



UTT50N06

Power MOSFET

50A, 60V N-CHANNEL POWER MOSFET

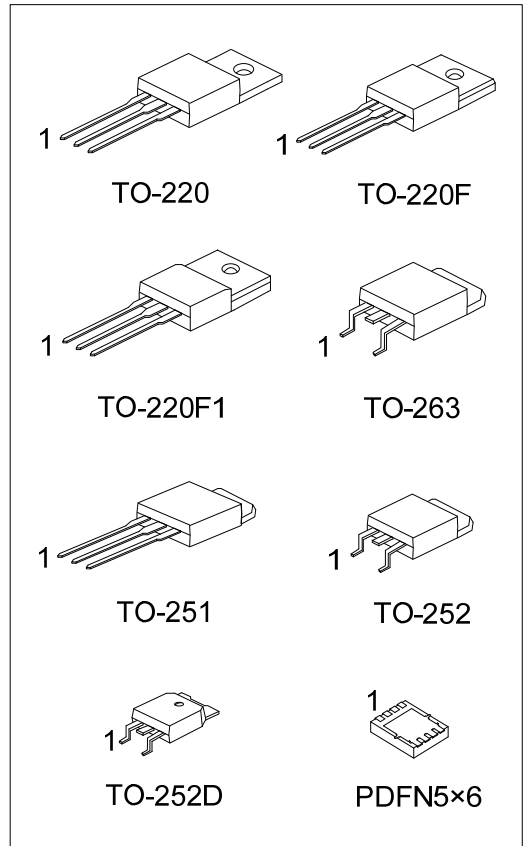
DESCRIPTION

The UTC **UTT50N06** is an N-channel power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance.

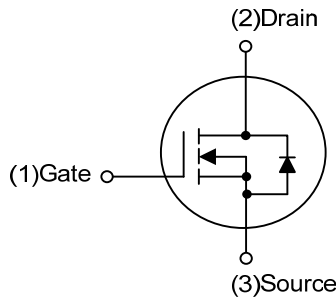
The UTC **UTT50N06** is generally applied in low power switching mode power appliances and electronic ballast.

FEATURES

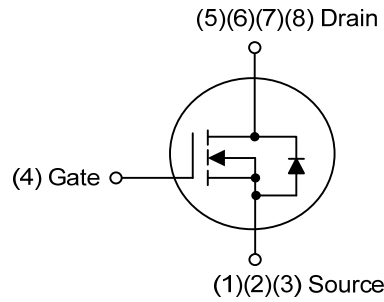
- * $R_{DS(ON)} \leq 15 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=25\text{A}$
- * $R_{DS(ON)} \leq 20 \text{ m}\Omega @ V_{GS}=4.5\text{V}, I_D=25\text{A}$
- * High Switching Speed
- * Improved dv/dt capability



SYMBOL



TO-220/TO-220F/TO-220F1
TO-251/TO-252/TO-252D/TO-263

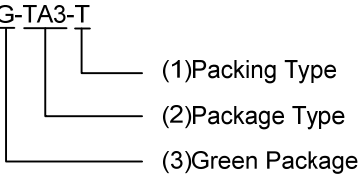


PDFN5x6

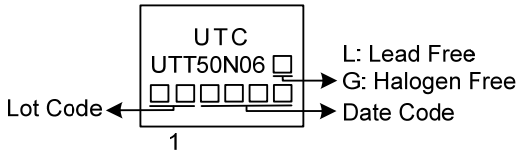
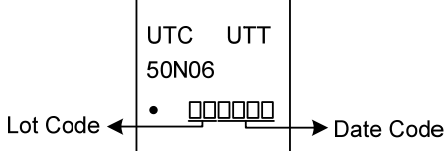
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT50N06L-TA3-T	UTT50N06G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UTT50N06L-TF3-T	UTT50N06G-TF3-T	TO-220F	G	D	S	-	-	-	-	-	Tube
UTT50N06L-TF1-T	UTT50N06G-TF1-T	TO-220F1	G	D	S	-	-	-	-	-	Tube
UTT50N06L-TM3-T	UTT50N06G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
UTT50N06L-TN3-R	UTT50N06G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UTT50N06L-TND-R	UTT50N06G-TND-R	TO-252D	G	D	S	-	-	-	-	-	Tape Reel
UTT50N06L-TQ2-T	UTT50N06G-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
UTT50N06L-TQ2-R	UTT50N06G-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
UTT50N06L-P5060-R	UTT50N06G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UTT50N06G-TA3-T</p>  <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1 TM3: TO-251, TN3: TO-252, TND: TO-252D, TQ2: TO-263, P5060: PDFN5×6 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING

TO-220 / TO-220F / TO-220F1 / TO-251 TO-252 / TO-252D / TO-263	PDFN5×6
 <p>UTC UTT50N06 Lot Code ← → Date Code L: Lead Free G: Halogen Free 1</p>	 <p>UTC UTT 50N06 Lot Code ← → Date Code</p>

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	60	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}	32	mJ
Peak Diode Recovery dv/dt		dv/dt	2.9	V/ns
Power Dissipation	TO-220/TO-263	P _D	120	W
	TO-220F/TO-220F1		36	W
	TO-251/TO-252		51	W
	TO-252D			
PDFN5×6			25	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}=25A, V_{DD}=30V, R_G=20Ω, Starting T_J=25°C

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

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-263	θ _{JA}	62.5	°C/W
	TO-251/TO-252 TO-252D		110	°C/W
	PDFN5×6		65	°C/W
Junction to Case	TO-220/TO-263	θ _{JC}	1.04	°C/W
	TO-220F/TO-220F1		3.47	°C/W
	TO-251/TO-252 TO-252D		2.45 (Note)	°C/W
	PDFN5×6		5 (Note)	°C/W

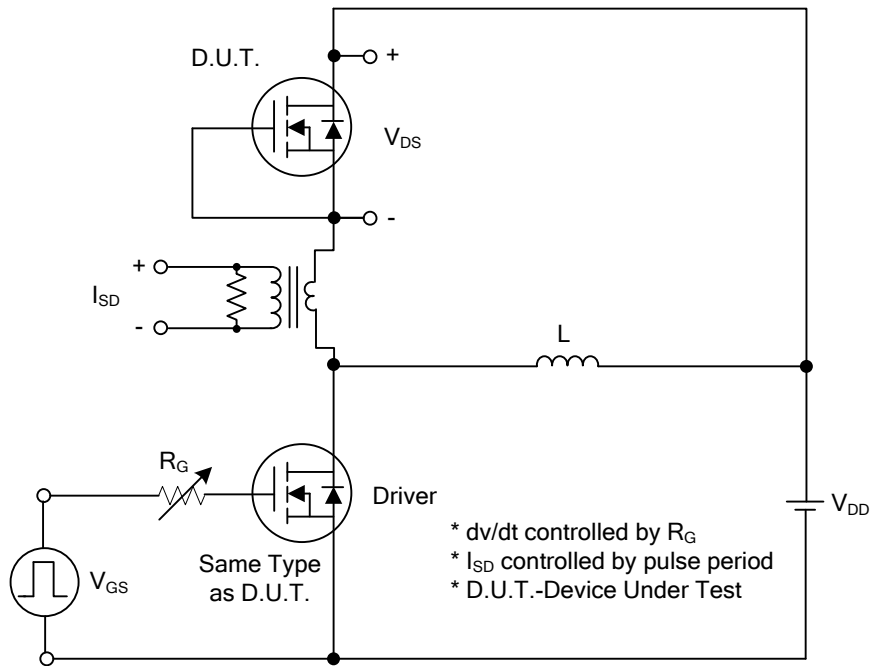
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

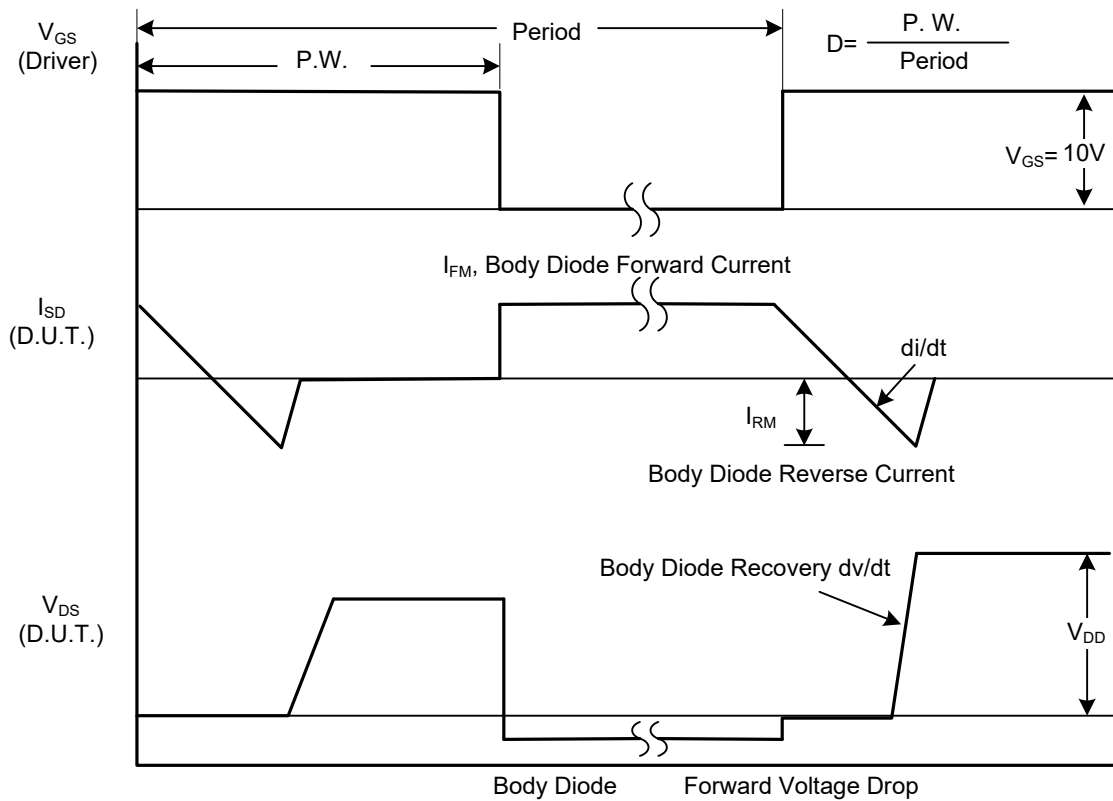
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	60			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	Forward	V _{GS} =20V, V _{DS} =0V			100	nA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100
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 =25A			15	mΩ
		V _{GS} =4.5V, I _D =25A			20	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1MHz		2315		pF
Output Capacitance	C _{OSS}			181		pF
Reverse Transfer Capacitance	C _{RSS}			144		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q _G	V _{DS} =48V, V _{GS} =10V, I _D =50A (Note1,2)		56		nC
Gate-Source Charge	Q _{GS}			8.4		nC
Gate-Drain Charge	Q _{GD}			16		nC
Turn-On Delay Time	t _{D(ON)}	V _{DS} =30V, V _{GS} =10V, I _D =50A, R _G =6Ω (Note1,2)		9		ns
Turn-On Rise Time	t _R			18		ns
Turn-Off Delay Time	t _{D(OFF)}			54		ns
Turn-Off Fall Time	t _F			28		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, dI _S /dt=100A/μs		60		ns
Body Diode Reverse Recovery Charge	Q _{rr}				30	

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

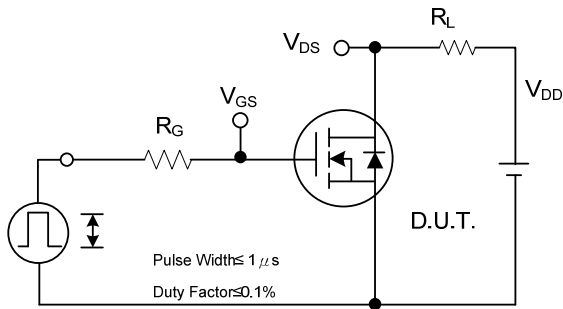


Fig. 2A Switching Test Circuit

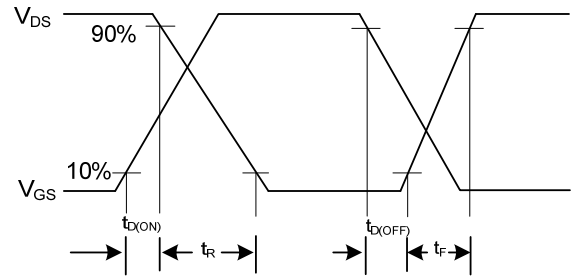


Fig. 2B Switching Waveforms

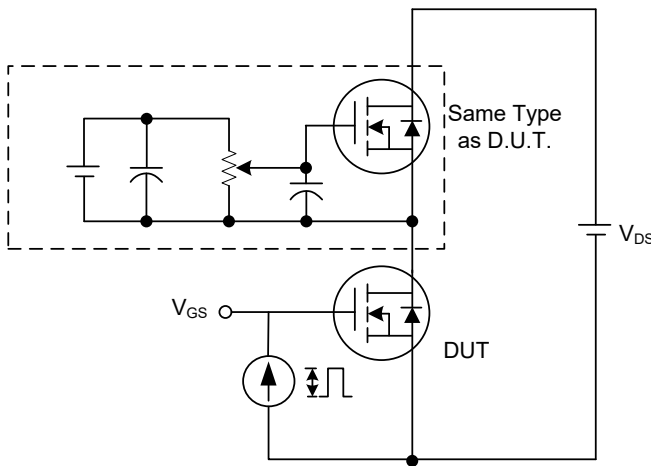


Fig. 3A Gate Charge Test Circuit

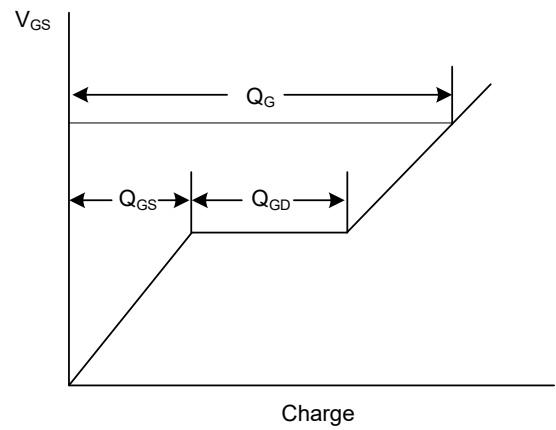


Fig. 3B Gate Charge Waveform

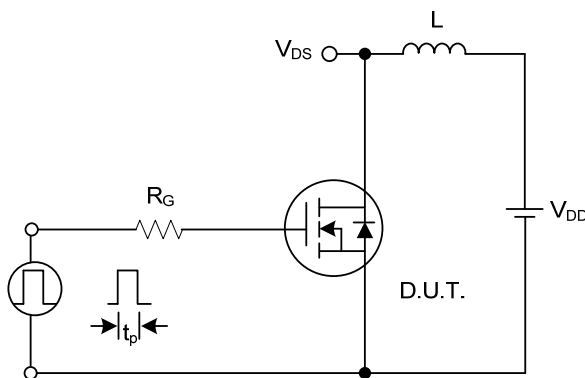


Fig. 4A Unclamped Inductive Switching Test Circuit

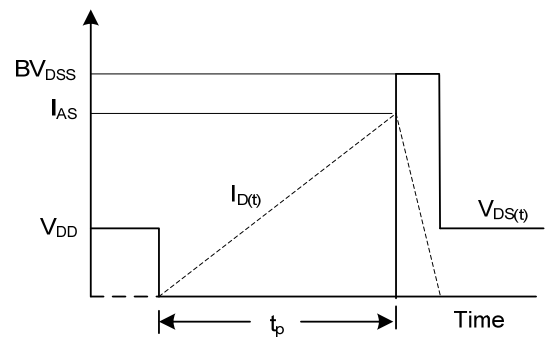
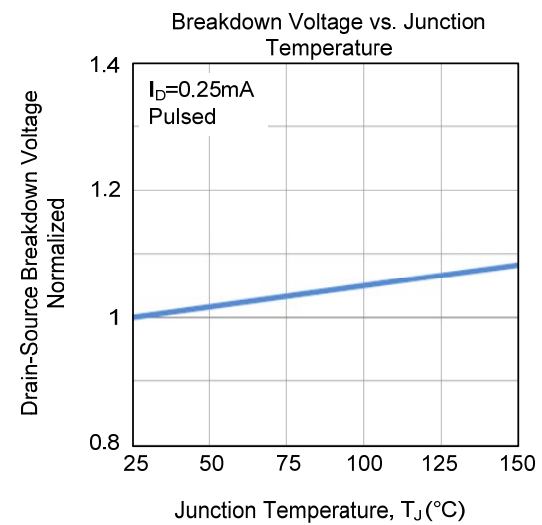
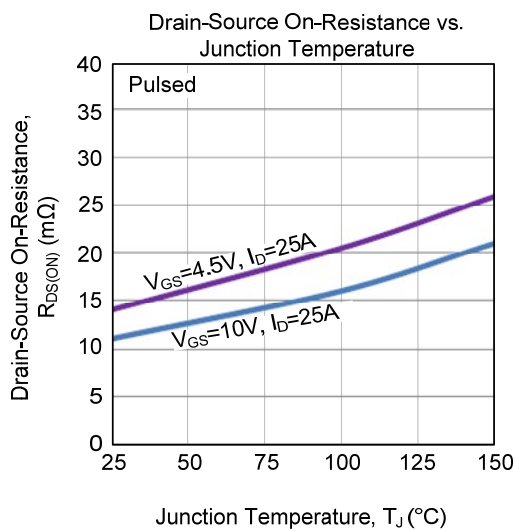
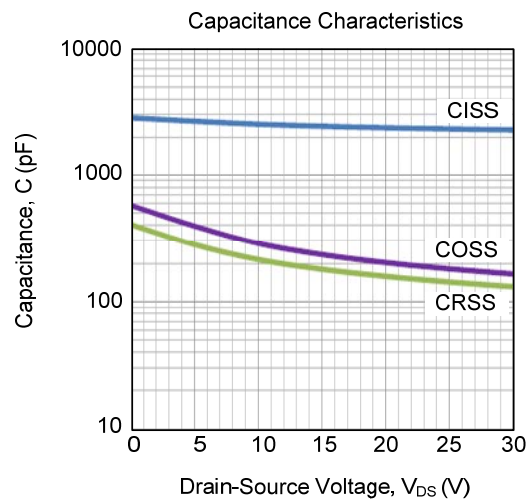
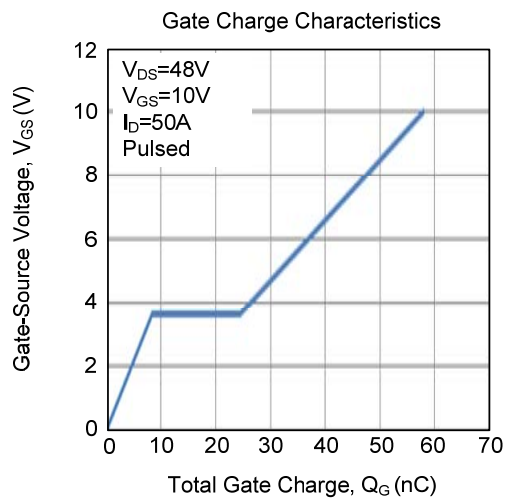
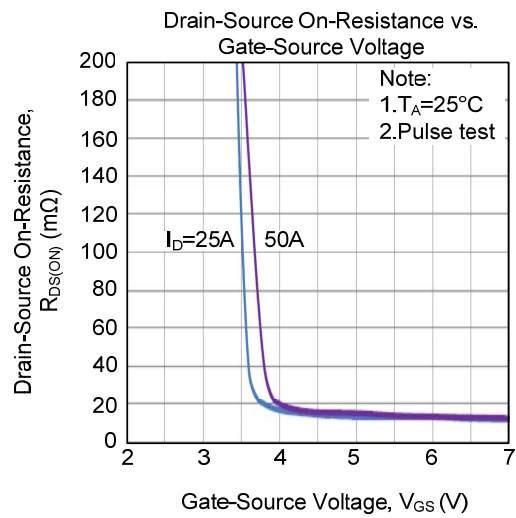
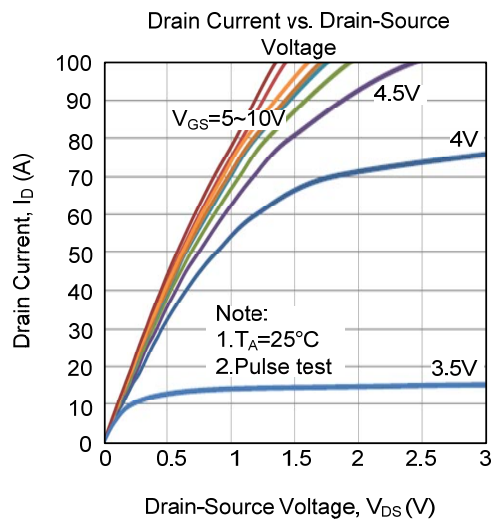
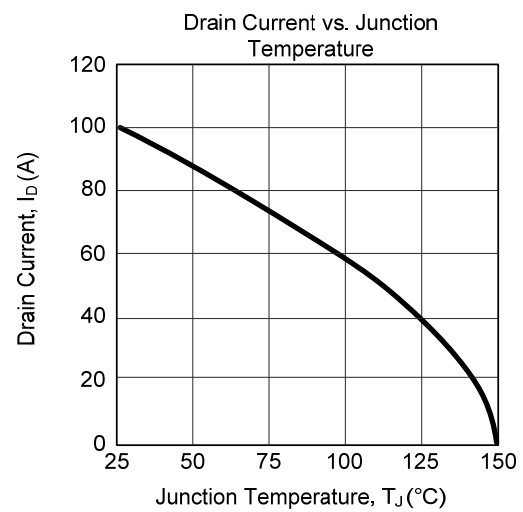
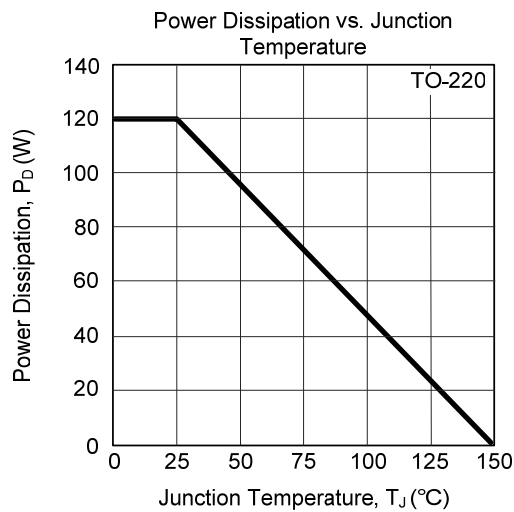
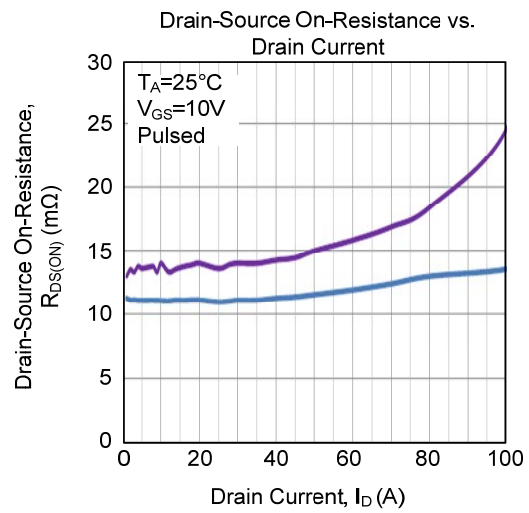
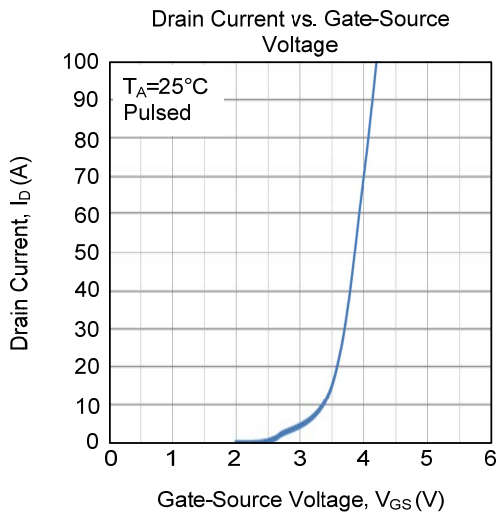
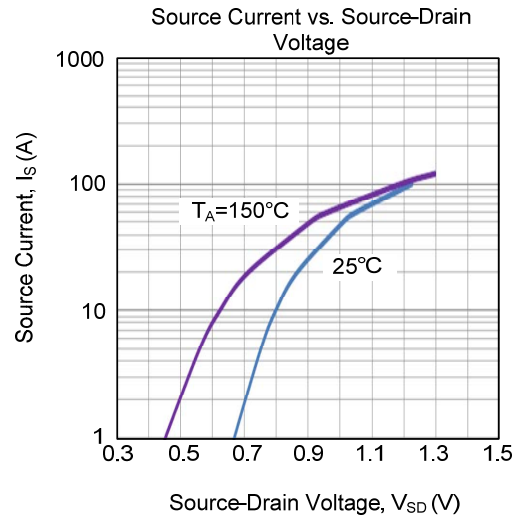
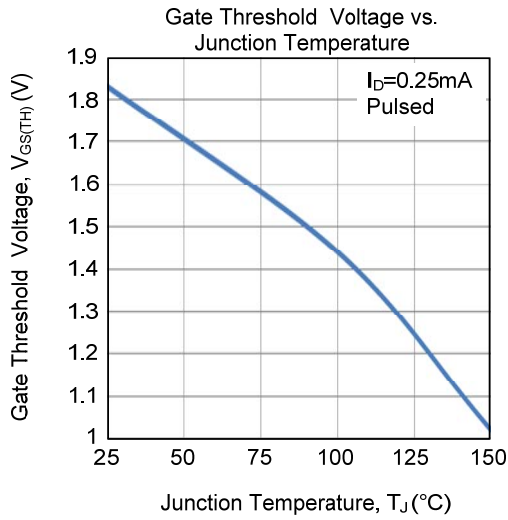


Fig. 4B Unclamped Inductive Switching Waveforms

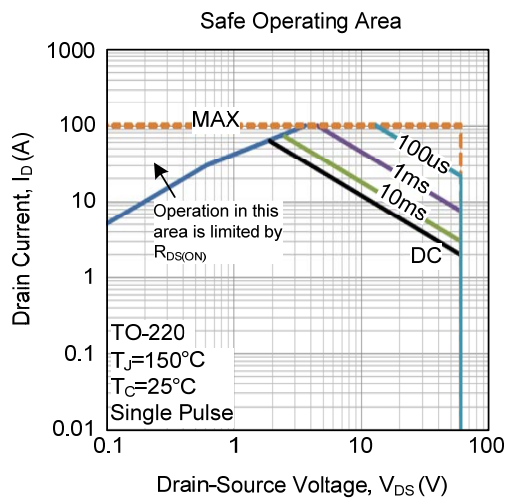
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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