



## UT4422

Power MOSFET

### N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

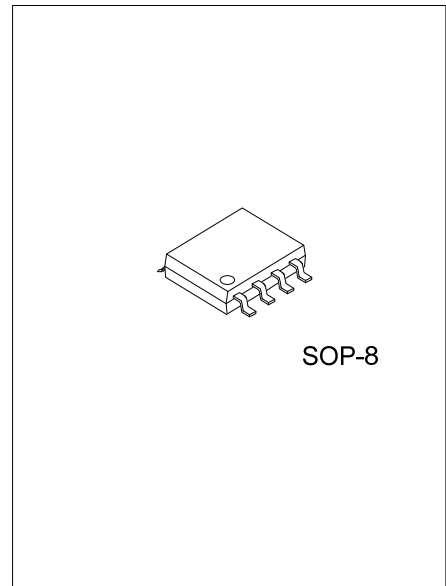
#### DESCRIPTION

The UTC **UT4422** is a N-channel MOSFET, it uses UTC's advanced technology to provide the customers with a minimum on state resistance and high switching speed.

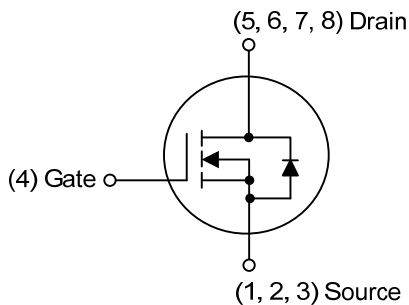
The UTC **UT4422** is suitable for load switch and battery protection applications.

#### FEATURES

- \*  $R_{DS(ON)} \leq 15 \text{ m}\Omega @ V_{GS} = 10\text{V}, I_D = 8.0\text{A}$
- \*  $R_{DS(ON)} \leq 24 \text{ m}\Omega @ V_{GS} = 4.5\text{V}, I_D = 8.0\text{A}$
- \* Low Capacitance
- \* Low Gate Charge
- \* Fast Switching Capability
- \* Avalanche Energy Specified



#### SYMBOL



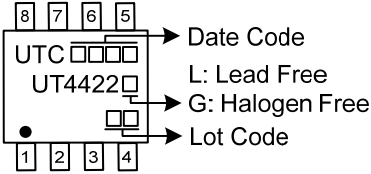
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing		
Lead Free	Halogen Free		1	2	3	4	5	6		7	8
UT4422L-S08-R	UT4422G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UT4422G-S08-R</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) S08: SOP-8</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
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■ MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	30	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 1)	$I_D$	11	A
Pulsed Drain Current	$I_{DM}$	50	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	7
Power Dissipation	$P_D$	1.5	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.  $L = 0.1\text{mH}$ ,  $I_{AS} = 11.6\text{A}$ ,  $V_{DD} = 20\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	90	$^\circ\text{C/W}$
Junction to Case	$\theta_{JC}$	83.3 (Note)	$^\circ\text{C/W}$

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

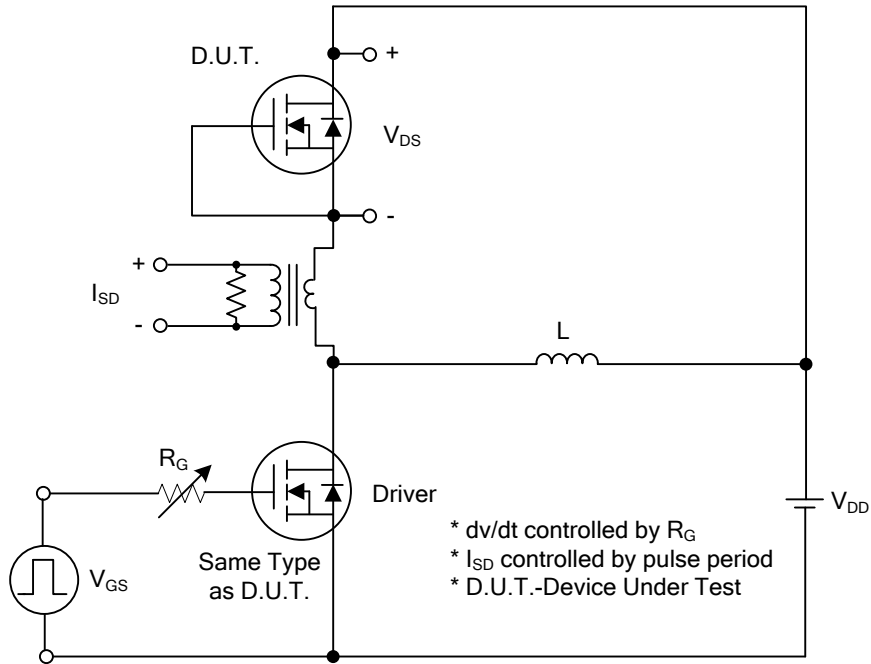
■ ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{V}$ , $I_D=250\mu\text{A}$	30			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=30\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate-Body Leakage Current	$I_{GSS}$	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 20\text{V}$			100	nA
<b>ON CHARACTERISTICS</b>						
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	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=8.0\text{A}$			15	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$ , $I_D=8.0\text{A}$			24	$\text{m}\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=15\text{V}$ , $V_{GS}=0\text{V}$ , $f=1\text{MHz}$		850		pF
Output Capacitance	$C_{OSS}$			201		pF
Reverse Transfer Capacitance	$C_{RSS}$			168		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{DS}=24\text{V}$ , $V_{GS}=10\text{V}$ , $I_D=11\text{A}$		29		nC
Gate Source Charge	$Q_{GS}$			4		nC
Gate Drain Charge	$Q_{GD}$			8		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DS}=15\text{V}$ , $V_{GS}=10\text{V}$ , $I_D=11\text{A}$ , $R_G=3.0\Omega$ (Note 1, 2)		6		ns
Turn-ON Rise Time	$t_R$			18		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			22		ns
Turn-OFF Fall-Time	$t_F$			21		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Diode Forward Voltage	$V_{SD}$	$I_S=11\text{A}$ , $V_{GS}=0\text{V}$			1.4	V

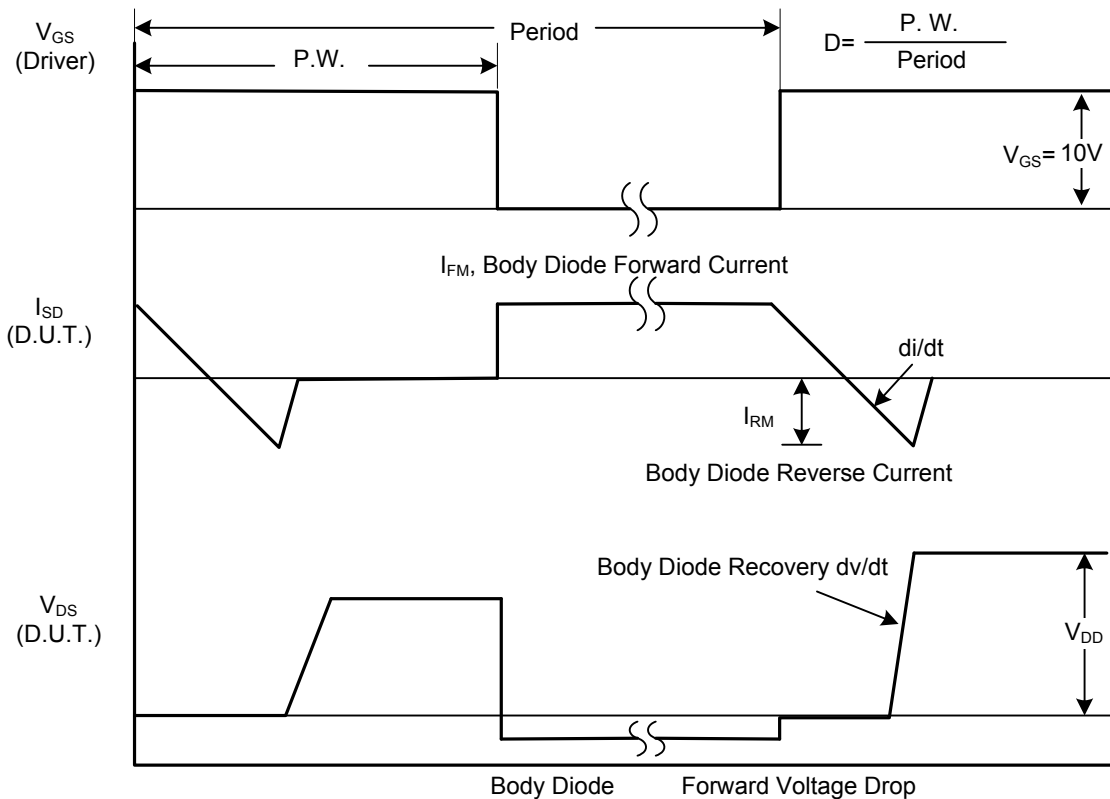
Notes: 1. Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

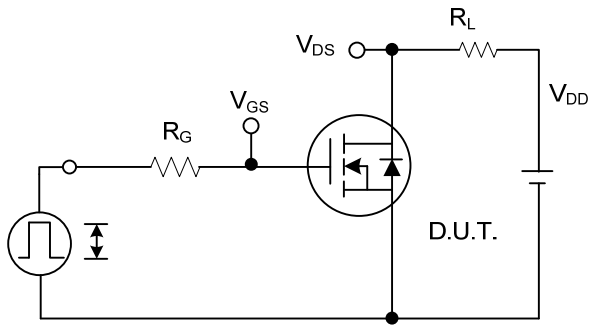


Peak Diode Recovery dv/dt Test Circuit

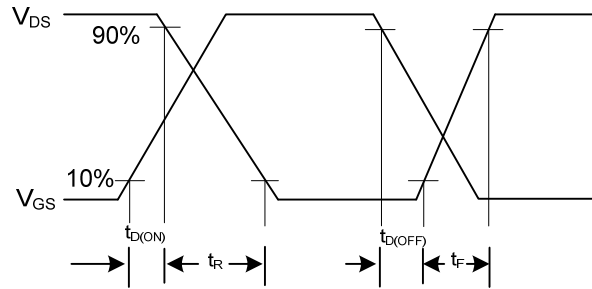


Peak Diode Recovery dv/dt Waveforms

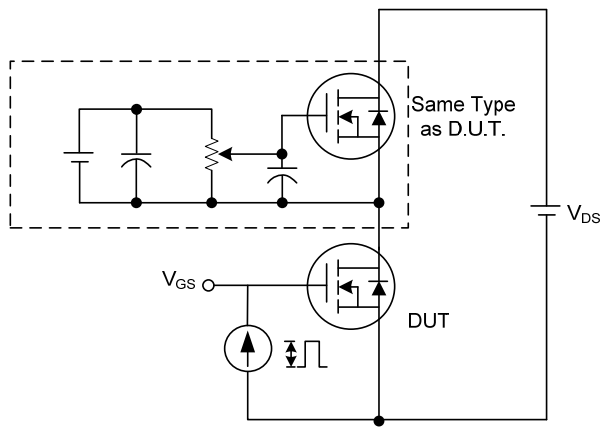
■ TEST CIRCUITS AND WAVEFORMS



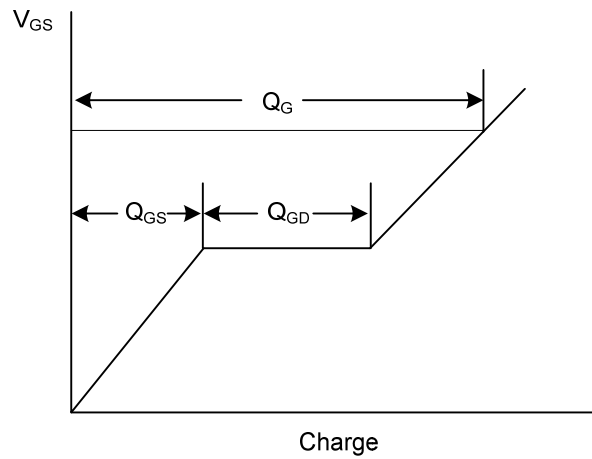
Switching Test Circuit



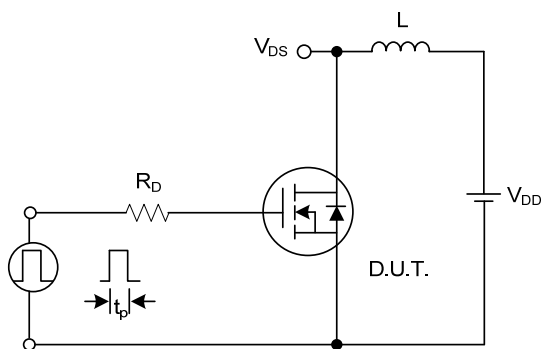
Switching Waveforms



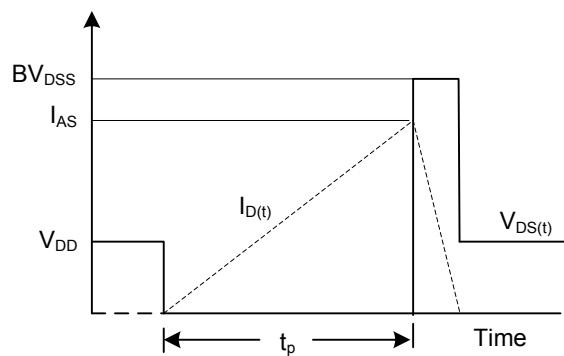
Gate Charge Test Circuit



Gate Charge Waveform

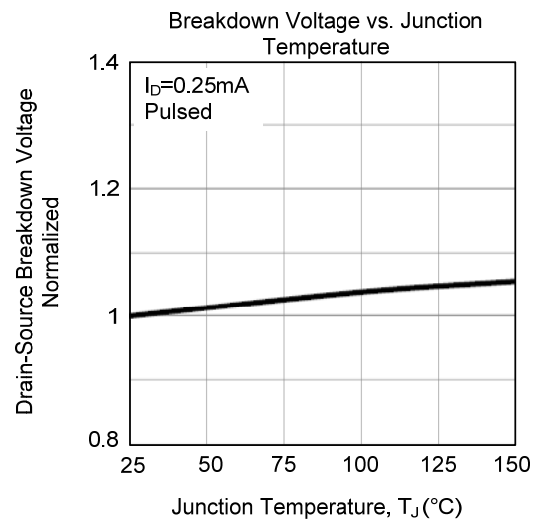
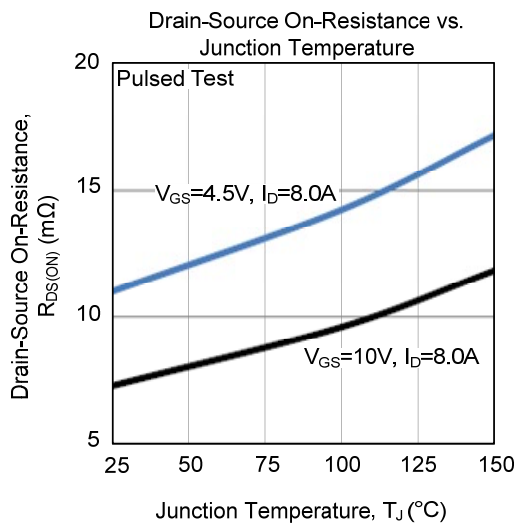
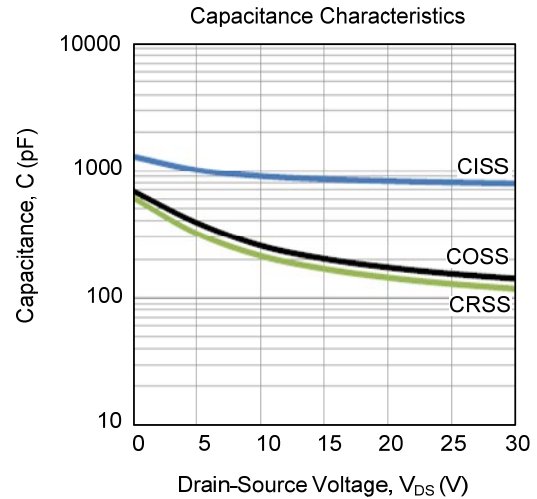
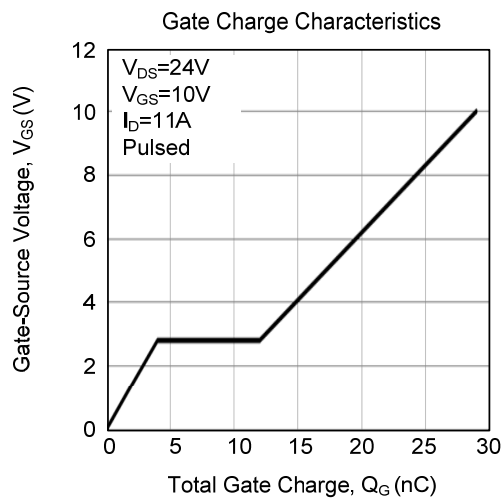
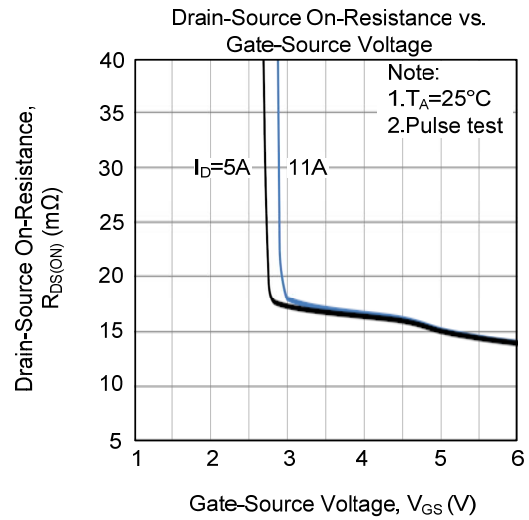
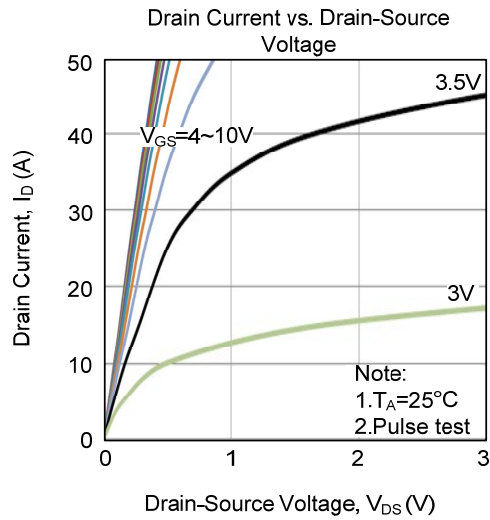


Unclamped Inductive Switching Test Circuit

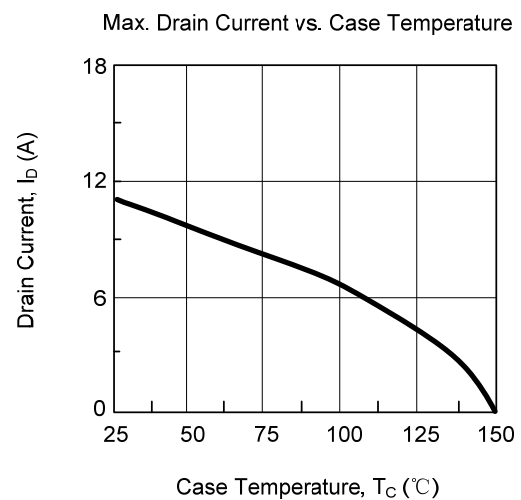
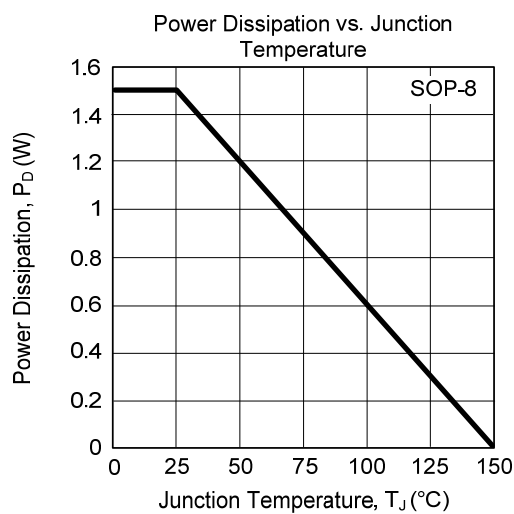
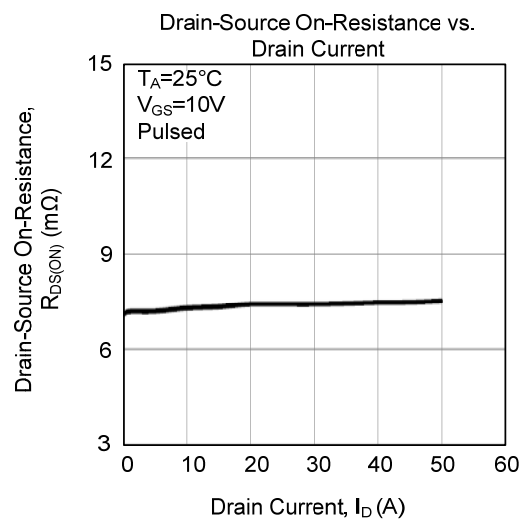
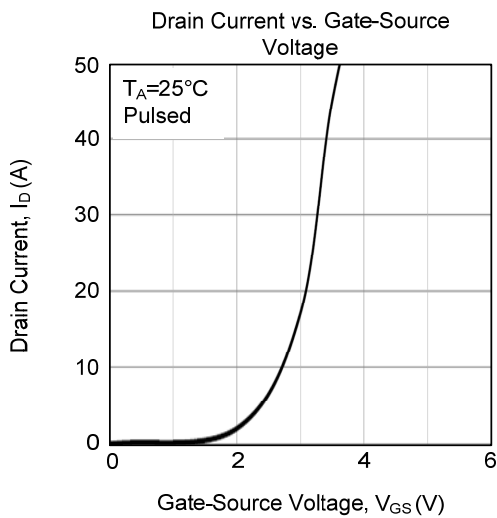
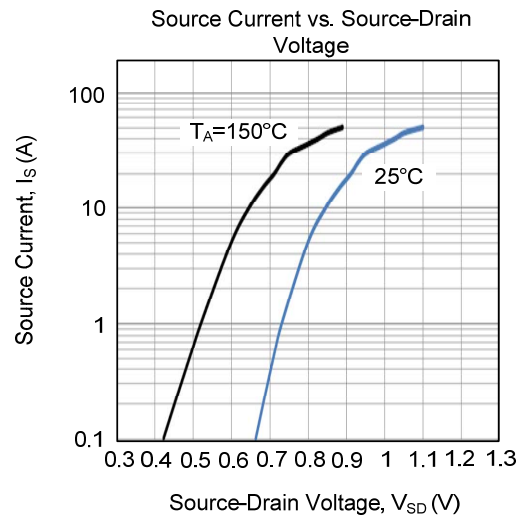
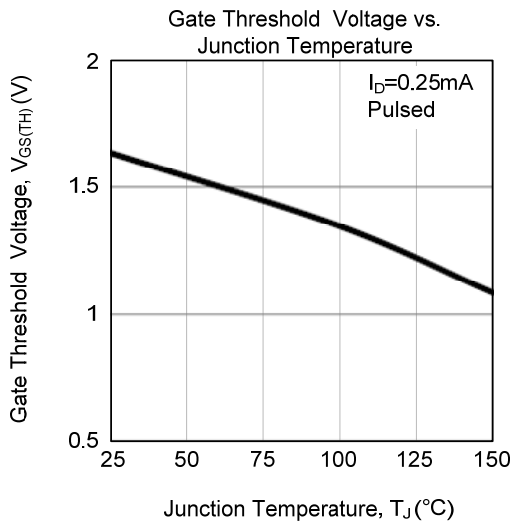


Unclamped Inductive Switching Waveforms

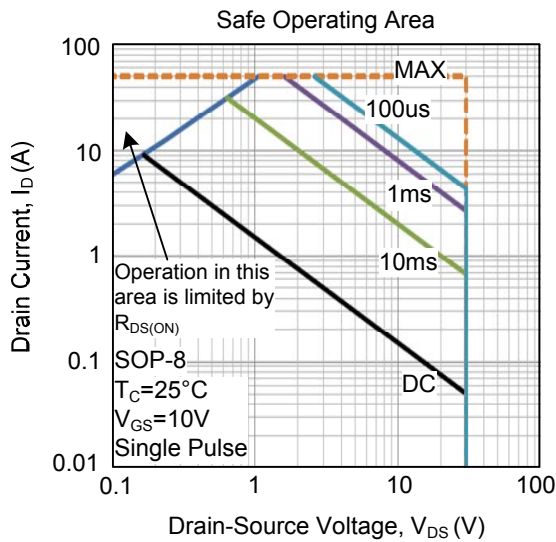
## TYPICAL CHARACTERISTICS



## ■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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