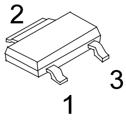
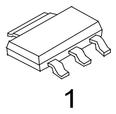
5.0A, 700V N-CHANNEL SUPER-JUNCTION MOSFET



SOT-223-2



SOT-223

DESCRIPTION

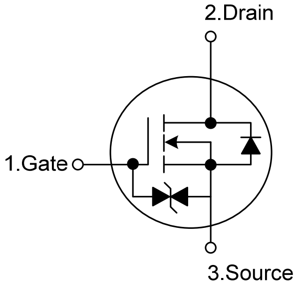
The UTC **5NM70Z-U2** is a Super Junction MOSFET Structure and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics.

This power MOSFET is usually used in high speed switching applications at power supplies, PWM motor controls, high efficient AC to DC converters and bridge circuits.

FEATURES

* $R_{DS(ON)} \leq 1.5\ \Omega$ @ V_{GS}=10V, I_D=1.25A
* Fast Switching Capability
* Improved dv/dt Capability, High Ruggedness

SYMBOL



ORDERING INFORMATION

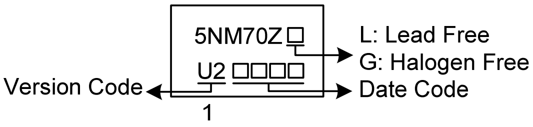
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
5NM70ZL-AA2-R	5NM70ZG-AA2-R	SOT-223-2	G	D	S	Tape Reel
5NM70ZL-AA3-R	5NM70ZG-AA3-R	SOT-223	G	D	S	Tape Reel

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

5NM70ZG-AA2-R

(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) AA2: SOT-223-2, AA3: SOT-223
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

MARKING



Copyright © 2025 Unisonic Technologies Co., Ltd

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	700	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	5	A
	Pulsed (Note 2)	I_{DM}	20	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	72	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.1	V/ns
Power Dissipation		P_D	5 (Note 5)	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 = 144mH, I_{AS} = 1.0A, V_{DD} = 50V, R_G = 25Ω Starting T_J = 25°C
4. $I_{SD} \leq$ 5.0A, di/dt ≤ 200A/μs, $V_{DD} \leq BV_{DSS}$, Starting T_J = 25°C
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	160	°C/W
Junction to Case	θ_{JC}	25	°C/W

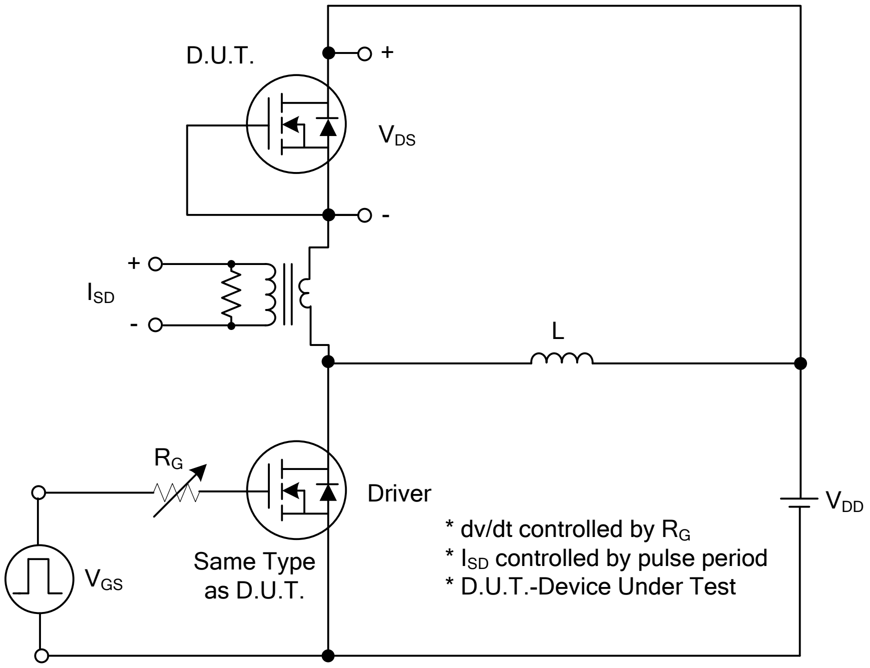
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

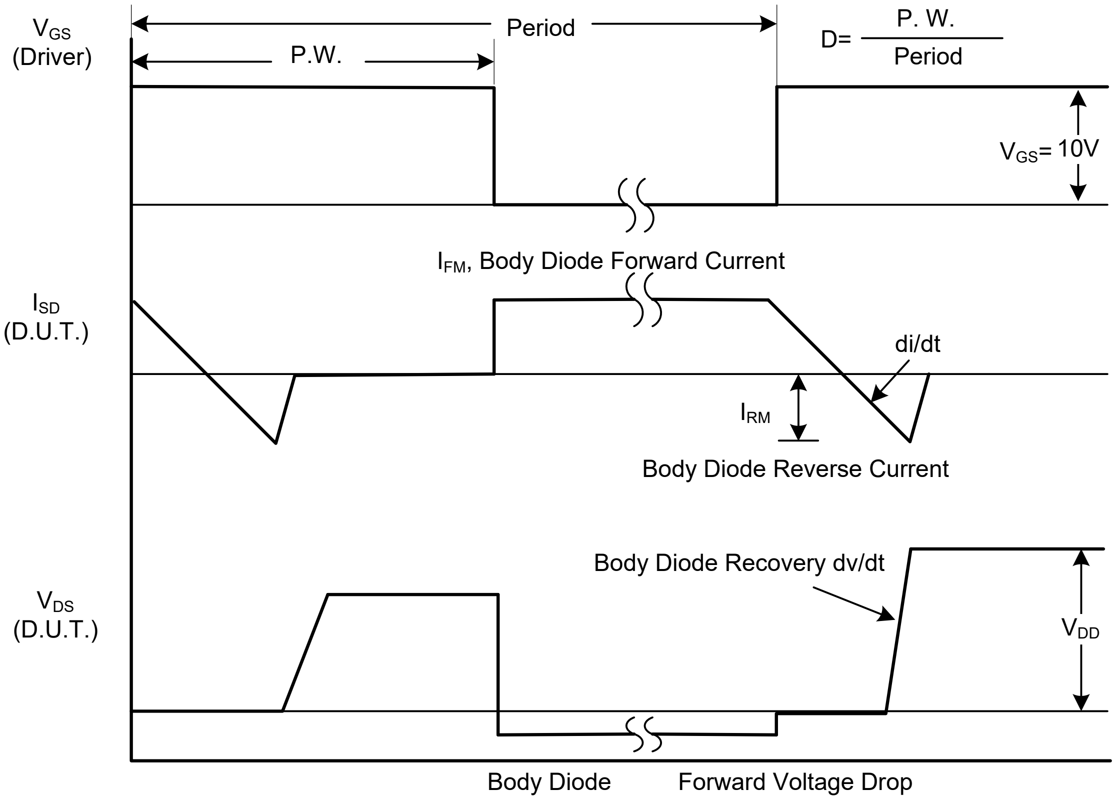
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	700			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=700V, V_{GS}=0V			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=20V, V_{DS}=0V			10	μA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-10	μA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	2.5		4.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=1.25A		1.3	1.5	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=50V, f=1.0MHz		278		pF
Output Capacitance		C_{OSS}			37		pF
Reverse Transfer Capacitance		C_{RSS}			3.5		pF
Gate Resistance		R_G	V_{DS}=0V, f=1.0MHz		4		Ω
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=560V, V_{GS}=10V, I_D=5.0A (Note 1, 2)		10		nC
Gate to Source Charge		Q_{GS}			3.3		nC
Gate to Drain Charge		Q_{GD}			2.2		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=100V, V_{GS}=10V, I_D=5.0A, R_G=25Ω (Note 1, 2)		5.2		ns
Rise Time		t_R			17		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			36		ns
Fall-Time		t_F			29		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				5	A
Maximum Body-Diode Pulsed Current		I_{SM}				20	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=5.0A, V_{GS}=0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)		t_{rr}	I_S=5.0A, V_{GS}=0V, dI_F/dt=100A/μs		280		ns
Body Diode Reverse Recovery Charge		Q_{rr}			2.2		μC

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

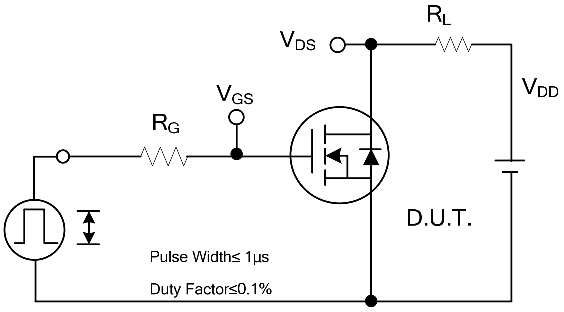


Peak Diode Recovery dv/dt Test Circuit

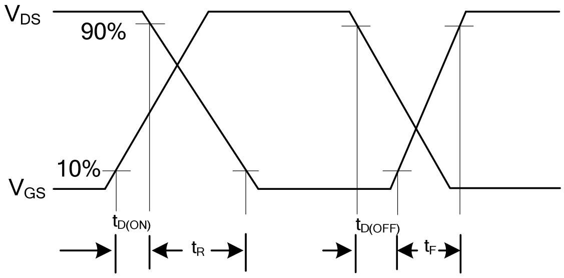


Peak Diode Recovery dv/dt Waveforms

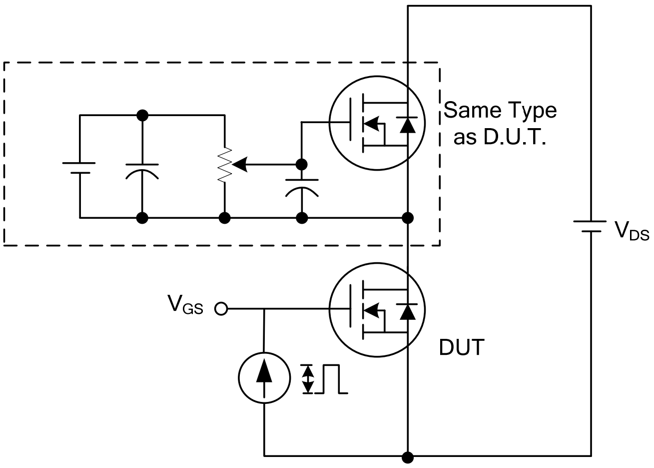
■ TEST CIRCUITS AND WAVEFORMS



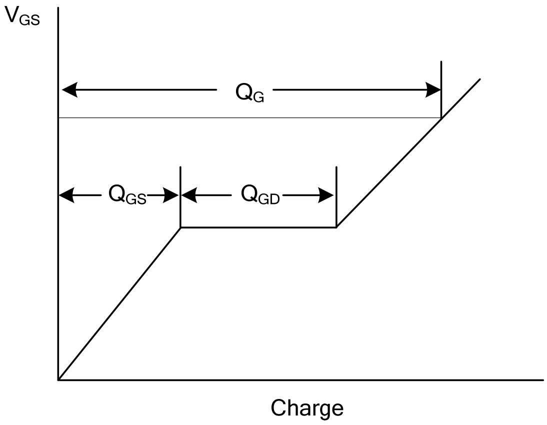
Switching Test Circuit



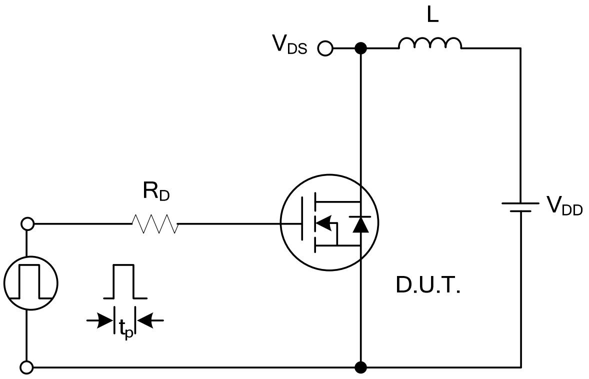
Switching Waveforms



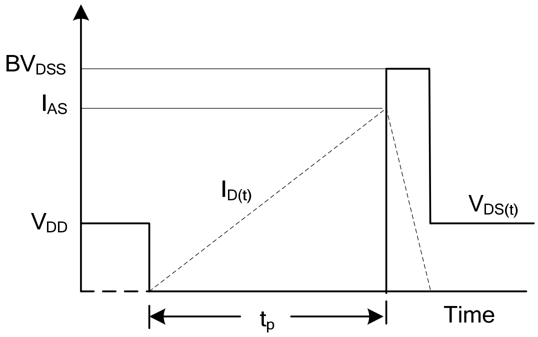
Gate Charge Test Circuit



Gate Charge Waveform

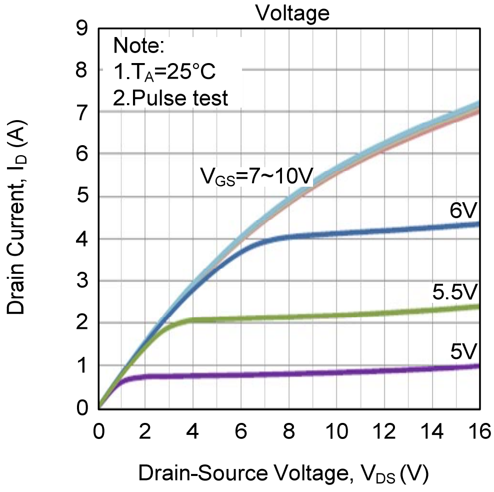


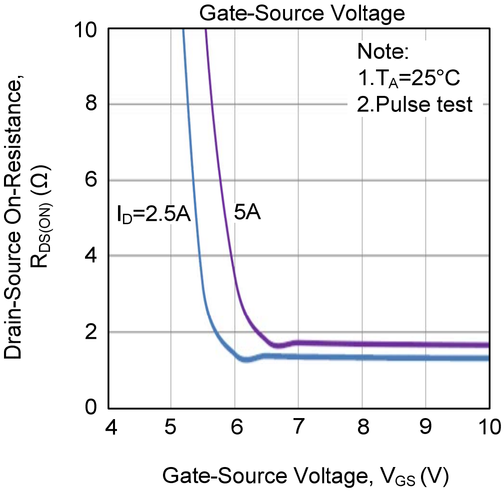
Unclamped Inductive Switching Test Circuit

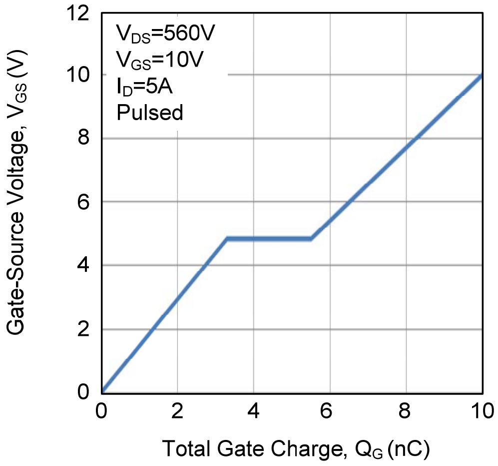


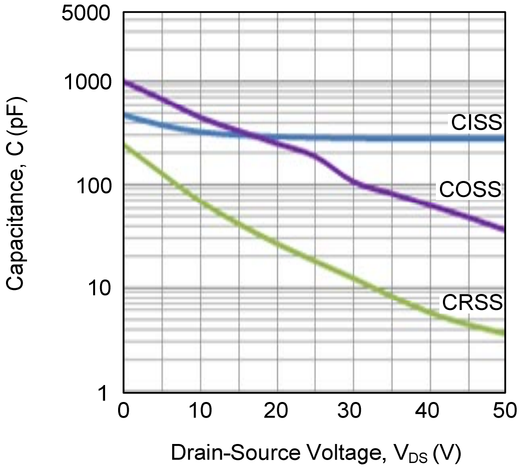
Unclamped Inductive Switching Waveforms

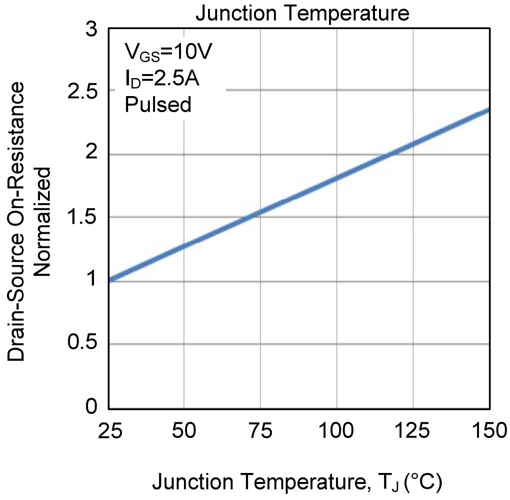
■ TYPICAL CHARACTERISTICS

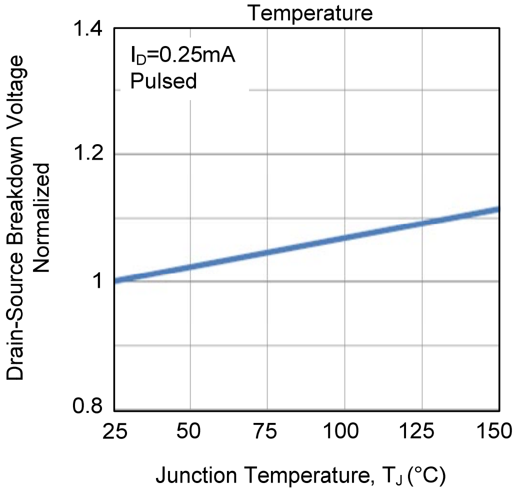

Drain Current vs. Drain-Source Voltage


Drain-Source On-Resistance vs. Gate-Source Voltage

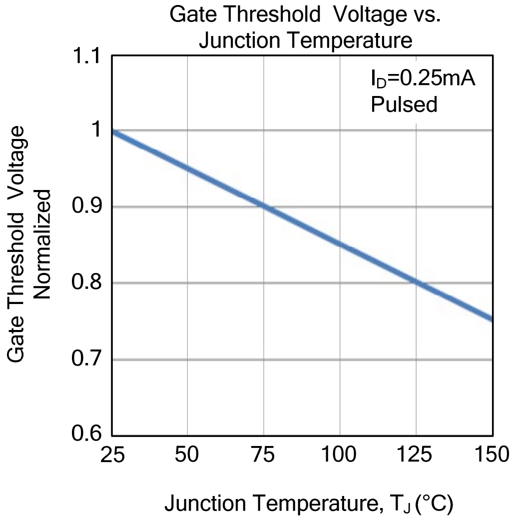

Gate Charge Characteristics

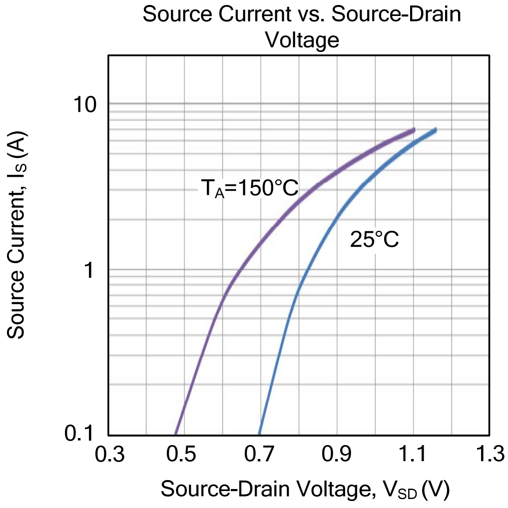

Capacitance Characteristics

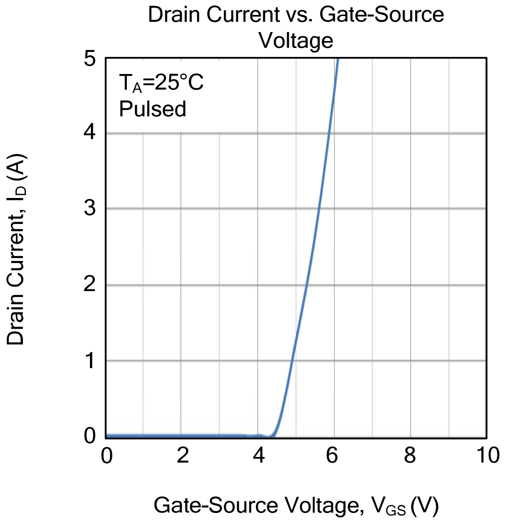

Drain-Source On-Resistance vs. Junction Temperature

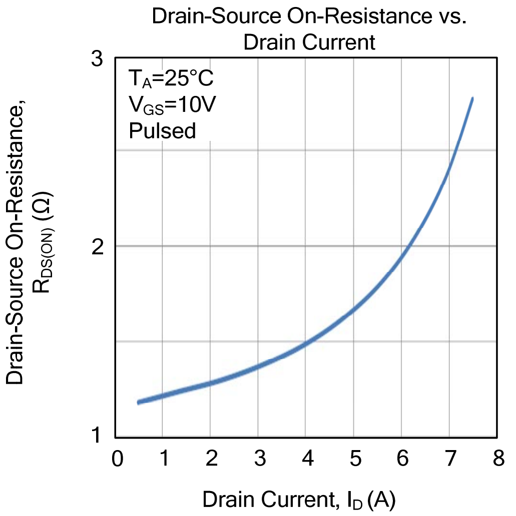

Breakdown Voltage vs. Junction Temperature

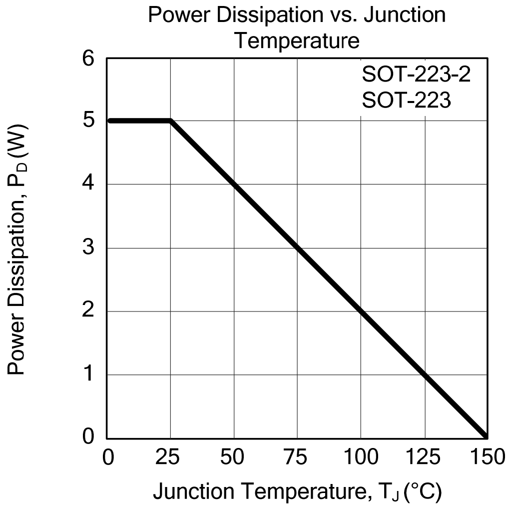
■ TYPICAL CHARACTERISTICS (Cont.)

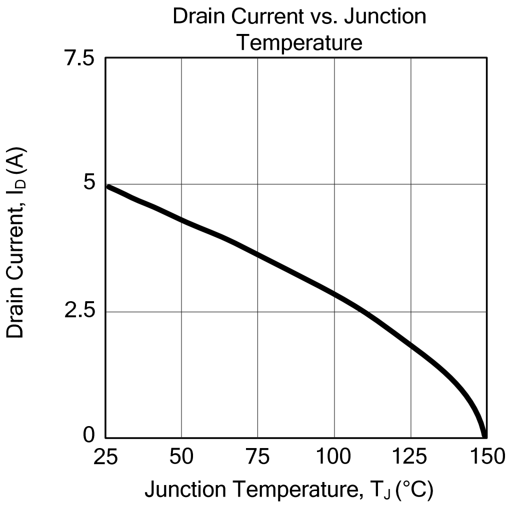




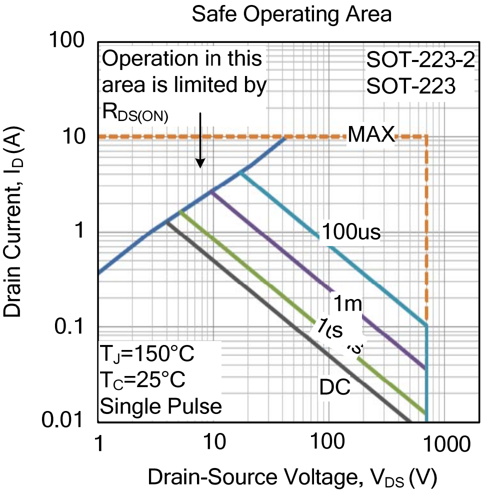








■ TYPICAL CHARACTERISTICS (Cont.)



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.