



UTT50P10

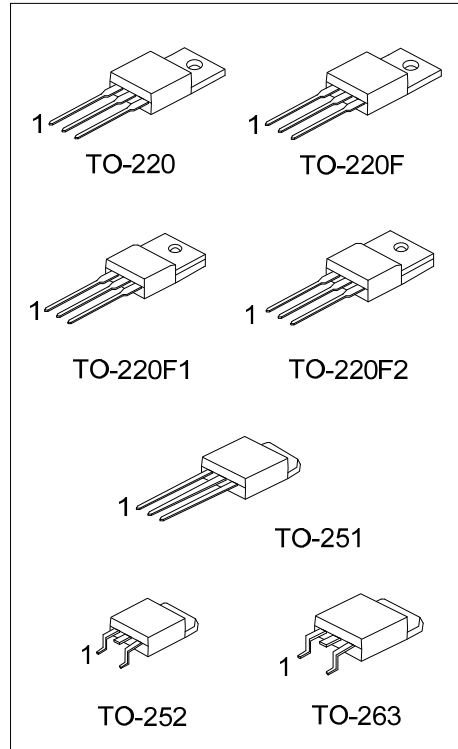
Power MOSFET

**-50A, -100V P-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **UTT50P10** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance. It can also withstand high energy in the avalanche.

FEATURES

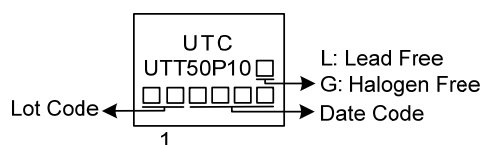
- * $V_{DS} = -100V$
- * $I_D = -50A$
- * $R_{DS(ON)} \leq 60\text{ m}\Omega$ @ $V_{GS} = -10V$, $I_D = -20A$
- $R_{DS(ON)} \leq 75\text{ m}\Omega$ @ $V_{GS} = -4.5V$, $I_D = -15A$
- * High Switching Speed

**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT50P10L-TA3-T	UTT50P10G-TA3-T	TO-220	G	D	S	Tube
UTT50P10L-TF1-T	UTT50P10G-TF1-T	TO-220F1	G	D	S	Tube
UTT50P10L-TF2-T	UTT50P10G-TF2-T	TO-220F2	G	D	S	Tube
UTT50P10L-TF3-T	UTT50P10G-TF3-T	TO-220F	G	D	S	Tube
UTT50P10L-TM3-T	UTT50P10G-TM3-T	TO-251	G	D	S	Tube
UTT50P10L-TN3-R	UTT50P10G-TN3-R	TO-252	G	D	S	Tape Reel
UTT50P10L-TQ2-T	UTT50P10G-TQ2-T	TO-263	G	D	S	Tube
UTT50P10L-TQ2-R	UTT50P10G-TQ2-R	TO-263	G	D	S	Tape Reel

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

	(1) Packing Type	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2, TM3: TO-251, TN3: TO-252, TQ2: TO-263 (3) G: Halogen Free and Lead Free, L: Lead Free
	(2) Package Type	
	(3) Green Package	

MARKING

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	-100	V
Gate-Source Voltage		V _{GSS}	±20	V
Drain Current	Continuous	I _D	-50	A
	Pulsed	I _{DM}	-90	A
Avalanche energy	Single Pulsed (Note 3)	E _{AS}	90	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.1	V/ns
Power Dissipation	TO-220/TO-263	P _D	110	W
	TO-220F/TO-220F1		34	W
	TO-220F2			
	TO-251/TO-252		50	W
Junction Temperature		T _J	+150	°C
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} = -42A, V_{DD} = -50V, R_G = 25Ω, Starting T_J = 25°C

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

■ THERMAL DATA

PARAMETER	PACKAGE	SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	θ _{JA}	62.5	°C/W
	TO-220F1/TO-220F2			
	TO-263		110	°C/W
	TO-251/TO-252			
Junction to Case	TO-220/TO-263	θ _{JC}	1.13	°C/W
	TO-220F/TO-220F1		3.68	°C/W
	TO-220F2			
	TO-251/TO-252		2.5	°C/W

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

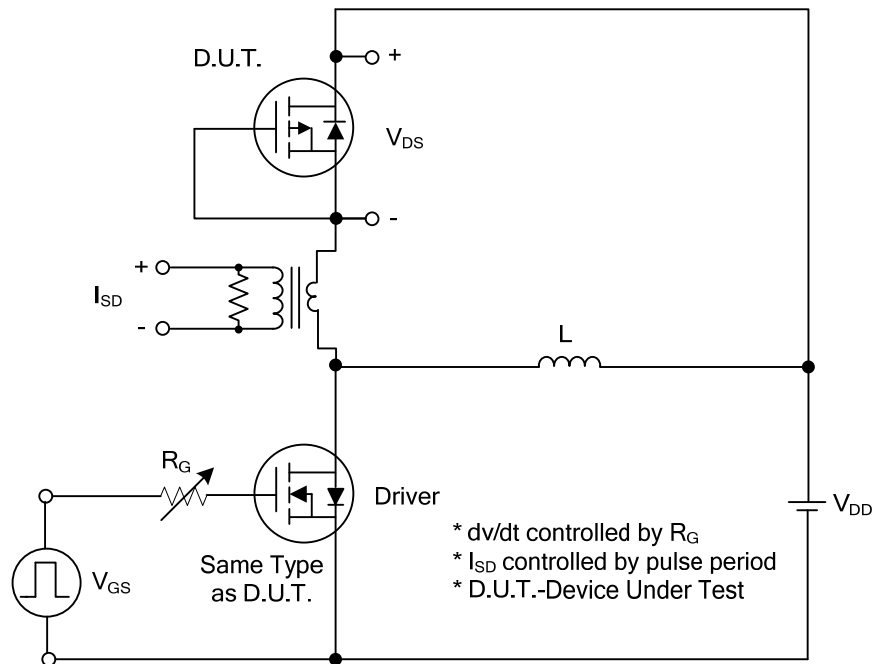
■ ELECTRICAL CHARACTERISTICS (T_c=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =-250μA, V _{GS} =0V	-100			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =-100V, 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 =-20A			60	mΩ
			V _{GS} =-4.5V, I _D =-15A			75	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =-25V, f=1.0MHz		4760		pF
Output Capacitance		C _{OSS}			225		pF
Reverse Transfer Capacitance		C _{RSS}			170		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =-80V, V _{GS} =-10V, I _D =-50A (Note 1)		70		nC
Gate to Source Charge		Q _{GS}			17		nC
Gate to Drain Charge		Q _{GD}			15		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =-50V, V _{GS} =-10V, I _D =-50A, R _G =3Ω (Note 1)		12		ns
Rise Time		t _R			20		ns
Turn-OFF Delay Time		t _{D(OFF)}			67		ns
Fall-Time		t _F			27		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage		V _{SD}	I _F =-20A, V _{GS} =0V, Pulse test, t≤300μs, duty cycle d≤2%			-2.0	V
Body Diode Reverse Recovery Time		t _{rr}	I _F =-30A, di/dt=100A/μs		57		ns
Body Diode Reverse Recovery Charge		Q _{rr}			107		ns

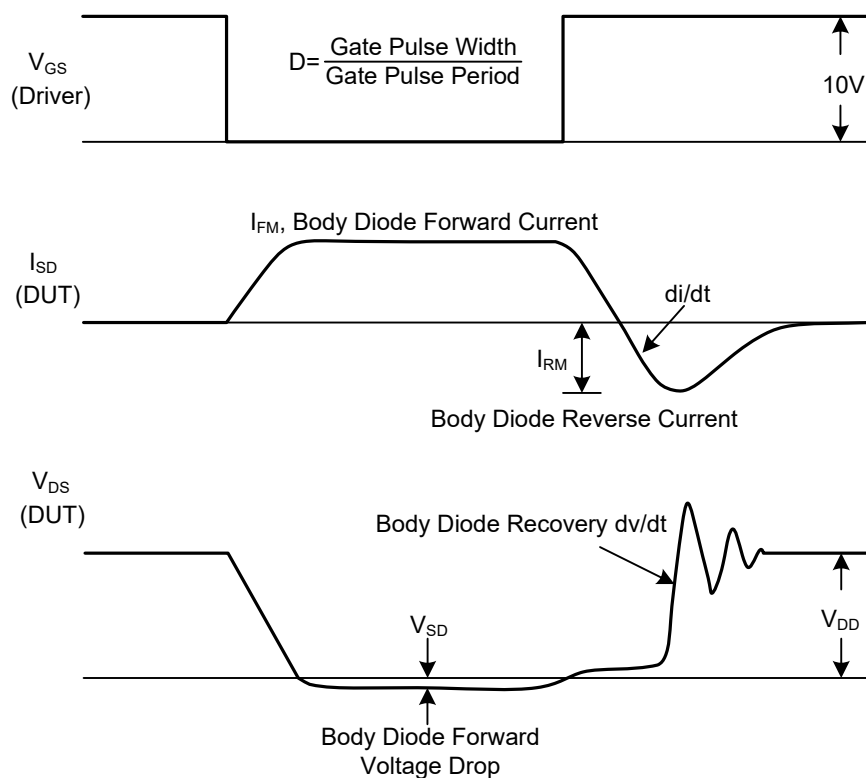
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



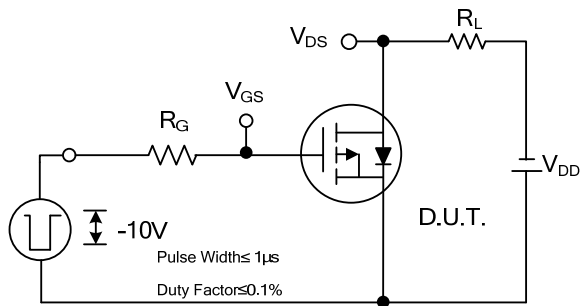
Peak Diode Recovery dv/dt Test Circuit



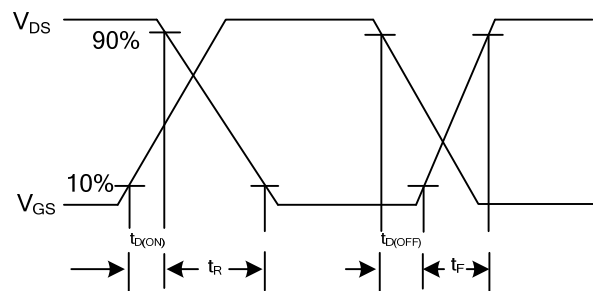
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

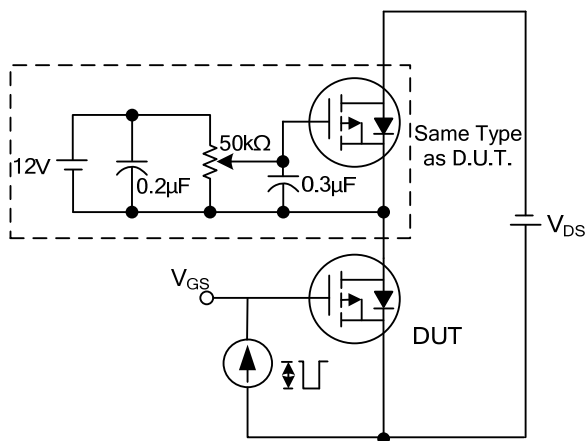
■ TEST CIRCUITS AND WAVEFORMS



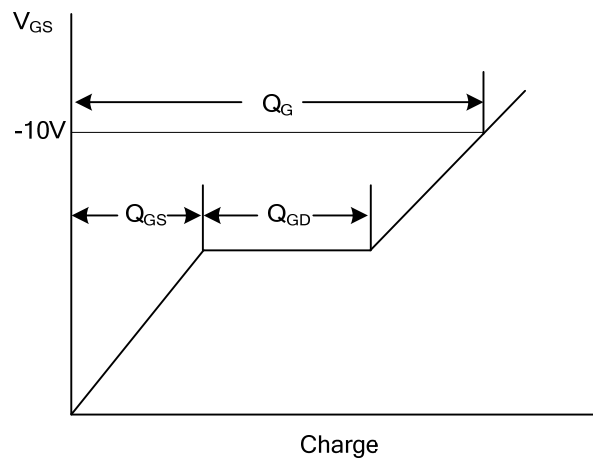
Switching Test Circuit



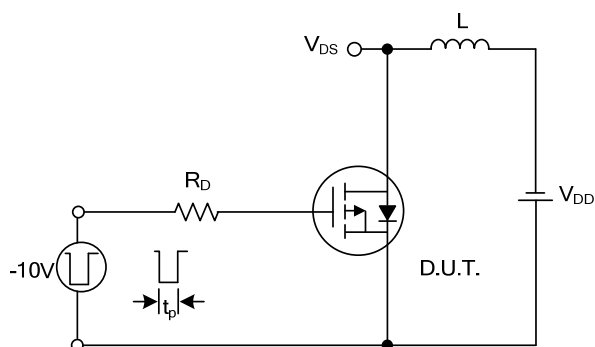
Switching Waveforms



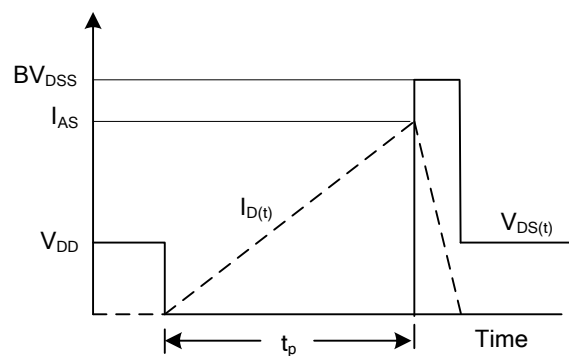
Gate Charge Test Circuit



Gate Charge Waveform

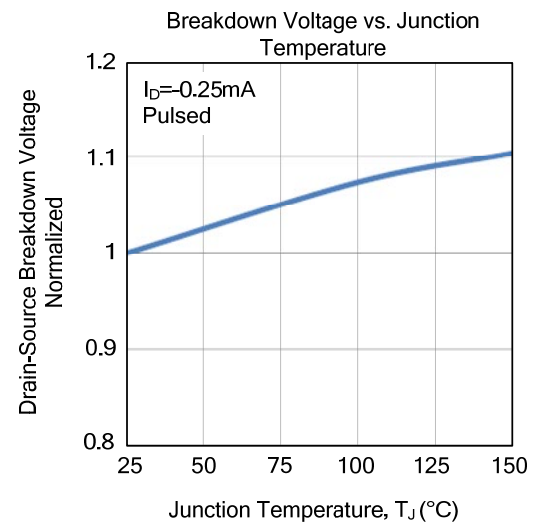
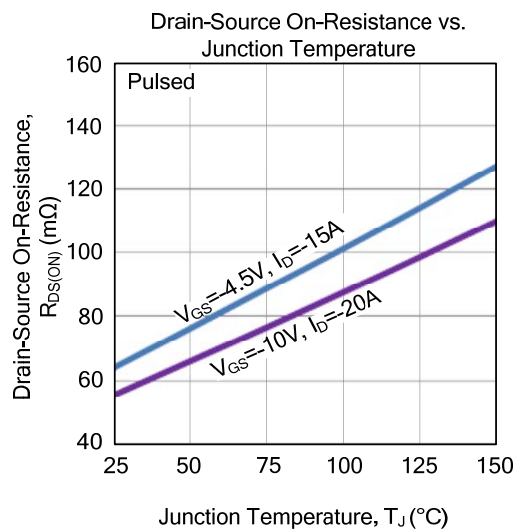
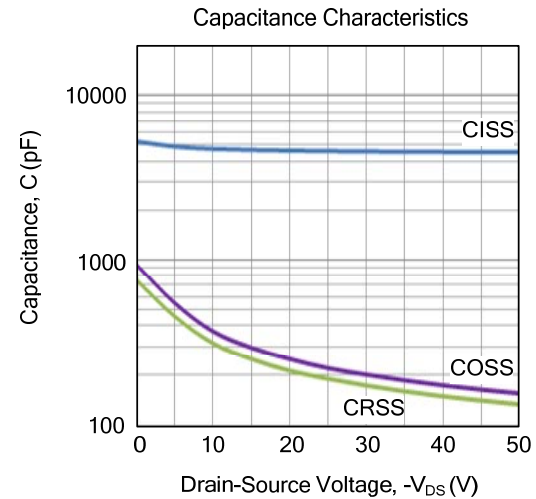
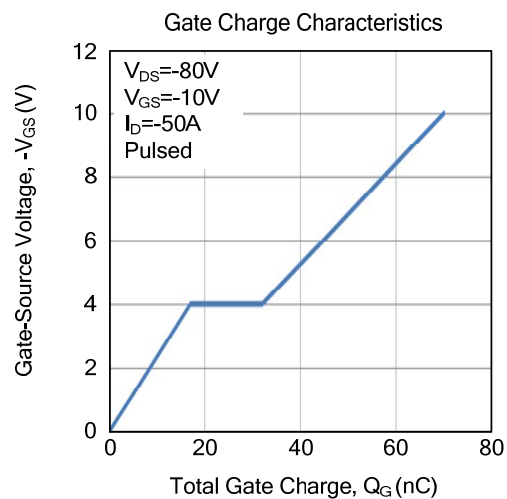
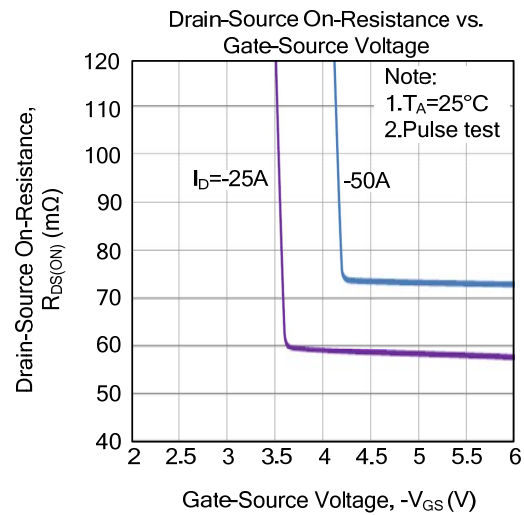
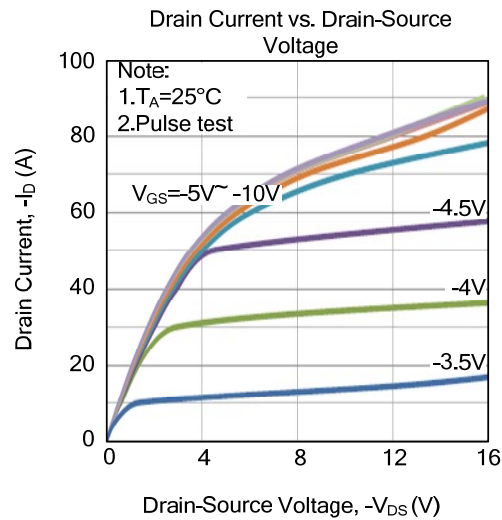


Unclamped Inductive Switching Test Circuit

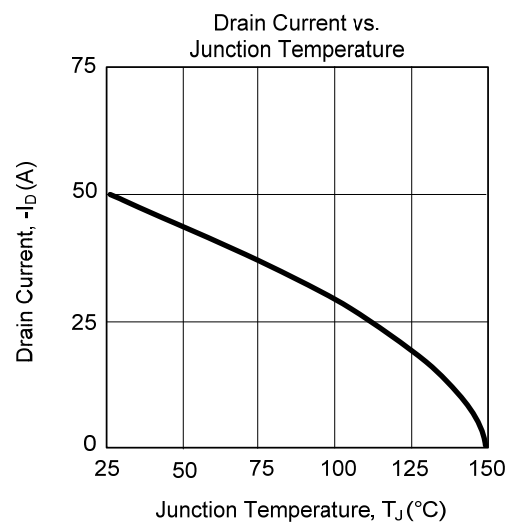
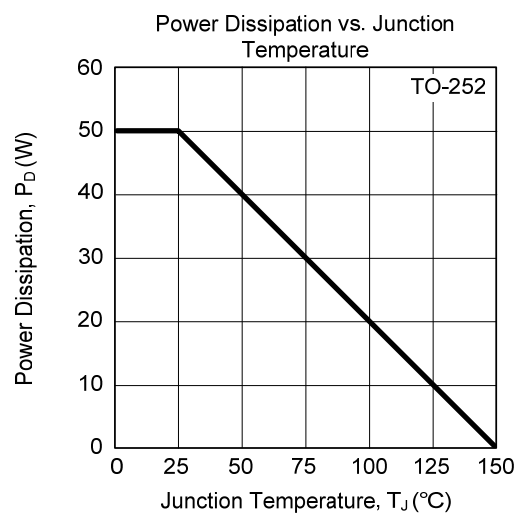
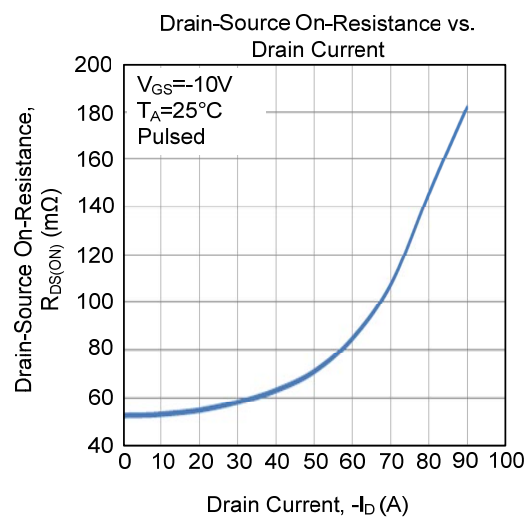
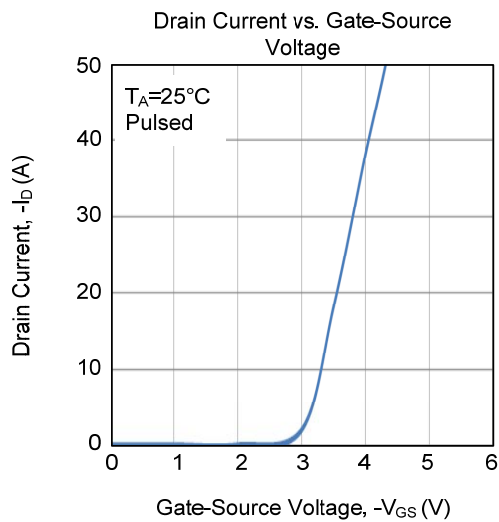
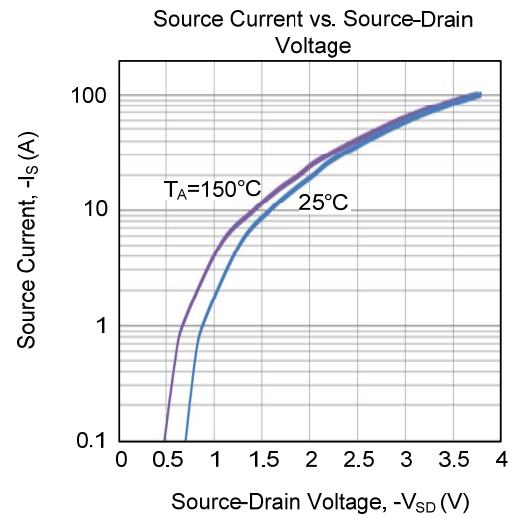
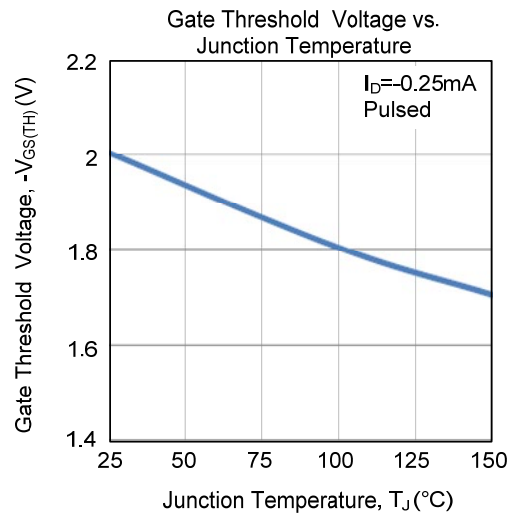


Unclamped Inductive Switching Waveforms

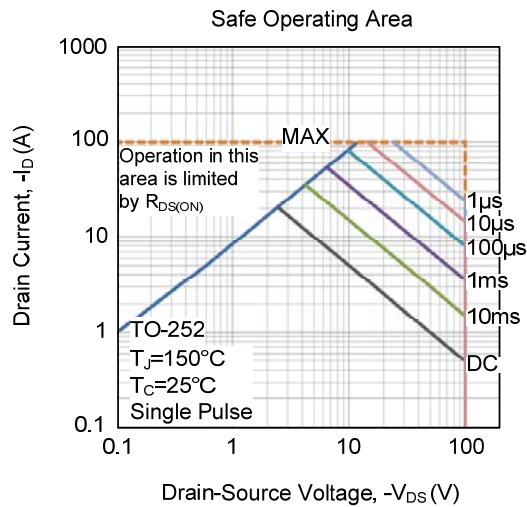
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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