



UTT20N04

Power MOSFET

20A, 40V N-CHANNEL ENHANCEMENT MODE

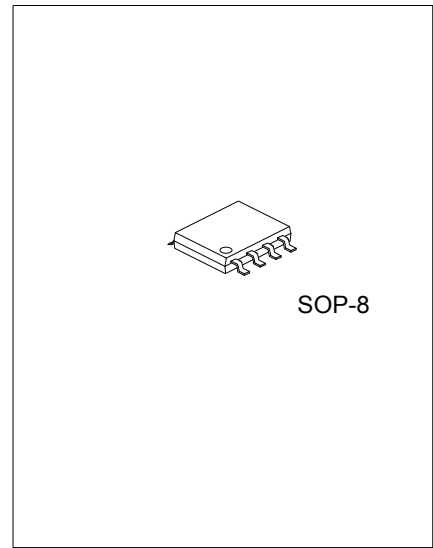
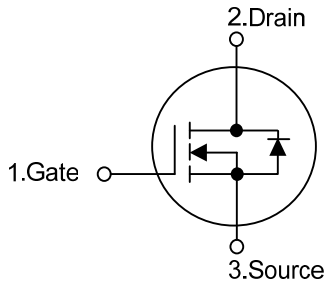
DESCRIPTION

The **UTT20N04** uses UTC's advanced trench technology to 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

- * $R_{DS(ON)} \leq 33 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=10\text{A}$
- * $R_{DS(ON)} \leq 60 \text{ m}\Omega @ V_{GS}=4.5\text{V}, I_D=10\text{A}$
- * Low capacitance
- * Low gate charge
- * Fast switching capability
- * Avalanche energy specified

SYMBOL



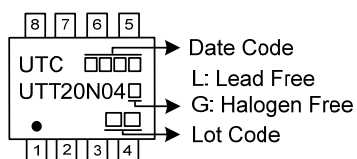
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT20N04L-S08-R	UTT20N04G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UTT20N04G-S08-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) S08: SOP-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DSS}	40	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current	I_D	20	A
Pulsed Drain Current	I_{DM}	40	A
Avalanche Energy	Single Pulsed (Note 3) E_{AS}	2.5	mJ
Power Dissipation	P_D	2.8	W
Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

Note: 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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction-to-Ambient	θ_{JA}	62.5	$^{\circ}\text{C/W}$
Junction to Case	θ_{JC}	44.6 (Note)	$^{\circ}\text{C/W}$

Note: The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

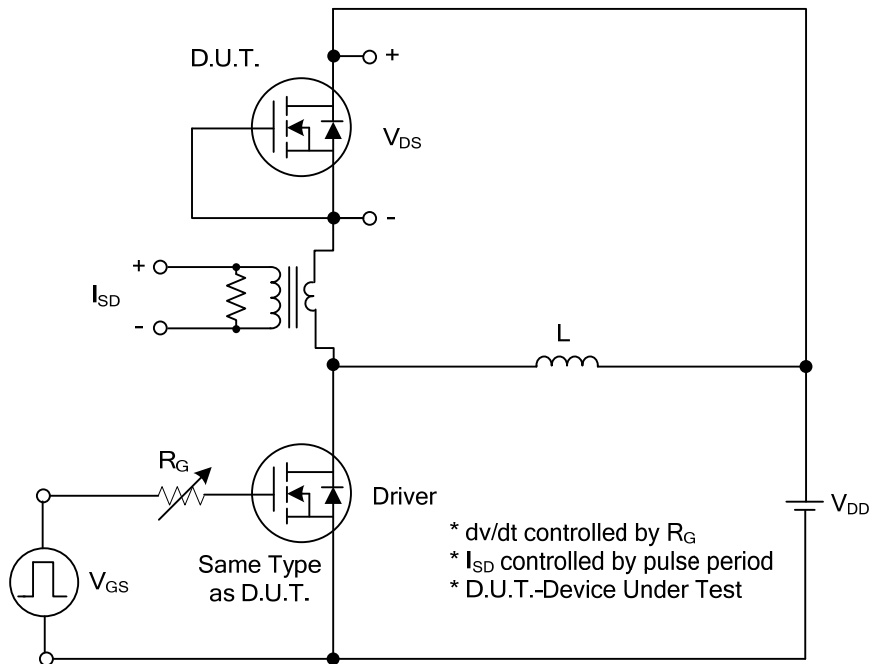
■ ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	40			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=40\text{V}, V_{GS}=0\text{V}$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$			100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0		3.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=10\text{A}$			33	m Ω
		$V_{GS}=4.5\text{V}, I_D=10\text{A}$			60	m Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=20\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$		480		pF
Output Capacitance	C_{OSS}			92		pF
Reverse Transfer Capacitance	C_{RSS}			81		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=20\text{V}, V_{GS}=10\text{V}, I_D=20\text{A}$ $I_G=1\text{mA}$		17		nC
Gate Source Charge	Q_{GS}			1.8		nC
Gate Drain Charge	Q_{GD}			2.8		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{GS}=10\text{V}, V_{DS}=20\text{V}, I_D=20\Omega,$ $R_G=3\Omega$		3.2		ns
Turn-ON Rise Time	t_R			21		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			15		ns
Turn-OFF Fall-Time	t_F			22		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				20	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				40	A
Diode Forward Voltage	V_{SD}	$I_S=20\text{A}, V_{GS}=0\text{V}$			1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F=20\text{A}, dI/dt=100\text{A}/\mu\text{s}$		28		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F=20\text{A}, dI/dt=100\text{A}/\mu\text{s}$		20		nC

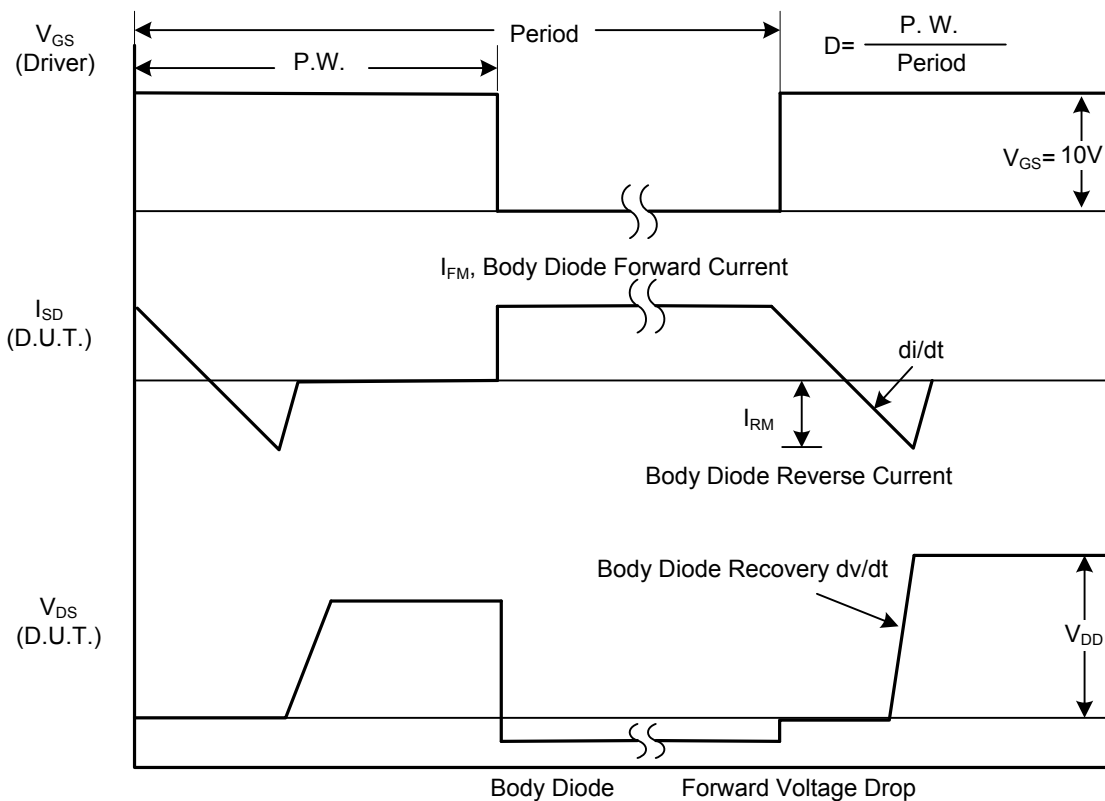
Notes: 1. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycles $\leq 2\%$.

2. The power dissipation is limited by 140 $^{\circ}\text{C}$ junction temperature.

■ TEST CIRCUITS AND WAVEFORMS

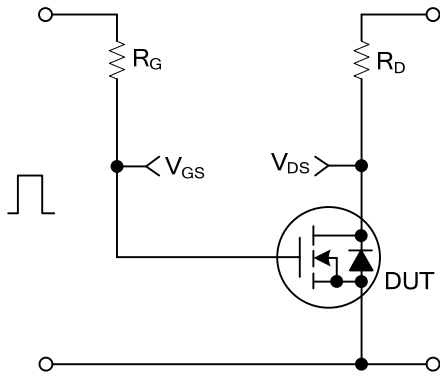


Peak Diode Recovery dv/dt Test Circuit

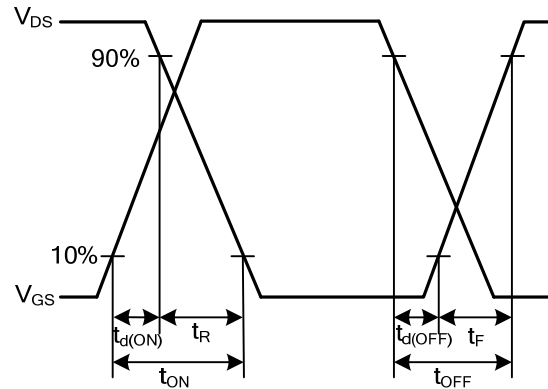


Peak Diode Recovery dv/dt Waveforms

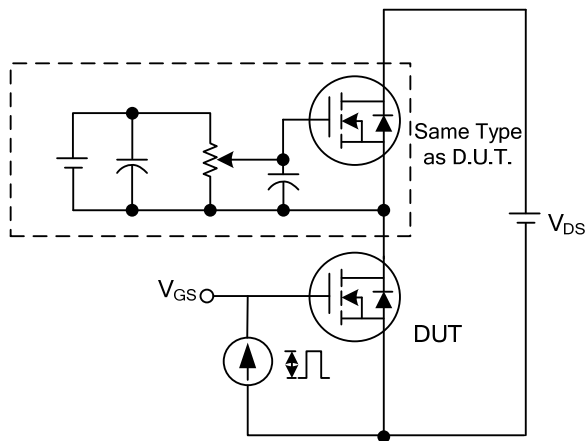
TEST CIRCUITS AND WAVEFORMS



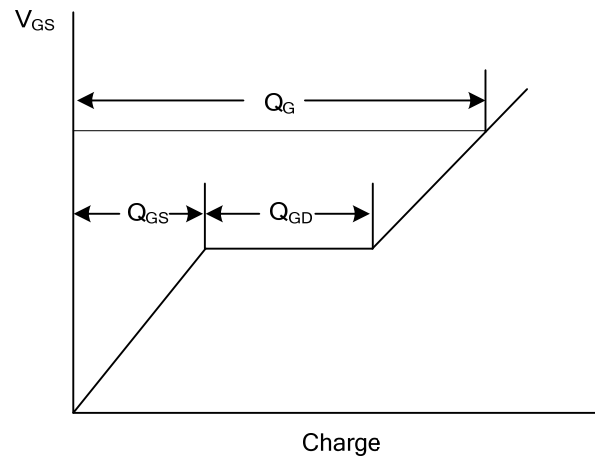
Switching Test Circuit



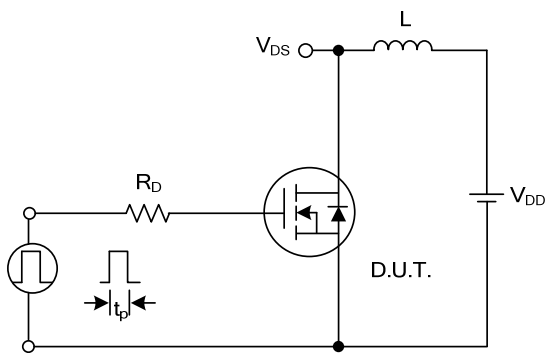
Switching Waveforms



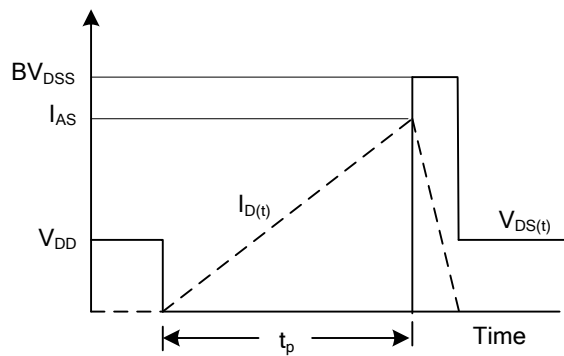
Gate Charge Test Circuit



Gate Charge Waveform

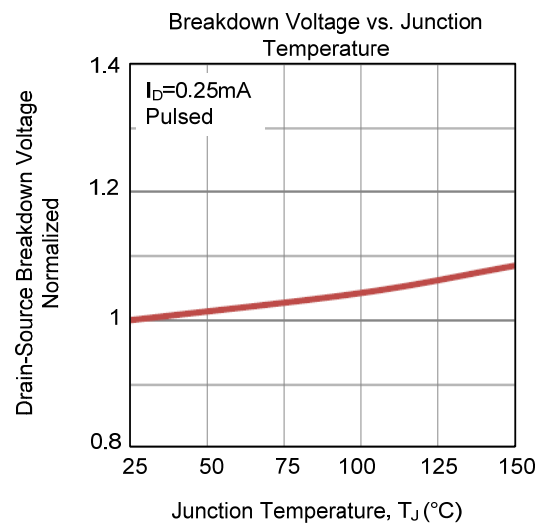
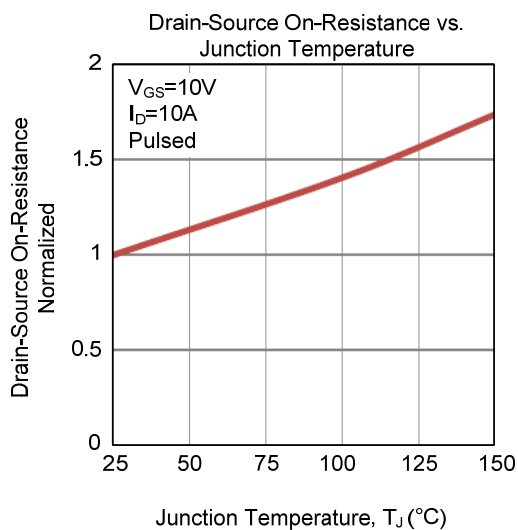
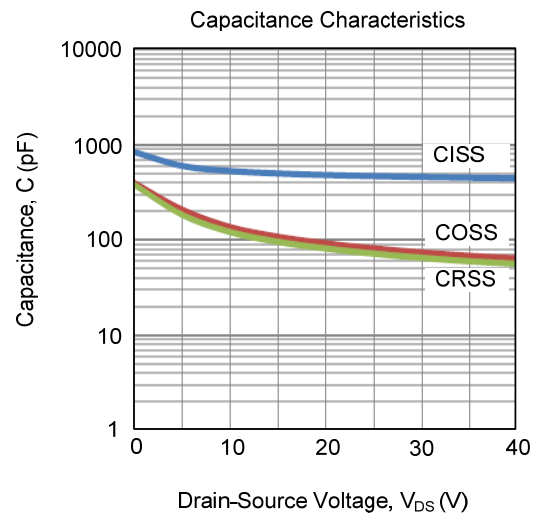
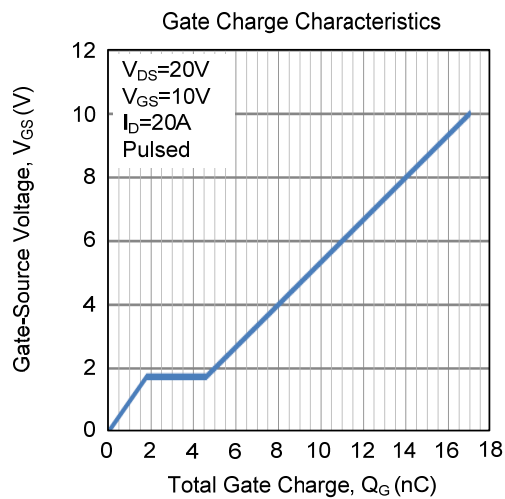
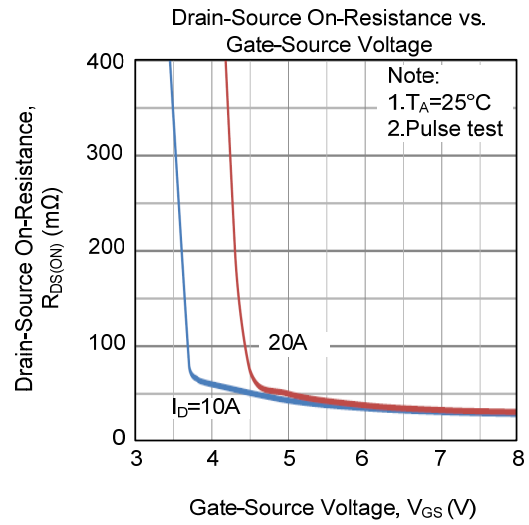
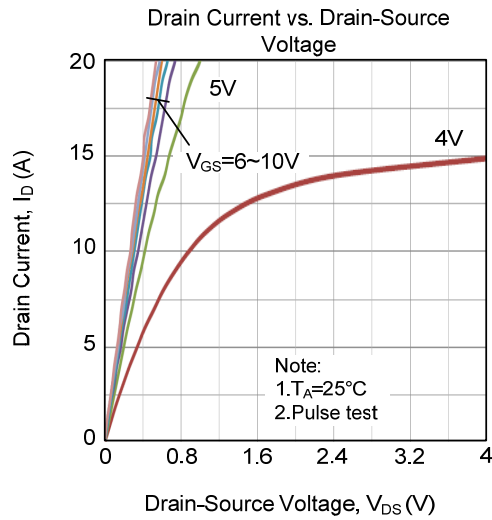


Unclamped Inductive Switching Test Circuit

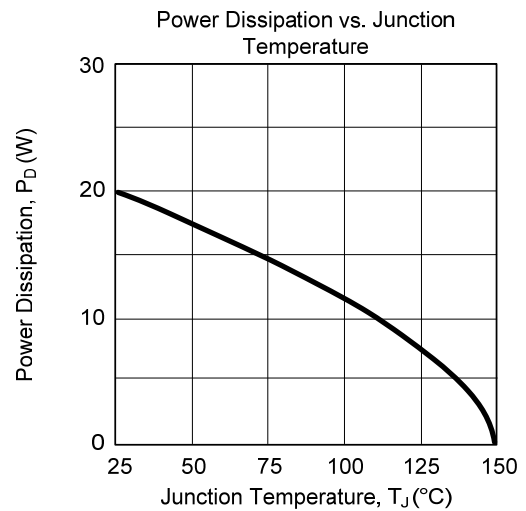
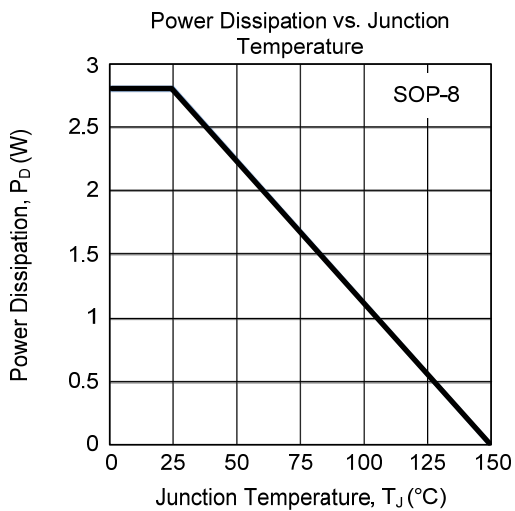
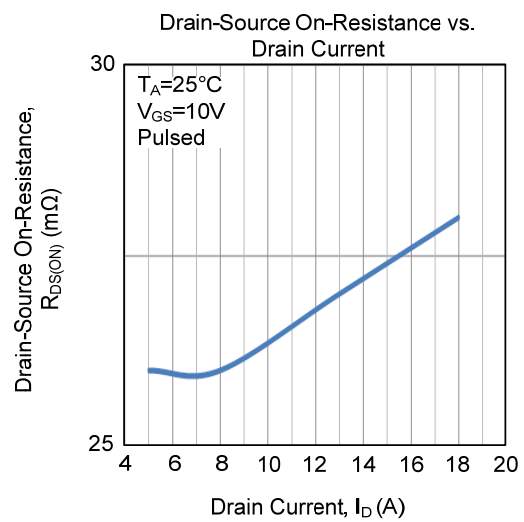
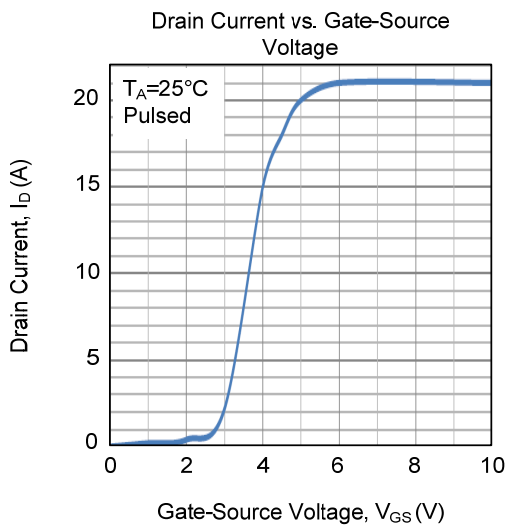
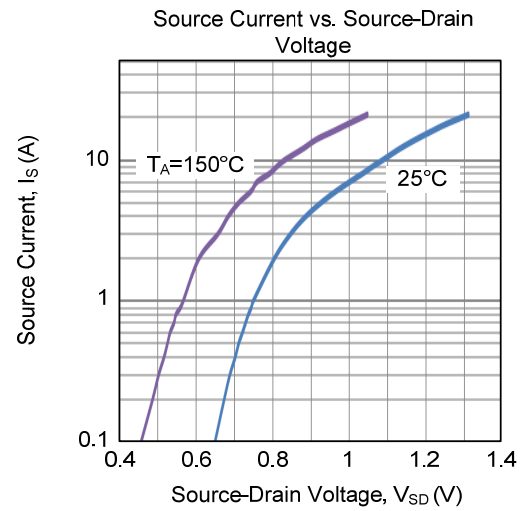
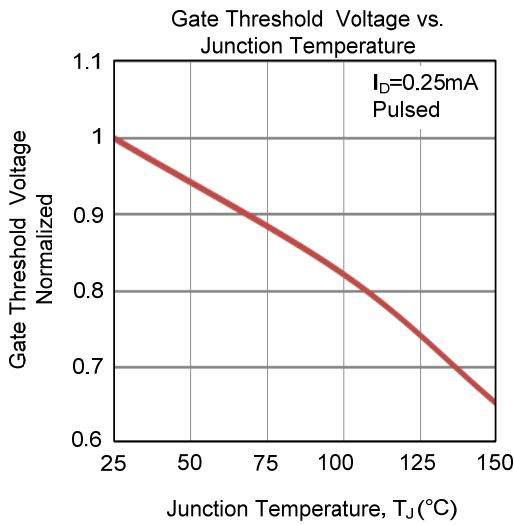


Unclamped Inductive Switching Waveforms

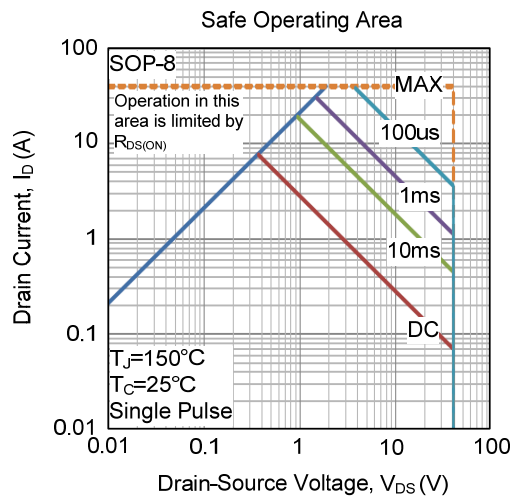
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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