

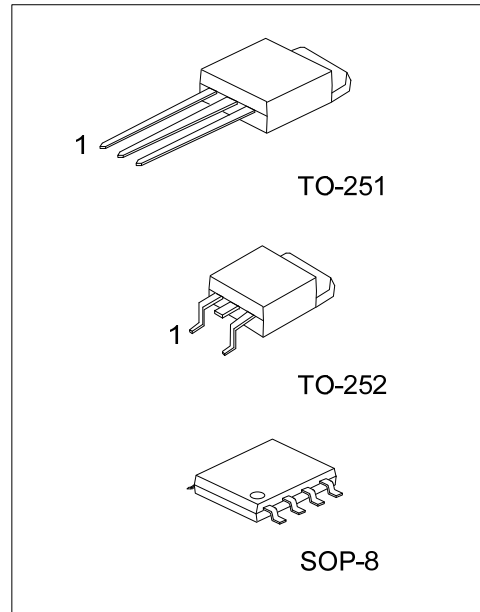
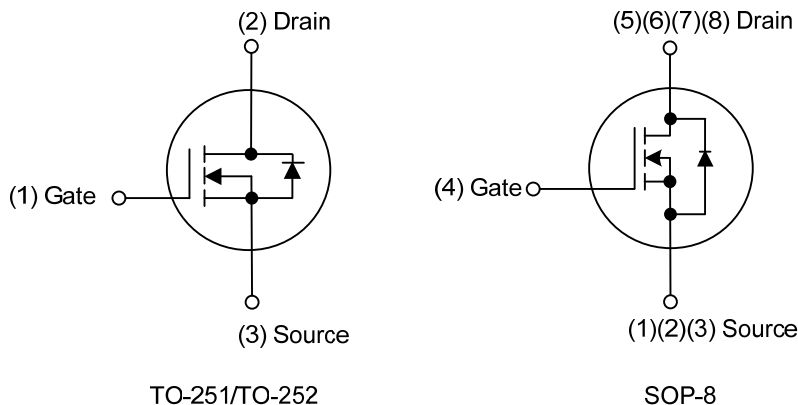
**1N50-LC1****Power MOSFET****1.0A, 500V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **1N50-LC1** is an N-channel power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance.

The UTC **1N50-LC1** is generally applied in low power switching mode power appliances and electronic ballast.

FEATURES

- * $R_{DS(ON)} \leq 7.5 \Omega$ @ $V_{GS}=10V$, $I_D=0.5A$
- * High Switching Speed
- * 100% Avalanche Tested

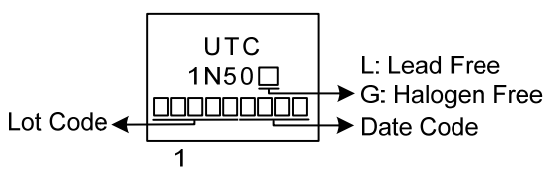
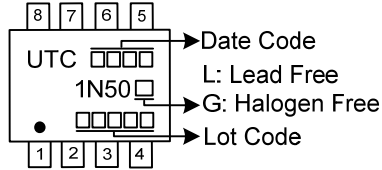
**SYMBOL****ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
1N50L-TM3-T	1N50G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
1N50L-TN3-R	1N50G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
1N50L-S08-R	1N50G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

1N50G-TM3-T (1) Packing Type (2) Package Type (3) Green Package		(1) T: Tube, R: Tape Reel (2) TM3: TO-251, TN3: TO-252, S08: SOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free
---	--	---

MARKING

TO-251 / TO-252	SOP-8
 Diagram of TO-251 / TO-252 marking: The package is marked with 'UTC' and '1N50' on the top. Below this, there are two rows of four characters each. The first row is labeled 'Lot Code' with an arrow pointing to it. The second row is labeled 'Date Code' with an arrow pointing to it. To the right of the package, there are three labels: 'L: Lead Free', 'G: Halogen Free', and 'Date Code', each with an arrow pointing to the corresponding row of characters.	 Diagram of SOP-8 marking: The package is marked with 'UTC' and '1N50' on the top. Below this, there are two rows of four characters each. The first row is labeled 'Date Code' with an arrow pointing to it. The second row is labeled 'Lot Code' with an arrow pointing to it. To the right of the package, there are three labels: 'L: Lead Free', 'G: Halogen Free', and 'Lot Code', each with an arrow pointing to the corresponding row of characters. The package also has a small dot on the bottom left corner.

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	500	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous	I_D	1	A
	Pulsed (Note 2)	I_{DM}	2	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	16.2	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.575	V/ns
Power Dissipation	TO-251/TO-252	P_D	27	W
	SOP-8		2.1	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. $L = 10\text{mH}$, $I_{AS} = 1.8\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 1.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-251/TO-252	θ_{JA}	110	$^{\circ}\text{C}/\text{W}$
	SOP-8		125 (Note)	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-251/TO-252	θ_{JC}	4.63 (Note)	$^{\circ}\text{C}/\text{W}$
	SOP-8		59.5 (Note)	$^{\circ}\text{C}/\text{W}$

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

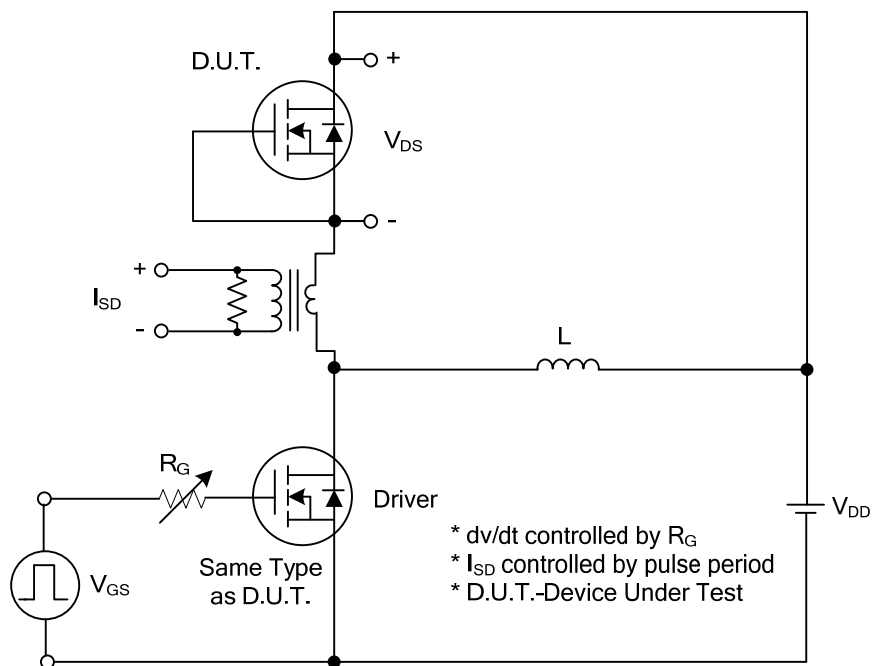
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	500			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =500V, V _{GS} =0V			10	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
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 =0.5A			7.5	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		126		pF
Output Capacitance		C _{OSS}			20		pF
Reverse Transfer Capacitance		C _{RSS}			2.3		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =400V, V _{GS} =10V, I _D =1A I _G =1mA (Note 1, 2)		9		nC
Gate to Source Charge		Q _{GS}			4		nC
Gate to Drain Charge		Q _{GD}			1.12		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =1A, R _G =25Ω (Note 1, 2)		4		ns
Rise Time		t _R			15.7		ns
Turn-OFF Delay Time		t _{D(OFF)}			14		ns
Fall-Time		t _F			29		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				1	A
Maximum Body-Diode Pulsed Current (Note 1)		I _{SM}				2	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =1A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _S =1A, V _{GS} =0V,		180		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dI _F /dt=100A/μs		0.4		μC

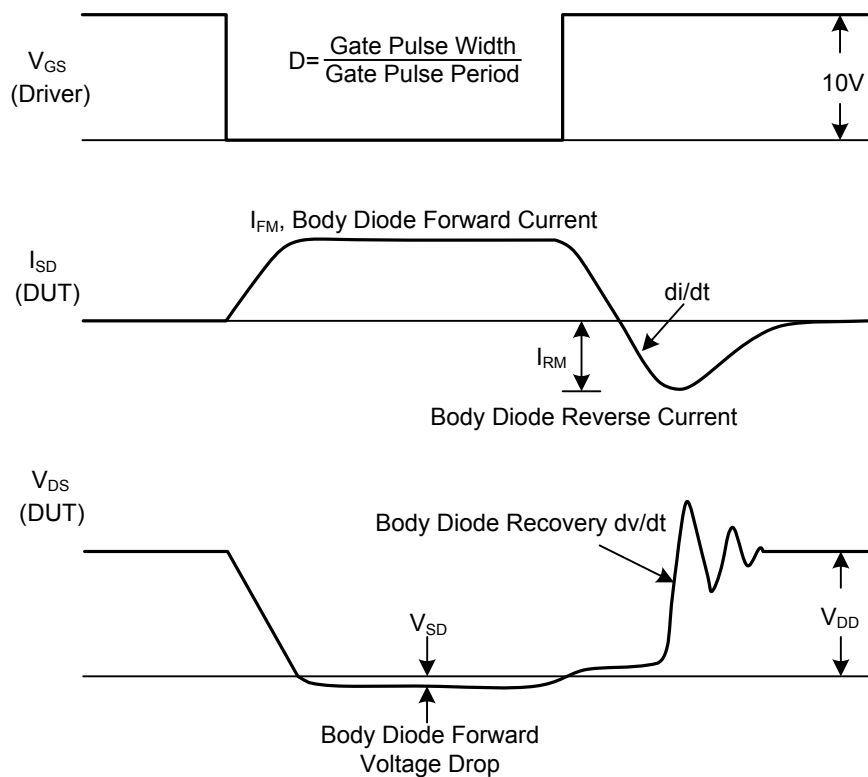
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

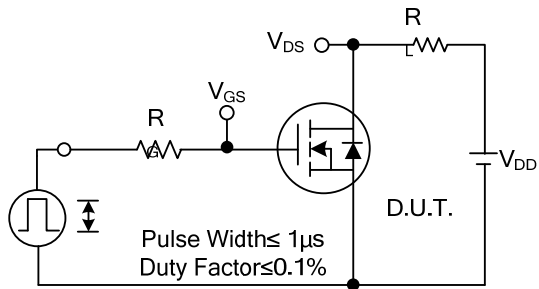


Peak Diode Recovery dv/dt Test Circuit

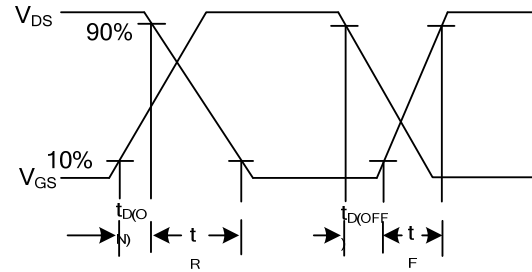


Peak Diode Recovery dv/dt Waveforms

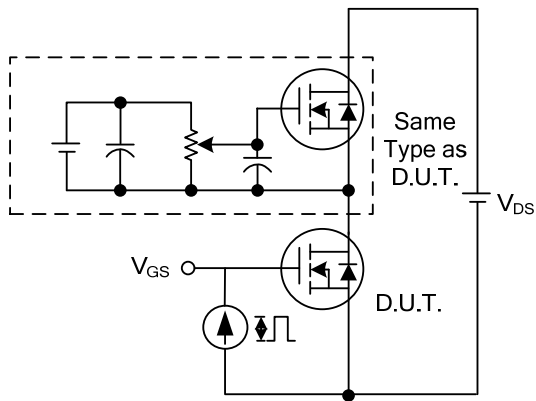
■ TEST CIRCUITS AND WAVEFORMS



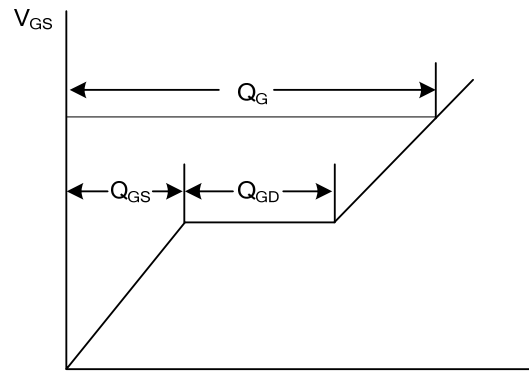
Switching Test Circuit



Switching Waveforms

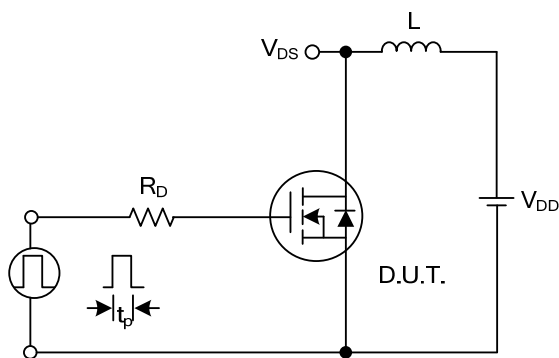


Gate Charge Test Circuit

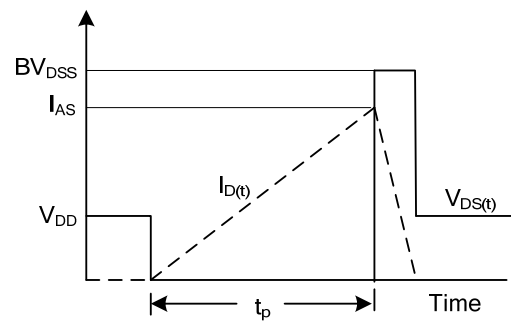


Charge

Gate Charge Waveform

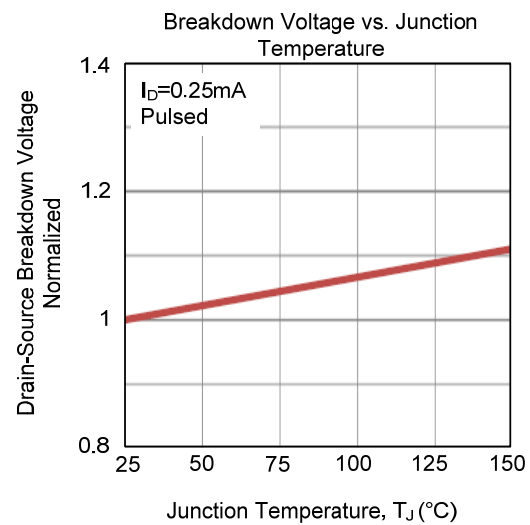
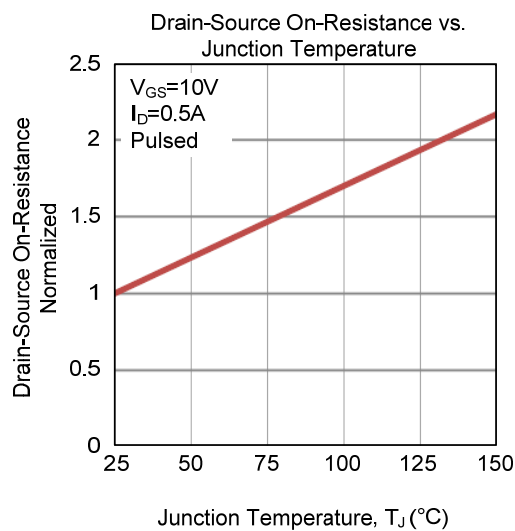
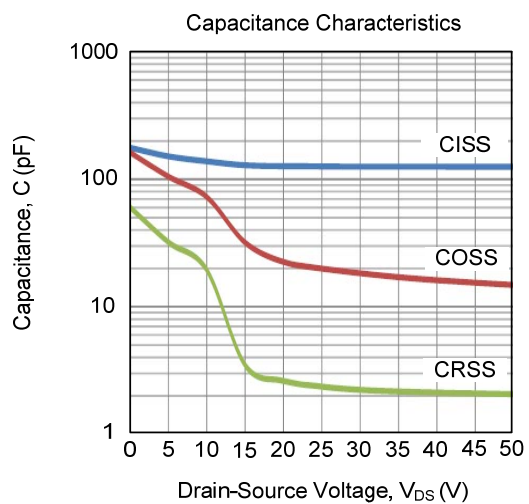
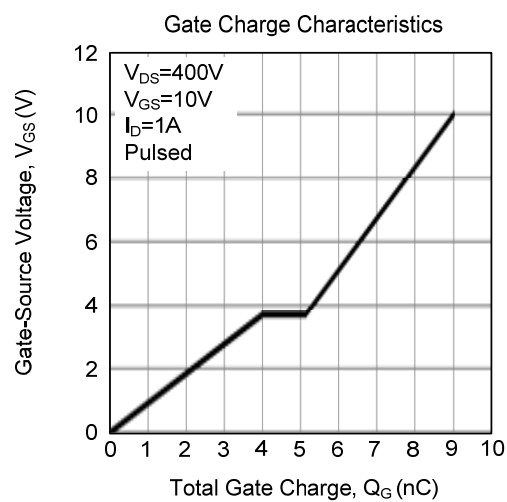
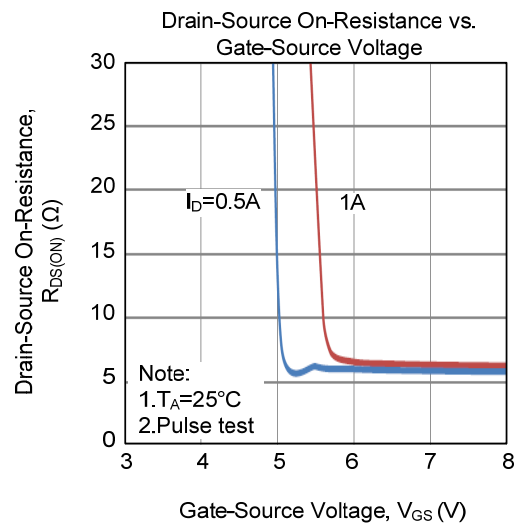
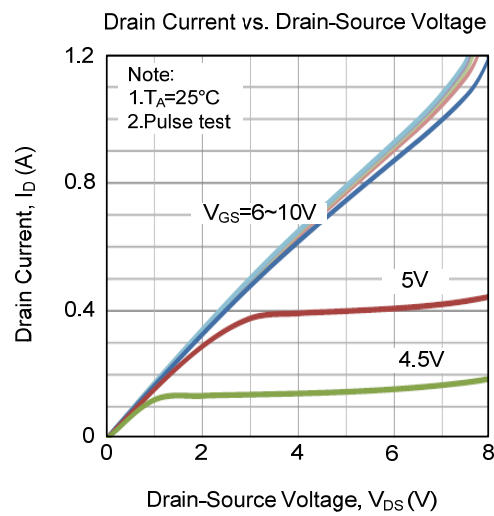


Unclamped Inductive Switching Test Circuit

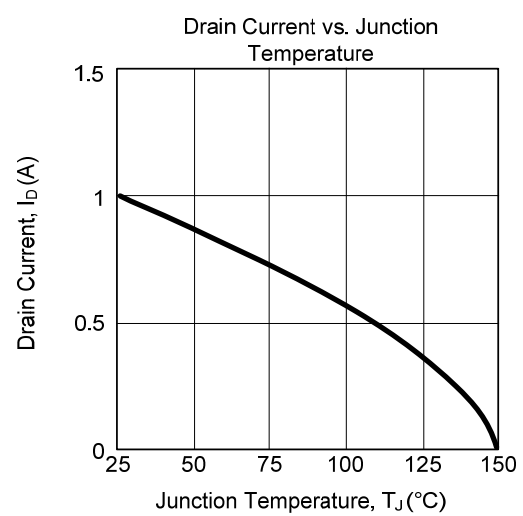
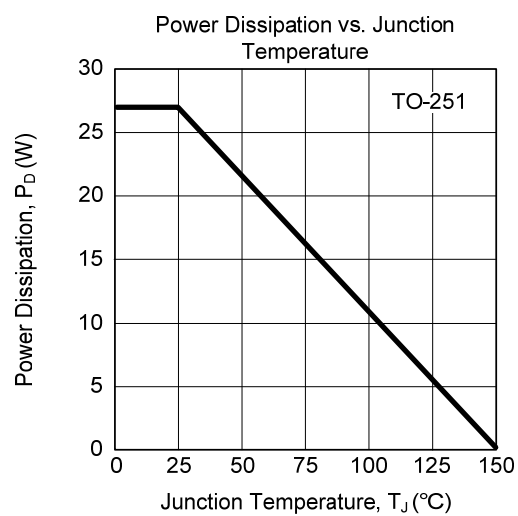
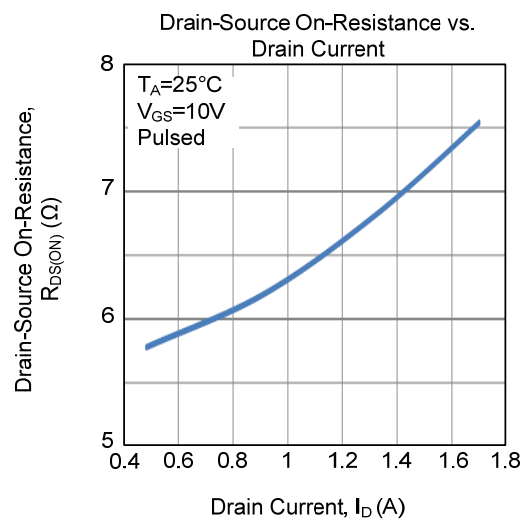
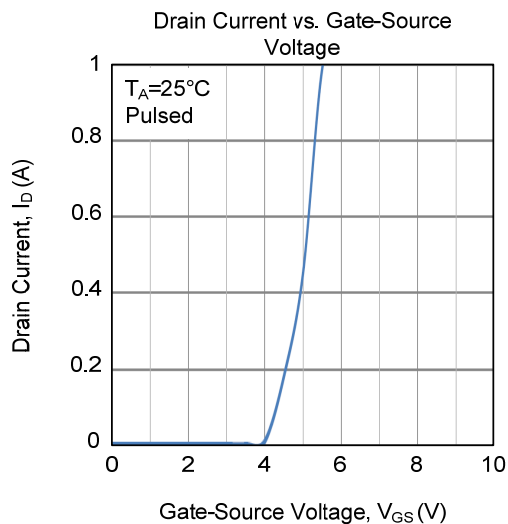
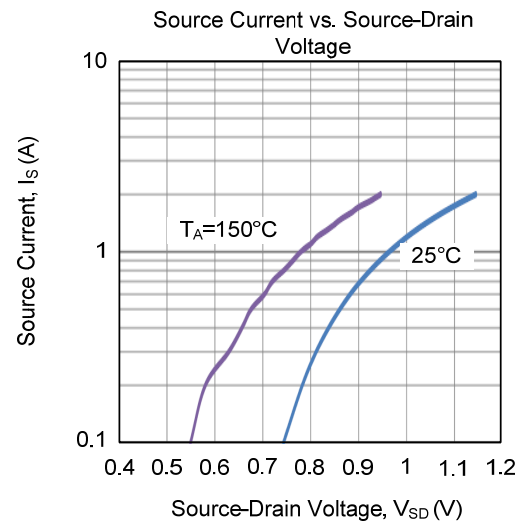
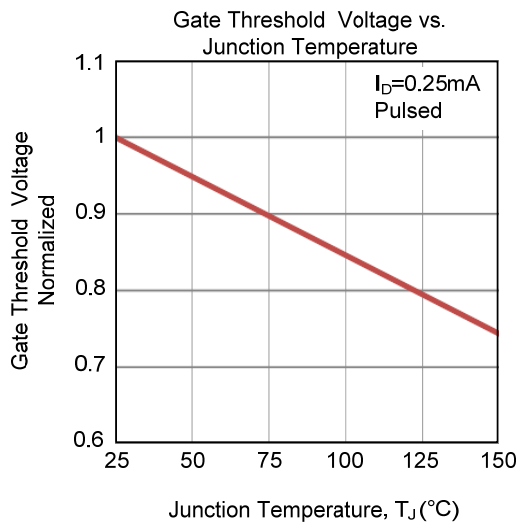


Unclamped Inductive Switching Waveforms

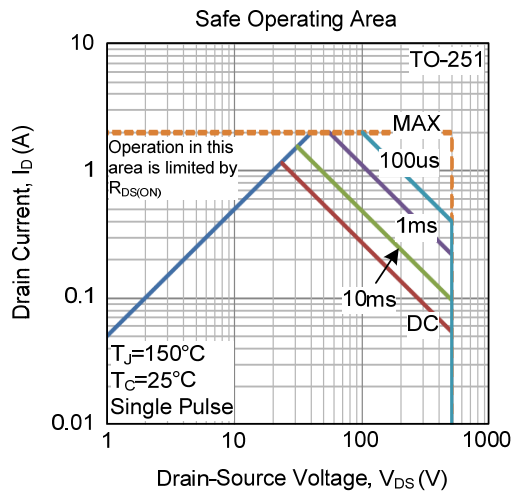
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



TYPICAL CHARACTERISTICS (Cont.)



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.