



UT40N02

Power MOSFET

40A, 20V N-CHANNEL POWER MOSFET

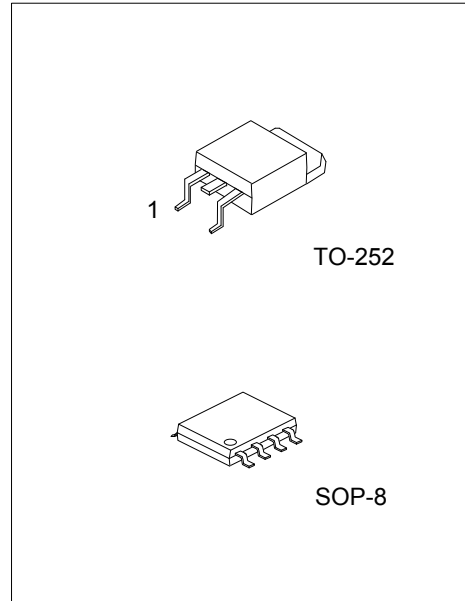
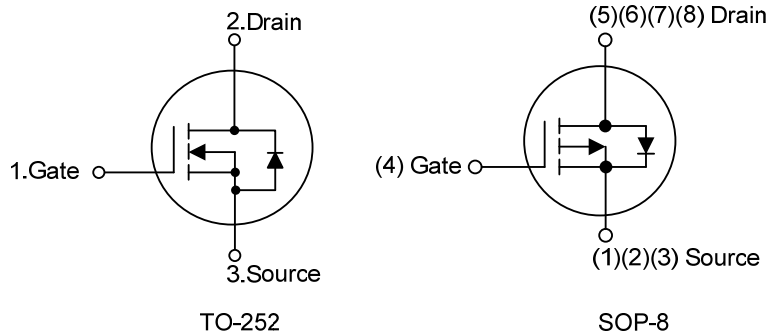
■ DESCRIPTION

The UTC **UT40N02** 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

- * $R_{DS(on)} \leq 7.5m\Omega @ V_{GS}=4.5V, I_D=15A$
- $R_{DS(on)} \leq 11.5m\Omega @ V_{GS}=2.5V, I_D=6.0A$
- * High breakdown voltage

■ SYMBOL



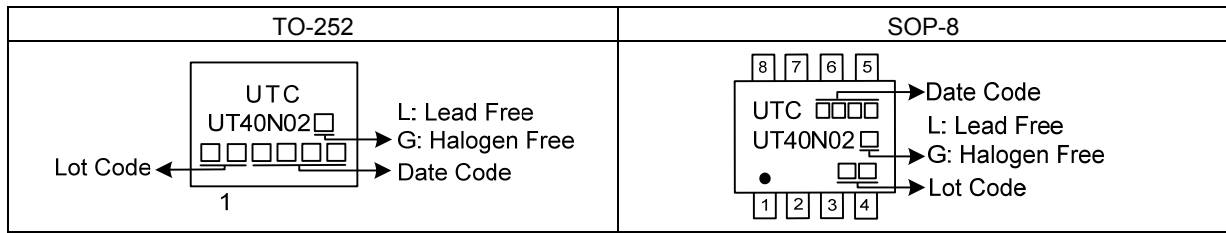
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT40N02L-TN3-R	UT40N02G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT40N02L-S08-R	UT40N02G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UT40N02G-TN3-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) TN3: TO-252, S08: SOP-8</p> <p>(3) G: Halogen Free and Lead Free L: Lead Free</p>
---	--

MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	± 8	V
Drain Current	Continuous	I_D	40	A
	Pulsed	I_{DM}	80	A
Single Pulsed Avalanche Energy		E_{AS}	81.2	mJ
Power Dissipation	TO-252	P_D	60	W
	SOP-8		6	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature Range		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. $L=0.1\text{mH}$, $I_{AS}=40.3\text{A}$, $V_{DD}=20\text{V}$, $R_G=25\Omega$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA (Note)

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-252	θ_{JA}	62.5	$^\circ\text{C/W}$
	SOP-8		125	$^\circ\text{C/W}$
Junction to Case	TO-252	θ_{JC}	2.03	$^\circ\text{C/W}$
	SOP-8		20.8	$^\circ\text{C/W}$

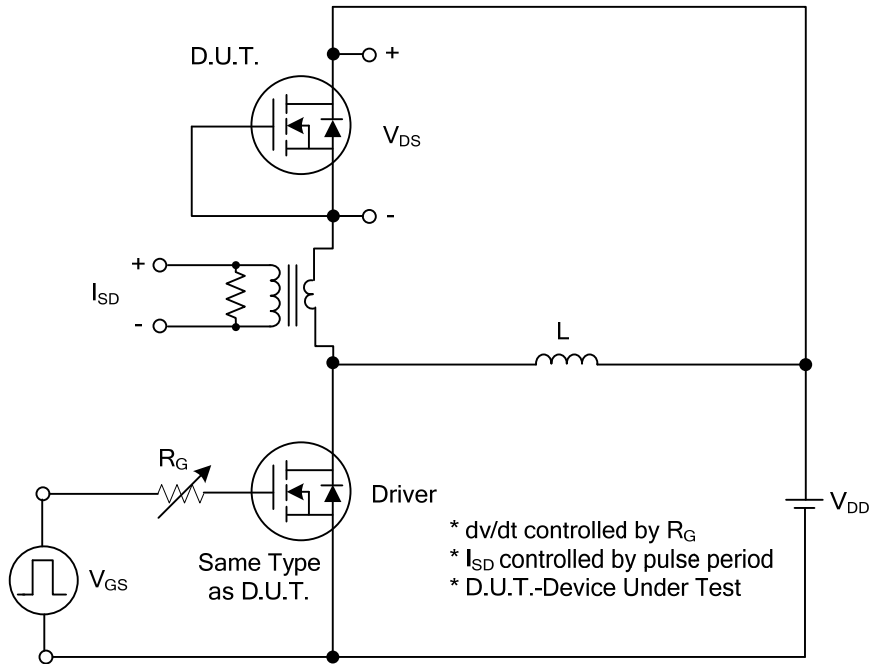
Note: Device mounted on FR-4 substrate P_c board, 2oz copper, with 1inch square copper plate.

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

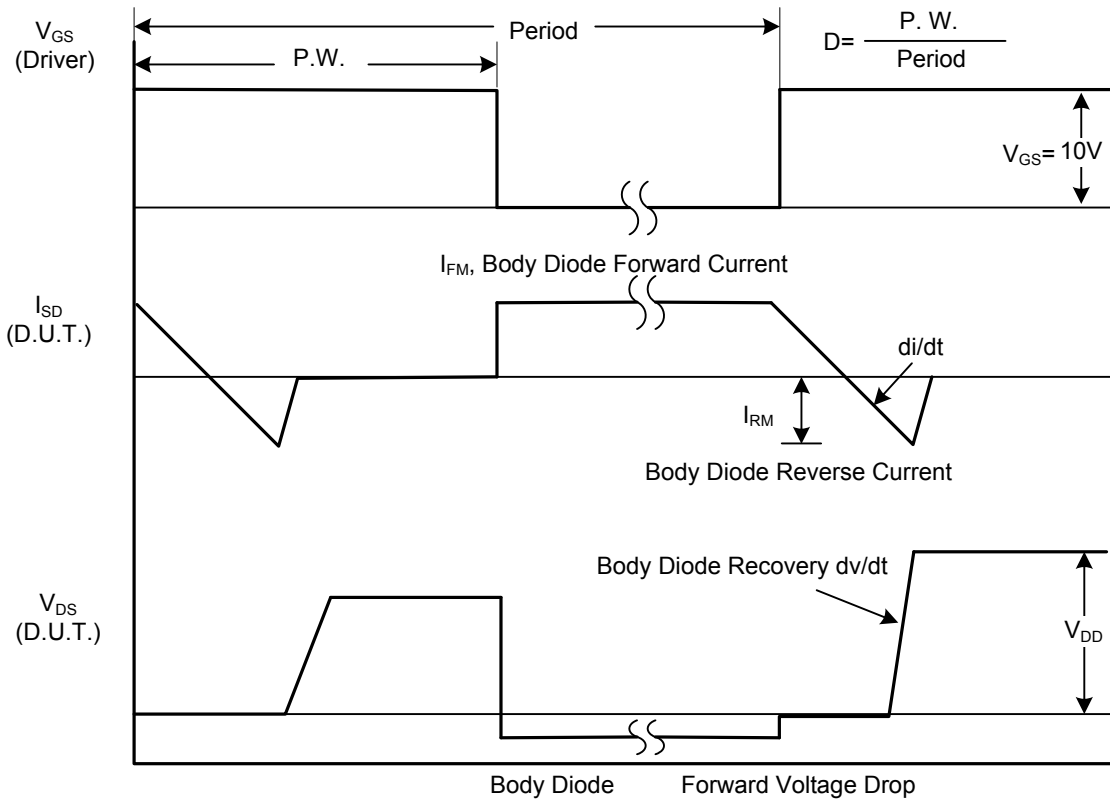
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	20			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=20\text{V}$, $V_{GS}=0\text{V}$			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}			+100	nA
	Reverse				-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	0.4		1.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=4.5\text{V}$, $I_D=15\text{A}$		6.0	7.5	$\text{m}\Omega$
		$V_{GS}=2.5\text{V}$, $I_D=6.0\text{A}$		9.2	11.5	$\text{m}\Omega$
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=20\text{V}$, $f=1.0\text{MHz}$		1720		pF
Output Capacitance	C_{OSS}			321		pF
Reverse Transfer Capacitance	C_{RSS}			303		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=10\text{V}$, $V_{GS}=4.5\text{V}$, $I_D=40\text{A}$, $I_D=1\text{mA}$ (Note 1, 2)		32.5		nC
Gate to Source Charge	Q_{GS}			2.5		nC
Gate to Drain Charge	Q_{GD}			11		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DS}=10\text{V}$, $V_{GS}=4.5\text{V}$, $I_D=40\text{A}$, $R_G=25\Omega$ (Note 1, 2)		7.5		ns
Rise Time	t_R			19.5		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			57		ns
Fall-Time	t_F			24		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				40	A
Maximum Body-Diode Pulsed Current	I_{SM}				80	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=1\text{A}$, $V_{GS}=0\text{V}$			1.2	V

- 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

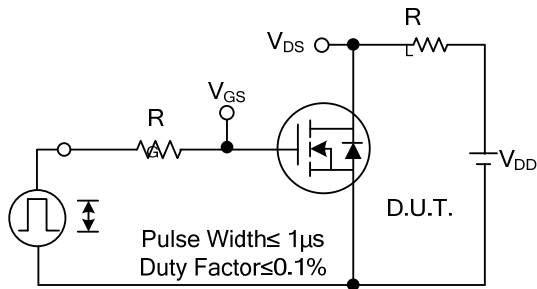


Peak Diode Recovery dv/dt Test Circuit

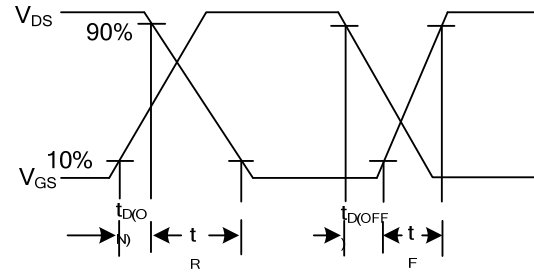


Peak Diode Recovery dv/dt Waveforms

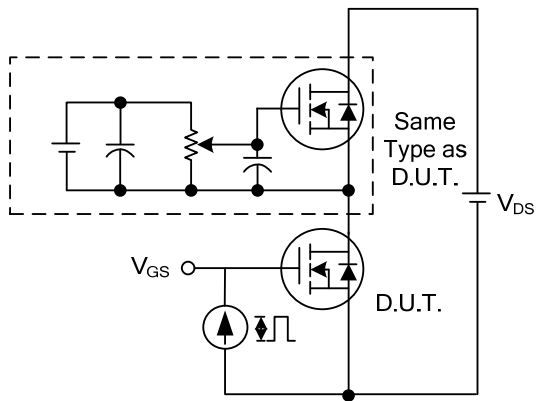
TEST CIRCUITS AND WAVEFORMS



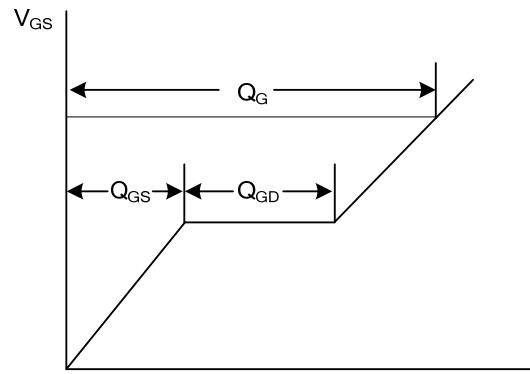
Switching Test Circuit



Switching Waveforms

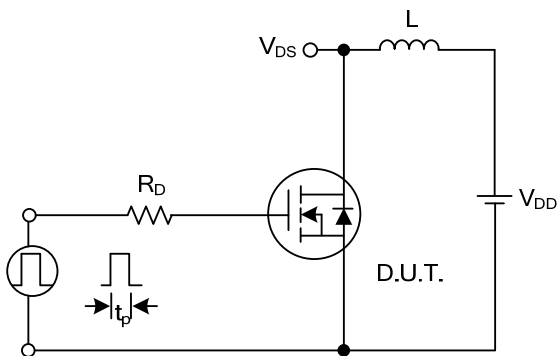


Gate Charge Test Circuit

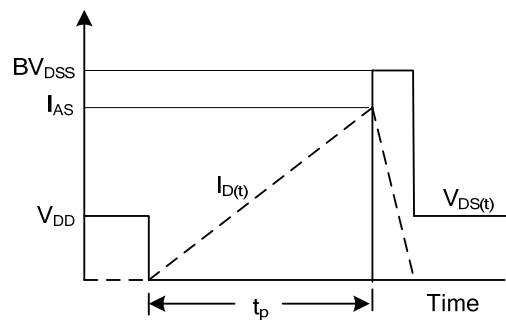


Charge

Gate Charge Waveform

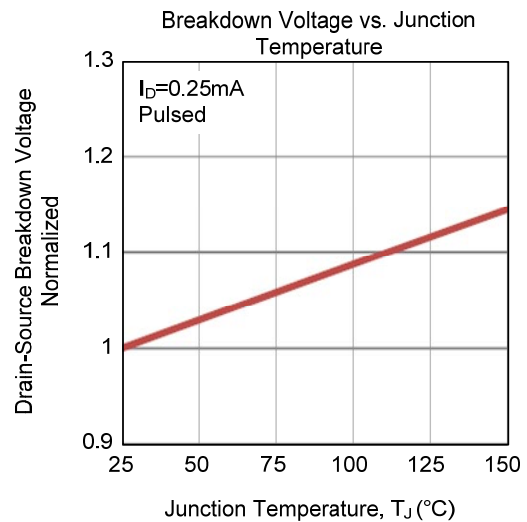
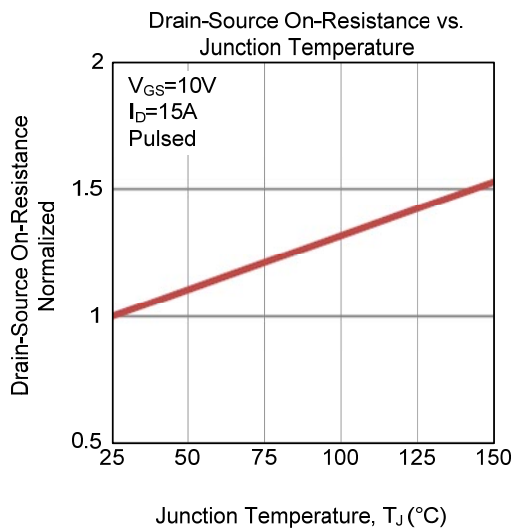
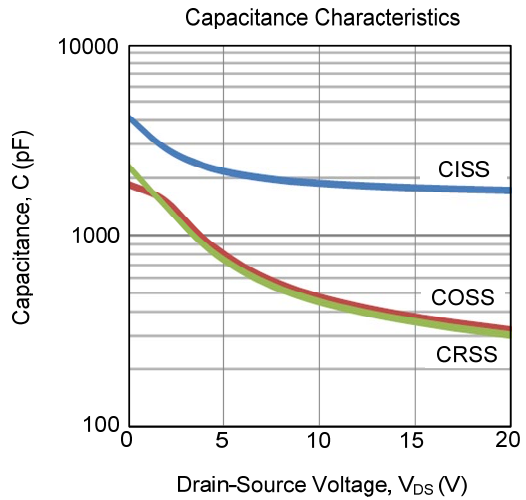
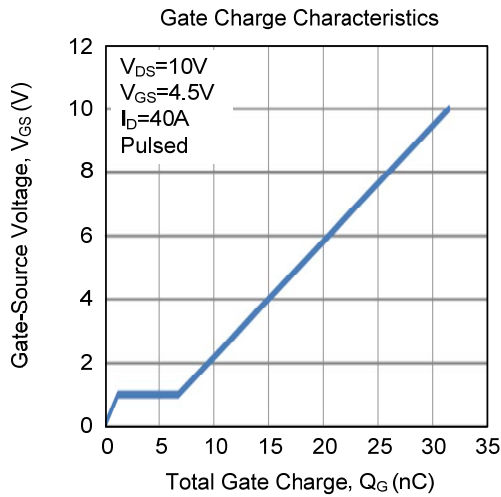
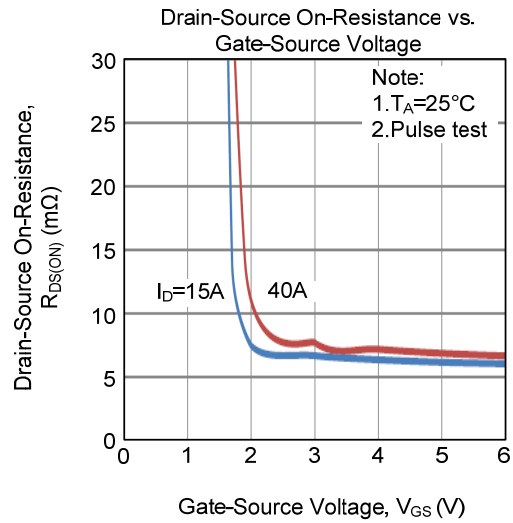
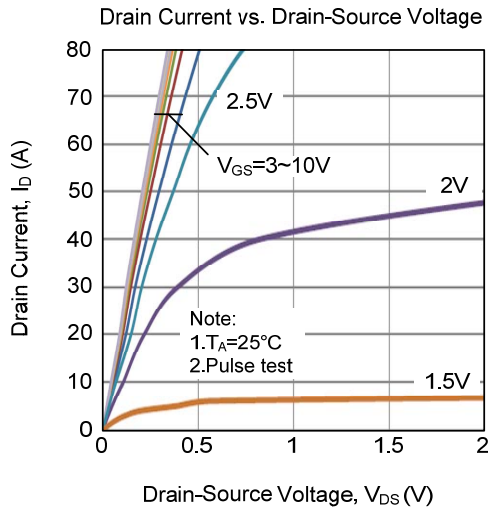


Unclamped Inductive Switching Test Circuit

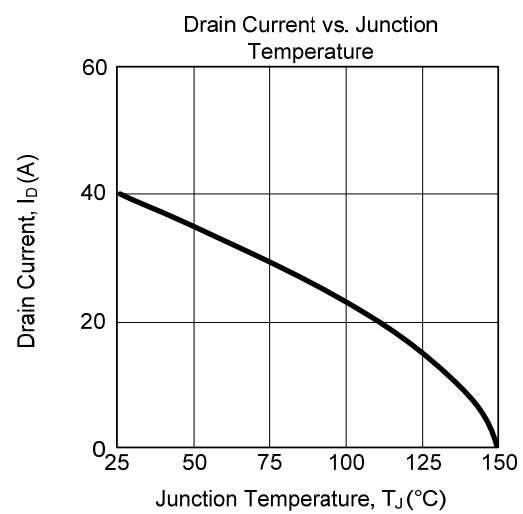
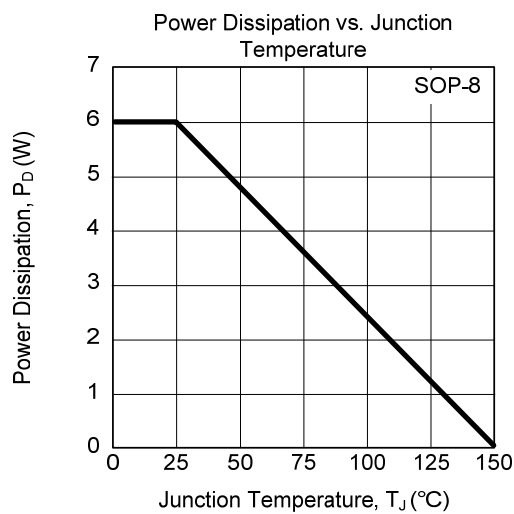
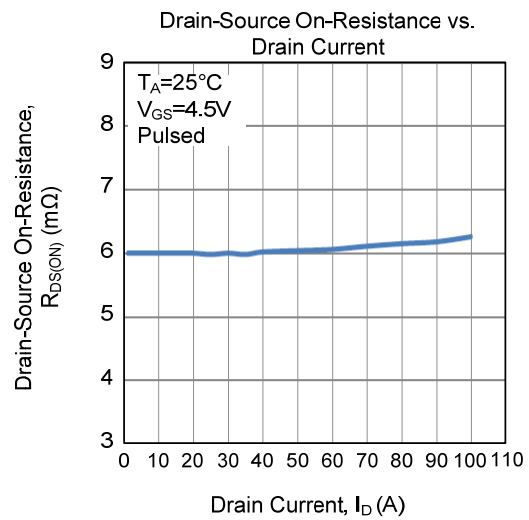
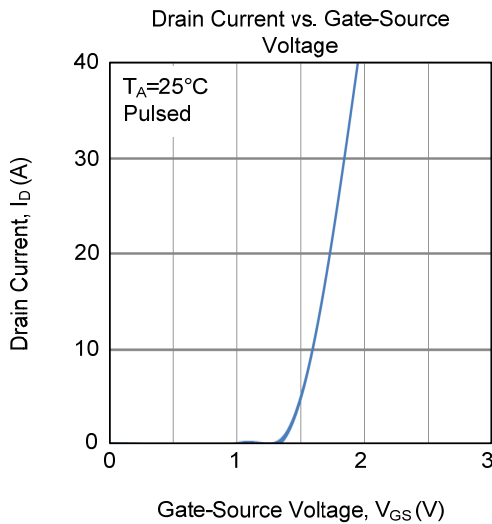
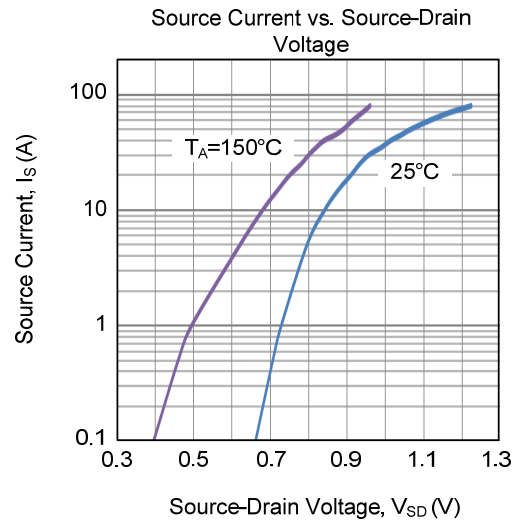
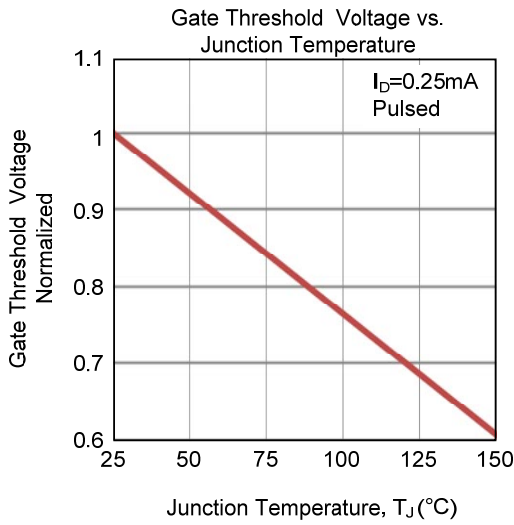


Unclamped Inductive Switching Waveforms

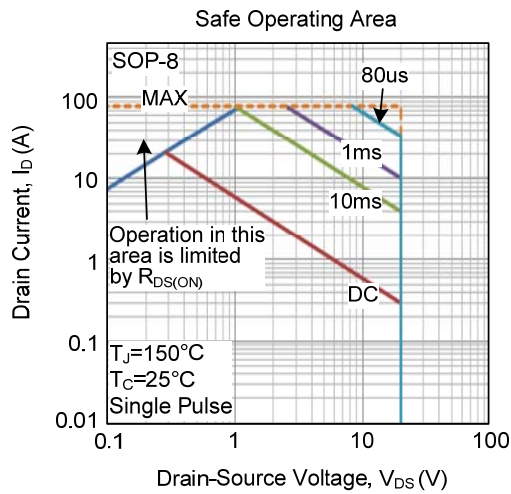
TYPICAL CHARACTERISTICS



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.