



7N80-C

Power MOSFET

7A, 800V NHANNEL POWER MOSFET

■ DESCRIPTION

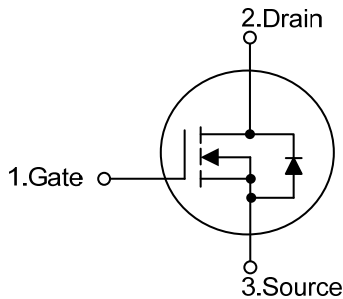
The UTC **7N80-C** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **7N80-C** is universally applied in high efficiency switch mode power supply.

■ FEATURES

- * $R_{DS(ON)} \leq 1.9\Omega @ V_{GS}=10V, I_D=3.5A$
- * Low Reverse Transfer Capacitance
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability, High Ruggedness

■ SYMBOL

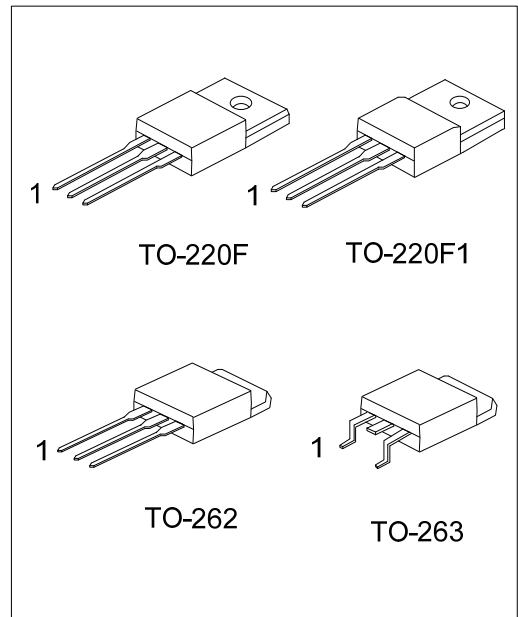


■ ORDERING INFORMATION

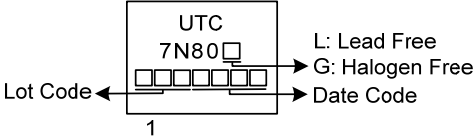
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
7N80L-TF1-T	7N80G-TF1-T	TO-220F1	G	D	S	Tube
7N80L-TF3-T	7N80G-TF3-T	TO-220F	G	D	S	Tube
7N80L-T2Q-T	7N80G-T2Q-T	TO-262	G	D	S	Tube
7N80L-TQ2-T	7N80G-TQ2-T	TO-263	G	D	S	Tube
7N80L-TQ2-R	7N80G-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>7N80G-TF1-T</p>	<p>(1) T: Tube, R: Tape Reel (2) TF1: TO-220F1, TF3: TO-220F, T2Q: TO-262 TQ2: TO-263 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	800	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous	I_D	7	A
	Pulsed (Note 2)	I_{DM}	14	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	245	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.4	V/ns
Power Dissipation	TO-220F/TO-220F1	P_D	36	W
	TO-262/TO-263		140	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. $L=10\text{mH}$, $I_{AS}=7.0\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD}\leq 7.0\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220F/TO-220F1	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-262/TO-263			
Junction to Case	TO-220F/TO-220F1	θ_{JC}	3.4	$^\circ\text{C}/\text{W}$
	TO-262/TO-263		0.89	$^\circ\text{C}/\text{W}$

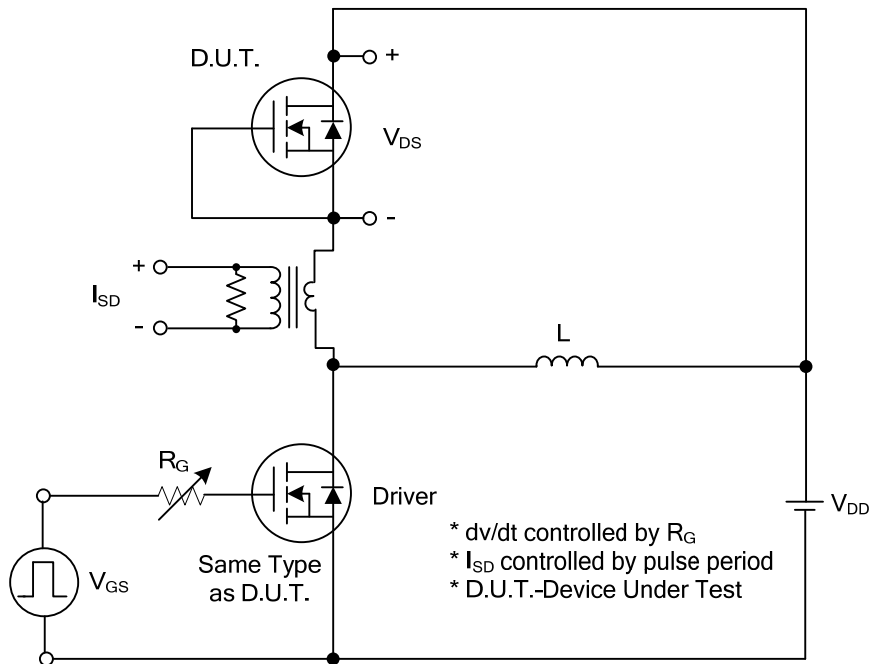
■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	800			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=800V, V_{GS}=0V$			10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	3.0		5.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=3.5A$			1.9	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$		1050		pF
Output Capacitance	C_{OSS}			120		pF
Reverse Transfer Capacitance	C_{RSS}			12		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=640V, V_{GS}=10V, I_D=7A$ $I_G=1\text{mA}$ (Note 1, 2)		31		nC
Gate-Source Charge	Q_{GS}			12		nC
Gate-Drain Charge	Q_{GD}			9		nC
Turn-On Delay Time (Note 1)	$t_{D(ON)}$	$V_{DD}=100V, V_{GS}=10V, I_D=7A,$ $R_G=25\Omega$ (Note 1, 2)		21.5		ns
Turn-On Rise Time	t_R			19		ns
Turn-Off Delay Time	$t_{D(OFF)}$			70		ns
Turn-Off Fall Time	t_F			35		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				7	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				14	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_S=7.0A, V_{GS}=0V$			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t_{rr}	$I_S=7.0A, V_{GS}=0V, dI_F/dt=100A/\mu s$		650		nS
Body Diode Reverse Recovery Charge	Q_{rr}			6.4		μC

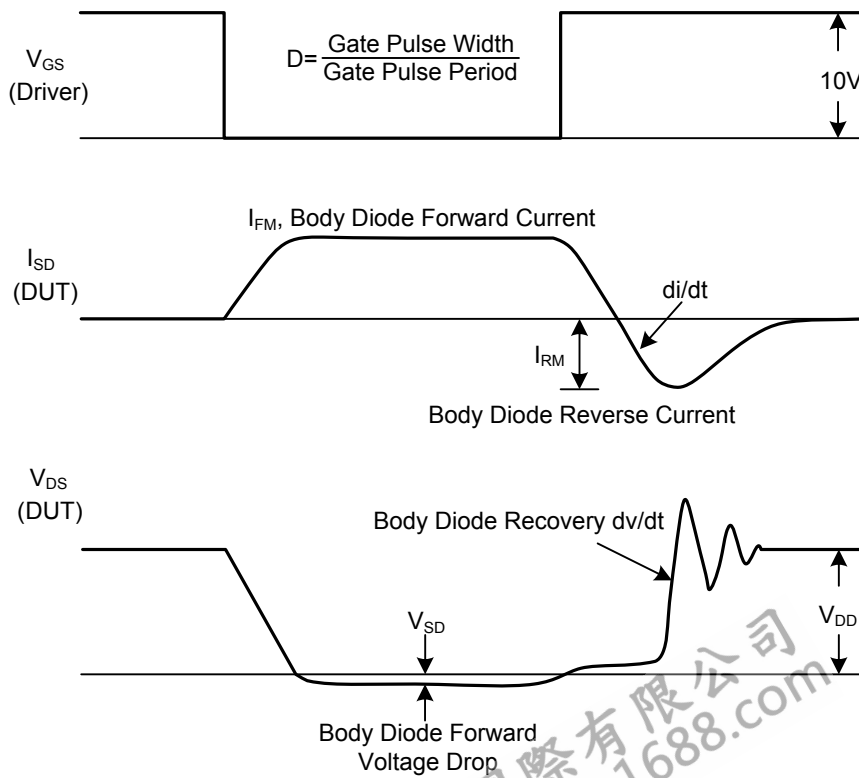
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

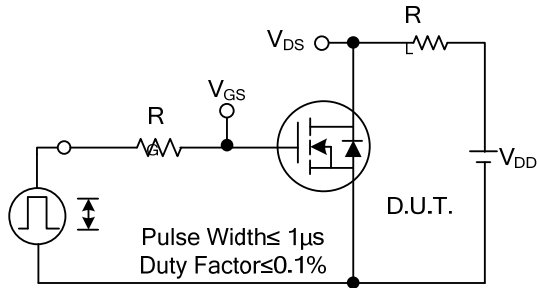


Peak Diode Recovery dv/dt Test Circuit

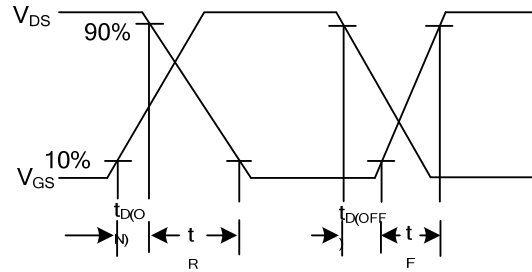


Peak Diode Recovery dv/dt Waveforms

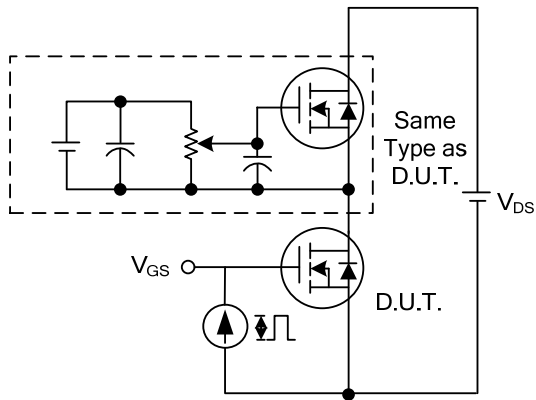
■ TEST CIRCUITS AND WAVEFORMS



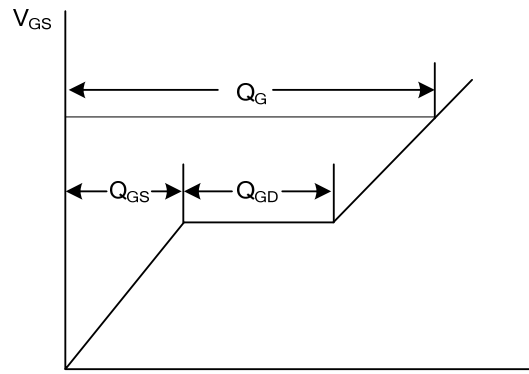
Switching Test Circuit



Switching Waveforms

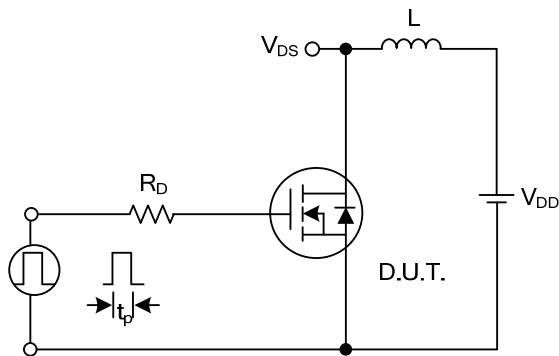


Gate Charge Test Circuit

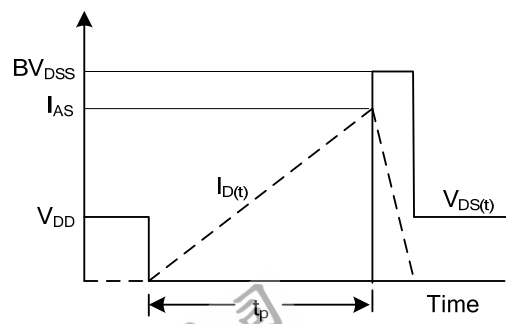


Charge

Gate Charge Waveform

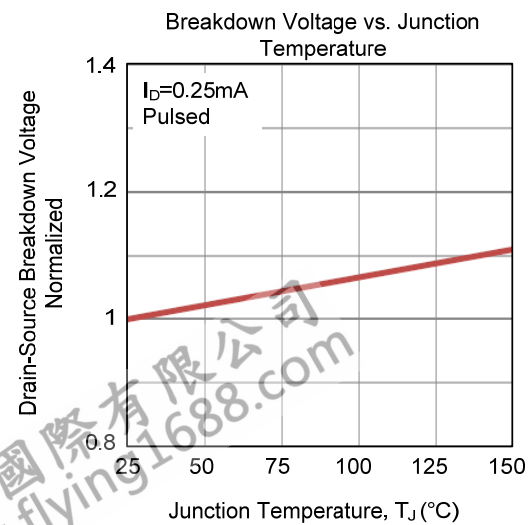
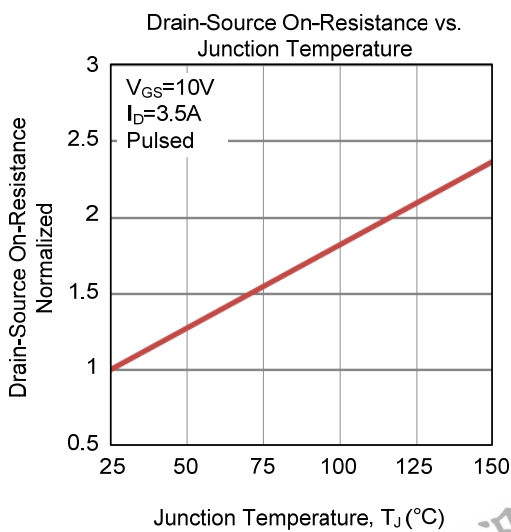
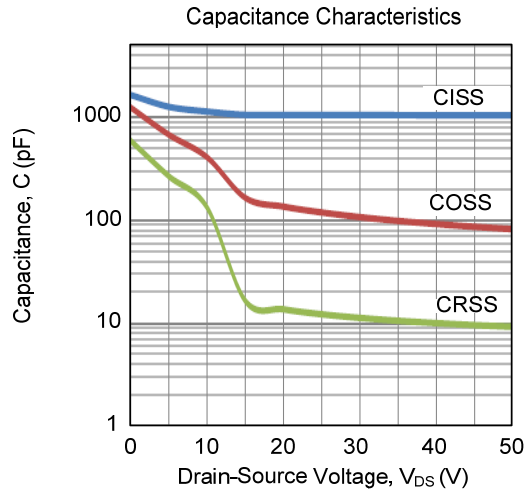
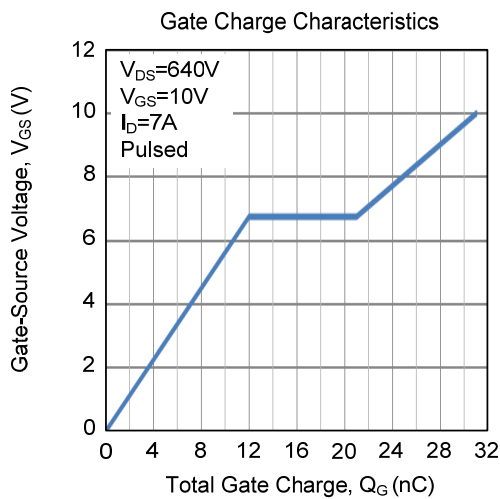
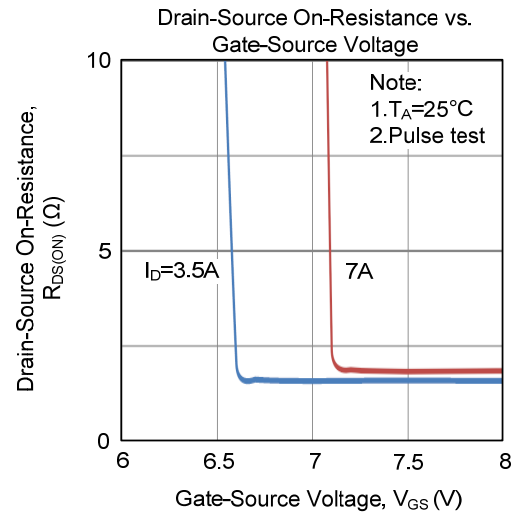
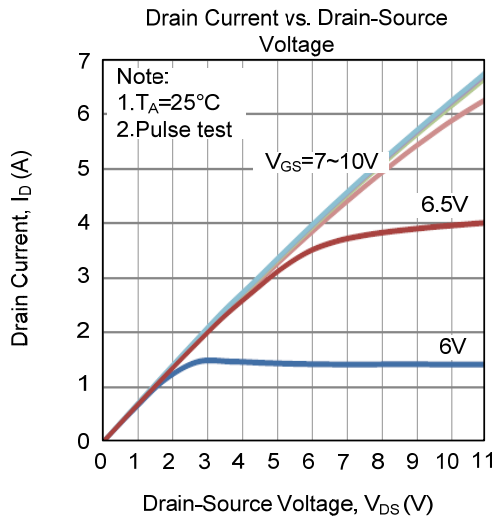


Unclamped Inductive Switching Test Circuit

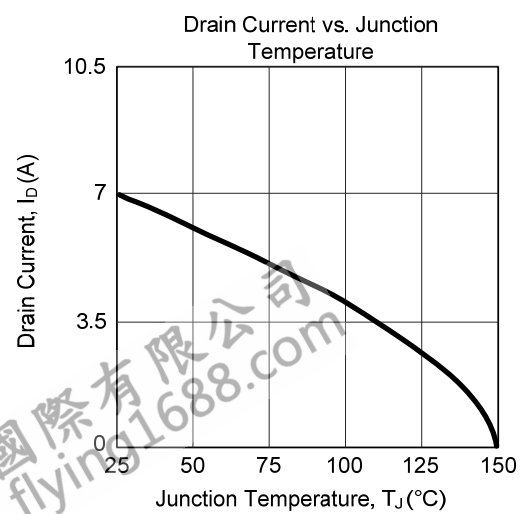
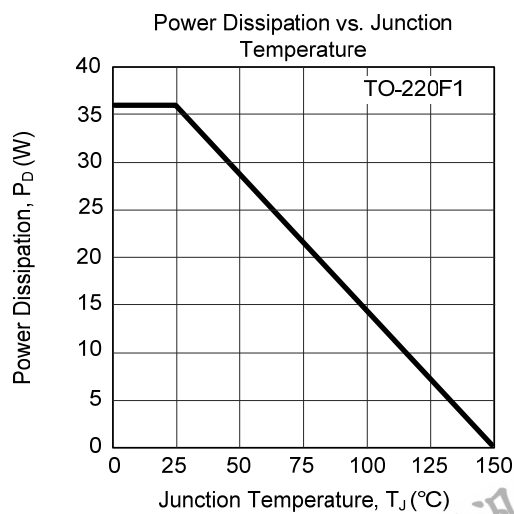
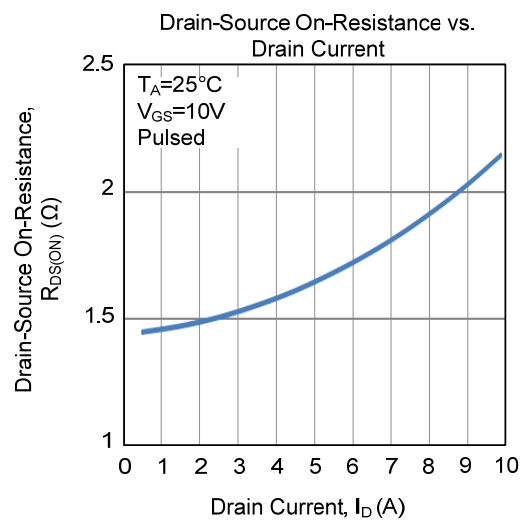
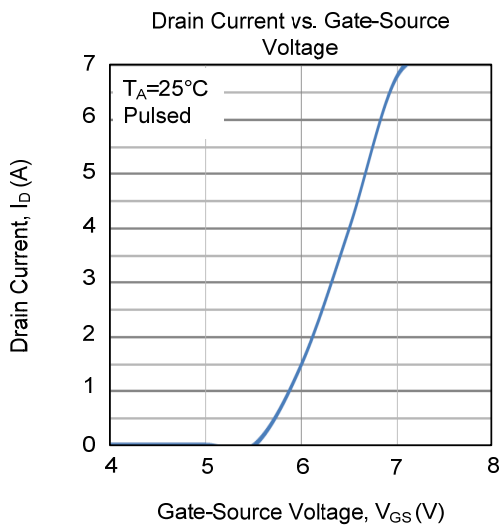
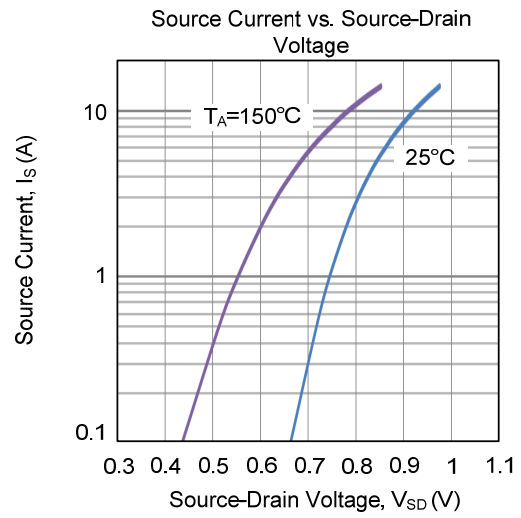
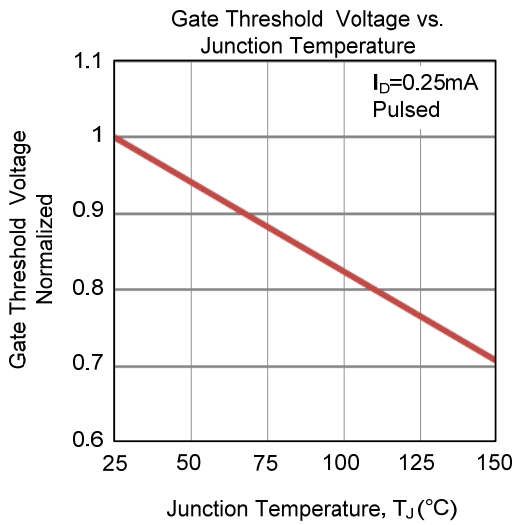


Unclamped Inductive Switching Waveforms

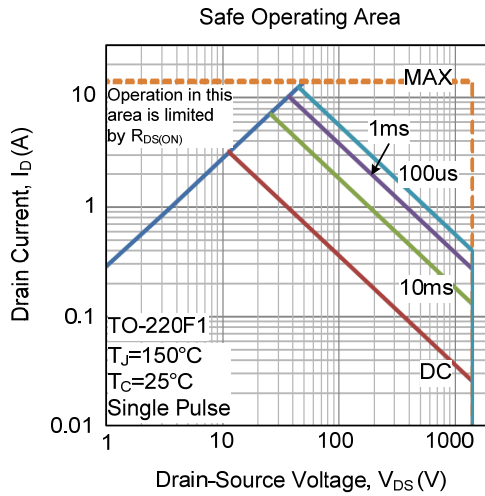
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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