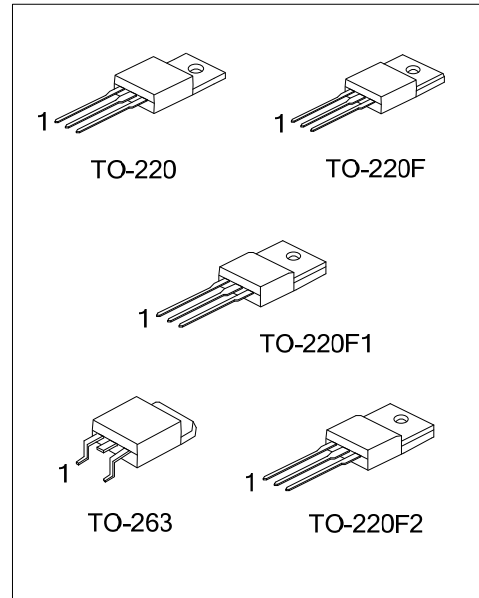
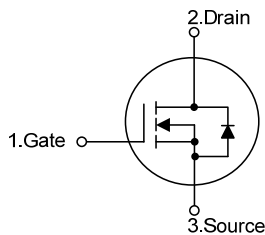


**7N65-M****Power MOSFET****7.4A, 650V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **7N65-M** is a high voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in switching power supplies and adaptors.

FEATURES

- * $R_{DS(ON)} \leq 1.2 \Omega$ @ $V_{GS} = 10V$, $I_D = 3.7A$
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

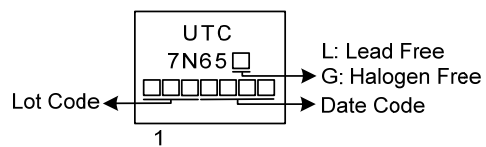
SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
7N65L-TA3-T	7N65G-TA3-T	TO-220	G	D	S	Tube
7N65L-TF3-T	7N65G-TF3-T	TO-220F	G	D	S	Tube
7N65L-TF1-T	7N65G-TF1-T	TO-220F1	G	D	S	Tube
7N65L-TF2-T	7N65G-TF2-T	TO-220F2	G	D	S	Tube
7N65L-TQ2-T	7N65G-TQ2-T	TO-263	G	D	S	Tube
7N65L-TQ2-R	7N65G-TQ2-R	TO-263	G	D	S	Tape Reel

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

7N65G-TA3-T (1) Packing Type (2) Package Type (3) Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF1: TO220-F1, TF2: TO-220F2 TF3: TO-220F, TQ2: TO-263 (3) G: Halogen Free and Lead Free, L: Lead Free
---	--

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	650	V
Gate-Source Voltage		V_{GSS}	± 30	V
Avalanche Current (Note 2)		I_{AR}	7.4	A
Drain Current	Continuous	I_D	7.4	A
	Pulsed (Note 2)	I_{DM}	29.6	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	530	mJ
	Repetitive (Note 2)	E_{AR}	14.2	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220/TO-263	P_D	142	W
	TO-220F/TO-220F1		48	W
	TO-220F2		50	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. $L = 19.5\text{mH}$, $I_{AS} = 7.4\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 7.4\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220/TO-263	θ_{JC}	0.88	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		2.6	$^\circ\text{C}/\text{W}$
	TO-220F2		2.5	$^\circ\text{C}/\text{W}$

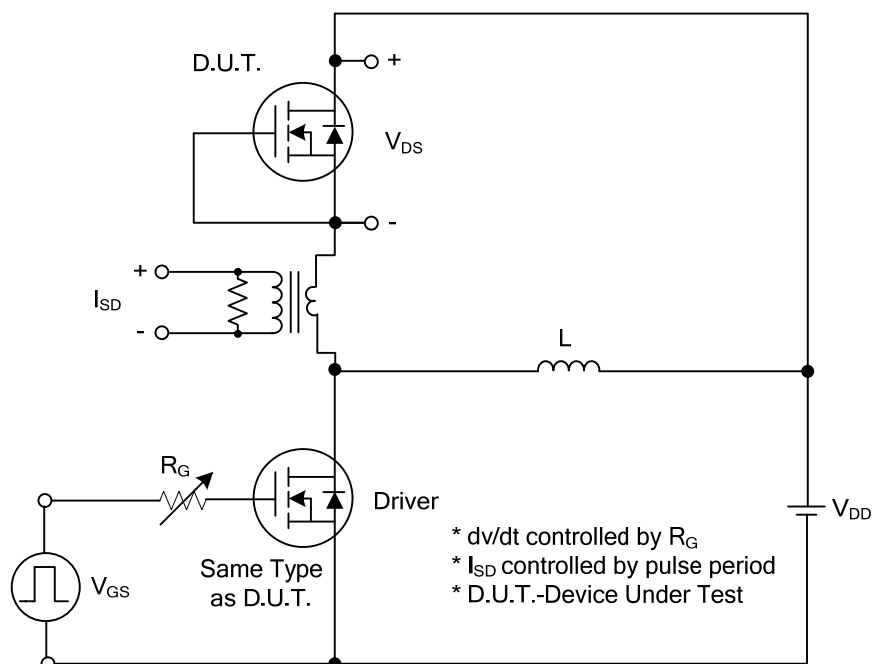
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	650			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =650V, V _{GS} =0V			10	μA
			V _{DS} =520V, V _{GS} =0V, T _C =125°C			100	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =30V, V _{DS} =0V			100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-100	nA
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	I _D =250μA,Referenced to 25°C		0.67		V/°C
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} = V _{GS} , I _D = 250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} = 10V, I _D = 3.7A		1.07	1.2	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0 MHz		1131	1400	pF
Output Capacitance		C _{OSS}			111.5	200	pF
Reverse Transfer Capacitance		C _{RSS}			19.4	40	pF
Gate Resistance		R _G	V _{DS} =0V, V _{GS} =0V, f =1MHz		0.8	5.0	Ω
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q _G	V _{DS} =520V, I _D =7.4A, V _{GS} =10V (Note 1, 2)		35.3	140	nC
Gate-Source Charge		Q _{GS}			10.2		nC
Gate-Drain Charge		Q _{GD}			9.3		nC
Turn-On Delay Time		t _{D(ON)}	V _{DD} =325V, I _D =7.4A, R _G =25Ω (Note 1, 2)		11.9	95	ns
Turn-On Rise Time		t _R			18.7	75	ns
Turn-Off Delay Time		t _{D(OFF)}			104.3	350	ns
Turn-Off Fall Time		t _F			39.4	80	ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				7.4	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				29.6	A
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} = 0V, I _S = 7.4 A			1.4	V
Reverse Recovery Time		t _{rr}	V _{GS} = 0V, I _S = 7.4 A,		366		ns
Reverse Recovery Charge		Q _{rr}	dl _F / dt = 100A/μs (Note 1)		0.8		μC

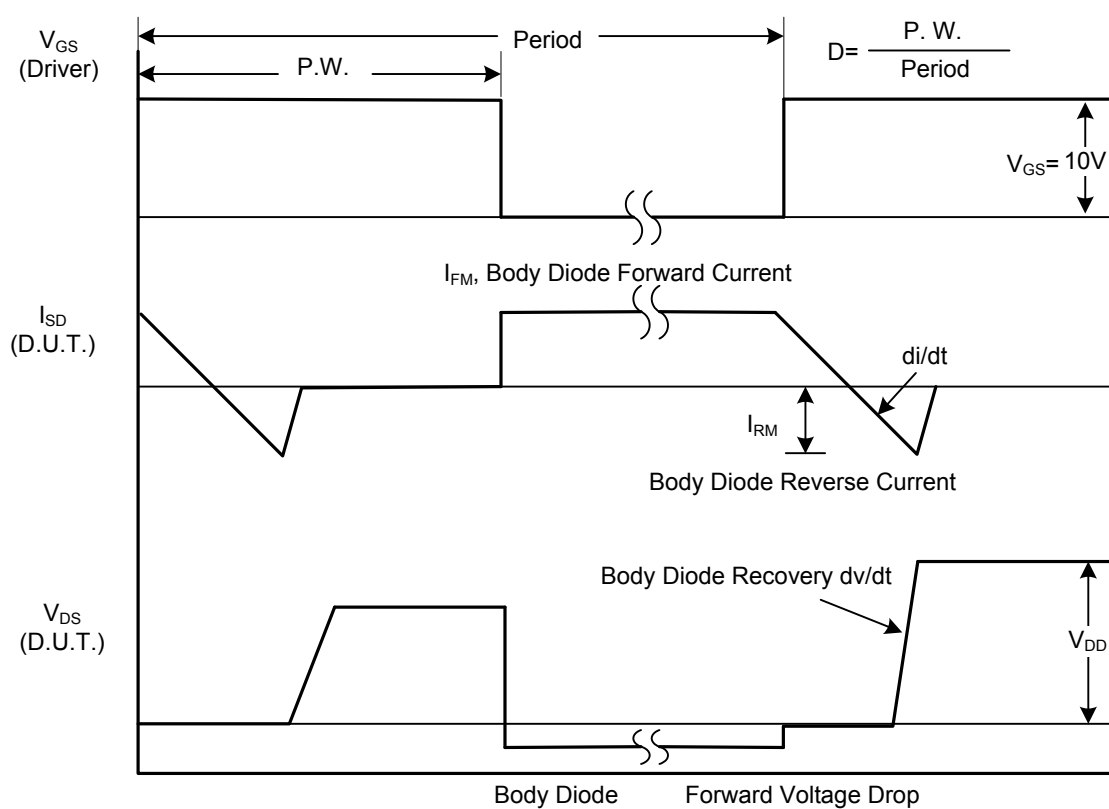
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

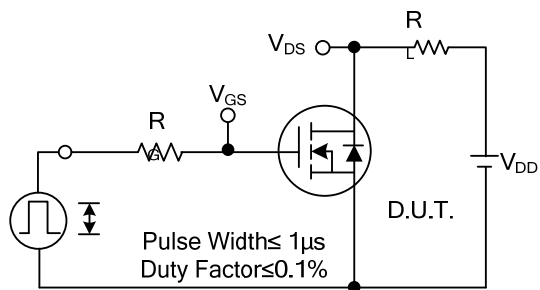


Peak Diode Recovery dv/dt Test Circuit

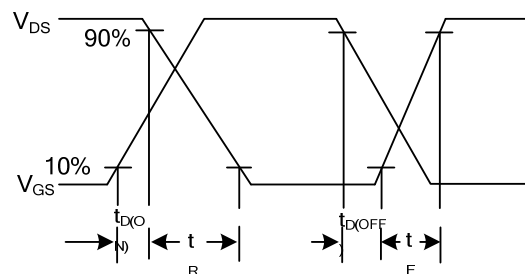


Peak Diode Recovery dv/dt Waveforms

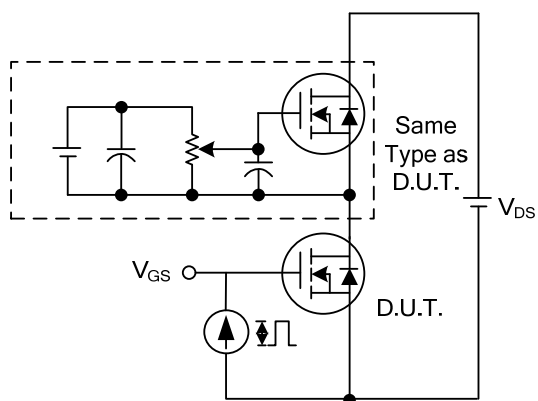
■ TEST CIRCUITS AND WAVEFORMS



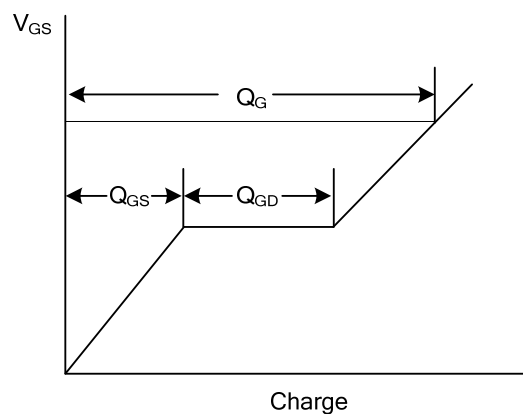
Switching Test Circuit



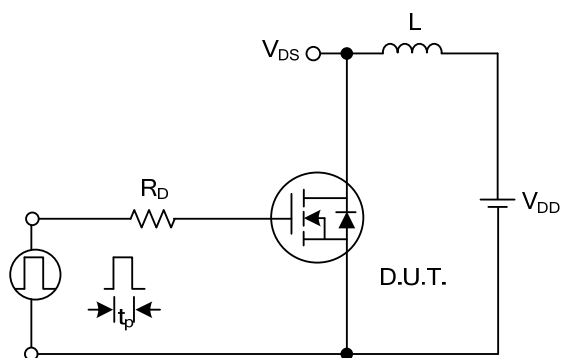
Switching Waveforms



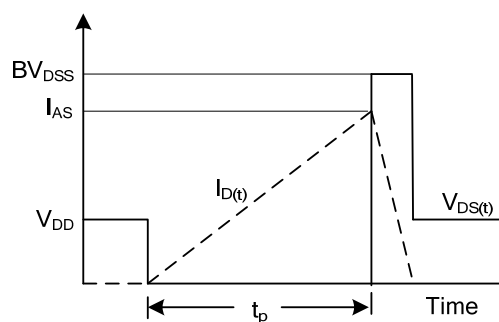
Gate Charge Test Circuit



Gate Charge Waveform

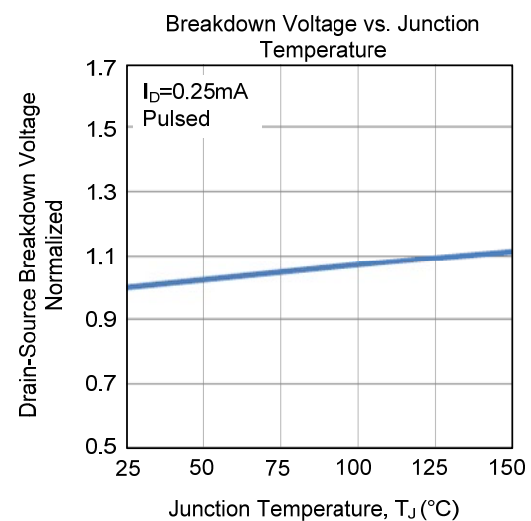
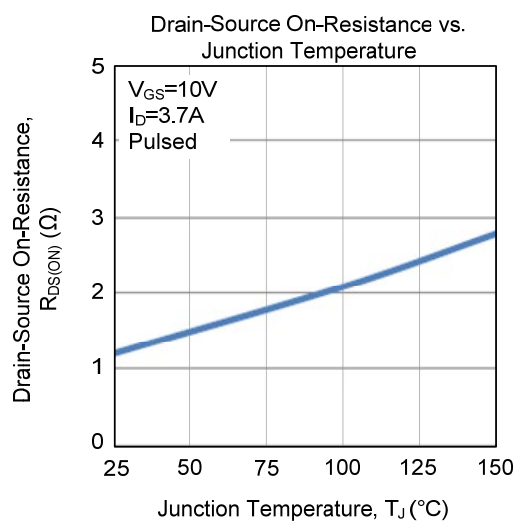
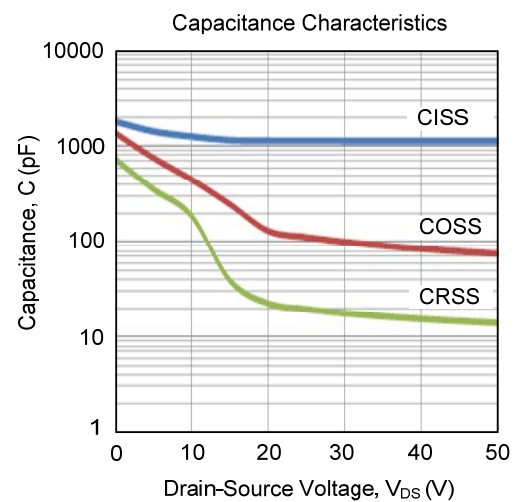
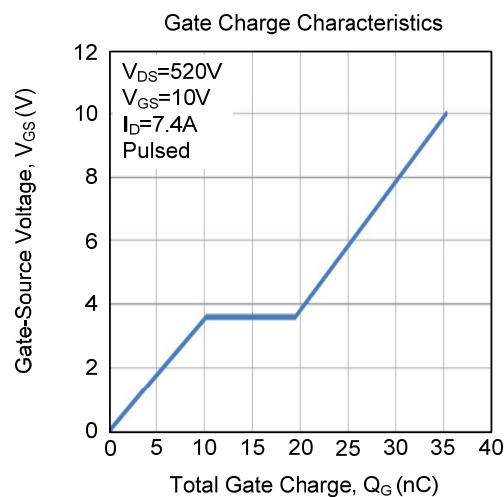
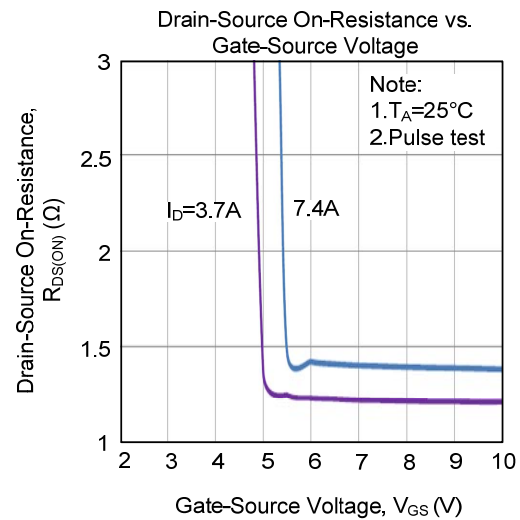
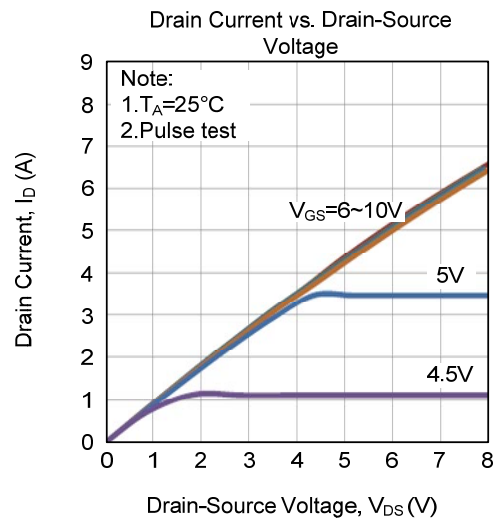


Unclamped Inductive Switching Test Circuit

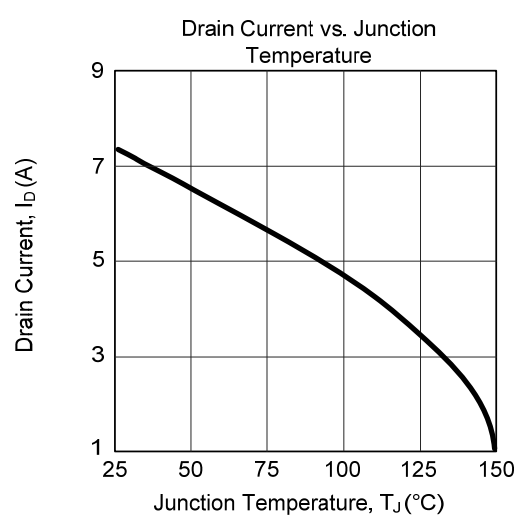
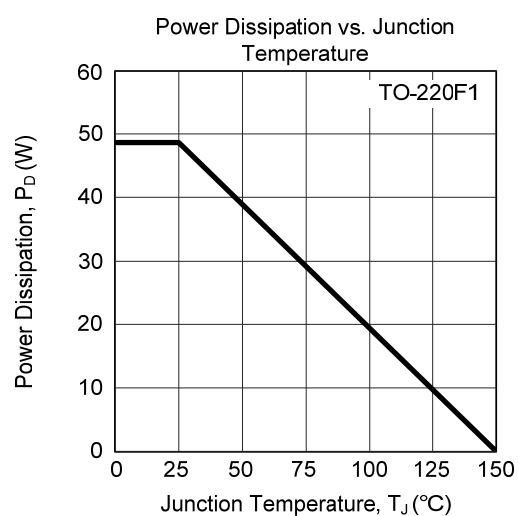
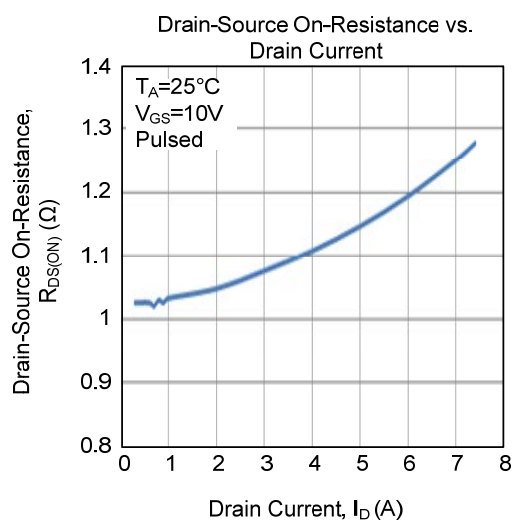
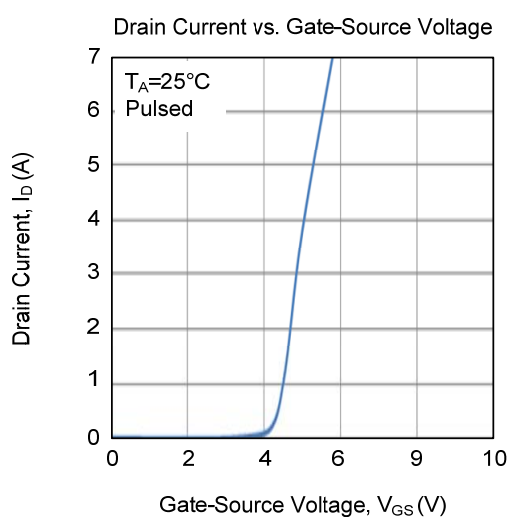
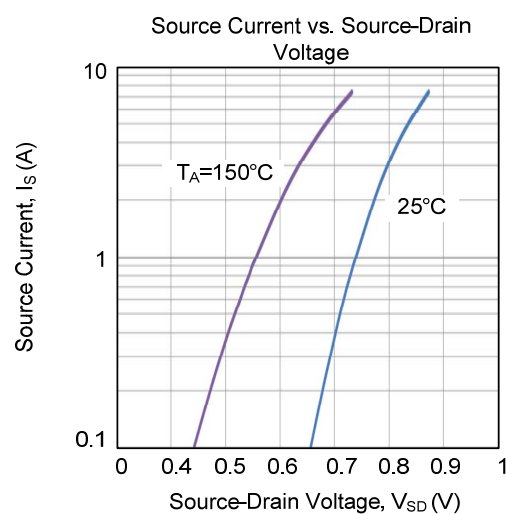
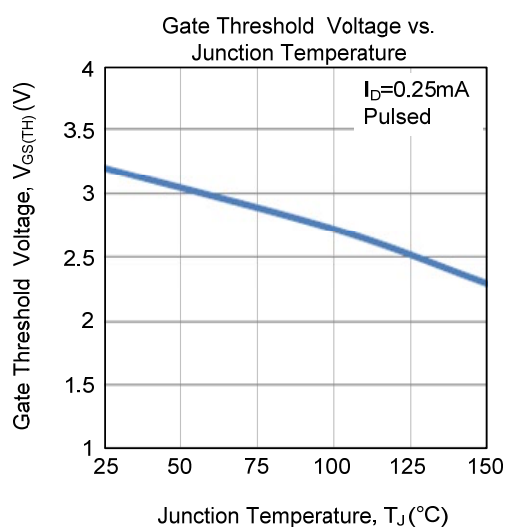


Unclamped Inductive Switching Waveforms

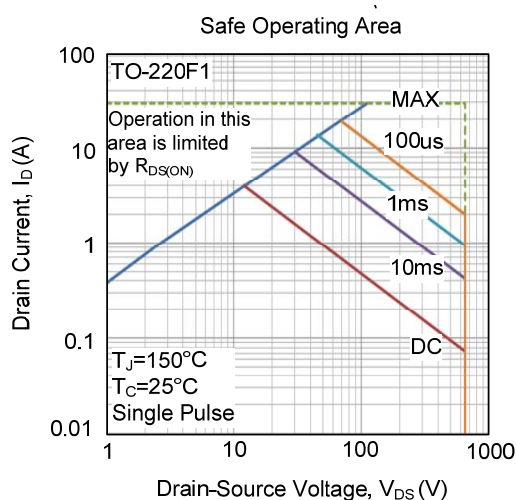
TYPICAL CHARACTERISTICS



■ 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.