



UTT130N06M

POWER MOSFET

120A, 60V N-CHANNEL POWER MOSFET

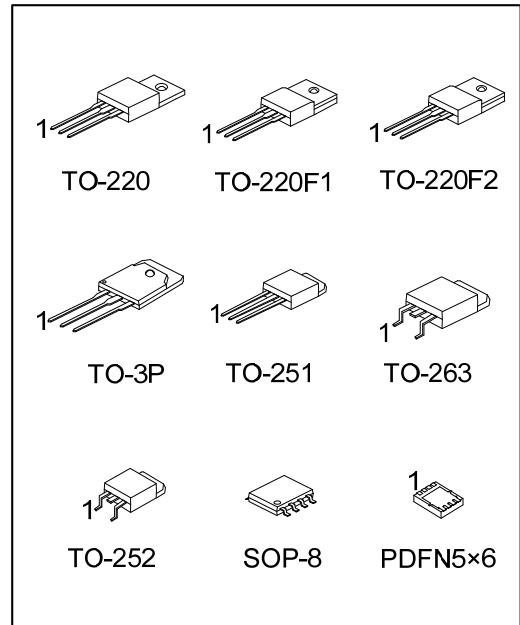
■ DESCRIPTION

The UTC **UTT130N06M** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and extremely low on-state resistance, etc.

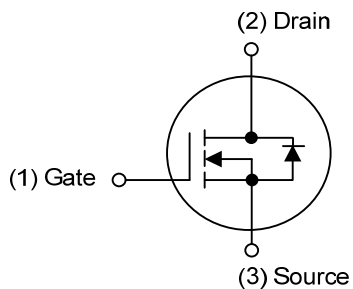
The UTC **UTT130N06M** is suitable for secondary side synchronous rectification, DC-DC converter, motor control and load switching, etc.

■ FEATURES

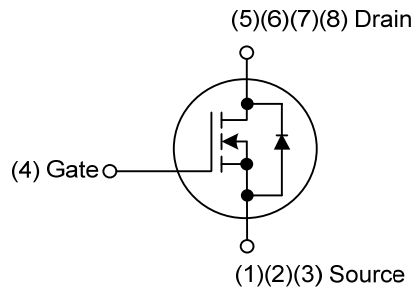
- * High power and current handling capability
- * Low gate charge



■ SYMBOL



TO-220 / TO-220F1 / TO-220F2
TO-251 / TO-252 / TO-263 / TO-3P



SOP-8 / PDFN5x6

ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT130N06ML-TA3-T	UTT130N06MG-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UTT130N06ML-TF1-T	UTT130N06MG-TF1-T	TO-220F1	G	D	S	-	-	-	-	-	Tube
UTT130N06ML-TF2-T	UTT130N06MG-TF2-T	TO-220F2	G	D	S	-	-	-	-	-	Tube
UTT130N06ML-TM3-T	UTT130N06MG-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
UTT130N06ML-TN3-R	UTT130N06MG-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UTT130N06ML-TQ2-T	UTT130N06MG-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
UTT130N06ML-TQ2-R	UTT130N06MG-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
UTT130N06ML-T3P-T	UTT130N06MG-T3P-T	TO-3P	G	D	S	-	-	-	-	-	Tube
UTT130N06ML-S08-R	UTT130N06MG-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UTT130N06ML-P5060-R	UTT130N06MG-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source

UTT130N06MG-TA3-T (1) Packing Type (2) Package Type (3) Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2 TM3: TO-251, TN3: TO-252, TQ2: TO-263 T3P: TO-3P, S08: SOP-8, P5060: PDFN5×6 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

PACKAGE	MARKING
TO-220 / TO-220F1 TO-220F2 / TO-251 TO-252 / TO-263 / TO-3P	UTC UTT 130N06M Lot Code → → → → → Date Code 1 L: Lead Free G: Halogen Free
SOP-8	UTC 130N06M 8 7 6 5 → Date Code 1 2 3 4 → Lot Code L: Lead Free G: Halogen Free
PDFN5×6	UTC UTT 130N06M Lot Code → → → → → Date Code

■ **ABSOLUTE MAXIMUM RATING** ($T_C = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER			SYMBOL	RATINGS	UNIT	
Drain-Source Voltage			V _{DSS}	60	V	
Gate-Source Voltage			V _{GSS}	±20	V	
Drain Current	Continuous (Note 2)	TO-220 TO-263	I _D	120	A	
		TO-220F1 TO-220F2 TO-3P		80	A	
		TO-251 TO-252		60	A	
		SOP-8 PDFN5×6		50	A	
		Pulsed (Note 3)		TO-220 TO-263	I _{DM}	240
	TO-220F1 TO-220F2 TO-3P		160	A		
	TO-251 TO-252		120	A		
	SOP-8 PDFN5×6		100	A		
	Avalanche Current			I _{AS}		52
	Avalanche Energy (Note 4)			E _{AS}	135	mJ
Power Dissipation	TO-220 TO-263	P _D	165	W		
	TO-220F1		36	W		
	TO-220F2		38	W		
	TO-251 TO-252		50	W		
	TO-3P		375	W		
	SOP-8		6	W		
	PDFN5×6		96	W		
	Junction Temperature			T _J	+150	°C
Storage Temperature Range			T _{STG}	-55 ~ +150	°C	

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Current limited by bond wire.

3. Pulse width limited by max. junction temperature.

4. $L = 0.1\text{mH}$, $I_{AS} = 52\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	°C/W
	TO-220F1			
	TO-220F2			
	TO-263			
	TO-251		75	°C/W
	TO-252			
Junction to Case	TO-3P	θ_{JC}	30	°C/W
	SOP-8		125	°C/W
	PDFN5×6		110	°C/W
	TO-220		0.75	°C/W
	TO-263			
	TO-220F1		3.4	°C/W
	TO-220F2		3.29	°C/W
	TO-251		2.5	°C/W
	TO-252			
	TO-3P		0.33	°C/W
	SOP-8		20.8	°C/W
	PDFN5×6		1.3	°C/W

Note: The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

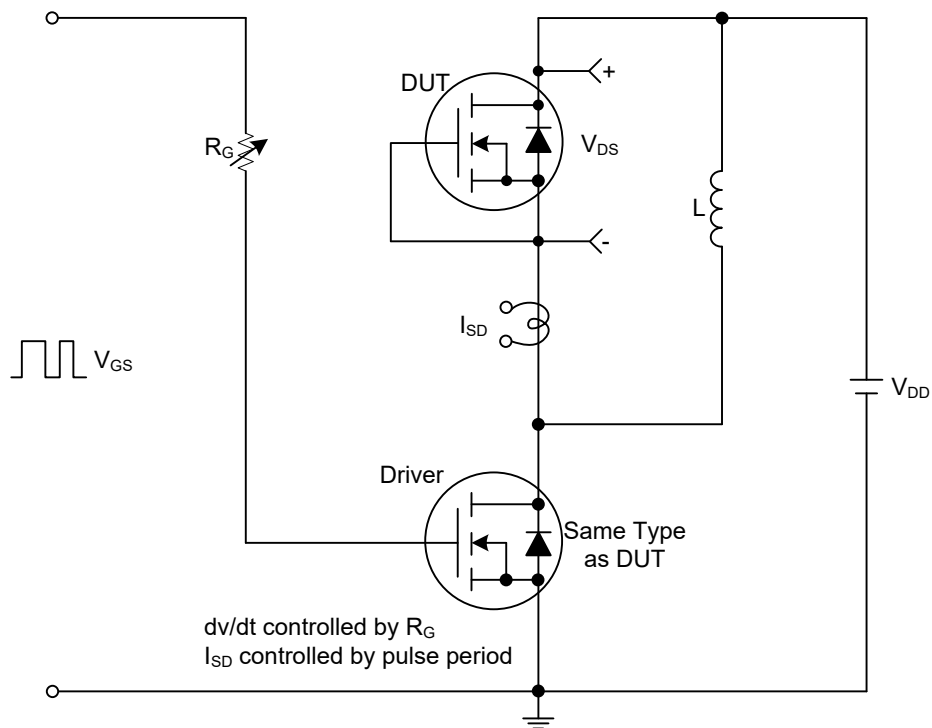
■ ELECTRICAL CHARACTERISTICS (T_J = 25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	60			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =60V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1.0	1.8	3.0	V
Static Drain-Source On-State Resistance (Note 1)		R _{DS(ON)}	V _{GS} =10V, I _D =20A	TO-220		5.9	mΩ
				TO-220F1			
				TO-220F2			
				TO-263			
			TO-3P				
			TO-251			6.0	mΩ
			TO-252				
			SOP-8			6.5	mΩ
PDFN5×6							
			V _{GS} =4.5V, I _D =20A	TO-220		7.2	mΩ
				TO-220F1			
				TO-220F2			
				TO-263			
TO-3P							
TO-251							
TO-252							
SOP-8			9.0	mΩ			
PDFN5×6							
DYNAMIC PARAMETERS (Note 2)							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		4950		pF
Output Capacitance		C _{OSS}			470		pF
Reverse Transfer Capacitance		C _{RSS}			345		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =48V, V _{GS} =10V, I _D =130A, I _G =1mA (Note 1,2)		130		nC
Gate to Source Charge		Q _{GS}			22		nC
Gate to Drain Charge		Q _{GD}			37		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DD} =30V, V _{GS} =10V, I _D =130A, R _G =3Ω, (Note 1,2)		18		ns
Rise Time		t _R			20		ns
Turn-OFF Delay Time		t _{D(OFF)}			60		ns
Fall-Time		t _F			26		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				40	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				160	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =20A, V _{GS} =0V		0.8	1.3	V
Body Diode Reverse Recovery Time (Note 1)		t _{rr}	I _S =30A, dI _F /dt=100A/μs		44		ns
Body Diode Reverse Recovery Charge		Q _{rr}			45		nC

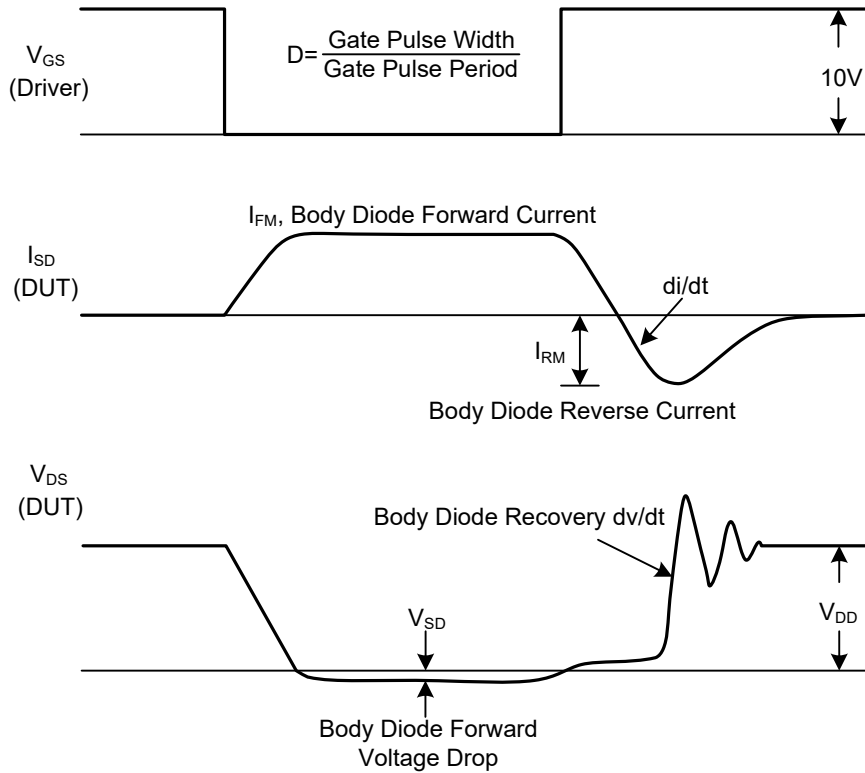
Notes: 1. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%.

2. Guaranteed by design, not subject to production testing.

■ TEST CIRCUITS AND WAVEFORMS



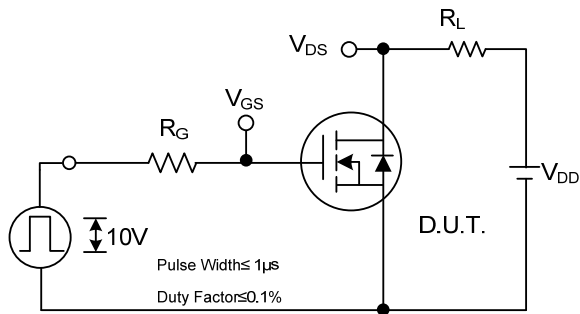
Peak Diode Recovery dv/dt Test Circuit



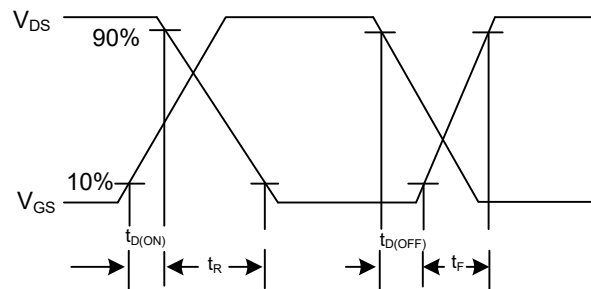
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

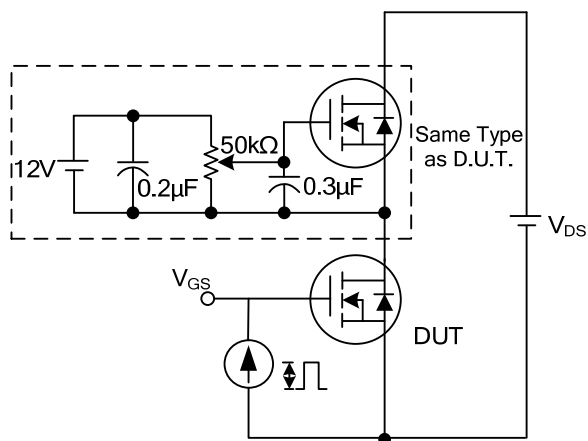
■ TEST CIRCUITS AND WAVEFORMS



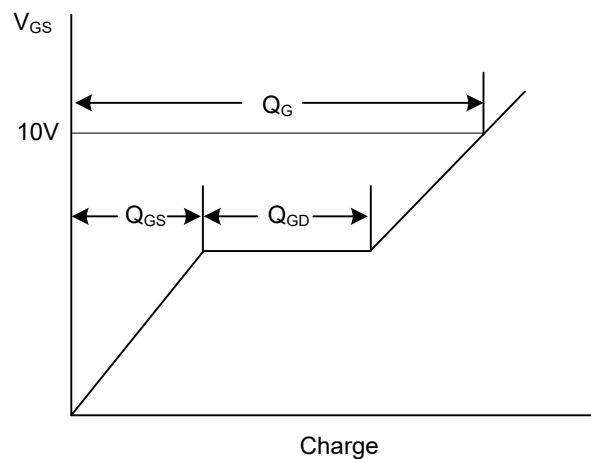
Switching Test Circuit



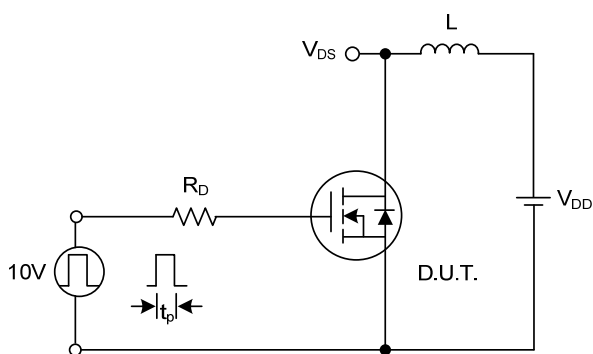
Switching Waveforms



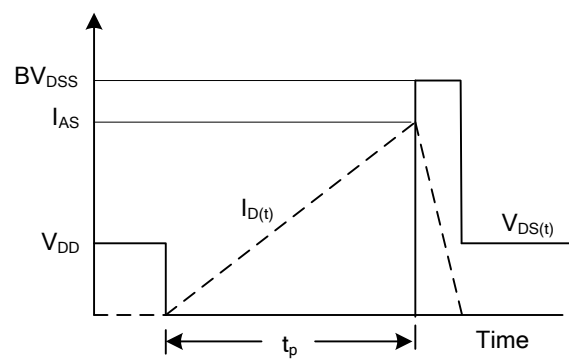
Gate Charge Test Circuit



Gate Charge Waveform

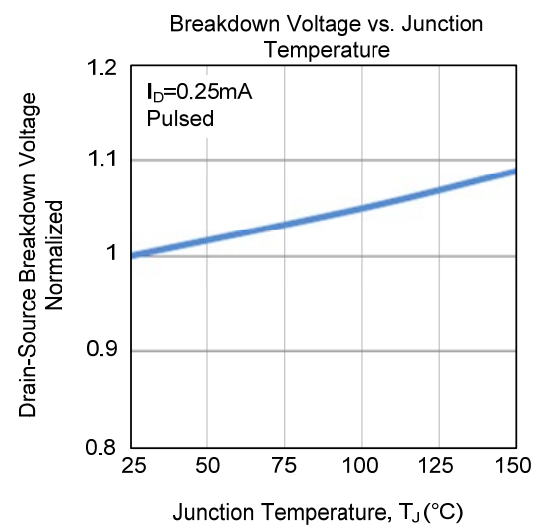
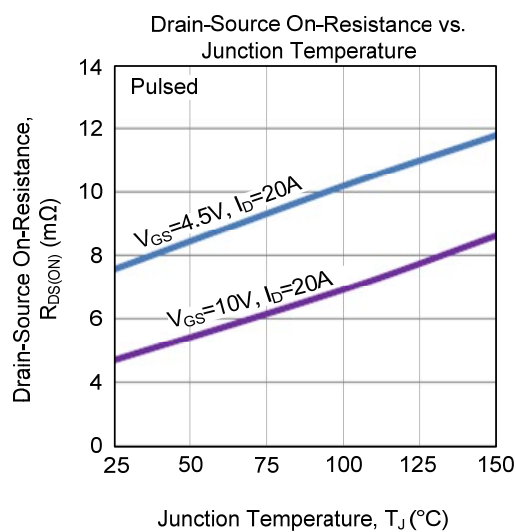
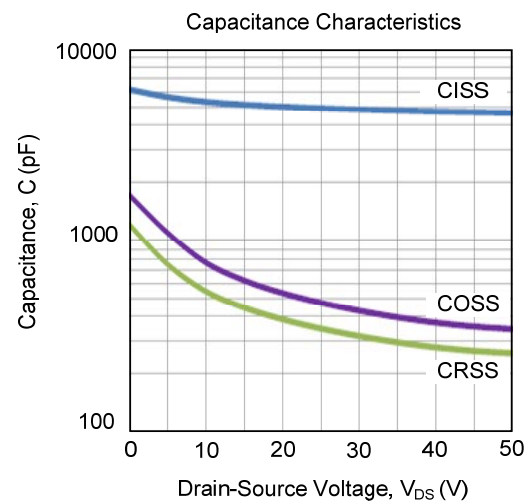
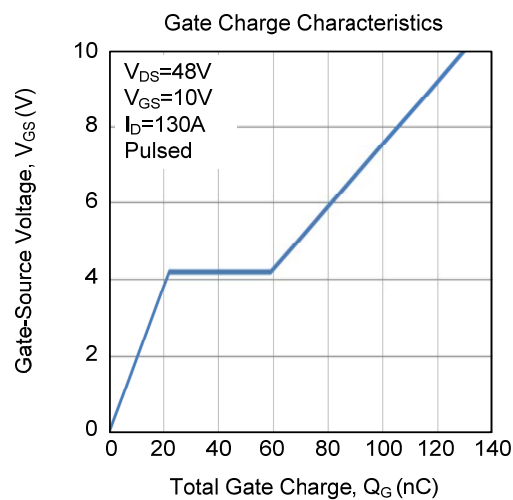
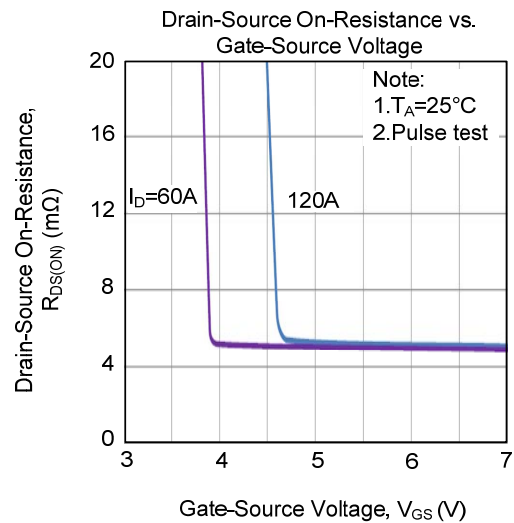
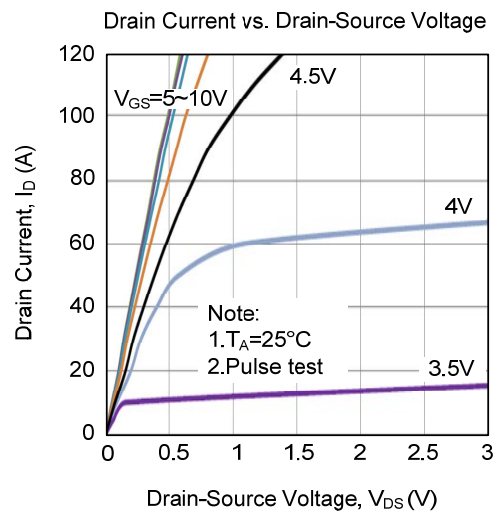


Unclamped Inductive Switching Test Circuit

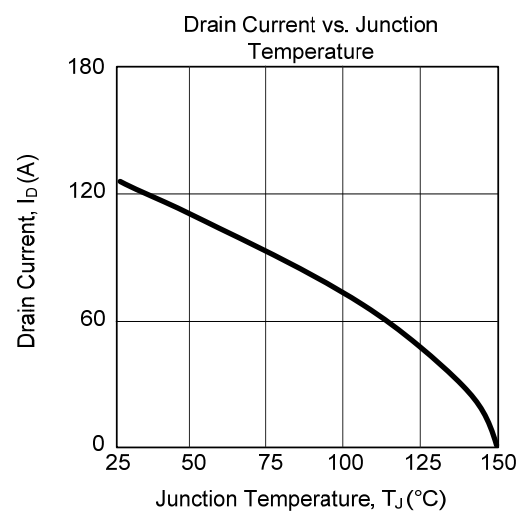
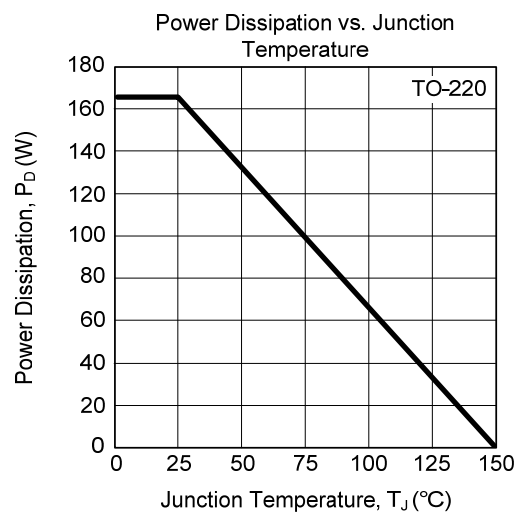
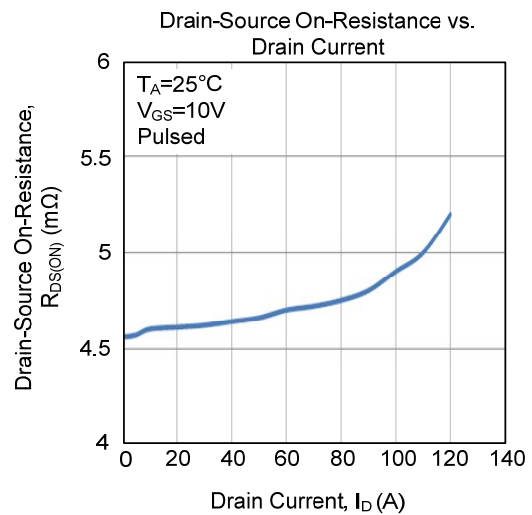
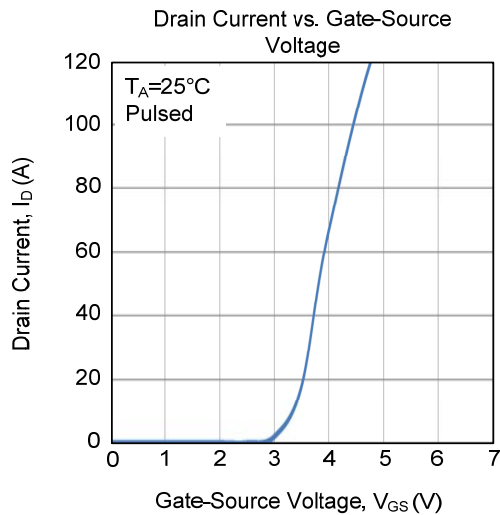
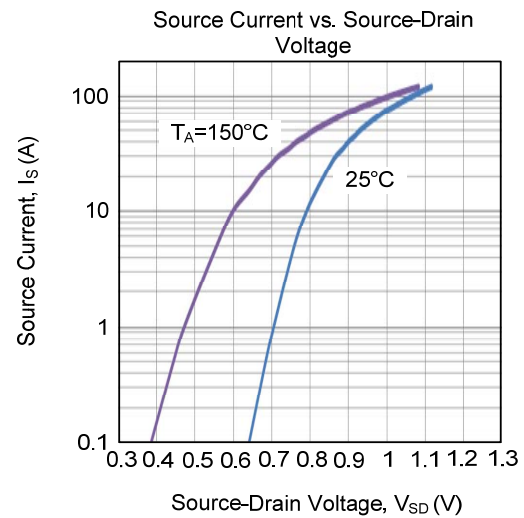
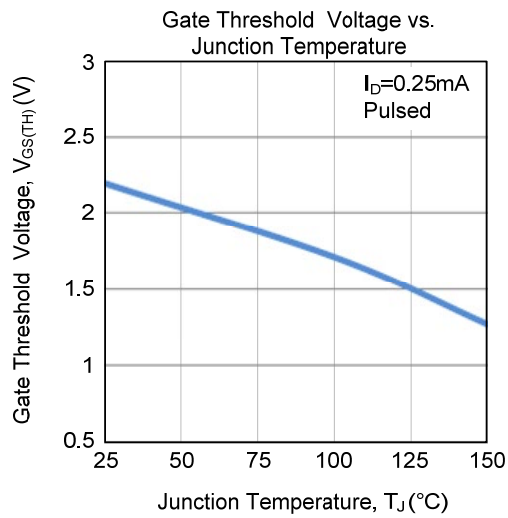


Unclamped Inductive Switching Waveforms

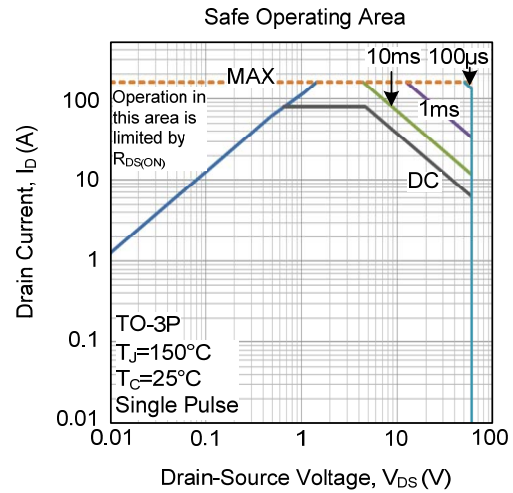
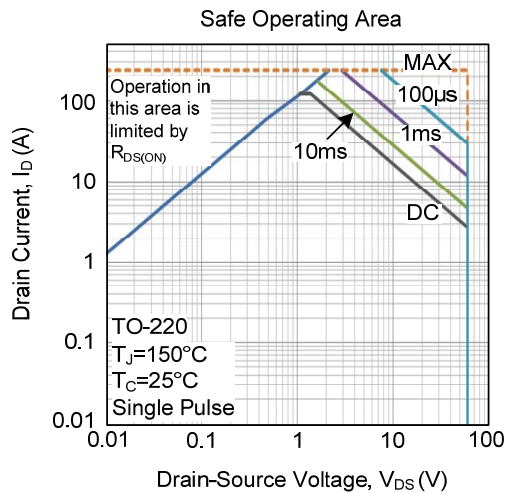
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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