



## UT5P06H

Power MOSFET

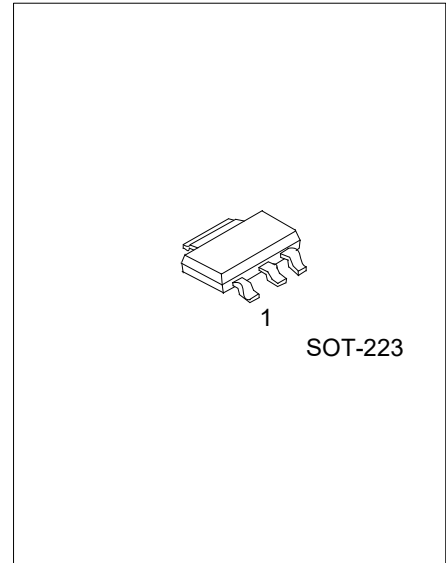
### -5.0A, -60V P-CHANNEL POWER MOSFET

#### DESCRIPTION

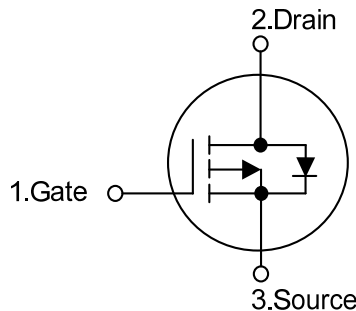
The UTC **UT5P06H** uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with low gate voltages. This device is suitable for use as a load switch, in PWM applications, converters and power supplies.

#### FEATURES

- \*  $R_{DS(ON)} \leq 115 \text{ m}\Omega @ V_{GS} = -10V, I_D = -2.5A$
- \* Low Capacitance
- \* Low Gate Charge
- \* Fast Switching Capability
- \* Avalanche Energy Specified



#### SYMBOL



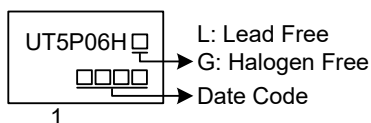
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT5P06HL-AA3-R	UT5P06HG-AA3-R	SOT-223	G	D	S	Tape Reel

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

<p>UT5P06HG-AA3-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AA3: SOT-223 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	-60	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous	$I_D$	-5	A
	Pulsed	$I_{DM}$	-10	A
Avalanche Energy	Single Pulsed	$E_{AS}$	21	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.1	V/ns
Power Dissipation		$P_D$	2.3	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.  $L = 0.1\text{mH}$ ,  $I_{AS} = -20\text{A}$ ,  $V_{DD} = -50\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^{\circ}\text{C}$   
 4.  $I_{SD} \leq -5.0\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

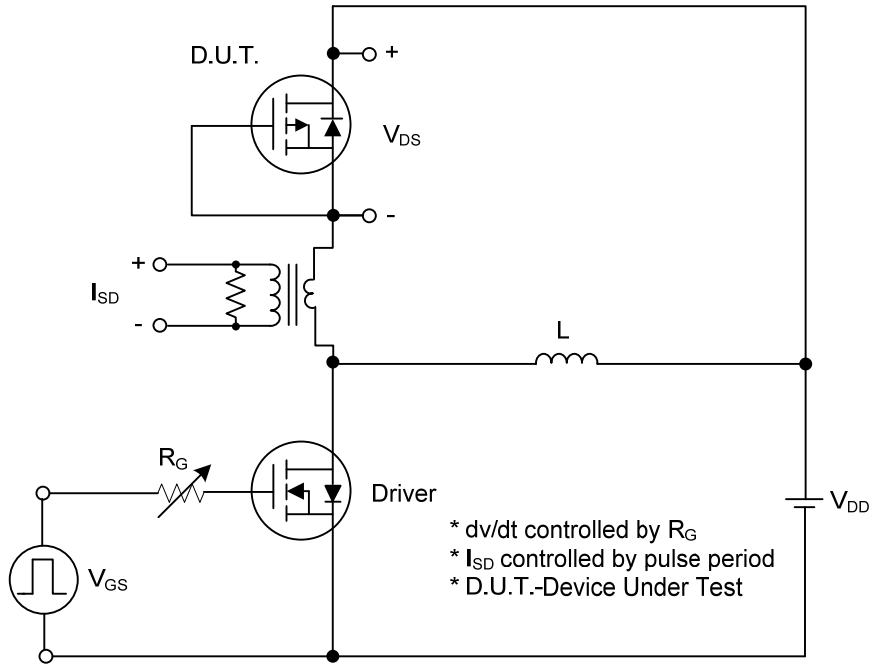
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	150	$^{\circ}\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	54.3	$^{\circ}\text{C}/\text{W}$

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

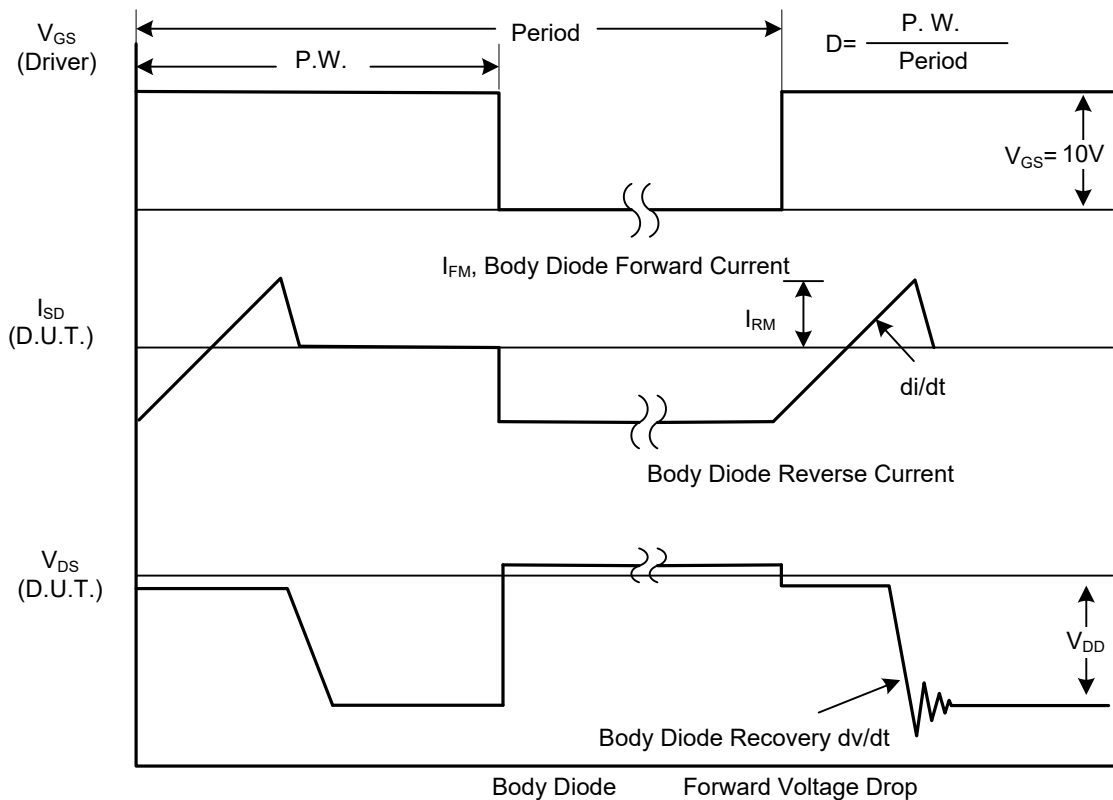
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=-250\mu\text{A}$ , $V_{GS}=0\text{V}$	-60			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-60\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	Forward $V_{GS}=+20\text{V}$ , $V_{DS}=0\text{V}$			+100	nA
		Reverse $V_{GS}=-20\text{V}$ , $V_{DS}=0\text{V}$			-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=-250\mu\text{A}$	-2.0		-4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10\text{V}$ , $I_D=-2.5\text{A}$			115	m $\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=-25\text{V}$ , $V_{GS}=0\text{V}$ , $f=1\text{MHz}$		787		pF
Output Capacitance	$C_{OSS}$			64		pF
Reverse Transfer Capacitance	$C_{RSS}$			50		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{DS}=-48\text{V}$ , $V_{GS}=-10\text{V}$ , $I_D=-5.0\text{A}$ (Note 1, 2)		21		nC
Gate to Source Charge	$Q_{GS}$			4		nC
Gate to Drain Charge	$Q_{GD}$			6		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=-30\text{V}$ , $V_{GS}=-10\text{V}$ , $I_D=-5.0\text{A}$ , $R_G=3\Omega$ (Note 1, 2)		6		ns
Rise Time	$t_R$			18		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			21		ns
Fall-Time	$t_F$			19		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$				-5	A
Maximum Body-Diode Pulsed Current	$I_{SM}$				-10	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_S=-5.0\text{A}$ , $V_{GS}=0\text{V}$			-1.4	V
Reverse Recovery Time	$t_{rr}$	$I_S=-5.0\text{A}$ , $V_{GS}=0\text{V}$		59		ns
Reverse Recovery Charge (Note 1)	$Q_{rr}$	$dI_S/dt=100\text{A}/\mu\text{s}$		90		nC

- Notes: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .  
 2. Essentially independent of operating ambient temperature.

## TEST CIRCUITS AND WAVEFORMS

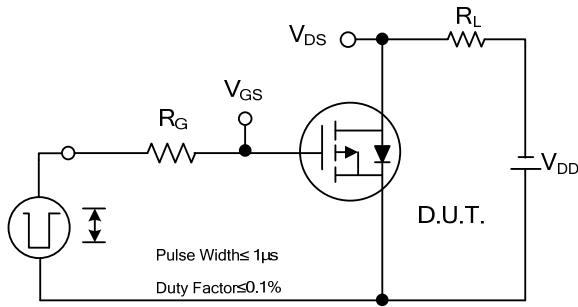


**Peak Diode Recovery  $dv/dt$  Test Circuit**

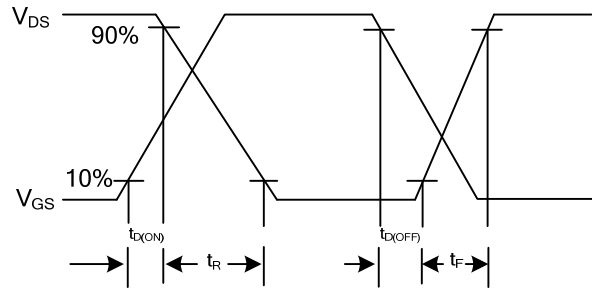


**Peak Diode Recovery  $dv/dt$  Waveforms**

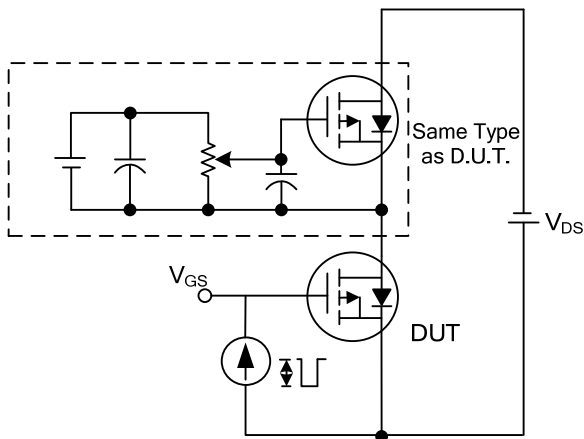
## TEST CIRCUITS AND WAVEFORMS



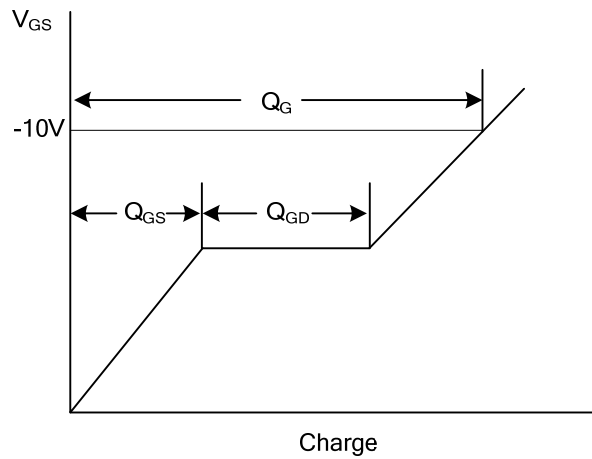
**Switching Test Circuit**



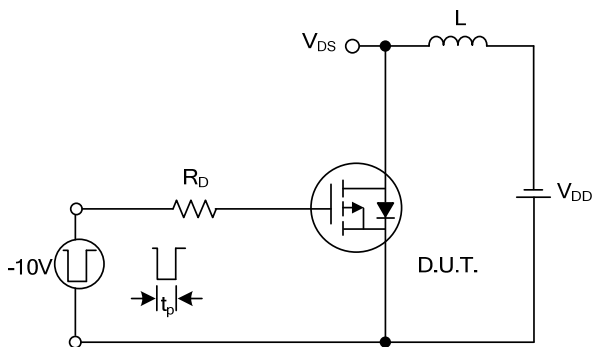
**Switching Waveforms**



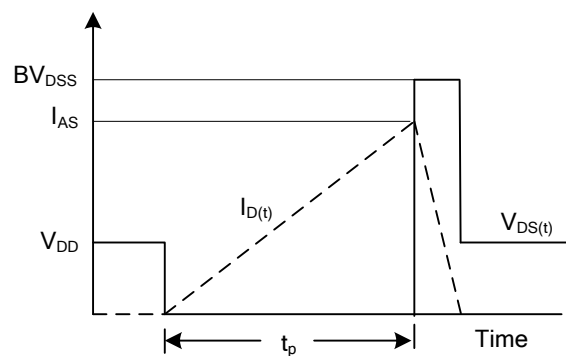
**Gate Charge Test Circuit**



**Gate Charge Waveform**

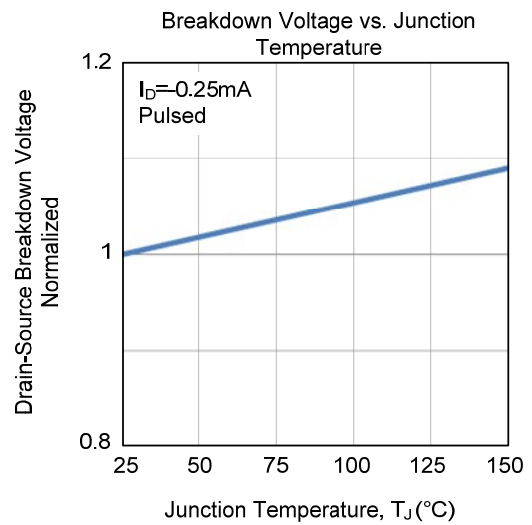
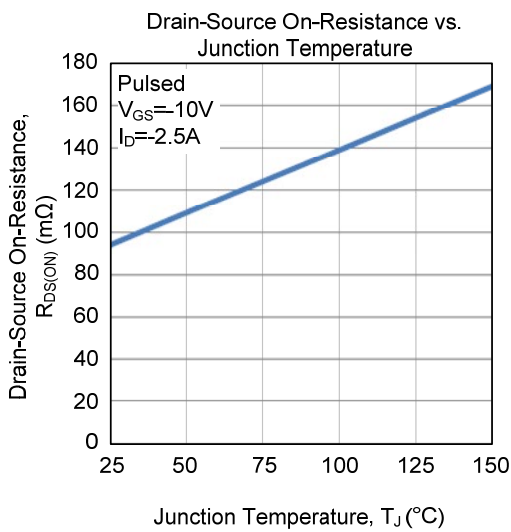
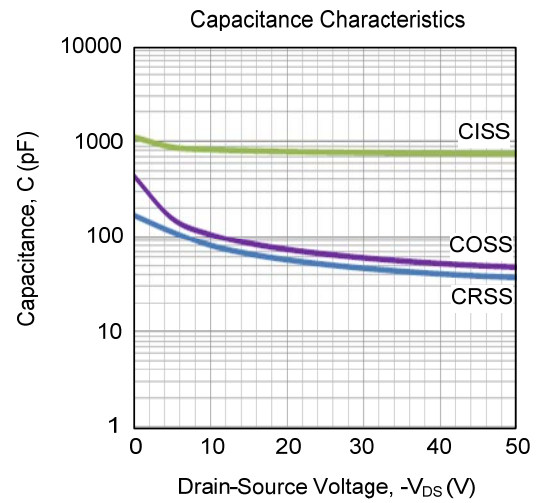
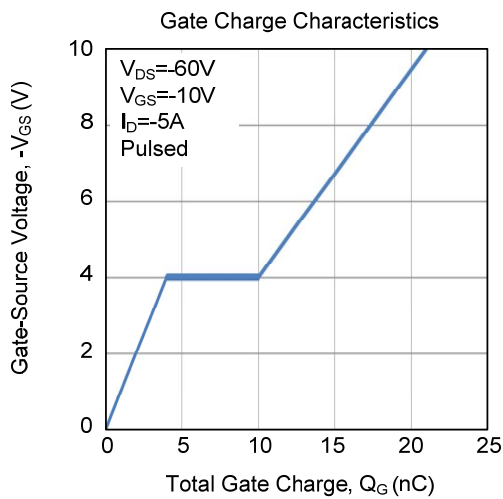
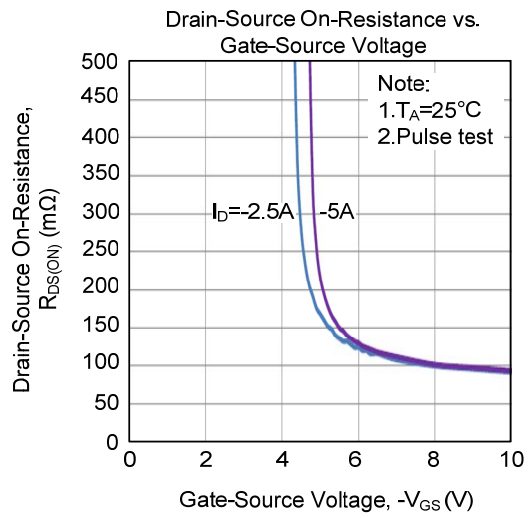
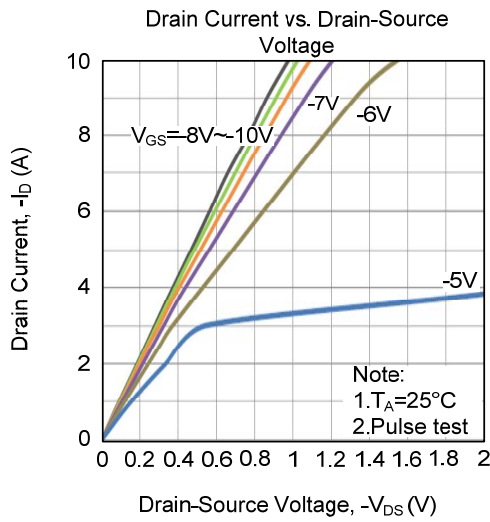


**Unclamped Inductive Switching Test Circuit**

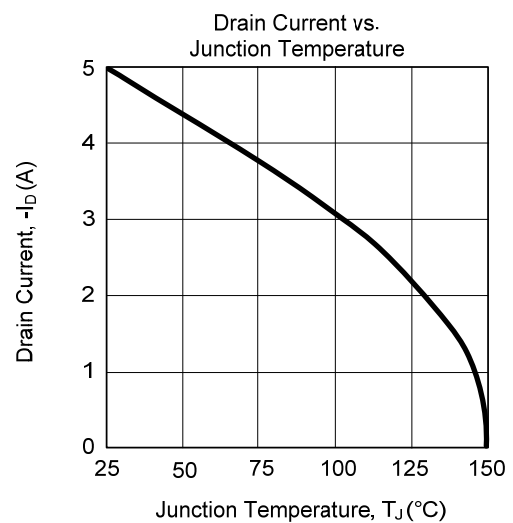
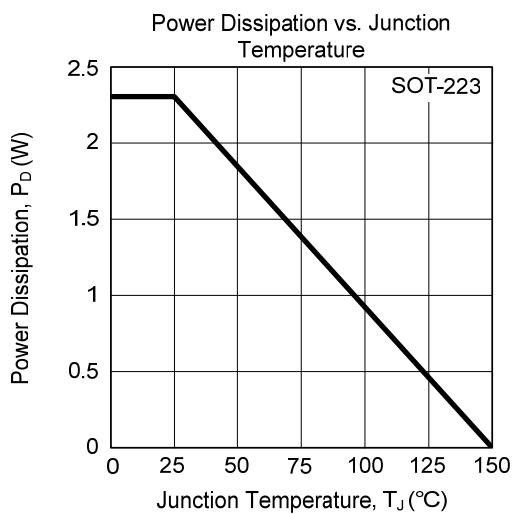
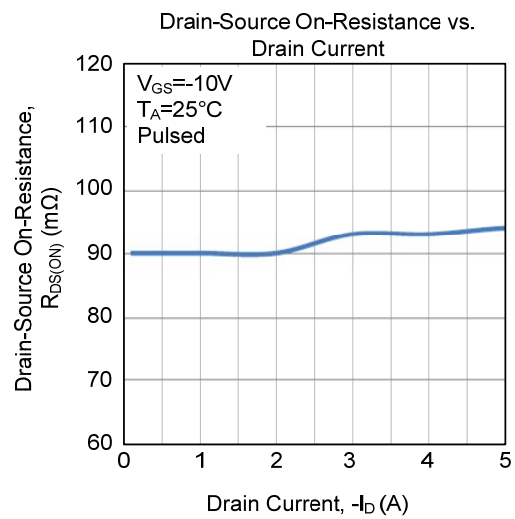
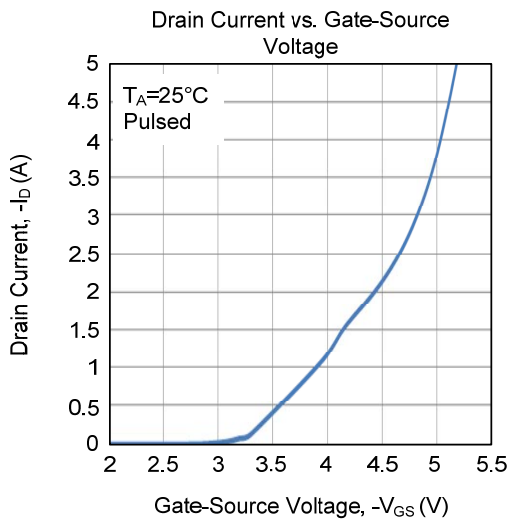
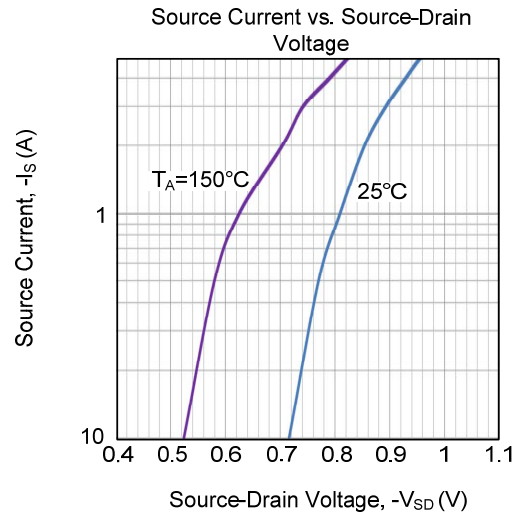
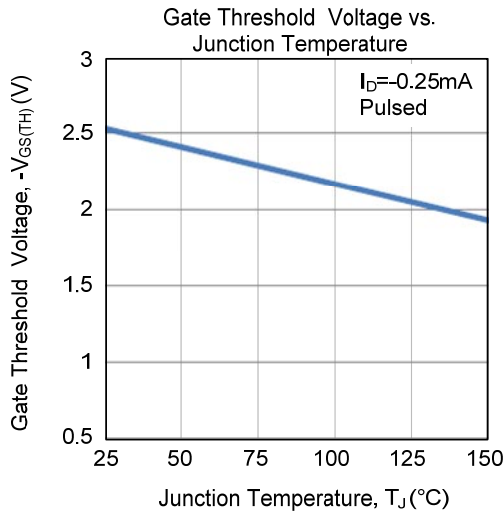


**Unclamped Inductive Switching Waveforms**

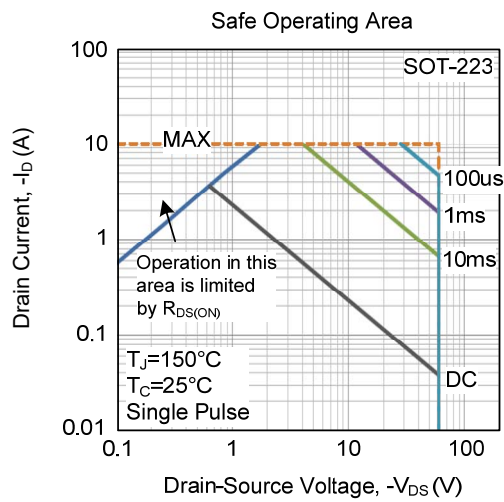
## TYPICAL CHARACTERISTICS



## ■ TYPICAL CHARACTERISTICS (Cont.)



### ■ TYPICAL CHARACTERISTICS (Cont.)



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