



6N90-C

Power MOSFET

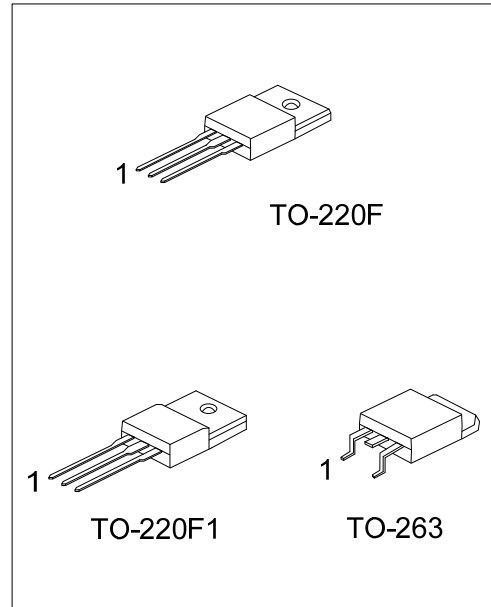
6.0A, 900V N-CHANNEL POWER MOSFET

DESCRIPTION

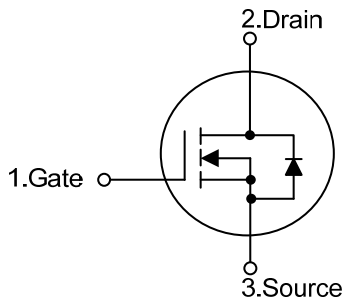
The UTC **6N90-C** provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

FEATURES

- * $R_{DS(ON)} \leq 2.3 \Omega @ V_{GS}=10V, I_D=3.0A$
- * Low Reverse Transfer Capacitance
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability, High Ruggedness



SYMBOL



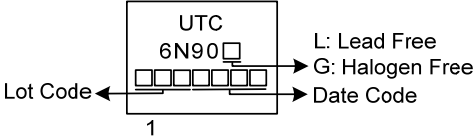
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
6N90L-TF1-T	6N90G-TF1-T	TO-220F1	G	D	S	Tube
6N90L-TF3-T	6N90G-TF3-T	TO-220F	G	D	S	Tube
6N90L-TQ2-T	6N90G-TQ2-T	TO-263	G	C	E	Tube
6N90L-TQ2-R	6N90G-TQ2-R	TO-263	G	C	E	Tape Reel

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

<p>6N90G-TF1-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) TF1: TO-220F1, TF3: TO-220F, TQ2: TO-263 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
--	---

MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	900	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous	I_D	6	A
	Pulsed (Note 2)	I_{DM}	12	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	360	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
MOSFET dv/dt Ruggedness			50	V/ns
Power Dissipation	TO-220F/TO-220F1	P_D	40	W
	TO-263		124	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
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. $L=10\text{mH}$, $I_{AS}=8.5\text{A}$, $V_{DD}=90\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD}\leq 6.0\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient		θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220F/TO-220F1	θ_{JC}	2.5	$^{\circ}\text{C}/\text{W}$
	TO-263		1	$^{\circ}\text{C}/\text{W}$

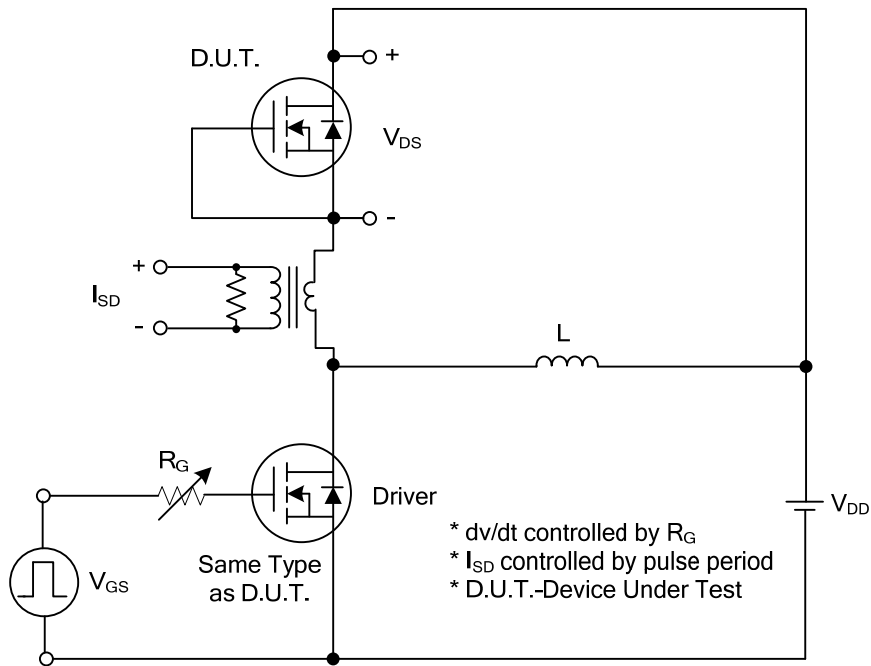
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	900			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =900V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±30V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	3.0		5.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =3.0A			2.3	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		1000		pF
Output Capacitance	C _{OSS}			110		pF
Reverse Transfer Capacitance	C _{RSS}			11		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =100V, V _{GS} =10V, I _D =6A (Note 1, 2)		27		nC
Gate-Source Charge	Q _{GS}			7.2		nC
Gate-Drain Charge	Q _{GD}			6.2		nC
Turn-On Delay Time (Note 1)	t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =6A, R _G =25Ω (Note 1, 2)		20		ns
Turn-On Rise Time	t _R			18		ns
Turn-Off Delay Time	t _{D(OFF)}			80		ns
Turn-Off Fall Time	t _F			38		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				6	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				12	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =6.0A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t _{rr}	I _S =6.0A, V _{GS} =0V, dI _F /dt=100A/μs		880		ns
Body Diode Reverse Recovery Charge	Q _{rr}				6.4	

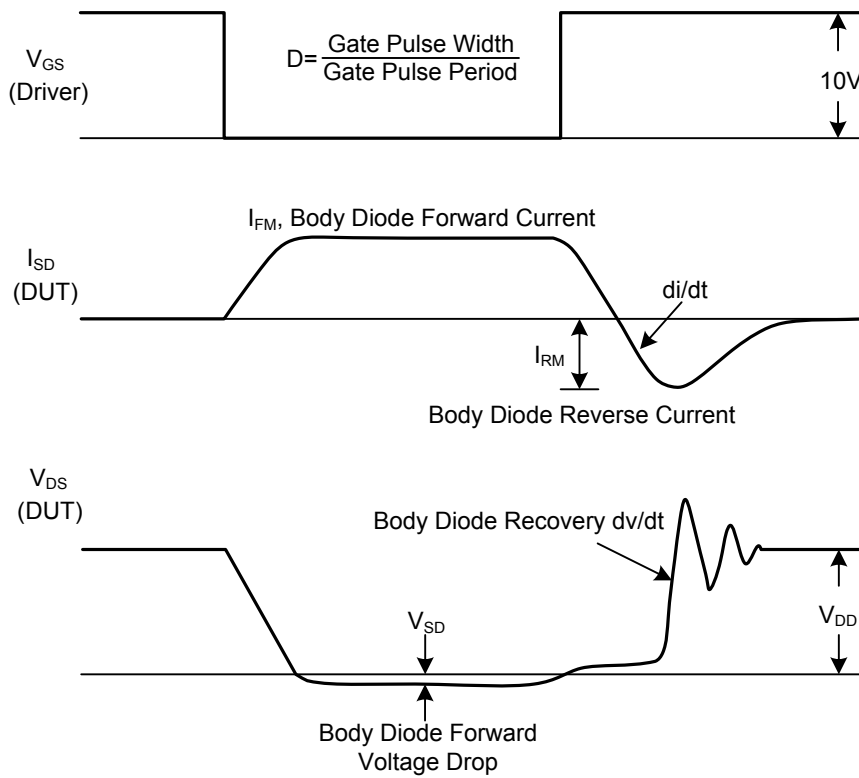
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

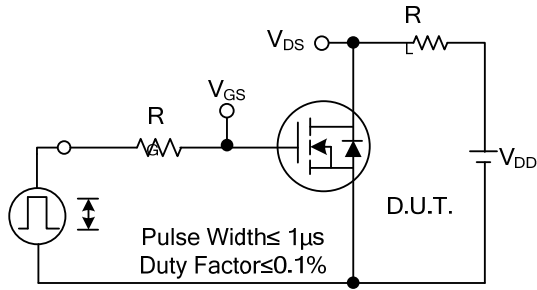


Peak Diode Recovery dv/dt Test Circuit

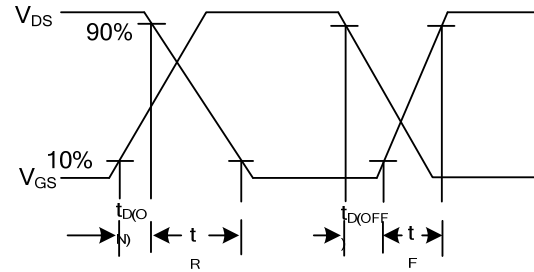


Peak Diode Recovery dv/dt Waveforms

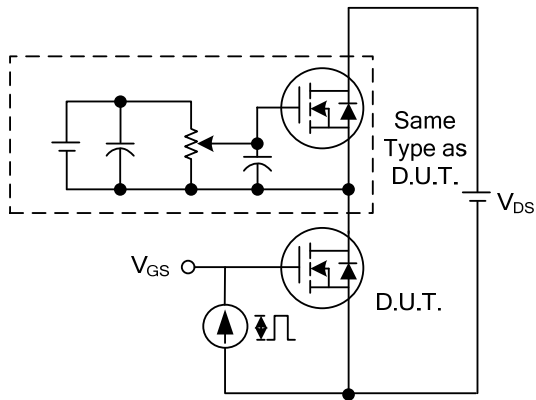
TEST CIRCUITS AND WAVEFORMS



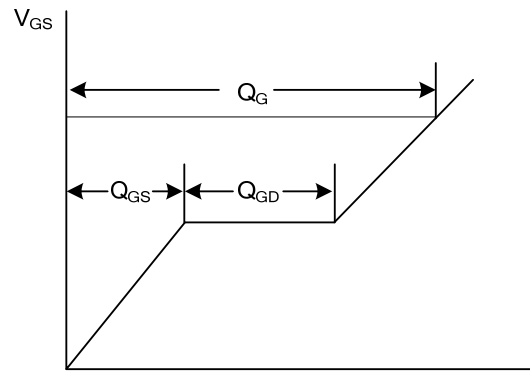
Switching Test Circuit



Switching Waveforms

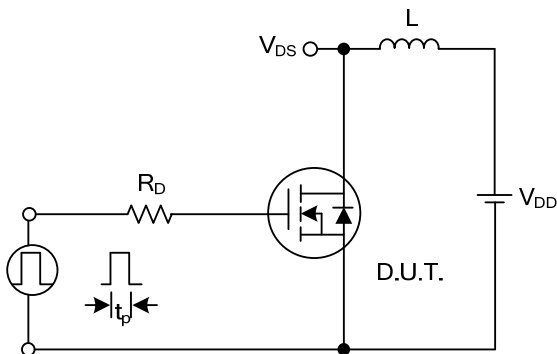


Gate Charge Test Circuit

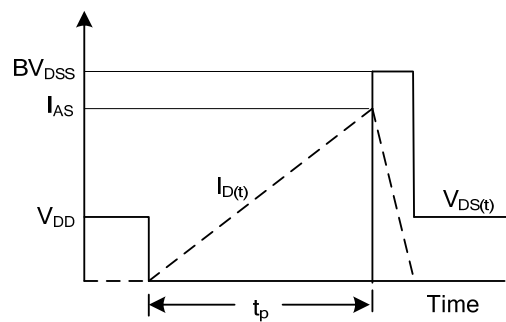


Charge

Gate Charge Waveform

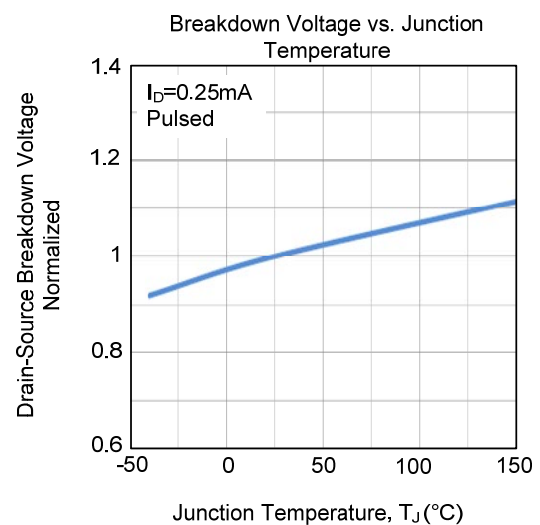
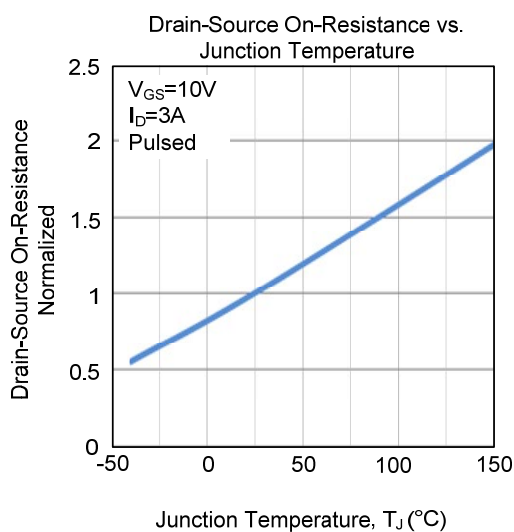
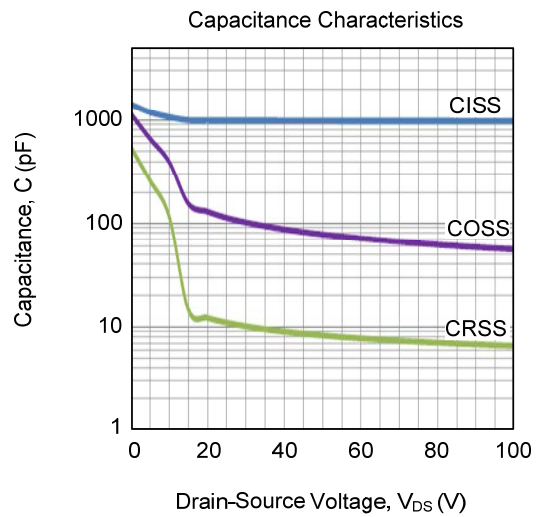
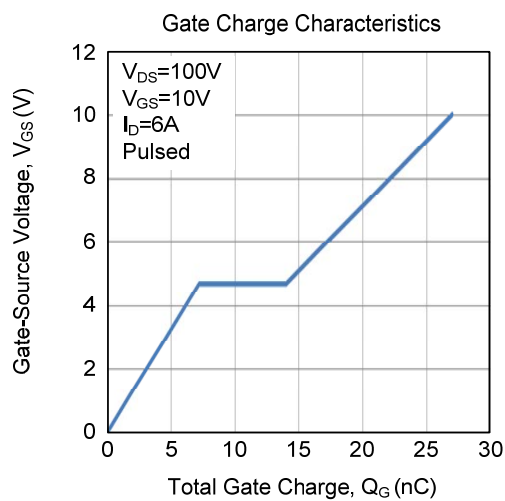
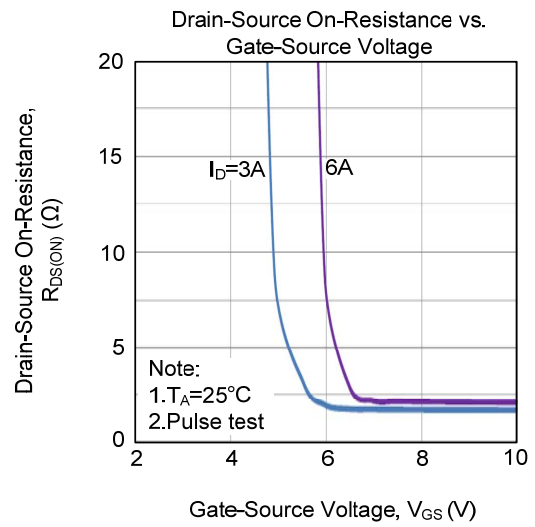
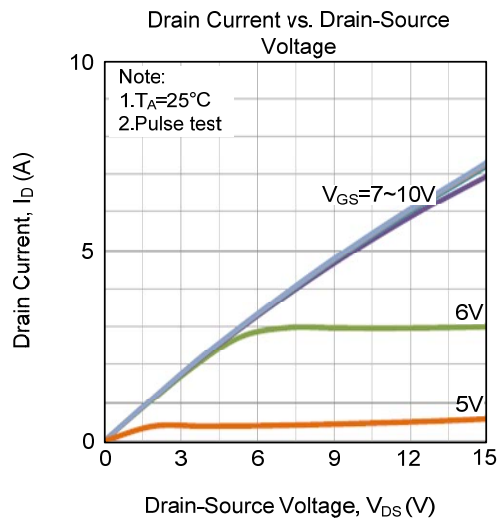


Unclamped Inductive Switching Test Circuit

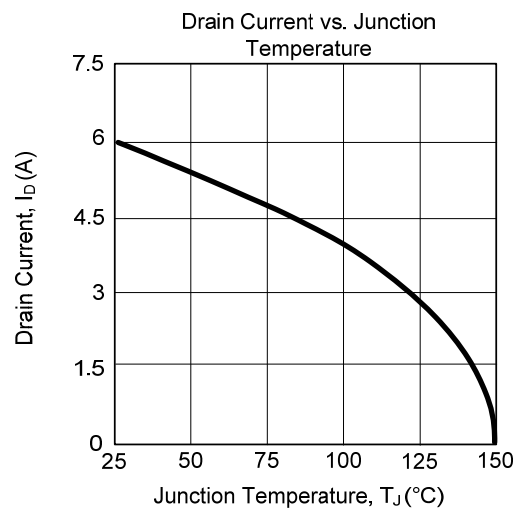
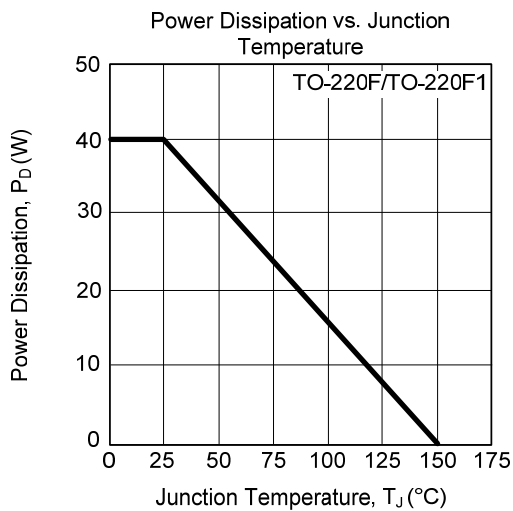
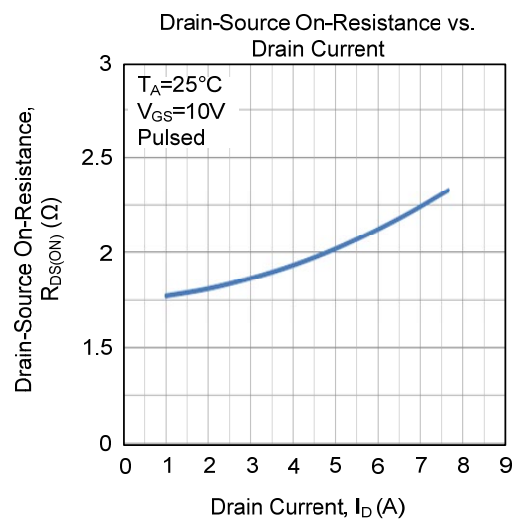
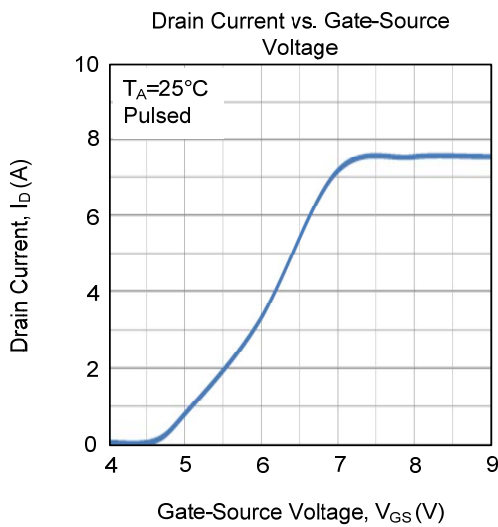
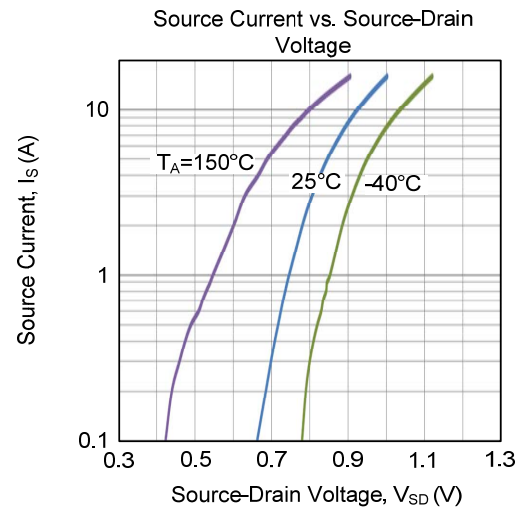
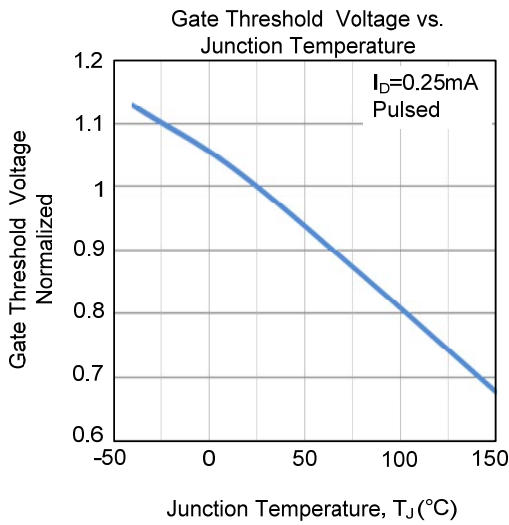


Unclamped Inductive Switching Waveforms

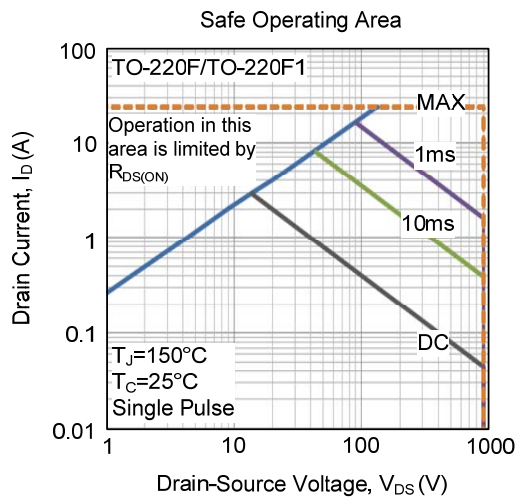
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.