028	0.0179	8		•	•	•	•
	UTG28N65-S	650	20	28	28	2.1	2.5 - 6.5	87.3	0.019	0.0762	3			•	•	
	UTG30N65-S	650	20	30	30	2.1	5 - 7	89.3	0.0257	0.1181	8		•	•	•	•
	UTG40N65LLS2	650	20	40	40	2.3	4 - 7	83	0.024	0.191	8				•	
	UTG40N65LLS3	650	20	40	40	2.2	4 - 7	123	0.037	0.064	8		•		•	•
	UTG40N65LLS4	650	20	40	40	2.2	4 - 7	121	0.04	0.131	8				•	
	UTG40N65LSS1	650	20	40	40	2.2	3.5 - 6.5	108	0.037	0.18	3				•	•
	UTG40N65LSS2	650	20	40	40	1.9	4 - 6	78	0.055	0.051	3				•	
	UTG40N65LSS3	650	20	40	40	2.2	3.5 - 6.5	114	0.037	0.123	3				•	•
	UTG40N65HSS1	650	20	40	40	2.2	3.5 - 6.5	108	0.035	0.062	3				•	•

IGBT

Type	Part Number	BVCES	VGES	IC (TC=100℃)	IF (TC=100℃)	VCE(SAT) max.	VGE(th) min-max	QG typ.	tR typ.	tF typ.	tSC Max.	TO-263	TO-220/F	TO-247	TO-3P
		[V]	[±V]	[A]	[A]	[V]	[V]	[nC]	[uS]	[uS]	[uS]				
Trench IGBT	UTG40N65-S	650	20	40	40	2.1	2.5 - 6.5	134.7	0.0271	0.0612	3	•	•	•	•
	UTG40N65FQ-S	650	20	40	20	2.1	4.5 - 7.5	119	0.077	0.063	10			•	
	UTG40N65WAFQ	650	20	40	20	2.1	4.5 - 7.5	121	0.04	0.131	10			•	
	UTG40N65SQ	650	30	40	20	2.1	4.5 - 6.5	79	0.041	0.117	5		•	•	•
	UTG40N65HLX1	650	20	40	x	2.1	3.5 - 6.5	94	0.033	0.046	8			•	
	UTG60N65HLS1	650	20	60	60	2.2	3.5 - 6.5	157	0.065	0.033	8			•	
	UTG60N65HLS2	650	20	60	60	2.3	3.5 - 6.5	161	0.060	0.034	8				•
	UTG60N65LLD1	650	20	60	60	2.1	3.5 - 6.5	221	0.052	0.12	8			•	
	UTG60N65LSS1	650	20	60	60	2.3	3.5 - 6.5	111	0.067	0.066	3			•	•
	UTG60N65	650	20	60	60	2.1	4.5 - 6.5	152	0.062	0.116	3			•	
	UTG60N65WBFQ	650	20	60	36	2.1	4.5 - 7.5	221	0.052	0.12	10			•	
	UTG60N65FQ-S	650	20	60	30	2.2	4.5 - 7.5	110	0.07	0.052	8			•	•
	UTG60N65HLD1	650	20	60	30	2.3	4.5 - 7	124	0.04	0.046	8			•	
	UTG70N65HLS1	650	20	70	70	2.3	3.5 - 6.5	135	0.039	0.066	8			•	
	UTG70N65-S	650	20	70	70	2.1	4.5 - 6.5	125.7	0.075	0.055	3		•	•	
	UTG70N65FQ-S	650	20	70	42	2.1	4.5 - 7.5	152	0.103	0.052	5			•	
	UTG75N65LLS1	650	20	75	75	2.1	4 - 7	175	0.103	0.112	8			•	

IGBT

Type	Part Number	BVCES	VGES	IC (TC=100℃)	IF (TC=100℃)	VCE(SAT) max.	VGE(th) min-max	QG typ.	tR typ.	tF typ.	tSC Max.	TOLL-8A/B	TO-263	TO-220/F	TO-247
		[V]	[±V]	[A]	[A]	[V]	[V]	[nC]	[uS]	[uS]	[uS]				
Trench IGBT	UTG75N65-S	650	20	75	75	2.1	4.5 - 6.5	180	0.1	0.065	3				•
	UTG75N65ND-S	650	20	75	x	2.1	4.5 - 6.5	194.5	0.022	0.174	3				•
	UTG80N65-S	650	20	80	80	2.1	4 - 6.5	199.5	0.0762	0.0544	10				•
	UTG80N65LLS1	650	20	80	80	1.9	4 - 6.5	233.7	0.0825	0.0499	8				•
	UTG80N65LLS2	650	20	80	80	2.6	4 - 6.5	488	0.051	0.11	8				•
	UTG80N65ND-S	650	20	80	x	2.1	4.5 - 6.5	221	0.089	0.05	10				•
	UTG10N120LSS2	1200	20	10	10	2.2	4.5 - 7.5	54	0.015	0.295	3		•		•
	UTG12N120LLS1	1200	20	12	12	2.2	4 - 7	74	0.015	0.299	8			•	
	UTG12N120-S	1200	20	12	12	2.1	2.5 - 5	99	0.02	0.226	8			•	•
	UTG12N120HSS1	1200	20	12	12	2.2	4 - 7	62	0.014	0.293	3			•	
	UTG15N120-H	1200	20	15	15	2.3	4.5 - 7.5	139	0.0239	0.2126	10				•
	UTG15N120LLS1	1200	20	15	15	2.1	4 - 7	75	0.082	0.286	8				•
	UTG15N120LNS1	1200	20	15	15	2.3	4 - 7.5	63	0.021	0.275	-				•
	UTG25N120-G2	1200	20	25	25	2.1	4.5 - 7.5	121.7	0.0284	0.222	10	•	•		•
	UTG25N120-H	1200	20	25	25	2	4 - 6.5	267	0.049	0.258	10				•
	UTG25N120LLS1	1200	20	25	25	2.3	4 - 7	96	0.025	0.265	8				•

IGBT

Type	Part Number	BVCES	VGES	IC (TC=100℃)	IF (TC=100℃)	VCE(SAT) max.	VGE(th) min-max	QG typ.	tR typ.	tF typ.	tSC Max.	TO-263	TO-220/F	TO-247	TO-264	TO-3P
		[V]	[±V]	[A]	[A]	[V]	[V]	[nC]	[uS]	[uS]	[uS]					
Trench IGBT	UTG25N120LLS2	1200	20	25	25	2.1	4 - 7	149	0.022	0.218	8			•		
	UTG25N120LSS1	1200	20	25	25	2.5	4 - 7	123	0.023	0.224	3			•		
	UTG25N120LSS2	1200	20	25	25	2.2	3.5 - 6.5	120	0.025	0.269	3			•		
	UTG25N135LNS2	1200	20	25	25	2.3	3.5 - 6.5	140	0.03	0.071	-		•	•		
	UTG25N120	1200	20	25	25	2.5	3.5 - 7.5	200	0.06	0.154	-		•	•		•
	UTG30N120-G2	1200	20	30	30	2.1	4.5 - 7.5	138.3	0.023	0.217	10	•	•	•		•
	UTG40N120	1200	20	40	40	2.1	5 - 7.5	415	0.107	0.163	10			•		
	UTG40N120LLS1	1200	20	40	40	2	4.5 - 7.5	132	0.035	0.16	8			•		
	UTG40N120WT	1200	20	40	40	2.3	4.5 - 7.5	152.4	0.0424	0.254	5			•		
	UTG40N120FQ-S	1200	20	40	24	2.2	4.5 - 7.5	107.7	0.0346	0.2461	10			•	•	•
	UTG50N120-S	1200	20	50	50	2.1	4.5 - 6.5	326	0.0309	0.206	10			•		
	UTG50N120-G2	1200	20	50	50	2.1	4.5 - 7.5	213.6	0.024	0.213	10			•		
	UTG50N120FQ-G2	1200	20	50	30	2.3	4.5 - 6.5	198	0.0349	0.2167	10			•		
	UTG50N120LND1	1200	20	50	30	2.5	4.5 - 7.5	135.1	0.0616	0.2465	-			•		
	UTG50N120FQ-S	1200	20	50	30	2.5	4.5 - 7.5	135.1	0.0616	0.2465	-			•		
	UTG50N120ND-S	1200	20	50	x	2.1	4.5 - 6.5	-	0.1	0.181	10			•		
	UTG60N120-G2	1200	20	60	60	2	4.5 - 7.5	282	0.031	0.179	5			•		

IGBT

Type	Part Number	BVCES	VGES	IC (TC=100℃)	IF (TC=100℃)	VCE(SAT) max.	VGE(th) min-max	QG typ.	tR typ.	tF typ.	tSC Max.	TO-220/F	TO-247	TO-3P
		[V]	[±V]	[A]	[A]	[V]	[V]	[nC]	[uS]	[uS]	[uS]			
Trench IGBT	UTG60N120FQ-G2	1200	20	60	36	2.2	4.5 - 6.5	282	0.0419	0.2457	5		•	
	UTG75N120LLS1	1200	20	75	75	2.3	4.5 - 7.5	27.3	0.0773	0.235	8		•	
	UTG75N120-G2	1200	20	75	75	2.1	4.5 - 7.5	282	0.041	0.182	5		•	
	UTG80N120-S	1200	20	80	80	2.2	2.5 - 6.5	312	0.0725	0.221	10		•	
	UTG15N135LNS1	1350	20	15	15	2.4	3.5 - 6.5	98	0.023	0.21	-		•	•
	UTG30N135LNS1	1350	20	15	15	2.3	4 - 7.5	126	0.034	0.238	-		•	
	UTG25N135LLS1	1350	20	25	25	2.5	4 - 7	117	0.015	0.077	8	•	•	
	UTG25N135LNS1	1350	20	25	25	2.6	4.5 - 6.5	109	0.033	0.196	-	•	•	•
	UTG30N135-G2	1350	20	30	30	2.1	4.5 - 7.5	142	0.0232	0.271	10		•	
	UTG30N135FQ-S	1350	20	30	18	2.1	4.5 - 7.5	132	0.0322	0.213	-		•	•
	UTG30N135ND-S	1350	20	30	x	2.1	4.5 - 6.5	-	0.0301	0.257	10		•	•
	UTG40N135LSS1	1350	20	40	40	2.3	4 - 7	148	0.039	0.211	3		•	
Planar IGBT	UPGE80N33W	330	20	80	40	2.3	4.5 - 7.5	92	0.057	0.474	10		•	
	UPGE85N33	330	30	85	42.5	1.9	3.5 - 6	89	0.1	0.525	-		•	•
	UPGE120N33LNK1	330	20	120	120	2.3	2.5 - 6.5	110	0.1	0.5	-		•	
	UPGE145N33LNK1	330	20	145	145	2.3	2.5 - 6.5	151	0.079	0.689	-		•	
	UPGE155N33	330	20	155	35	2.2	2.5 - 5.5	164	0.113	1.032	-		•	

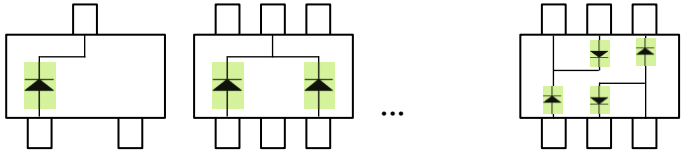
IGBT

Type	Part Number	BVCES	VGES	IC (TC=100℃)	IF (TC=100℃)	VCE(SAT) max.	VGE(th) min-max	QG typ.	tR typ.	tF typ.	tSC Max.	TO-252	TO-263	TO-251	TO-220/F	TO-247	TO-264	TO-3P
		[V]	[±V]	[A]	[A]	[V]	[V]	[nC]	[uS]	[uS]	[uS]							
Planar IGBT	UPG9N60	600	20	9	4.5	2.6	4 - 6	35	0.019	0.051	-				•			
	UPG10N60	600	20	10	-	2.3	4 - 6.5	53.1	0.0133	0.0844	5				•			
	UPG5N65	650	20	5	-	2.3	4.5 - 6.5	36.6	0.0113	0.1725	10	•		•	•			
	UPGE5N65FQ	650	20	5	3	2.1	4.5 - 7.5	28.8	0.022	0.218	10	•						
	UPG6N65	650	20	6	-	2.3	2 - 4	51.4	0.0136	0.1015	5				•			
	UPG7N65	650	20	7	-	2.3	2 - 4	54	0.0136	0.1063	5				•			
	UPG9N65	650	20	9	4.5	2.4	4 - 6	28	0.017	0.06	-				•			
	UPG5N120	1200	20	5	-	2.25	4- 6	45	0.12	0.068	-					•		
	UG5N120	1200	20	10	-	2.7	6	53	0.36	0.12	8				•	•		•
	UPG15N120	1200	20	15	-	2.4	4 - 6	95	0.155	0.085	-					•		
	UPG11N120ND	1200	20	17	x	2.4	4.5 - 7.5	78	0.017	0.266	-		•			•		
	UPG20N120	1200	20	20	-	2.6	4 - 6	105	0.19	0.081	-					•		•
	UG11N120	1200	20	22	-	2.4	5	100	0.012	0.19	8					•		
	UPG25N120	1200	20	25	-	2.8	4 - 6.5	126	0.027	0.075	-					•		•
	UPG30N120	1200	20	30	-	2.8	4.5 - 6.5	96	0.145	0.067	-					•		
	UPG40N120	1200	20	40	-	2.7	4.5 - 6.5	169	0.151	0.13	-					•		
	UPG50N120	1200	25	50	-	2.6	3.5 - 7.5	230	0.037	0.134	-						•	

Diode – Small-signal / Schottky / Fast-recovery

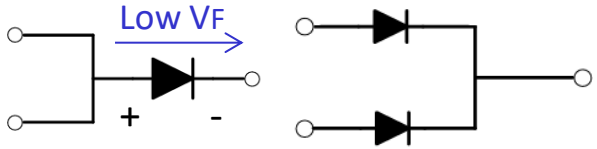
Small-signal switching diode

- VRM: 30 ~ 250V
- Fast Switch
- Mini Package Available
- Multiple Configuration



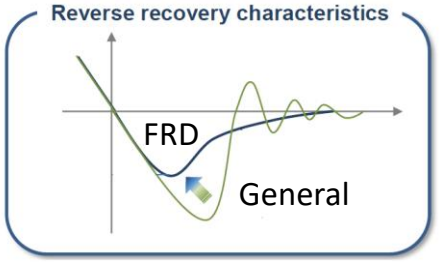
Schottky diode

- VRM: 20 ~ 300V
- IF: 0.5 ~ 60A
- Low Forward Voltage
- Single / Dual Available

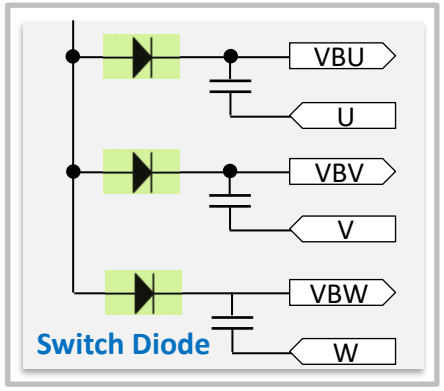


Fast recovery rectifier

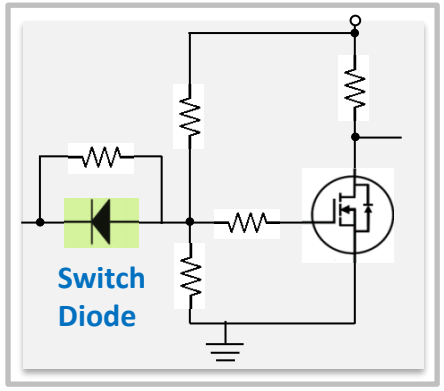
- VRM: 50 ~ 1200V
- IF: 1 ~ 140A
- Fast version: 150nS
- Super Fast: 35nS



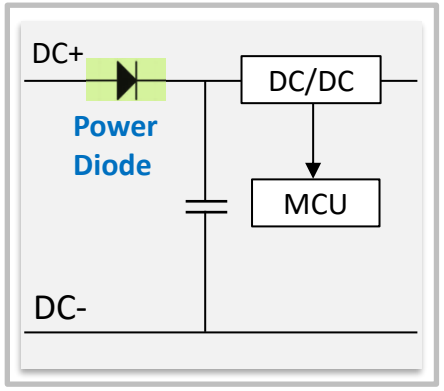
Boost Circuit



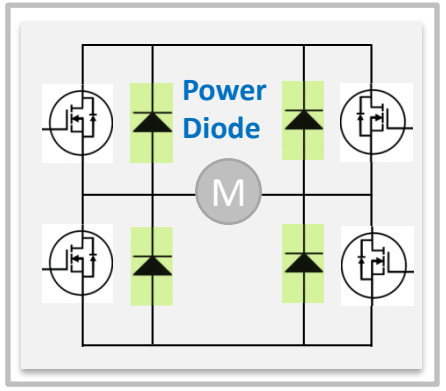
PWM Signal



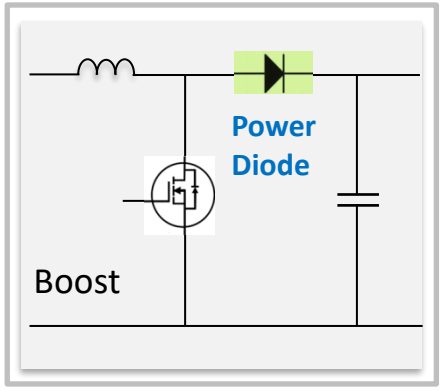
Polarity Protection



Freewheeling Diode



Boost Converter



Small Signal Switching Diode

■ Single Diode

VRRM [V]	Part Number	SOT-23	SOT-323	SOT-523	SOD-123	SOD-323	SOD-523	DFN0603	DFN1006
250	BAS21	•			•	•			
200	BAV20W				•	•			
100	1N4148	•	•		•	•	•		•
	BAS316					•	•		
	BAS16	•			•	•			
	MMBD4148	•	•	•	•	•			
90	1SS355					•			
	1SS400						•		
70	BAS70	•	•						
40	SD103AW				•	•	•		
	BAT165WS					•			
	BAS40	•							
	RB520S40						•		
	RB751V40					•	•		
	RB501-V40					•			
30	BAT42VS				•				
	SD106WS				•	•			
	RB520S30						•		
	RB521S30						•		
	BAT54	•	•	•	•	•	•		•
	SR0130							•	

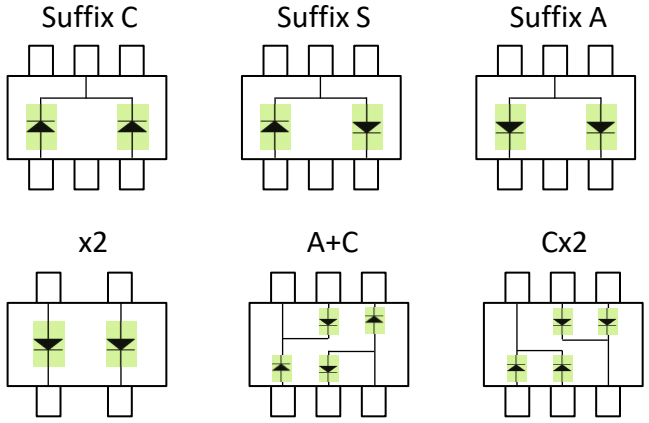
■ Dual Diode

VRRM [V]	Part Number	SOT-23	SOT-323	SOT-523
250	BAV23C	C		
	BAV23S	S		
	BAV23A	A		
100	BAV70C	C	C	C
	MMBD4148CC	C		
	BAV99	S	S	S
	BAS299	S		
	MMBD7000	S		
	MMBD4148SE	S		
	BAW56	A	A	
	MMBD4148CA	A		
85	1SS184	C		
	BAV199 (low IR)	S	S	
70	MMBD6100	C		
	BAS70C	C	C	
	BAS70S	S	S	
	BAS70A	A	A	
40	BAT721C	C		
	BAT64A	A		
	BAT721A	A		
30	BAT54C	C	C	C
	BAT54S	S	S	S
	BAT54A	A	A	A

■ Multi- Diode

VRRM [V]	Part Number	SOT-363	SOT-143
100	BAS70		x2
	BAV99	S x 2	
	BAV70S	C x 2	
90	BAV756S	A + C	
80	UMR11N	A + C	
30	BAT74		x2
	BAT54DW	X2	
	BAT54TDW	X3	
	BAT54CDW	C x 2	
	BAT54ADW	A x 2	
	BAT54SDW	S x 2	

Dual & Multi Diode Configuration：



Schottky Diode – Single

Part Number	VRRM [V]	IF [A]	VF [V]	SOD-323	SOD-123	SMA	SMB	SMC	TO-277	PDFN5x6
B5817W / SB120	20	1	0.5	•	•	•				
SR22	20	2	0.5			•	•			
MBR0530	30	0.5	0.43	•	•					
SB130	30	1	0.5-0.62	•	•	•				
SR23	30	2	0.5			•	•			
SB330	30	3	0.5			•	•	•		
MGBR5V30	30	5	0.48				•			
MGBR10x30	30	10	0.43-0.55						•	
MGBR12L30	30	12	0.54						•	
MGBR15x30	30	15	0.49-0.54						•	
MBR0540 TGBR05S40	40	0.5	0.49- 0.51	•	•					
B5819WS / SB140 SS14 / MBR140	40	1	0.5-0.7	•	•	•				
TGBR2S40 /MGBR2U40 SK24 / MBR240	40	2	0.43-0.52		•	•	•	•		
SK34 / MBR340 / SB3U40 / SB340	40	3	0.48-0.6		•	•	•	•		
SK44	40	4	0.45					•		

Part Number	VRRM [V]	IF [A]	VF [V]	SMA	SMB	SMC	TO-277	PDFN5x6
TGBR5U40 MGBR5x40 SK54、MBR540	40	5	0.43-0.58	•	•	•	•	•
MBR840	40	8	0.7		•			
MGBR10x40	40	10	0.47-0.57				•	
MGBR12L40 MGBR15x40	40	12-15	0.57				•	
MGBR20L40	40	20	0.59				•	

■ Naming Rule - Low VF Schottky

TGBR	30	S	100	C

Product Type
- **MGBR** = MOS Schottky
- **TGBR** = Trench MOS Schottky

Current Rating
ex:
- **5** = 5A
- **30** = 30A

Characteristic
- **L** = Low Leakage
- **V** = Very Low VF
- **S** = Super Low VF
- **U** = Ultra Low VF

Voltage Rating
ex:
- **60** = 60V
- **100** = 100V

Configuration
- **Black** = Single Diode
- **C** = Dual Diode

Schottky Diode – Single

Part Number	VRRM	IF	VF	SOD-323	SMA	SMB	SMC	TO-277	TO-252	TO-263
	[V]	[A]	[V]							
MBR145	45	1	0.7	•						
MBR245 MGBR2V45	45	2	0.5-0.7		•					
TGBR5x45 MGBR5x45	45	5	0.43-0.7		•	•	•	•	•	
TGBR10x45 MGBR10x45	45	10	0.47-0.84					•	•	•
MGBR12L45	45	12	0.6					•		
TGBR15x45	45	15	0.5-0.6					•	•	•
TGBR20x45	45	20	0.52-0.55						•	•
MBR3045 TGBR30x45	45	30	0.5-0.7							•
SR25	50	2	0.65		•	•				
TGBR5x50 MGBR5x50	50	5	0.5-0.56						•	

Part Number	VRRM	IF	VF	SOD-323	SOD-123	SMA	SMB	SMC	TO-277	PDFN3x3	PDFN5x6	TO-252	TO-263
	[V]	[A]	[V]										
TGBR10x50 MGBR10x50	50	10	0.45-0.6						•			•	
MGBR15x50	50	15	0.45-0.61						•		•		
MGBR20x50	50	20	0.48-0.63						•		•	•	
TGBR30x50	50	30	0.56-0.6										•
MBR0560	60	0.5	0.7		•								
MRB160M-60 MBR160	60	1	0.67-0.74	•	•	•							
SK26、MBR260	60	2	0.65-0.74			•	•						
SK36、MBR360	60	3	0.74-0.75			•		•				•	
SB460 MGBR4L60	60	4	0.52-0.67			•	•	•		•			
SK56、MBR560 TGBR5x60	60	5	0.48-0.75				•	•				•	

Schottky Diode – Single

Part Number	VRRM	IF	VF	SMC	TO-277	PDFN3x3	PDFN5x6	TO-252	TO-263	TO-220/F/-2
	[V]	[A]	[V]							
SK86	60	8	0.65	•						
TGBR10x60 MGBR10x60	60	10	0.5-0.8		•			•		
MGBR12L60	60	12	0.65		•					
MGBR15x60	60	15	0.6-0.64		•					
TGBR20x60 MGBR20x60	60	20	0.58-0.6		•		•			
TGBR30x60	60	30	0.6-0.65							•
TGBR10x80	80	10	0.54					•		
TGBR20U80	80	20	0.47					•		
TGBR30x80 MGBR3080	80	30	0.75-0.95							•
TGBR30L100	100	30	0.9				•			

Part Number	VRRM	IF	VF	SMA	SMB	SMC	TO-277	TO-252	TO-263	TO-220/F/-2
	[V]	[A]	[V]							
MBR10120 MGBR10L120	120	10	0.82-0.85				•			
MBR10150 MGBR10L150	150	10	0.9-0.93				•	•		
MBR2200	200	2	0.9		•	•				
SB3200 MBR3200	200	3	0.86-0.9	•	•	•				
SB5200	200	5	0.9			•				
MBR10200	200	10	0.9				•			
MGBR20L200	200	20	0.9					•		
MGBR5L300	300	5	0.92	•	•	•				
MGBR10x300/M1	300	10	0.85-0.9					•		•
MGBR20L300	300	20	0.92						•	•

Schottky Diode – Dual

Part Number	VRRM [V]	IF [A]	VF [V]	TO-252	TO-263
MGBR10L40C	40	10	0.55		•
MGBR6L45C	45	6	0.67	•	
MGBR6V45C	45	6	0.62	•	
MGBR6S45C	45	6	0.57	•	
MBR1045C	45	10	0.55	•	
TGBR10L45C	45	10	0.61	•	
MGBR10V45C	45	10	0.5	•	
MGBR10S45C	45	10	0.45	•	
MGBR10U45C	45	10	0.4	•	
MGBR15L45C	45	15	0.6	•	
MBR1645C	45	16	0.7		•
MBR2045C	45	20	0.84	•	
MGBR20L45C	45	20	0.58	•	•
MGBR20V45C	45	20	0.59	•	•
MBR3045C	45	30	0.76		•
SBL3045C	45	30	0.62		•

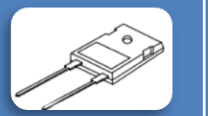
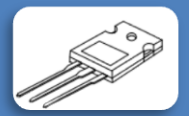
Part Number	VRRM [V]	IF [A]	VF [V]	TO-252	TO-263	TO-247
MGBR30L45C	45	30	0.6	•		
MGBR30S45C	45	30	0.5	•		
MGBR30U45C	45	30	0.45	•		
MBR6045C	45	60	0.55			•
MGBR6L50C	50	6	0.67	•		
MGBR6V50C	50	6	0.62	•		
MGBR6S50C	50	6	0.57	•		
TGBR10L50C	50	10	0.62	•		
TGBR10V50C	50	10	0.57	•		
MGBR15L50C	50	15	0.61	•		
MGBR6L60C	60	6	0.67	•		
MBR1060C	60	10	0.95		•	
MGBR10L60C	60	10	0.63	•	•	
MGBR10V60C	60	10	0.58	•		
MGBR10S60C	60	10	0.53	•		
MGBR10U60C	60	10	0.48	•		

Schottky Diode – Dual

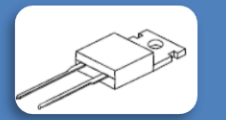
Part Number	VRRM [V]	IF [A]	VF [V]	PDFN5x6	TO-252	TO-263
MBR2060C	60	20	0.95		•	•
MGBR20L60C	60	20	0.64		•	
MGBR20V60C	60	20	0.59	•	•	
MGBR20U60C	60	20	0.49		•	•
MGBR30S60C	60	30	0.55		•	
MGBR30U60C	60	30	0.5			•
SBL3065C	65	30	0.75			•
MBR10100C	100	10	0.95		•	•
TGBR10V100C	100	10	0.72		•	
TGBR10S100C	100	10	0.67		•	•
MGBR10L100C	100	10	0.8		•	
MGBR10V100C	100	10	0.77		•	
MGBR15L100C	100	15	0.8		•	
MBR20100C	100	20	0.85		•	•
TGBR20S100C	100	20	0.71		•	
MGBR20V100C	100	20	0.75		•	
MBR30100C	100	30	1.1			•

Part Number	VRRM [V]	IF [A]	VF [V]	TO-252	TO-263	TO-220/F
MBR10150C	150	10	0.92		•	
MBR20150C	150	20	1.05	•	•	
MGBR20L150C	150	20	0.9	•		
MGBR20V150C	150	20	0.85	•		
MBR30150C	150	30	1		•	
MGBR40V150C	150	40	0.85	•		
MBR10200C	200	10	1	•	•	
MGBR10L200C	200	10	0.9	•		
MBR16200C	200	16	0.9		•	
MBR20200C	200	20	1.23	•	•	
MGBR20L200C	200	20	0.86	•		
MGBR30V200C	200	30	0.87		•	
MGBR10L300C	300	10	0.94			•
MGBR20x300C	300	20	0.87-0.92		•	•
MGBR30V300C	300	30	0.9			•
MGBR40x300C	300	40	0.9-0.99			•

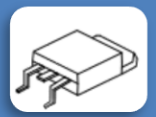
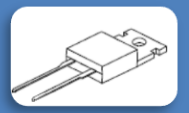
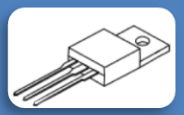
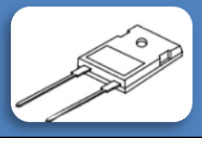
Fast-recovery Rectifier Diode

Type	VRM	IF	VF	Trr	SOD-123F	SMA	SMB	SMC	TO-247-2	TO-247
	[V]	[A]	[V]	[nS]						
Fast	50	1	1.3	150		RS1A				
	100	1	1.3	150		RS1B				
	200	1	1.3	150	RS1002FL	RS1D				
	400	1	1.3	150		RS1G				
	400	75	1.7	60					UFR10040	UFR10040
	600	1	1.3	250	RS1006FL	RS1J				
	600	100	1.7	34					UFR10060	UFR10060
	800	1	1.3	500		RS1K				
	1000	1	1.3	500	RS1010FL	RS1M				
Super Fast	50	2	0.95	35		ES2A	ES2A			
	50	3	0.95	35			ES3A	ES3A		
	100	1	0.95	35		ES1B	ES1B			
	100	2	0.95	35		ES2B	ES2B			
	100	3	0.95	35			ES3B	ES3B		

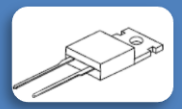
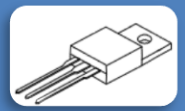
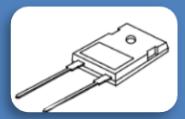
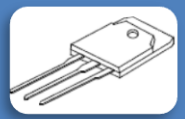
Fast-recovery Rectifier Diode

Type	VRM	IF	VF	Trr	SOD-123F	SMA	SMB	SMC	TO-252	TO-220/F-2
	[V]	[A]	[V]	[nS]						
Super Fast	150	2	0.95	35		ES2C	ES2C			
	150	3	0.95	35			ES3C	ES3C		
	200	1	0.95	35		ES1D				
	200	1	1	50		US1D				
	200	2	0.95	35		US2D	US2D			
	200	3	0.95	35			US3D	US3D		
	400	1	1.25	35	ES1G	ES1G				
	400	2	1.25	35		ES2G	ES2G			
	400	3	1.25	35			ES3G	ES3G		
	400	10	1.4	31.2					UFR1040	
	400	20	1.5	60						UMUR2040C
	600	1	1.7	35	ES1J	ES1J				
	600	2	1.7	35		ES2J	ES2J			
	600	3	1.7	50			ES3J	ES3J		

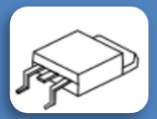
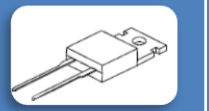
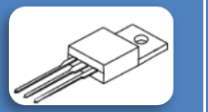
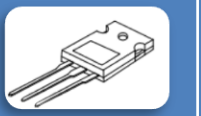
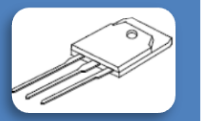
Fast-recovery Rectifier Diode

Type	VRM	IF	VF	Trr	TO-252	TO-263	TO-220/F-2	TO-220/F	TO-247-2
	[V]	[A]	[V]	[nS]					
Super Fast	600	8	1.8	35		USR860	USR860		
	600	10	1.9	65				UMUR2060C	
	600	10	1.7	26	UFR1060		UFR1060	UFR1060	
	600	15	1.7	30			UFR1560	UFR1560	
	600	20	1.7	22		UFR2060	UFR2060		
	600	25	1.7	34			UFR2560		
	600	30	2.1	31			UFR3060	UFR3060	UFR3060
	600	40	1.5	66			UFR4060		
	600	60	2.1	75					UFR6060
	600	75	1.6	46					UFR7560
	1200	5	1.8	70	UFR05120		UFR05120		
	1200	8	2.2	70	UFR08120		UFR08120		
	1200	12	2.2	70			UFR12120		

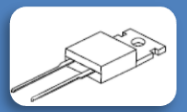
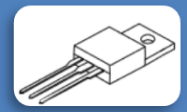
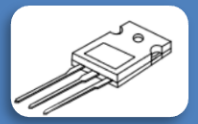
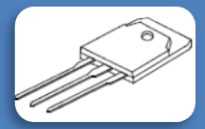
Fast-recovery Rectifier Diode

Type	VRM	IF	VF	Trr	TO-263	TO-220/F-2	TO-220/F	TO-247-2	TO-3P
	[V]	[A]	[V]	[nS]					
Super Fast	1200	15	2	80	UFR15120	UFR15120			
	1200	20	2	160		UFR20120			
	1200	30	3.2	65		UFR30120		UFR30120	
	1200	40	2.1	92		UFR40120			
	1200	75	3.2	85				UFR75120	
Ultra Fast	400	5	1.4	50			UMUR1040C		
	400	8	1.5	50		UMUR840			
	400	15	1.5	60		UUR1540			
	400	40	1.9	35					UFR8040
	400	60	1.5	50				UFR6040C	UFR6040C
	400	80	1.8	40				UFR8040C	UFR8040C
	400	90	1.3	55				UFR9040C	UFR9040C
	400	100	1.5	70				UFR10040C	UFR10040C

Fast-recovery Rectifier Diode

Type	VRM [V]	IF [A]	VF [V]	Trr [nS]	SMB 	TO-252 	TO-263 	TO-220/F-2 	TO-220/F 	TO-247 	TO-3P 
Ultra Fast	400	120	1.5	85						UFR12040C	UFR12040C
	400	140	1.5	80						UFR14040C	UFR14040C
	600	5	2.9	19		BYC5		BYC5			
	600	8	2.9	19	BYC8	BYC8		BYC8			
	600	8	1.8	50					UMUR860C		
	600	8	1.5	75				BYR29			
	600	8	1.5	60		UMUR860		UMUR860	UMUR860		
	600	10	2.9	52		BYC10		BYC10	BYC10		
	600	10	1.6	30		UMUR1060C	UMUR1060C				
	600	15	2.9	117				BYC15			
	600	15	1.5	70				UMUR1560			
	600	15	1.38	60				BYR79			
	600	16	1.9	40			UUR1660C		UUR1660C		
	600	16	1.5	60			UMUR1660C		UMUR1660C		
	600	20	2.9	19				BYC20			

Fast-recovery Rectifier Diode

Type	VRM	IF	VF	Trr	SOD-123F	SMA	TO-220/F-2	TO-220/F	TO-247	TO-3P
	[V]	[A]	[V]	[nS]						
Ultra Fast	600	20	2.9	64				BYC20C		
	600	20	1.5	50			UMUR2060			
	600	30	1.7	60					UMUR3060C	
	600	30	2.9	50					UUR3060C	
	600	40	1.6	48					UFR4060C	
	600	80	2	105					UFR8060C	UFR8060C
	1000	1	1.7	75	US1M	US1M				
	1200	30	1.9	180			UUFR30120			
Hyper Fast	400	10	1.5	30				UHR1040C		
	400	15	1.5	89				UHR1540		
	600	15	2.1	60			UHRP1560			
	1200	15	3.2	75			UHRP15120			
	1200	30	2.1	70			UHFR30120			
	1200	60	2.8	51			UMUR60120			

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Thank you



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