

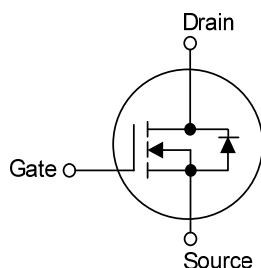
**UTT50N06****Power MOSFET****50A, 60V N-CHANNEL
POWER MOSFET****DESCRIPTION**

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

- * $R_{DS(ON)} \leq 20 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=25\text{A}$
- $R_{DS(ON)} \leq 30 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=25\text{A}$
- * High Switching Speed
- * Improved dv/dt capability

SYMBOL**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-K08-5060-R	UTT50N06G-K08-5060-R	DFN5060-8	S	S	S	G	D	D	D	D	Tape Reel

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

UTT50N06G-TA3-T	(1)Packing Type	(1) T: Tube, R: Tape Reel
	(2)Package Type	(2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1
	(3)Green Package	TM3: TO-251, TN3: TO-252, TND: TO-252D,
		TQ2: TO-263, K08-5060: DFN5060-8
		(3) G: Halogen Free and Lead Free, L: Lead Free

MARKING

TO-220 / TO-220F / TO-220F1 / TO-251 TO-252 / TO-252D / TO-263	DFN5060-8
UTC UTT50N06 □□□□□□ 1 Lot Code ← L: Lead Free G: Halogen Free Date Code	UTC UTT 50N06 • □□□□□□ Lot Code ← Date Code

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current		I_D	50	A
Pulsed Drain Current (Note 2)		I_{DM}	100	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	48	mJ
Peak Diode Recovery dv/dt		dv/dt	10	V/ns
Power Dissipation	TO-220/TO-263	P_D	100	W
	TO-220F/TO-220F1		36	W
	TO-251/TO-252		46	W
	TO-252D		20.8	W
DFN5060-8				
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Operation and Storage Temperature		T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

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. $L=0.1\text{mH}$, $I_{AS}=31\text{A}$, $V_{DD}=25\text{V}$, $R_G=20\Omega$, Starting $T_J=25^{\circ}\text{C}$

4. $I_{SD} \leq 30\text{A}$, $V_{DS}=0\text{V}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62	$^{\circ}\text{C}/\text{W}$
	TO-220F1/TO-263			
	TO-251/TO-252		100	$^{\circ}\text{C}/\text{W}$
	TO-252D			
DFN5060-8			65	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220/TO-263	θ_{JC}	1.24	$^{\circ}\text{C}/\text{W}$
	TO-220F/TO-220F1		3.47	$^{\circ}\text{C}/\text{W}$
	TO-251/TO-252		2.7 (Note)	$^{\circ}\text{C}/\text{W}$
	TO-252D			
DFN5060-8			6 (Note)	$^{\circ}\text{C}/\text{W}$

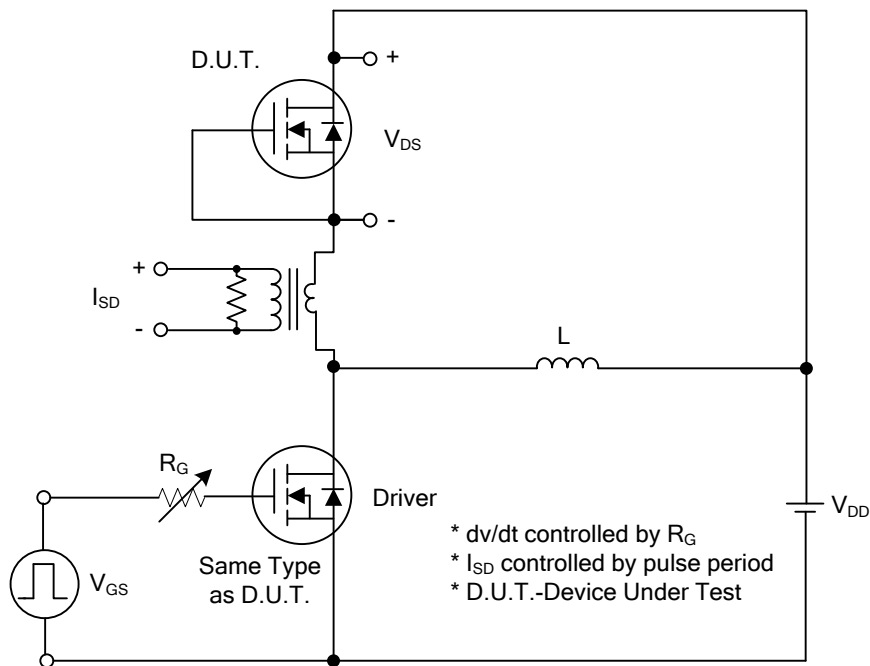
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

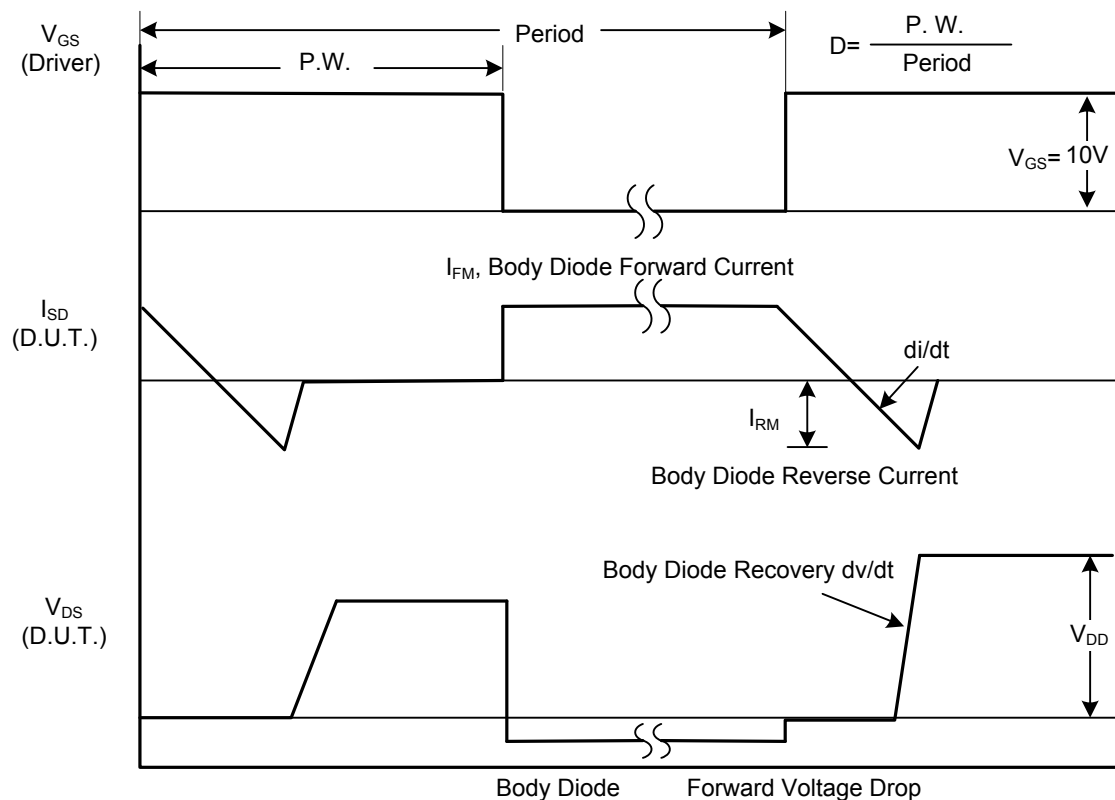
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	60			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =60V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =20V, V _{DS} =0V			100	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 =25A			20	mΩ
			V _{GS} =4.5V, I _D =25A			30	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1MHz		1256		pF
Output Capacitance		C _{OSS}			134		pF
Reverse Transfer Capacitance		C _{RSS}			112		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q _G	V _{DS} =48V, V _{GS} =10V, I _D =50A I _G =1mA (Note1,2)		40	56	nC
Gate-Source Charge		Q _{GS}			5		nC
Gate-Drain Charge		Q _{GD}			14		nC
Turn-On Delay Time		t _{D(ON)}	V _{DS} =30V, V _{GS} =10V, I _D =50A, R _G =4.7Ω (Note1,2)		10		ns
Turn-On Rise Time		t _R			19		ns
Turn-Off Delay Time		t _{D(OFF)}			33		ns
Turn-Off Fall Time		t _F			25		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,		40		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dl _S /dt=100A/μs		70		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

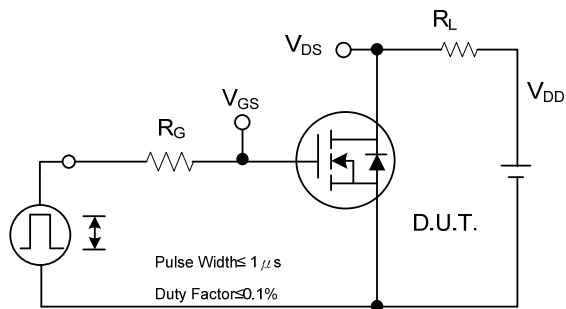


Fig. 2A Switching Test Circuit

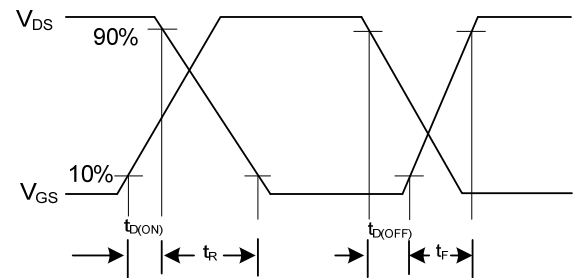


Fig. 2B Switching Waveforms

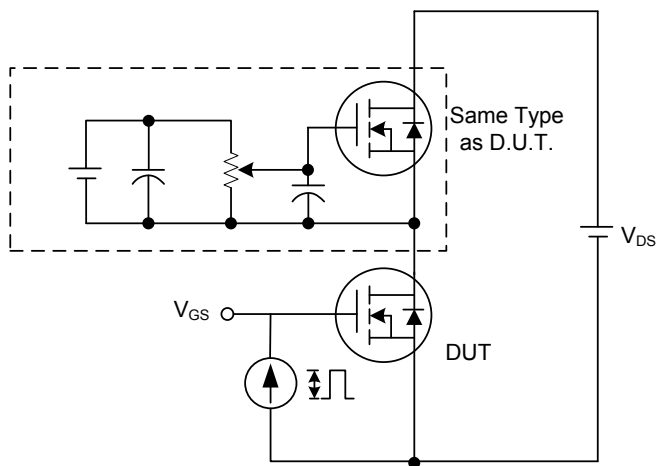


Fig. 3A Gate Charge Test Circuit

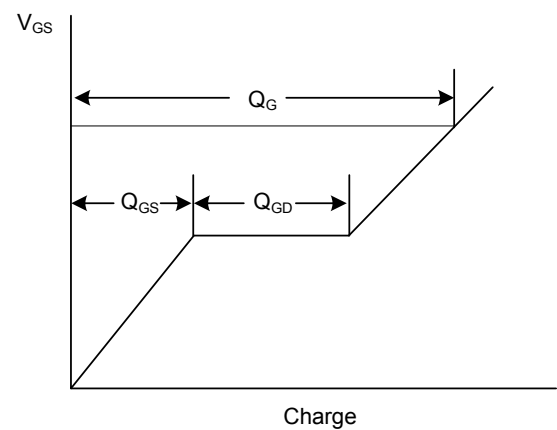


Fig. 3B Gate Charge Waveform

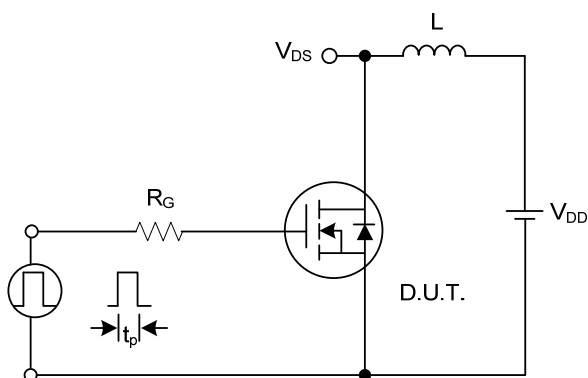


Fig. 4A Unclamped Inductive Switching Test Circuit

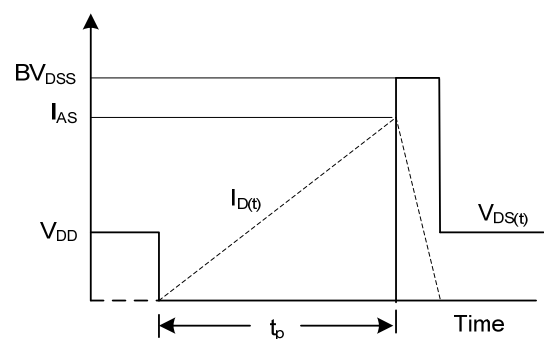
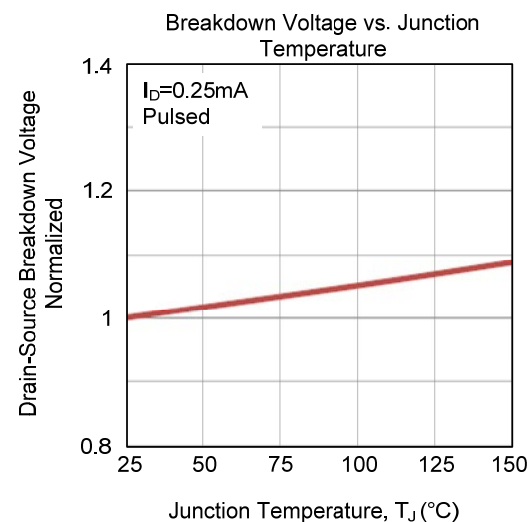
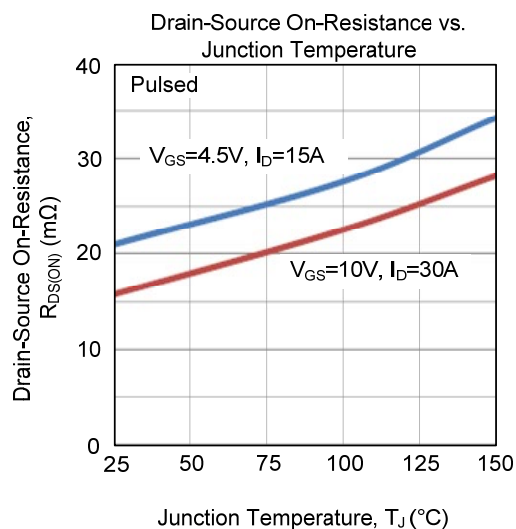
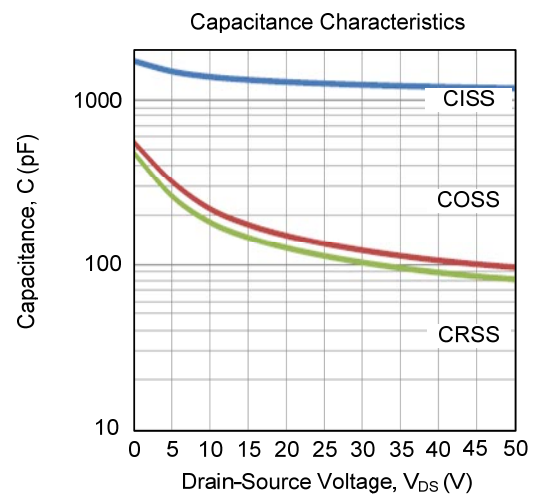
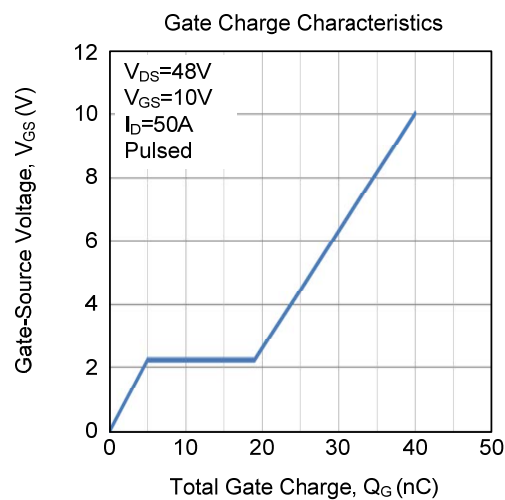
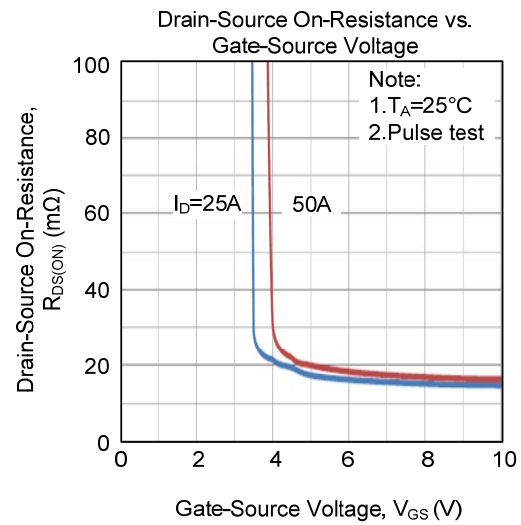
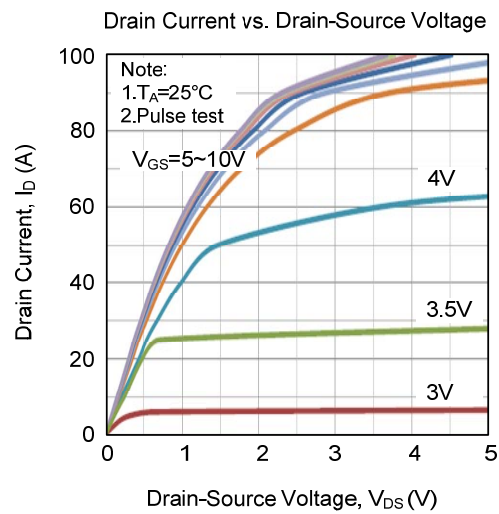
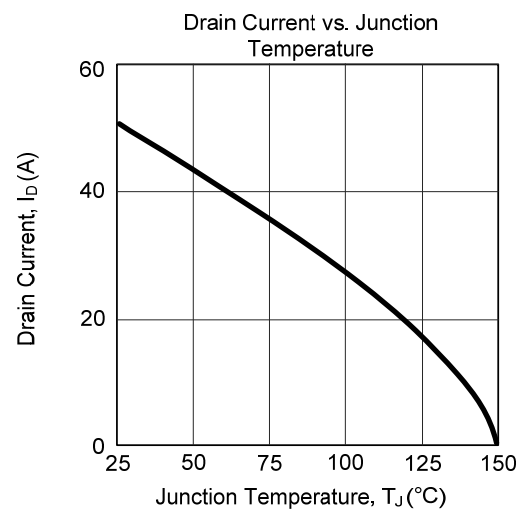
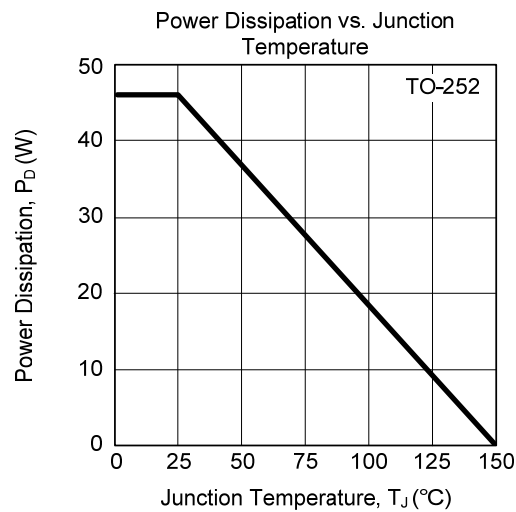
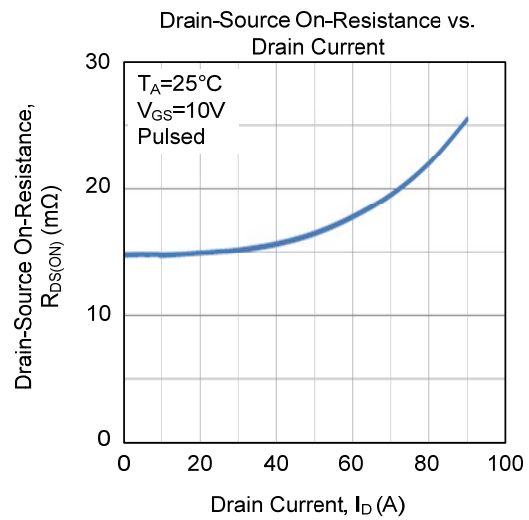
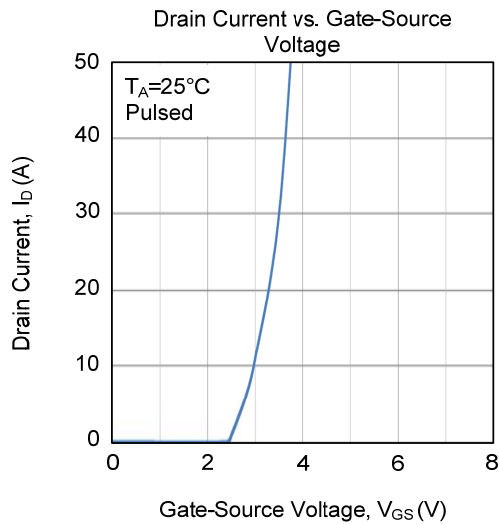
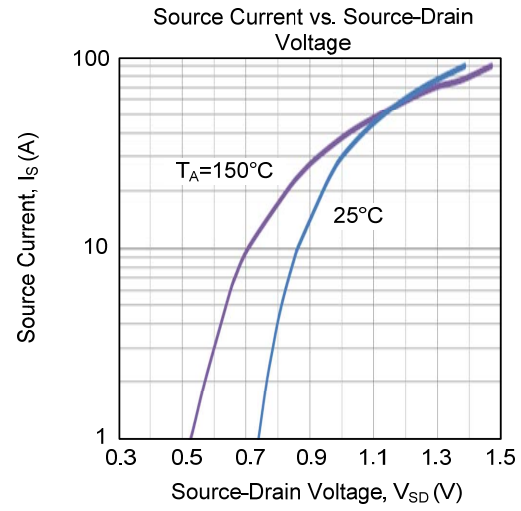
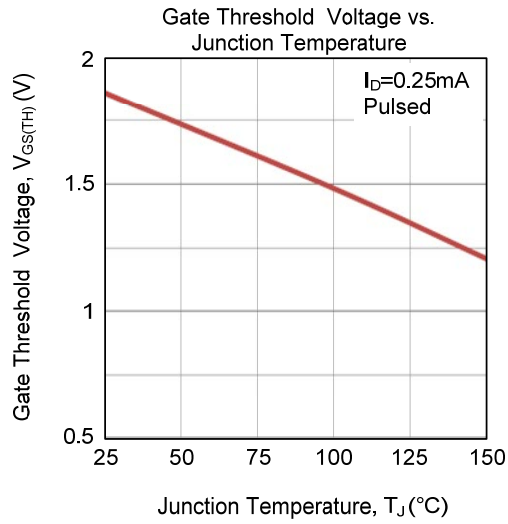


Fig. 4B Unclamped Inductive Switching Waveforms

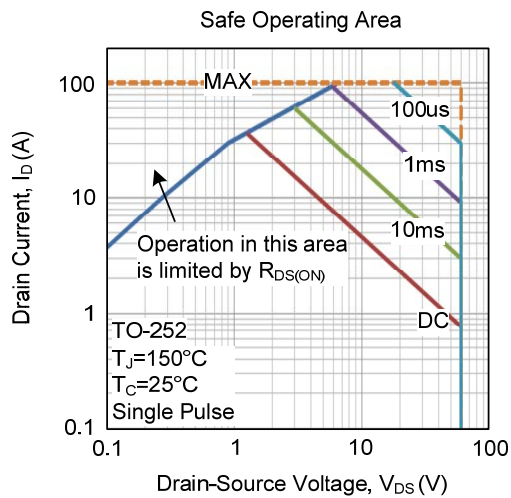
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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