



UTT50N03L

Power MOSFET

50A, 30V N-CHANNEL POWER MOSFET

DESCRIPTION

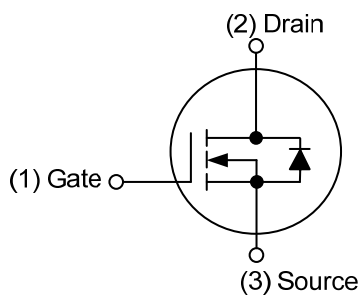
The UTC **UTT50N03L** is an N-channel power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance.

The UTC **UTT50N03L** is generally applied in low power switching mode power appliances and electronic ballast.

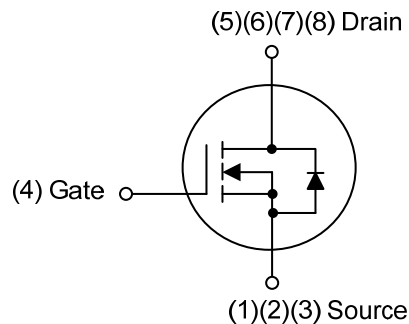
FEATURES

- * $R_{DS(ON)} \leq 7.8 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=12\text{A}$
- $R_{DS(ON)} \leq 13 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=9.0\text{A}$
- * High Switching Speed
- * Improved dv/dt capability

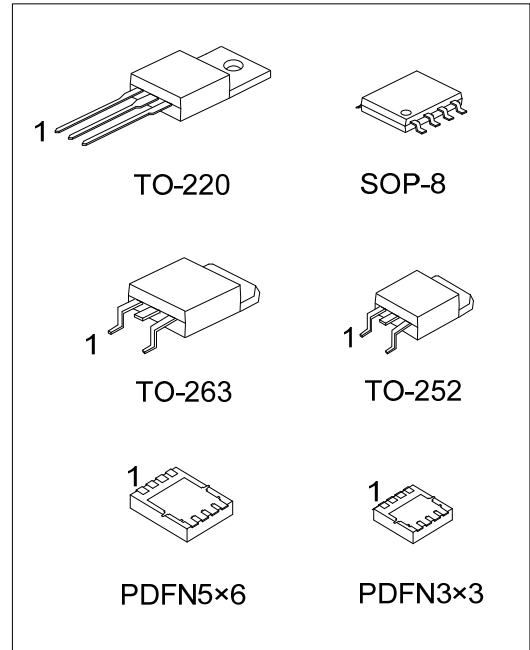
SYMBOL



TO-220 / TO-252 / TO-263



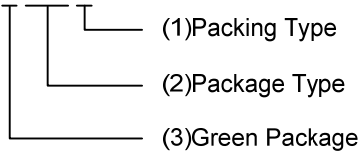
SOP-8 / PDFN3×3 / PDFN5×6



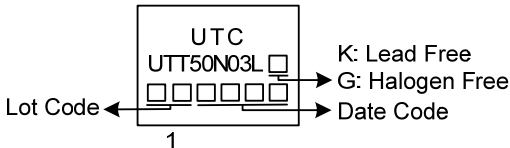
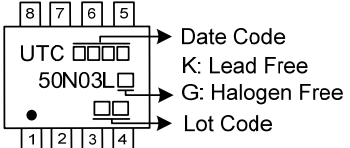
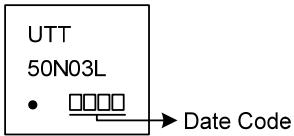
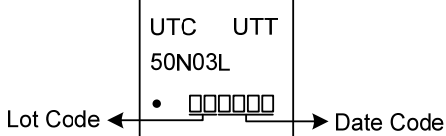
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT50N03LK -TA3-T	UTT50N03LG-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UTT50N03LK-TN3-R	UTT50N03LG-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UTT50N03LK-TQ2-T	UTT50N03LG-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
UTT50N03LK-TQ2-R	UTT50N03LG-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
UTT50N03LK-S08-R	UTT50N03LG-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UTT50N03LK-P3030-R	UTT50N03LG-P3030-R	PDFN3×3	S	S	S	G	D	D	D	D	Tape Reel
UTT50N03LK-P5060-R	UTT50N03LG-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

UTT50N03LG-TA3-T  (1) Packing Type (2) Package Type (3) Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TN3: TO-252, TQ2: TO-263 S08: SOP-8, P3030: PDFN3×3, P5060: PDFN5×6 (3) G: Halogen Free and Lead Free, K: Lead Free
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MARKING

TO-220 / TO-252 / TO-263	SOP-8
 UTC UTT50N03L Lot Code K: Lead Free G: Halogen Free Date Code	 UTC 50N03L Date Code K: Lead Free G: Halogen Free Lot Code
PDFN3×3	PDFN5×6
 UTT 50N03L Date Code	 UTC UTT 50N03L Lot Code Date Code

■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	30	V
Gate-Source Voltage		V _{GSS}	±20	V
Continuous Drain Current		I _D	50	A
Pulsed Drain Current (Note 2)		I _{DM}	100	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	7.2	mJ
Peak Diode Recovery dv/dt		dv/dt	10	V/ns
Power Dissipation	TO-220/TO-263	P _D	62	W
	TO-252		42	W
	SOP-8		2.2	W
	PDFN3×3		25	W
	PDFN5×6		32	W
Junction Temperature		T _J	+150	°C
Operation and Storage Temperature		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. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. L = 0.1mH, I_{AS} = 12A, V_{DD} = 25V, R_G = 20Ω, Starting T_J = 25°C.

4. I_{SD} ≤ 30A, V_{DS}=0V, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-263	θ _{JA}	62.5	°C/W
	TO-252		50 (Note)	°C/W
	SOP-8		125 (Note)	°C/W
	PDFN3×3		75 (Note)	°C/W
	PDFN5×6		65 (Note)	°C/W
Junction to Case	TO-220/TO-263	θ _{JC}	2	°C/W
	TO-252		2.97 (Note)	°C/W
	SOP-8		56 (Note)	°C/W
	PDFN3×3		5 (Note)	°C/W
	PDFN5×6		3.9 (Note)	°C/W

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

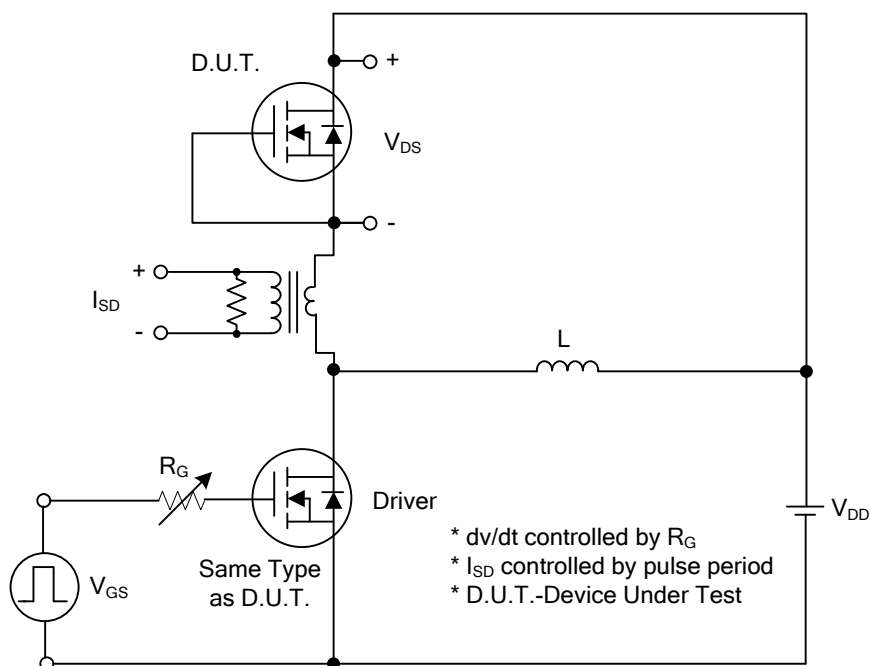
■ ELECTRICAL CHARACTERISTICS (T_c=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	30			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =30V, 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		3.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =12A		5.8	7.8	mΩ
			V _{GS} =4.5V, I _D =9.0A		9.0	13	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =15V, f=1MHz		1280		pF
Output Capacitance		C _{OSS}			270		pF
Reverse Transfer Capacitance		C _{RSS}			229		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q _G	V _{DS} =15V, V _{GS} =10V, I _D =50A (Note1,2)		44		nC
Gate-Source Charge		Q _{GS}			5		nC
Gate-Drain Charge		Q _{GD}			10.5		nC
Turn-On Delay Time		t _{D(ON)}	V _{DS} =15V, V _{GS} =10V, I _D =50A, R _G =3.3Ω (Note1,2)		7		ns
Turn-On Rise Time		t _R			17		ns
Turn-Off Delay Time		t _{D(OFF)}			33		ns
Turn-Off Fall Time		t _F			23		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				50	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				100	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =50A, V _{GS} =0V			1.5	V
Body Diode Reverse Recovery Time		t _{rr}	I _S =30A, V _{GS} =0V,		250		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dI _S /dt=100A/μs		1200		nC

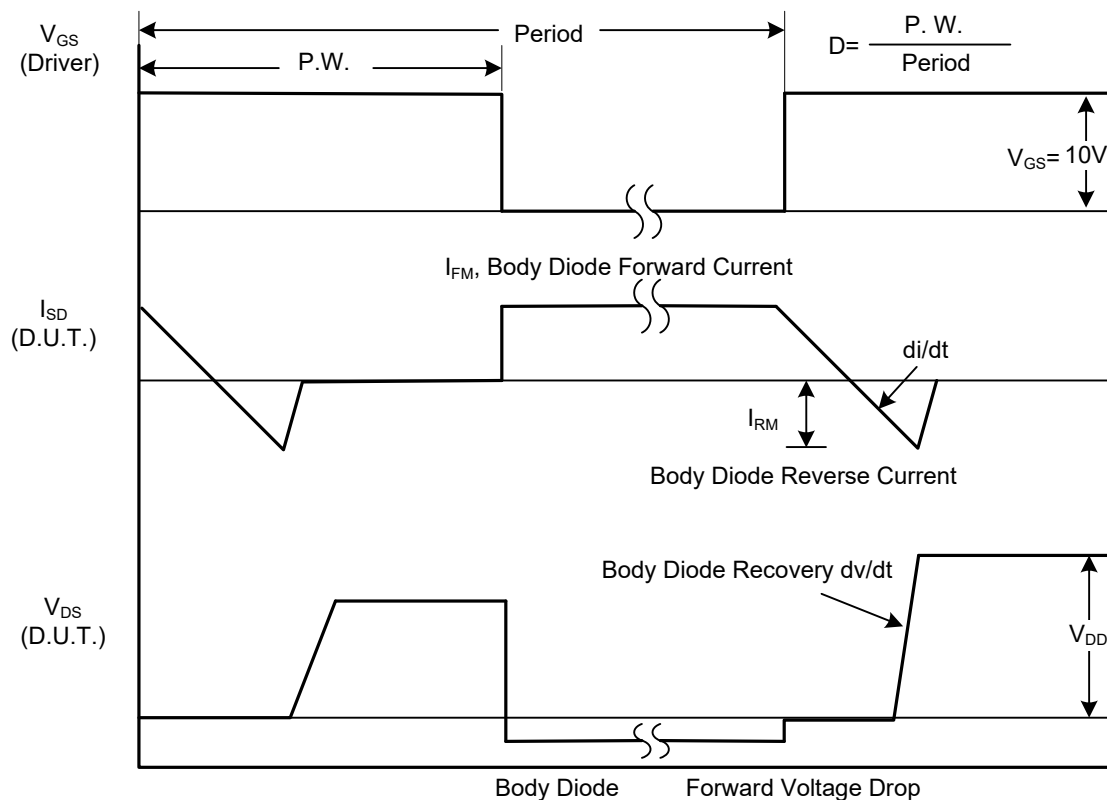
Notes: 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS

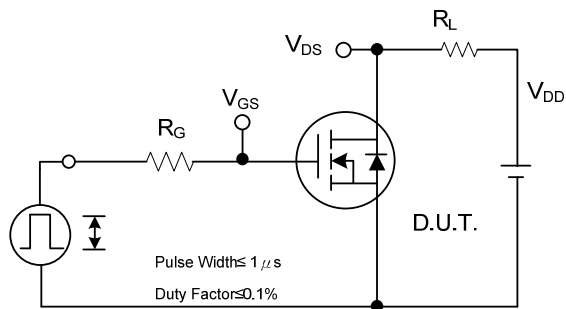


Fig. 2A Switching Test Circuit

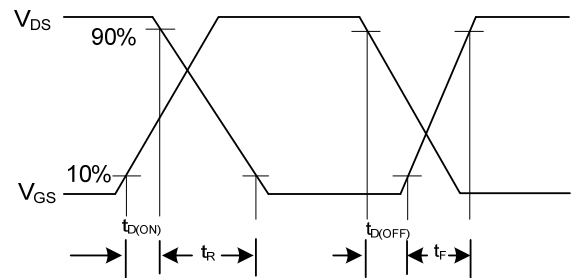


Fig. 2B Switching Waveforms

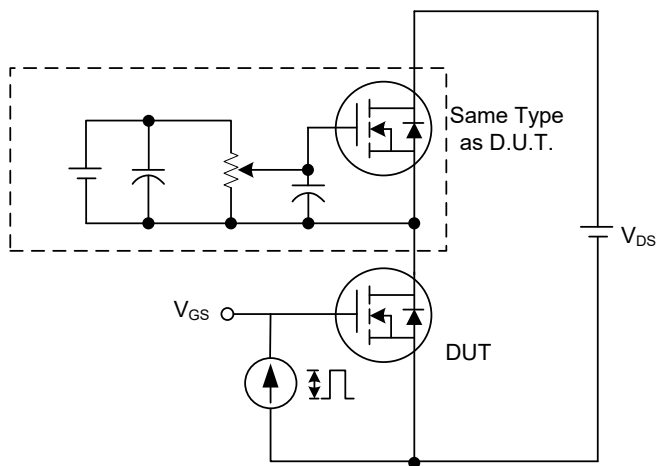


Fig. 3A Gate Charge Test Circuit

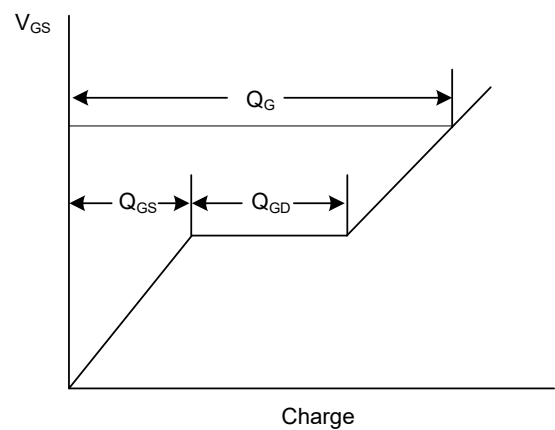


Fig. 3B Gate Charge Waveform

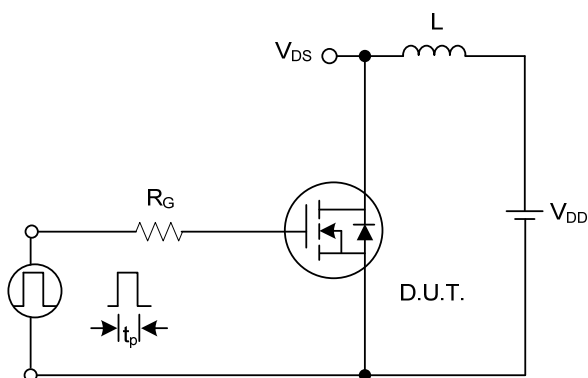


Fig. 4A Unclamped Inductive Switching Test Circuit

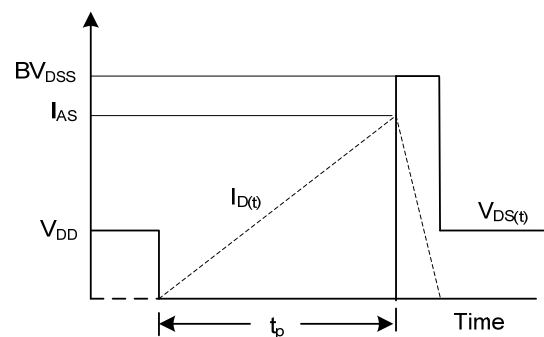
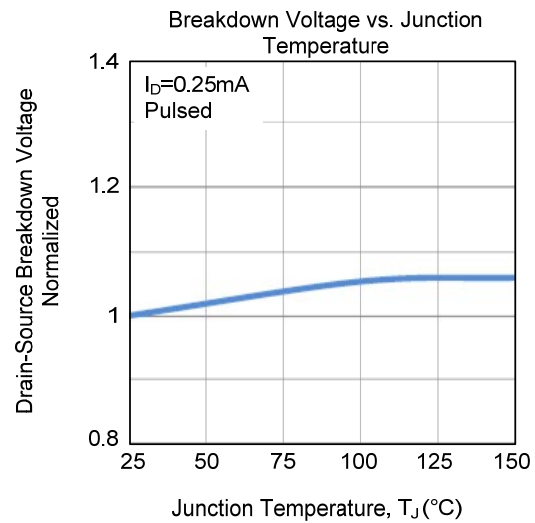
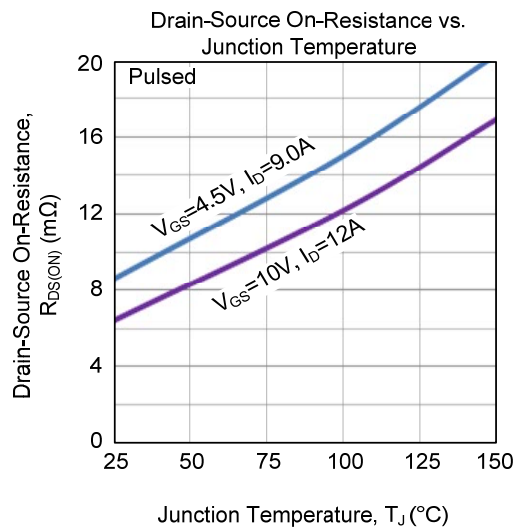
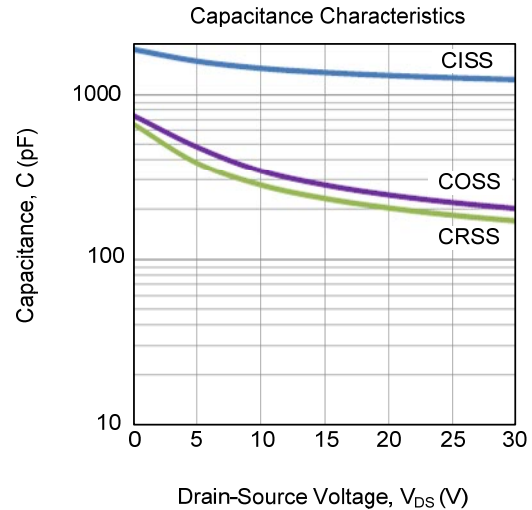
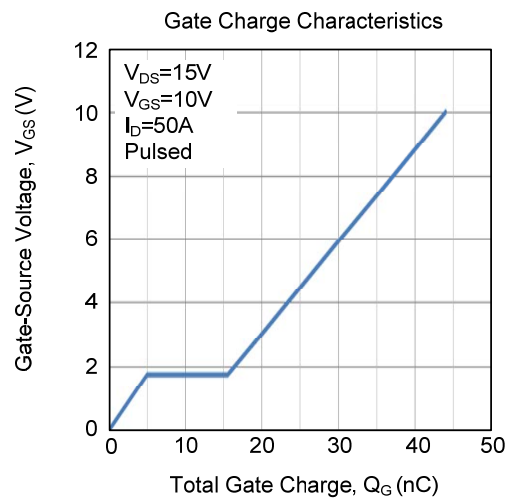
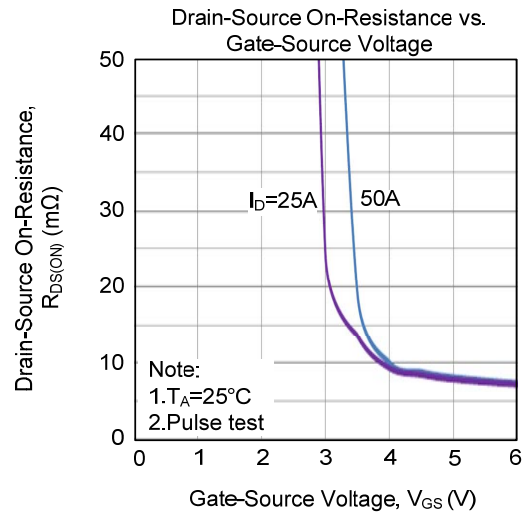
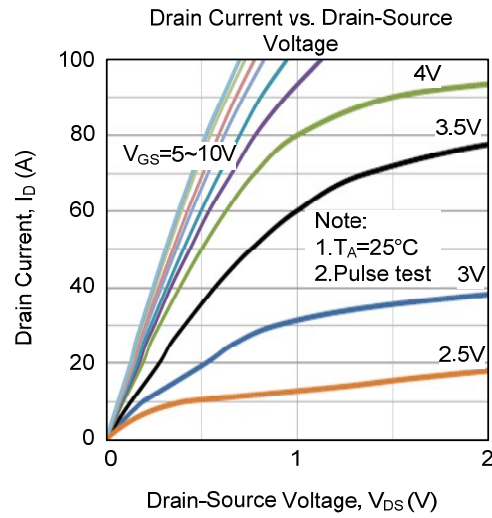
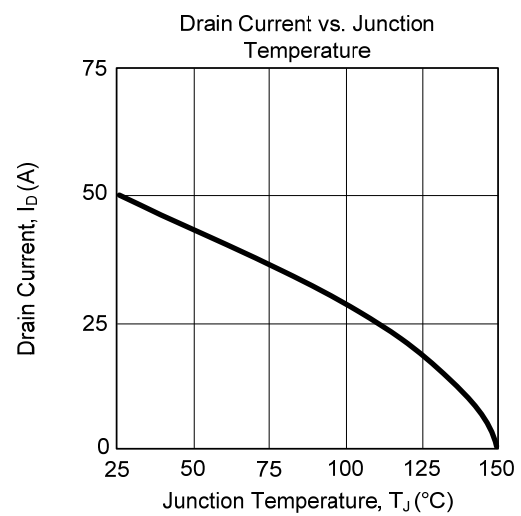
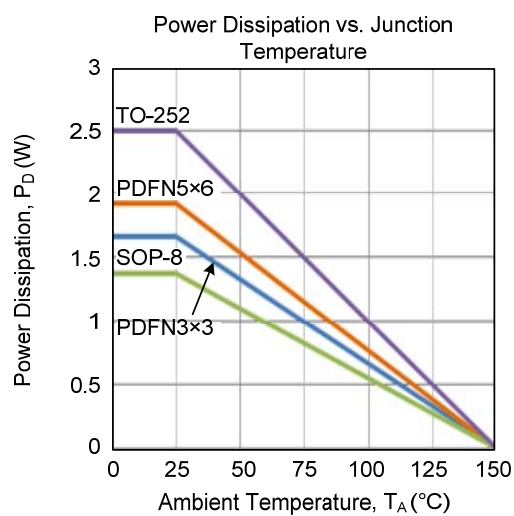
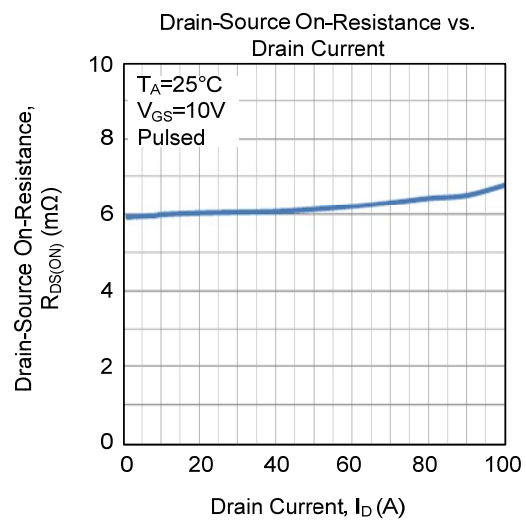
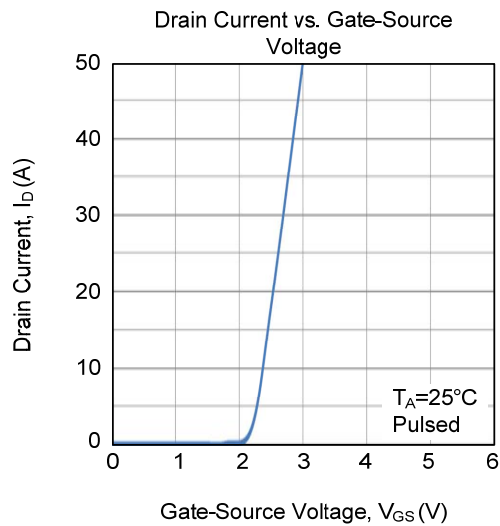
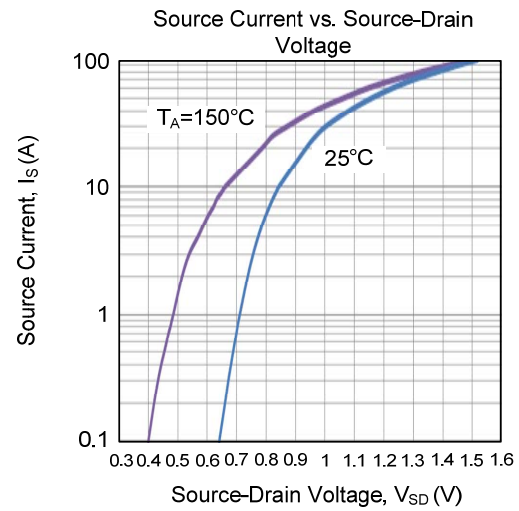
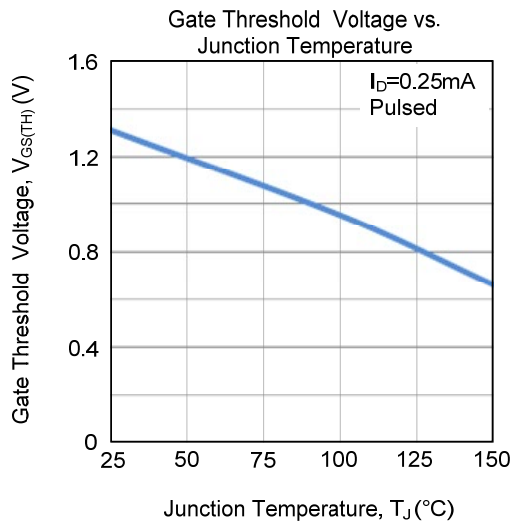


Fig. 4B Unclamped Inductive Switching Waveforms

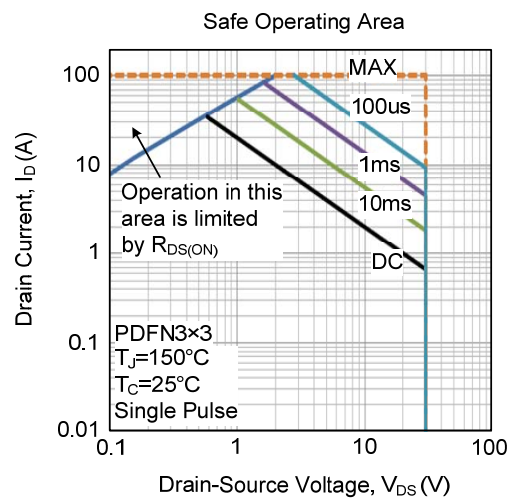
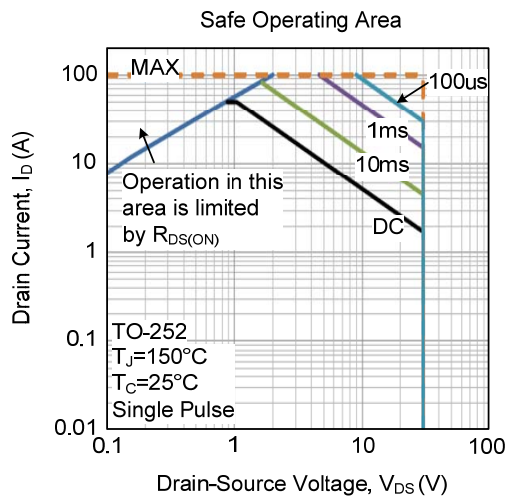
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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