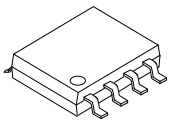
UT4407

Power MOSFET

-13A, -30V P-CHANNEL POWER MOSFET



SOP-8

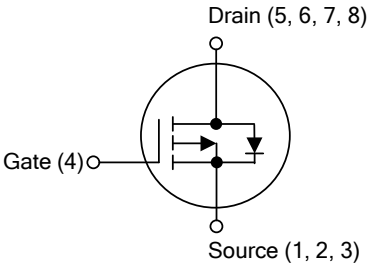
■ DESCRIPTION

UTC **UT4407** is a P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

■ FEATURES

* $R_{DS(ON)}$ ≤ 12 mΩ @ V_{GS}=-10V, I_D=-10A
  $R_{DS(ON)}$ ≤ 19 mΩ @ V_{GS}=-4.5V, I_D=-8.0A
* Fast switching

■ SYMBOL



■ ORDERING INFORMATION

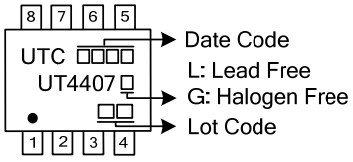
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT4407L-S08-R	UT4407G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

UT4407G-S08-R

(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) S08: SOP-8
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



Copyright © 2022 Unisonic Technologies Co., Ltd

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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	-30	V
Gate-Source Voltage			V_{GSS}	±20	V
Drain Current	Continuous	T_C = 25°C	I_D	-13	A
		T_C = 100°C		-7.8	A
	Pulsed (Note 2)		I_{DM}	-52	A
Avalanche Energy	Single Pulsed		E_{AS}	64.8	mJ
Power Dissipation			P_D	1.8	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=0.1mH, I_{AS}=-36A, V_{DD}=-30V, R_G=25 Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	90	°C/W
Junction to Case	θ_{JC}	69 (Note)	°C/W

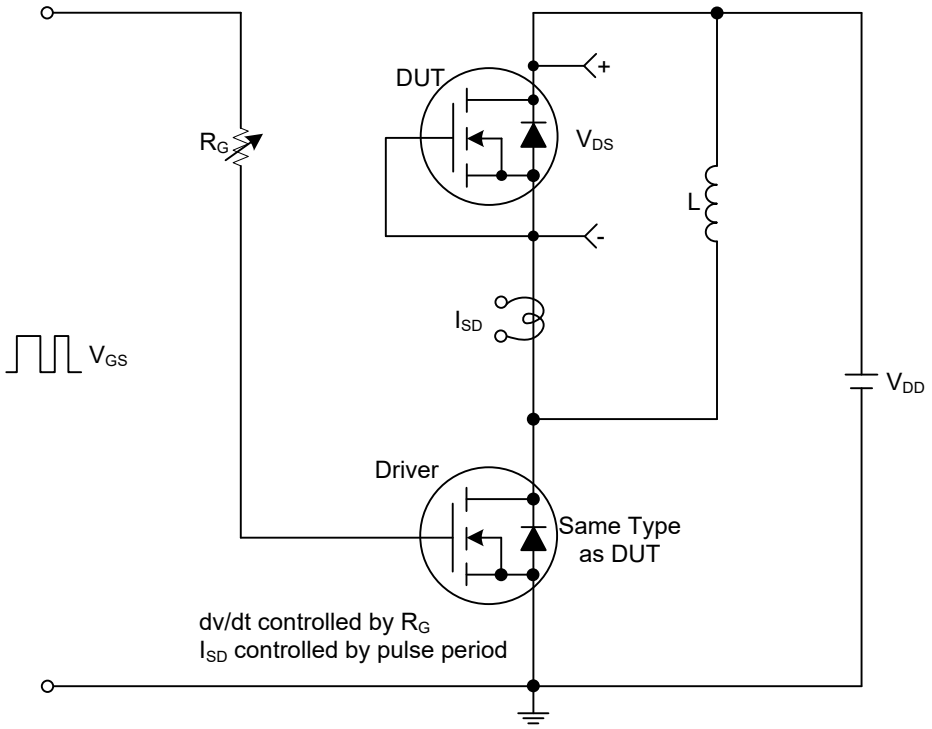
Note: The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

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

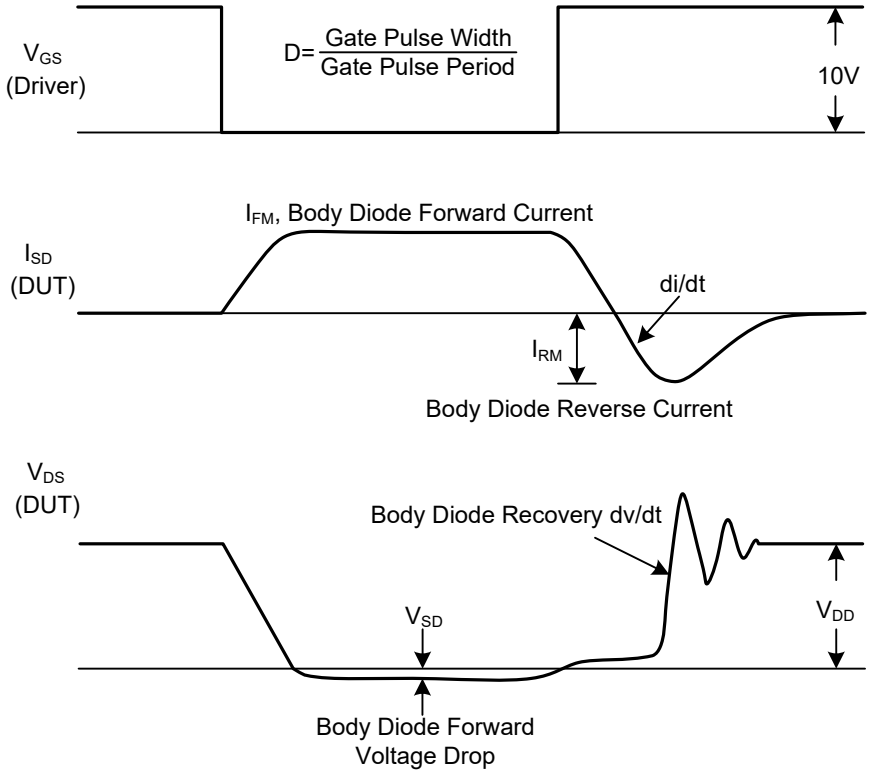
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V	-30			V
BV_{DSS} Temperature Coefficient		$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C , I_D=-1mA		-0.03		V/°C
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-30V, V_{GS}=0V			-1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.0	-1.6	-2.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-10A			12	mΩ
			V_{GS}=-4.5V, I_D=-8.0A			19	mΩ
Forward Transconductance		gfs	V_{DS}=-10V, I_D=-10A		13		S
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=-15V, f=1.0MHz		2970		pF
Output Capacitance		C_{OSS}			588		pF
Reverse Transfer Capacitance		C_{RSS}			399		pF
Gate resistance		R_G	V_{GS}=0V, V_{DS}=0V, f=1.0MHz			12	Ω
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=-15V, V_{GS}=-10V, I_D=-10A		54.8		nC
Gate to Source Charge		Q_{GS}			7.4		nC
Gate to Drain Charge		Q_{GD}			13.6		nC
Turn-on Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=-15V, V_{GS}=-10V, I_D=-1.0A, R_G=6.0Ω		11		ns
Rise Time		t_R			17		ns
Turn-off Delay Time		$t_{D(OFF)}$			100		ns
Fall-Time		t_F			60		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S	V_G=V_D=0V , Force Current			-13	A
Maximum Body-Diode Pulsed Current		I_{SM}				-26	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=-1.0A, V_{GS}=0V			-1.0	V

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

■ TEST CIRCUITS AND WAVEFORMS



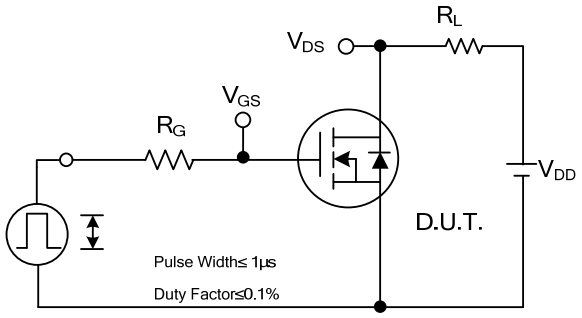
Peak Diode Recovery dv/dt Test Circuit



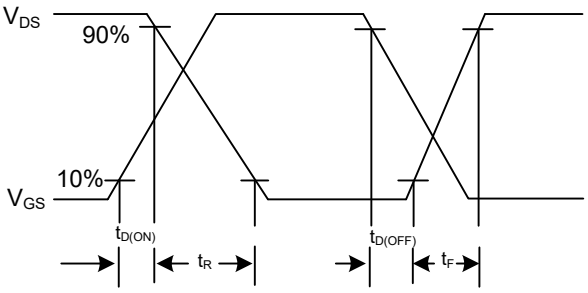
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

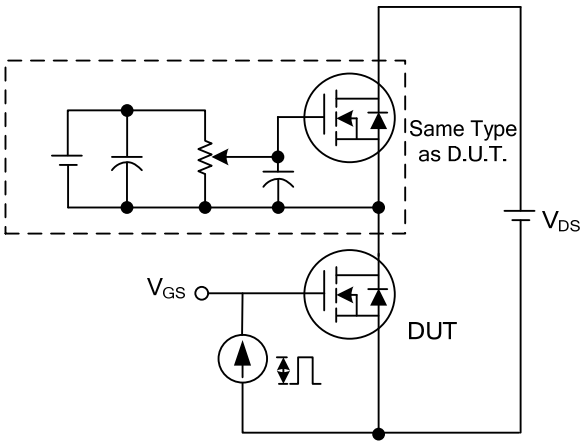
■ TEST CIRCUITS AND WAVEFORMS



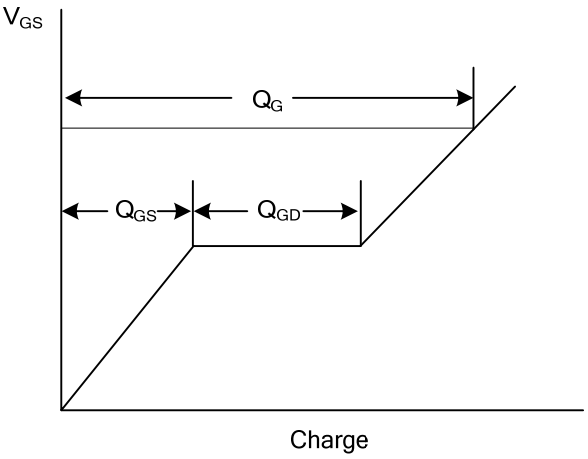
Switching Test Circuit



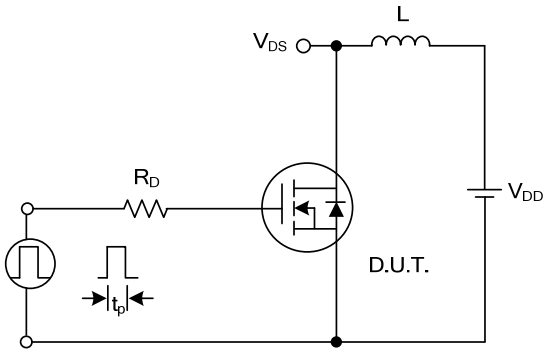
Switching Waveforms



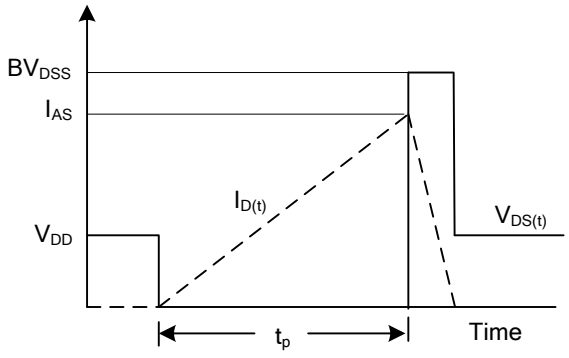
Gate Charge Test Circuit



Gate Charge Waveform



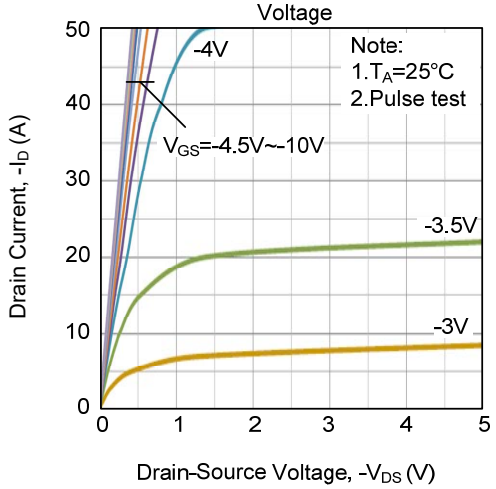
Unclamped Inductive Switching Test Circuit



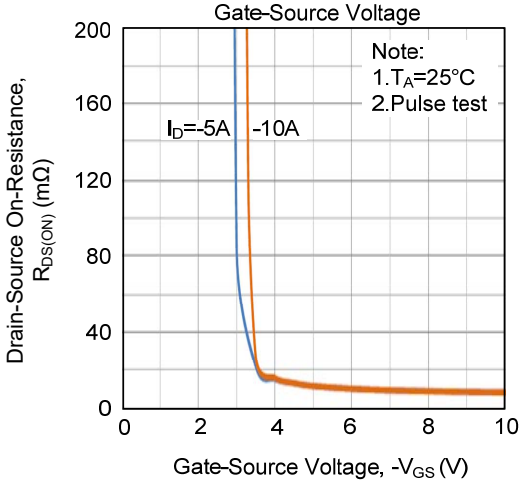
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

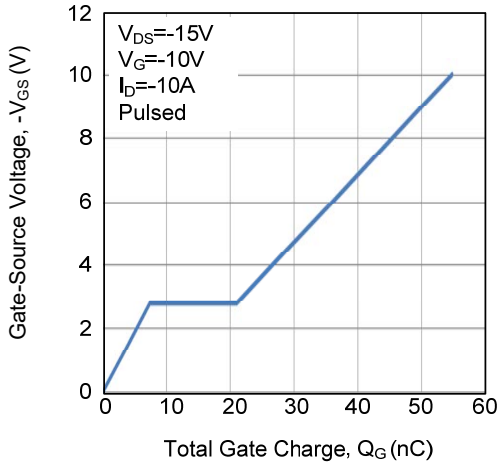
Drain Current vs. Drain-Source Voltage



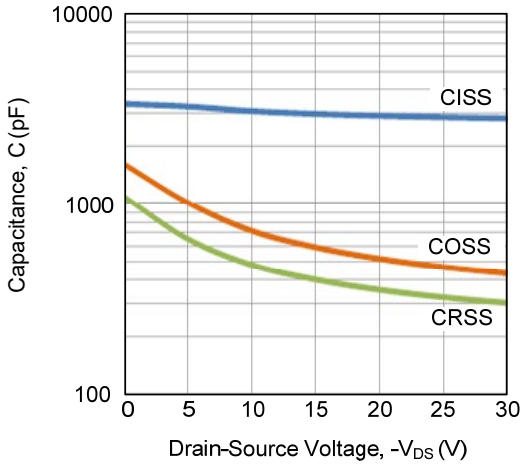
Drain-Source On-Resistance vs. Gate-Source Voltage



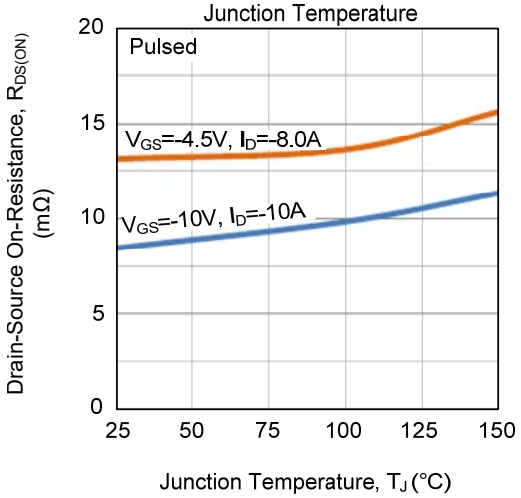
Gate Charge Characteristics



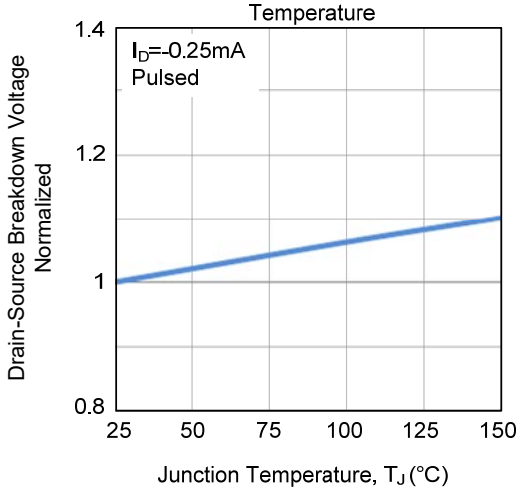
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

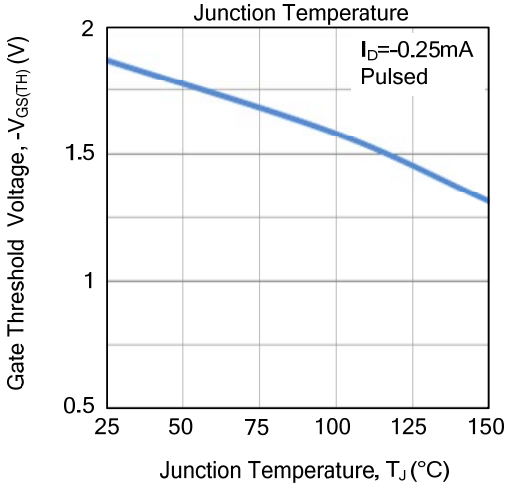


Breakdown Voltage vs. Junction Temperature

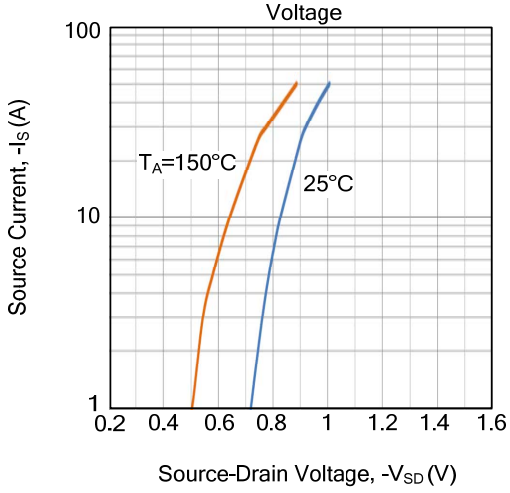


■ TYPICAL CHARACTERISTICS (Cont.)

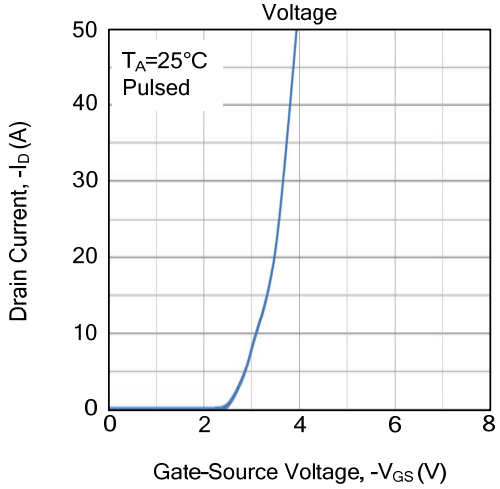
Gate Threshold Voltage vs. Junction Temperature



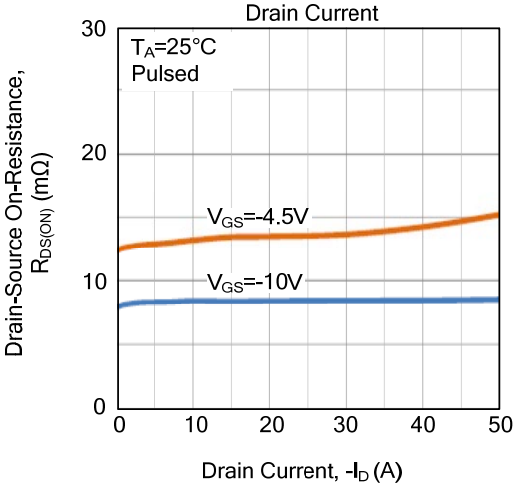
Source Current vs. Source-Drain Voltage



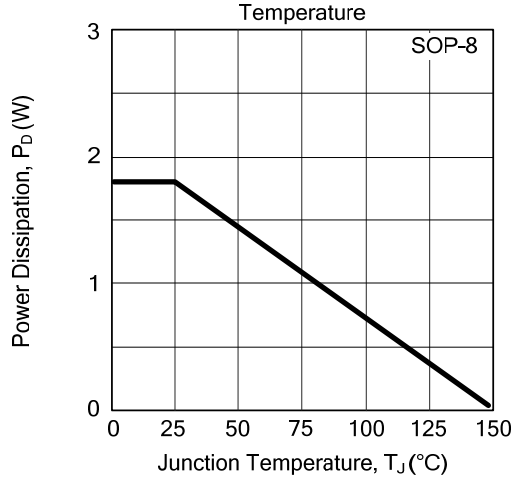
Drain Current vs. Gate-Source Voltage



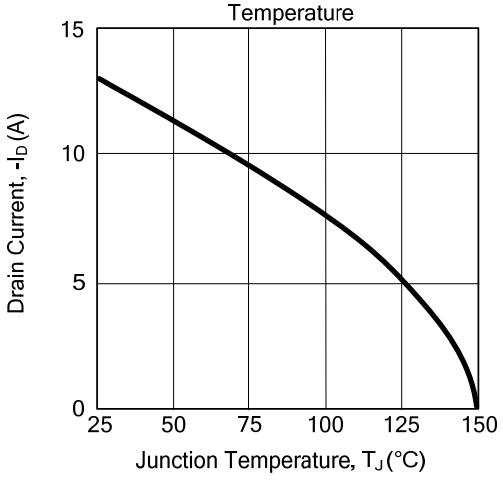
Drain-Source On-Resistance vs. Drain Current



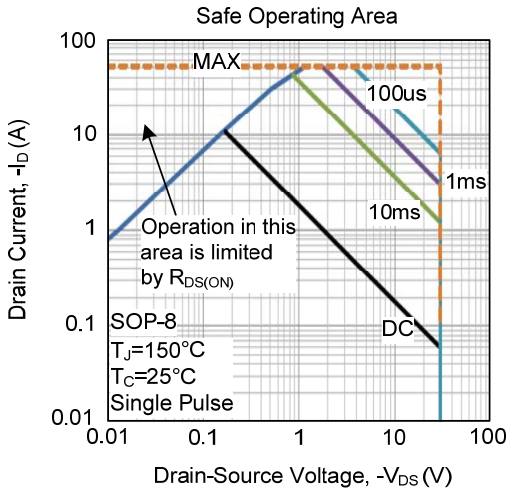
Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ 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.