



7N90-FC

Power MOSFET

7.0A, 900V N-CHANNEL POWER MOSFET

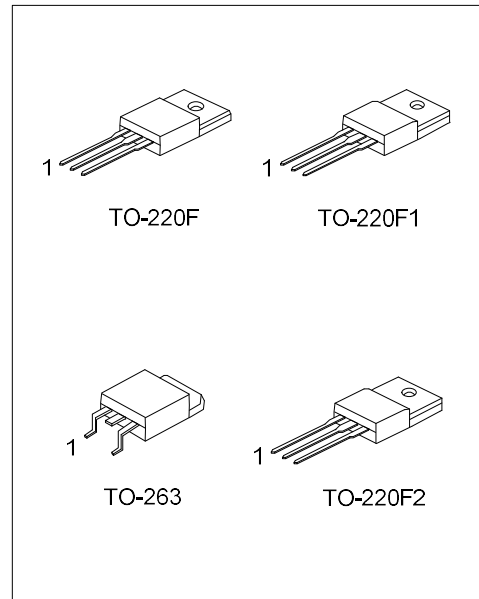
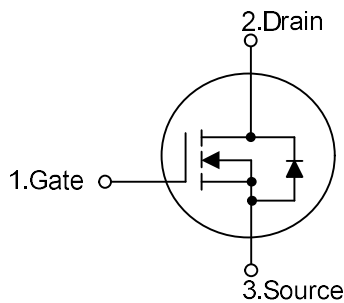
DESCRIPTION

The UTC 7N90-FC 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

- * $R_{DS(ON)} \leq 1.85 \Omega @ V_{GS}=10V, I_D=3.5A$
- * Fast Switching Capability
- * Avalanche Energy Specified

SYMBOL



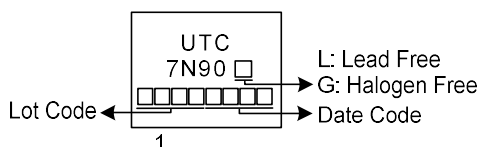
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
7N90L-TF1-T	7N90G-TF1-T	TO-220F1	G	D	S	Tube
7N90L-TF2-T	7N90G-TF2-T	TO-220F2	G	D	S	Tube
7N90L-TF3-T	7N90G-TF3-T	TO-220F	G	D	S	Tube
7N90L-TQ2-T	7N90G-TQ2-T	TO-263	G	D	S	Tube
7N90L-TQ2-R	7N90G-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>7N90G-TF1-T</p>	<p>(1) T: Tube, R: Tape Reel (2) TF1: TO-220F1, TF2: TO-220F2, TF3: TO-220F TQ2: TO-263 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C = 25°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	7	A
	Pulsed (Note 2)	I _{DM}	14	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	70	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4	V/ns
Power Dissipation	TO-220F/TO-220F1	P _D	38	W
	TO-220F2			
	TO-263		155	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=1.0mH, I_{AS}=11.8A, V_{DD}=50V, R_G=25 Ω, Starting T_J = 25°C

4. I_{SD} ≤ 7.0A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient (Note)		θ _{JA}	40	°C/W
Junction to Case (Note)	TO-220F/TO-220F1	θ _{JC}	3.28	°C/W
	TO-220F2			
	TO-263		0.8	°C/W

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

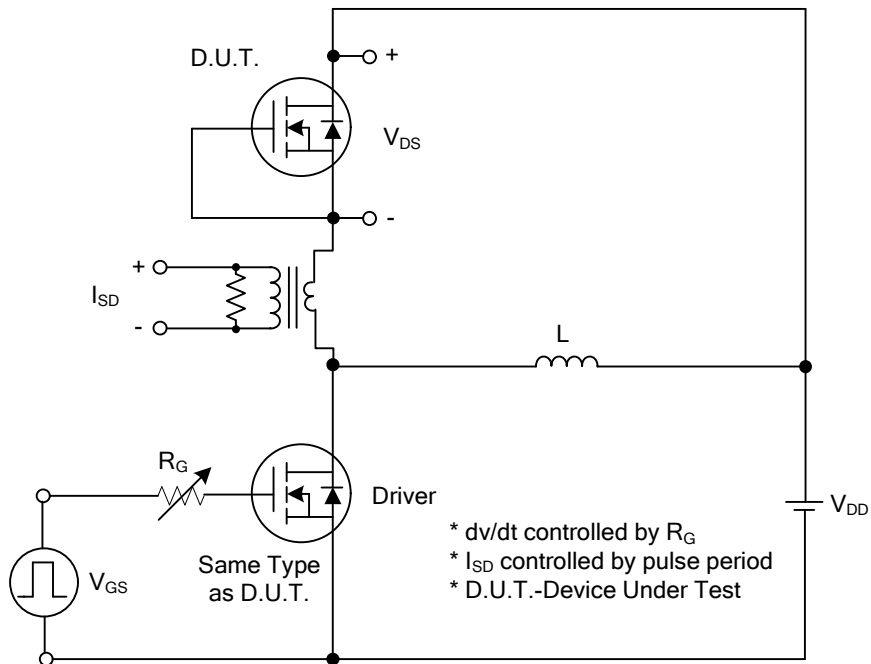
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	900			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=900V, V_{GS}=0V$			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	$R_{DS(ON)}$	$V_{GS}=10V, I_D=3.5A$			1.85	Ω
DYNAMIC CHARACTERISTICS¹²²⁰						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=25V, f=1MHz$		1430		pF
Output Capacitance	C_{OSS}			115		pF
Reverse Transfer Capacitance	C_{RSS}			1.8		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q_G	$V_{DS}=720V, V_{GS}=10V, I_D=7.0A$ $I_G=1mA$ (Note 1, 2)		22		nC
Gate-Source Charge	Q_{GS}			8		nC
Gate-Drain Charge	Q_{DD}			2		nC
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=100V, V_{GS}=10V, I_D=7.0A,$ $R_G=25\Omega$ (Note 1, 2)		20		ns
Turn-On Rise Time	t_R			16		ns
Turn-Off Delay Time	$t_{D(OFF)}$			55		ns
Turn-Off Fall Time	t_F			36		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	V_{SD}	$I_S=7.0A, V_{GS}=0V$			1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_S=7.0A, V_{GS}=0V, dI_F/dt=100A/\mu s$		520		nS
Body Diode Reverse Recovery Charge	Q_{rr}			1.2		μC

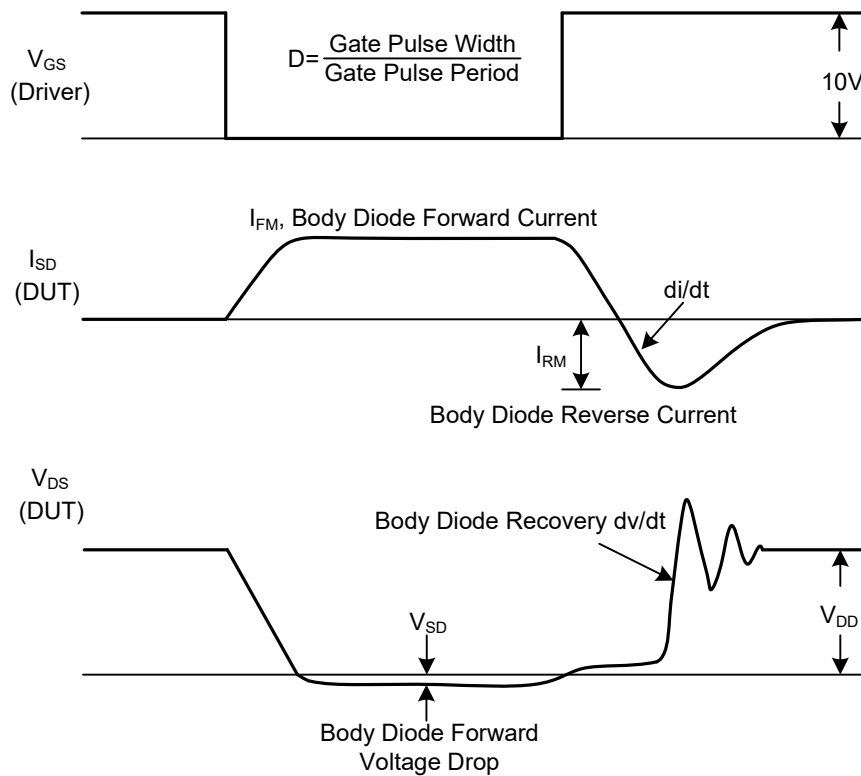
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

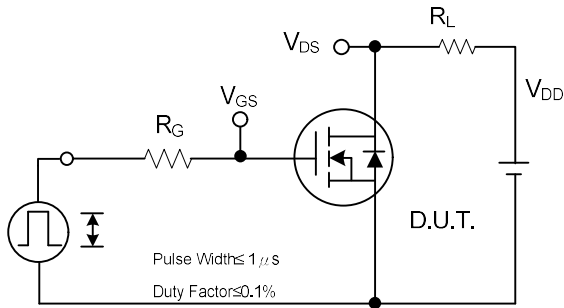


Peak Diode Recovery dv/dt Test Circuit

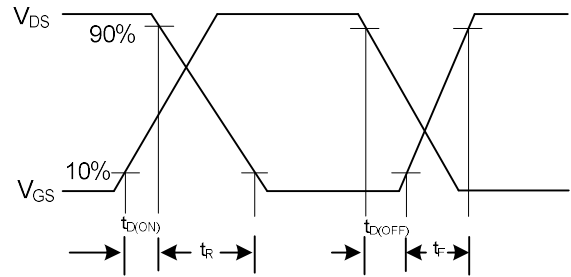


Peak Diode Recovery dv/dt Waveforms

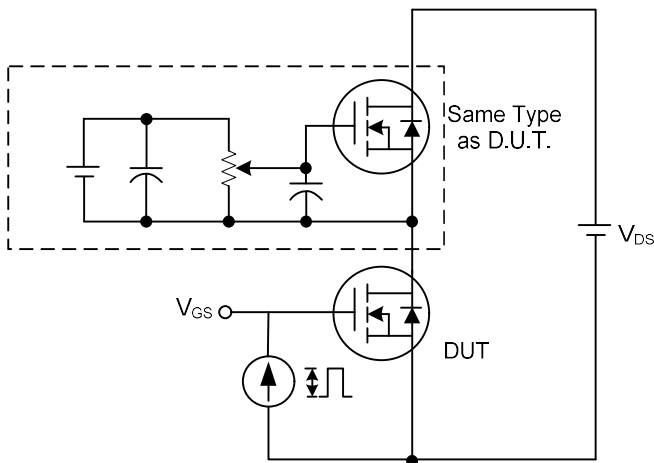
TEST CIRCUITS AND WAVEFORMS



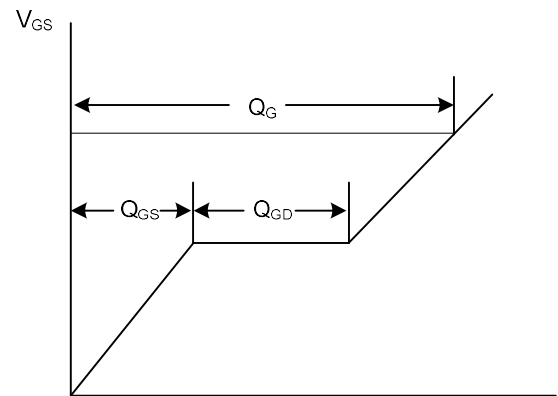
Switching Test Circuit



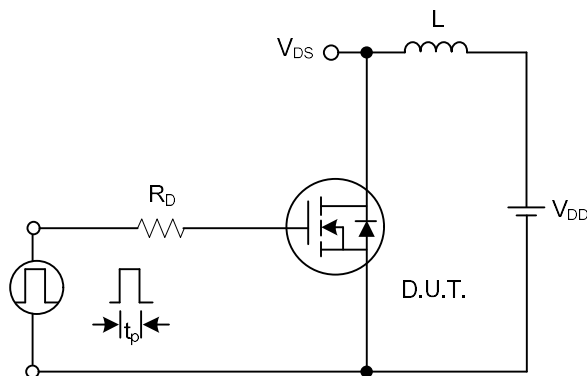
Switching Waveforms



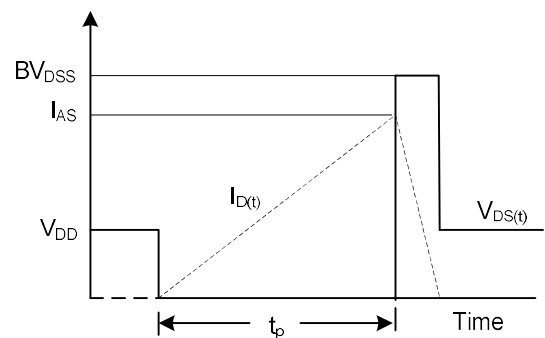
Gate Charge Test Circuit



Charge Gate Charge Waveform

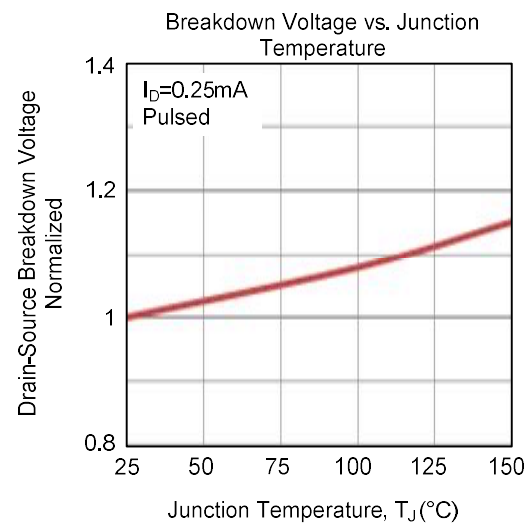
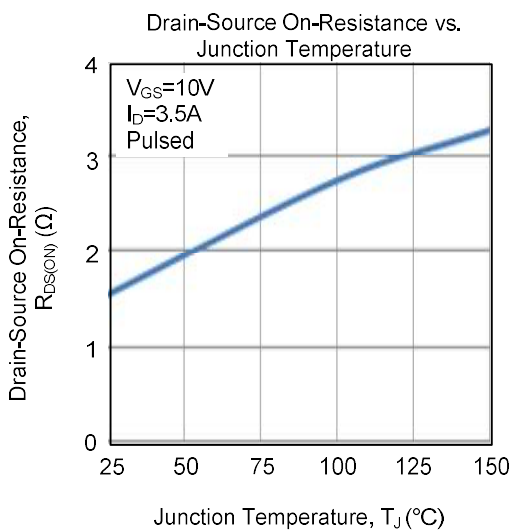
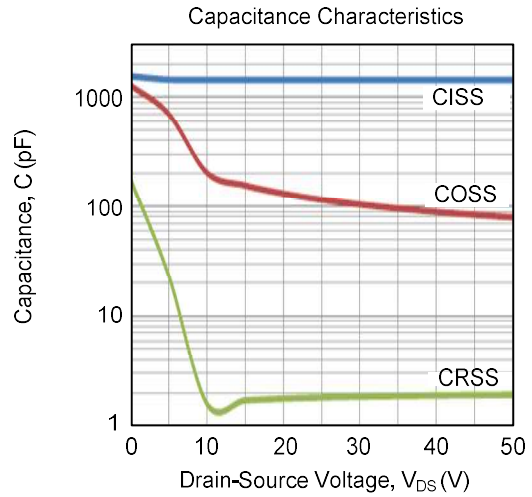
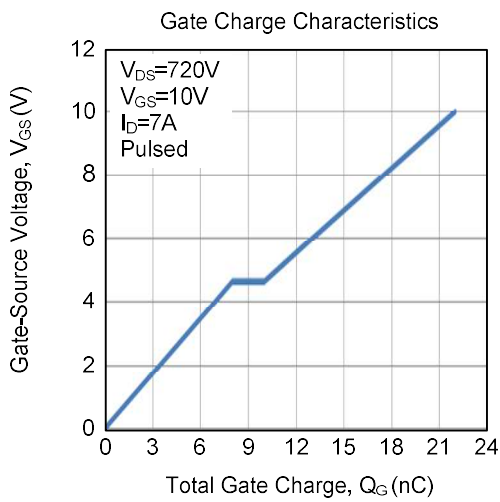
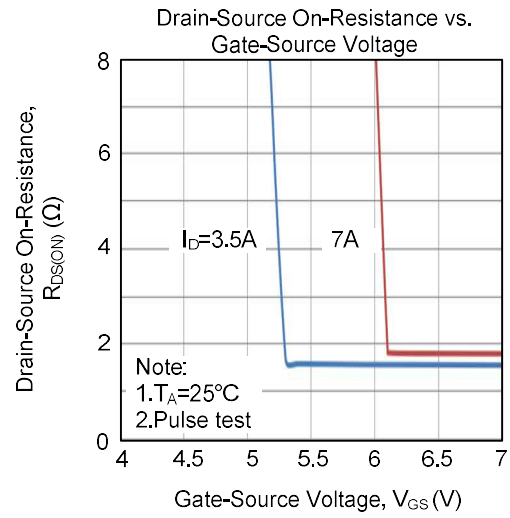
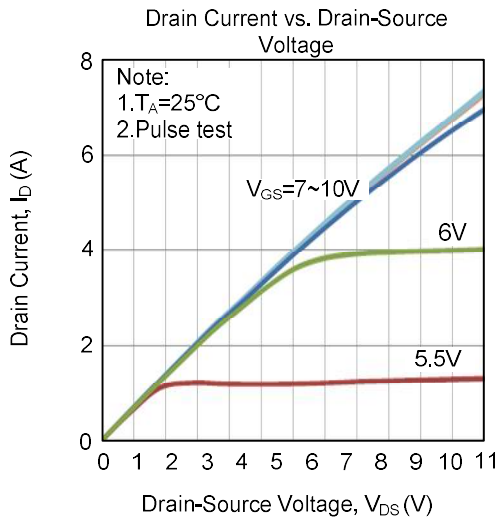


Unclamped Inductive Switching Test Circuit

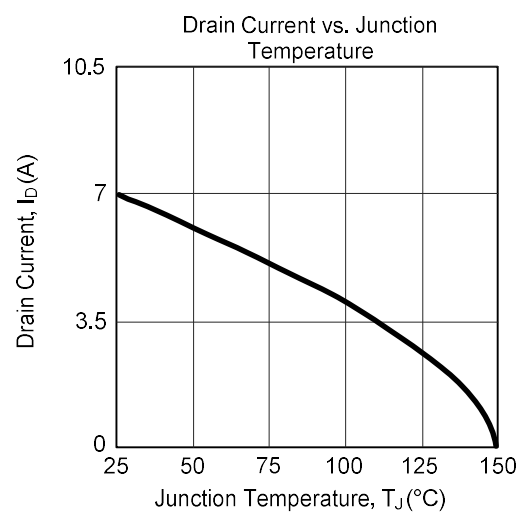
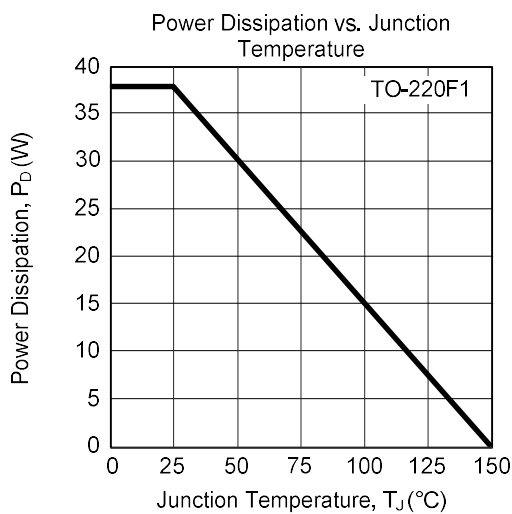
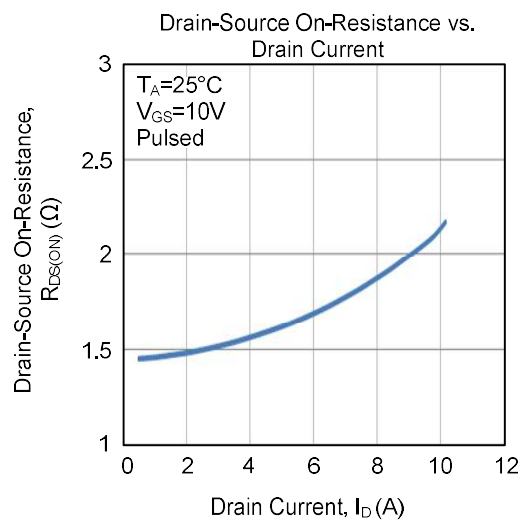
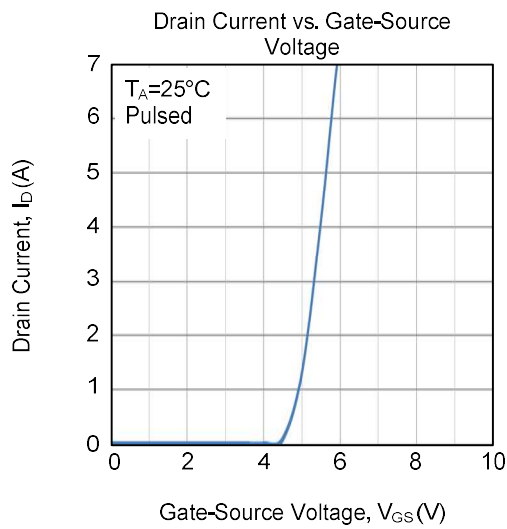
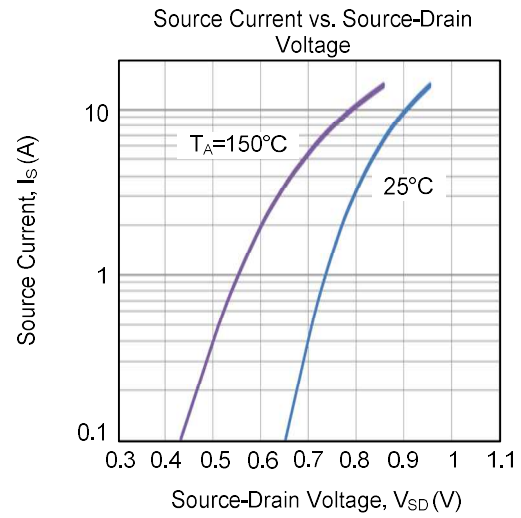
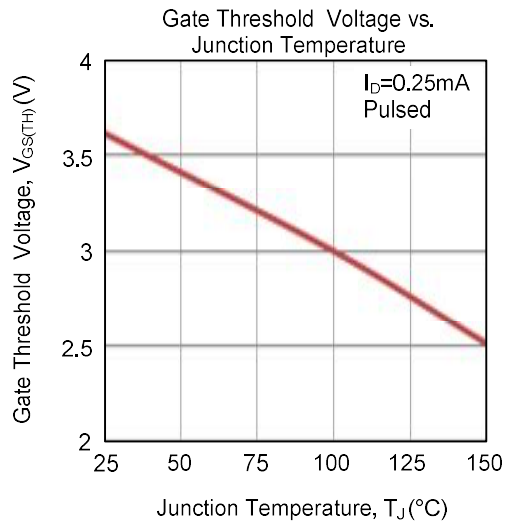


Unclamped Inductive Switching Waveforms

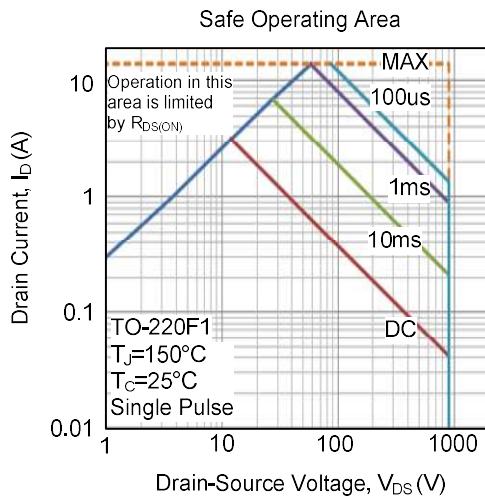
■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ **TYPICAL CHARACTERISTICS (Cont.)**



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