



UTT12P10

Power MOSFET

**-100V, -12A P-CHANNEL
POWER MOSFET**

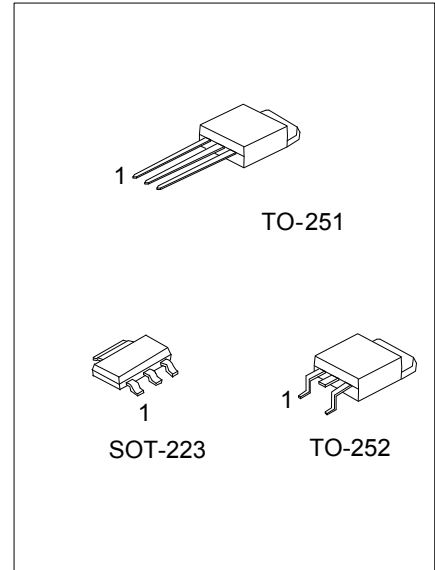
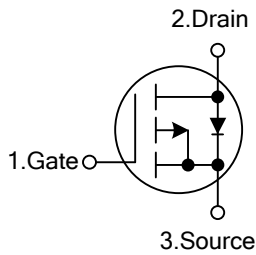
■ **DESCRIPTION**

The UTC **UTT12P10** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed, cost-effectiveness and a minimum on-state resistance. It can also withstand high energy in the avalanche.

■ **FEATURES**

- * $R_{DS(ON)} \leq 0.2 \Omega @ V_{GS} = -10V, I_D = -12A$
- * High Switching Speed

■ **SYMBOL**



■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT12P10L-AA3-R	UTT12P10G-AA3-R	SOT-223	G	D	S	Tape Reel
UTT12P10L-TM3-T	UTT12P10G-TM3-T	TO-251	G	D	S	Tube
UTT12P10L-TN3-R	UTT12P10G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UTT12P10G-AA3-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel, T: Tube (2) AA3: SOT-223, TM3: TO-251, TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ **MARKING**

SOT-223	TO-251 / TO-252
<p>1</p>	<p>1</p>

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-100	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous, $V_{GSS}@-10\text{V}$	I_D	-12	A
	Pulsed (Note 2)	I_{DM}	-48	A
	Single Pulsed (Note 3)	E_{AS}	18	mJ
Power Dissipation ($T_C=25^\circ\text{C}$)	SOT-223	P_D	2	W
	TO-251		44.5	W
	TO-252			
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 max. junction temperature.

3. $L=0.1\text{mH}$, $I_{AS}=-19.2\text{A}$, $V_{DD}=-25\text{V}$, $R_G=25\Omega$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	140	$^\circ\text{C/W}$
	TO-251		110	$^\circ\text{C/W}$
	TO-252			
Junction to Case	SOT-223	θ_{JC}	62.5	$^\circ\text{C/W}$
	TO-251		2.8	$^\circ\text{C/W}$
	TO-252			

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

■ ELECTRICAL CHARACTERISTICS (T_J=25°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	-100			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-100V, V _{GS} =0V			-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 =-250μA	-1.0		-3.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-12A (Note 2)			0.2	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =-25V, V _{GS} =0V, f=1.0MHz		1250		pF
Output Capacitance	C _{OSS}			70		pF
Reverse Transfer Capacitance	C _{RSS}			60		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =-80V, V _{GS} =-10V, I _D =-12A		31		nC
Gate to Source Charge	Q _{GS}			5		nC
Gate to Drain ("Miller") Charge	Q _{GD}			8		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =-50V, I _D =-12A, R _G =9.1Ω,		6		ns
Rise Time	t _R			18		ns
Turn-OFF Delay Time	t _{D(OFF)}			45		ns
Fall-Time	t _F			21		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				-12	A
Maximum Body-Diode Pulsed Current	I _{SM}	(Note 1)			-48	A
Drain-Source Diode Forward Voltage	V _{SD}	T _J =25°C, I _S =-12A, V _{GS} =0V (Note 2)			-5.0	V
Body Diode Reverse Recovery Time	t _{rr}	T _J =25°C, I _F =-12A,		130		ns
Body Diode Reverse Recovery Charge	Q _{rr}	di/dt=100A/μs (Note 2)		0.56		μC

Notes: 1. Repetitive rating; pulse width limited by max. junction temperature.

2. Pulse width ≤ 300μs; duty cycle ≤ 2%.

TEST CIRCUITS AND WAVEFORMS

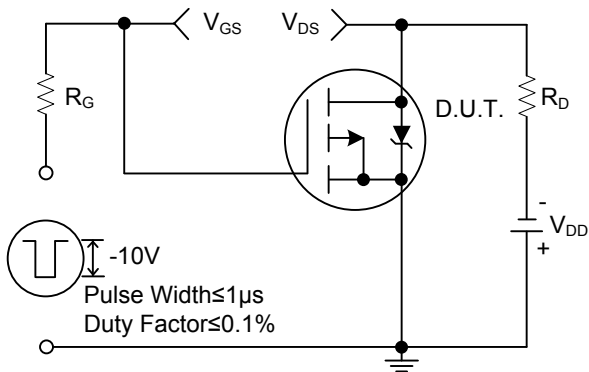


Fig. 1a Switching Time Test Circuit

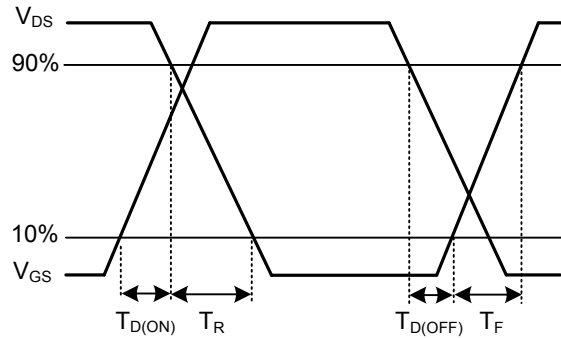


Fig. 1b Switching Time Waveforms

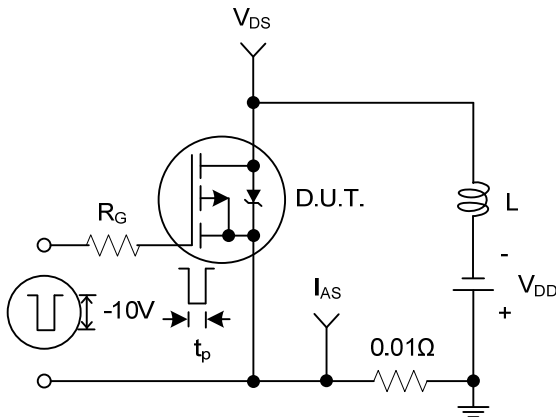


Fig. 2a Unclamped Inductive Test Circuit

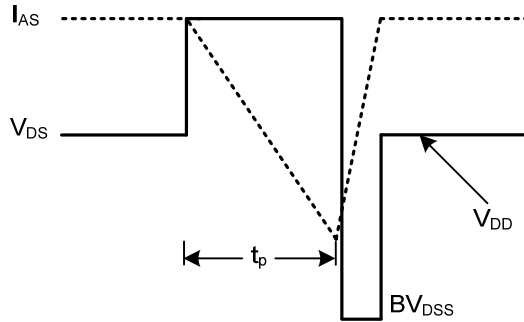


Fig. 2b Unclamped Inductive Waveforms

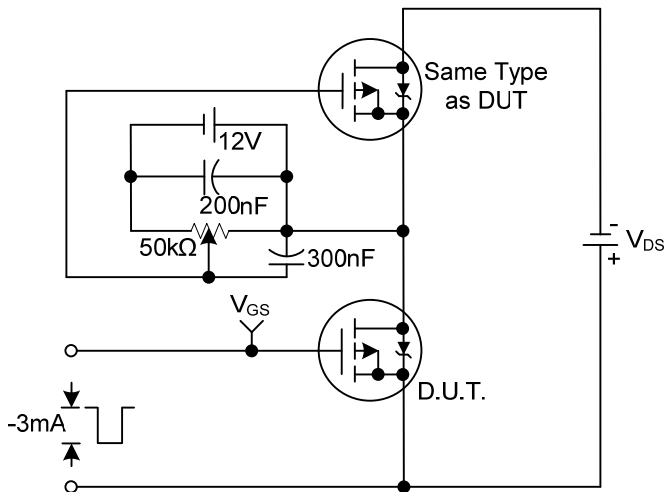


Fig.3a Gate Charge Test Circuit

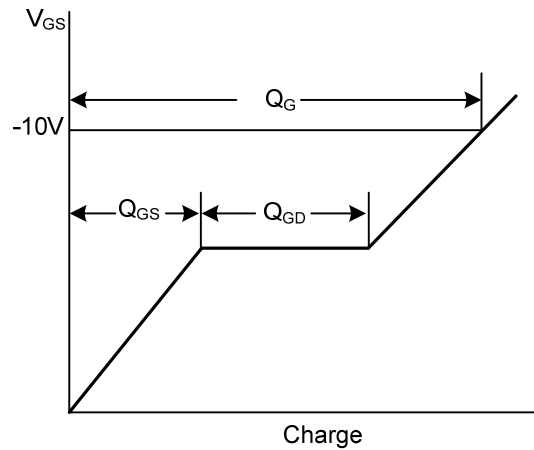
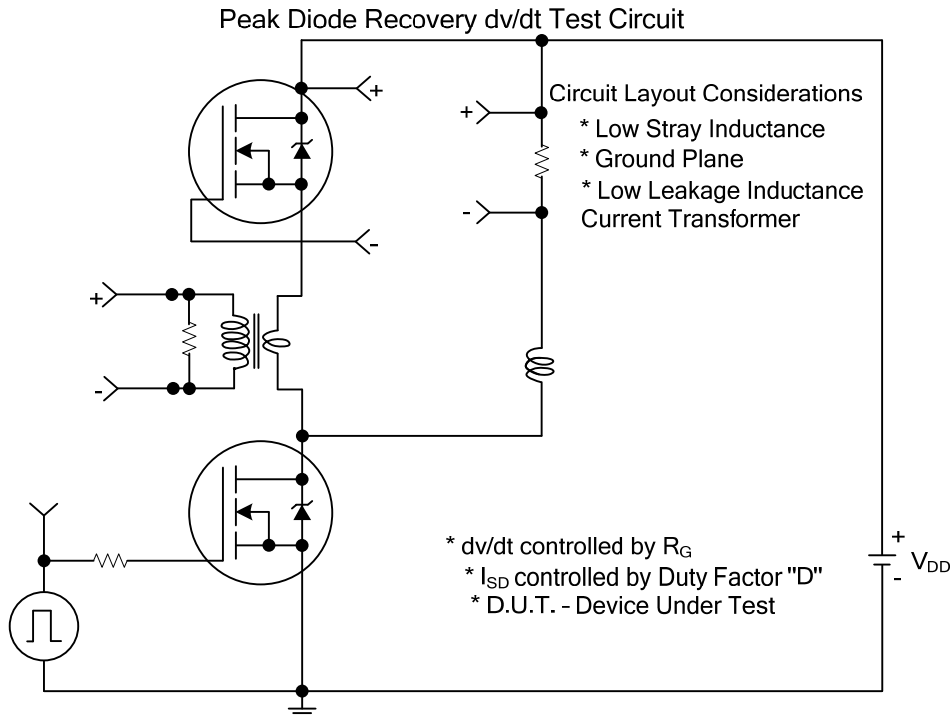
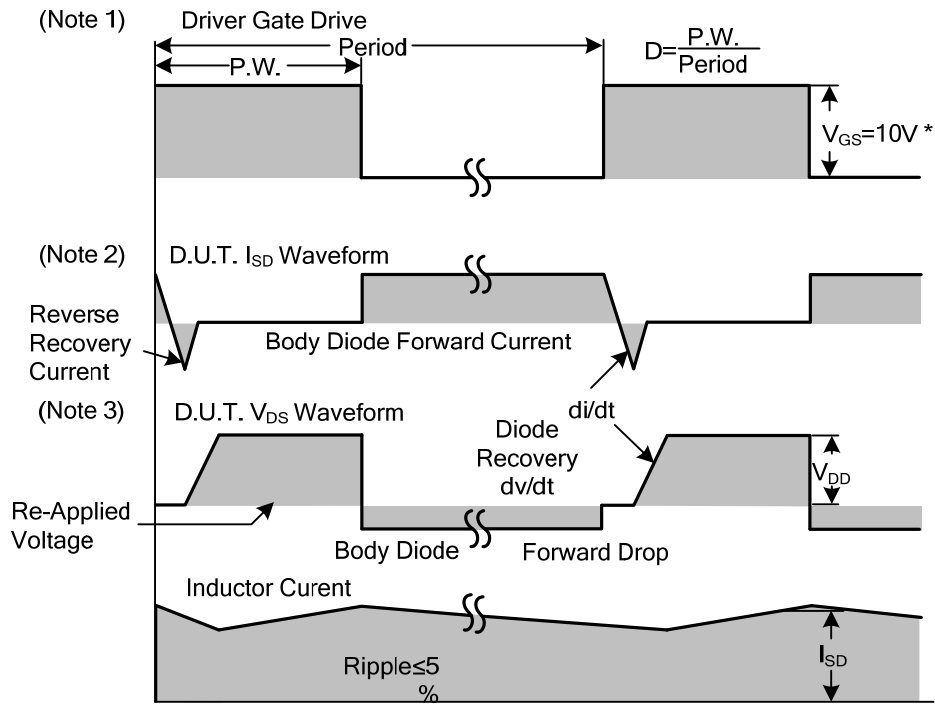


Fig. 3b Gate Charge Waveform

TEST CIRCUITS AND WAVEFORMS



* Reverse Polarity for P-Channel
 ** Use P-Channel Driver for P-Channel Measurements

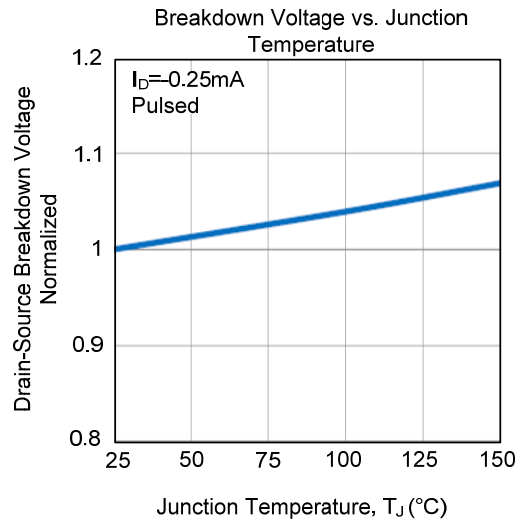
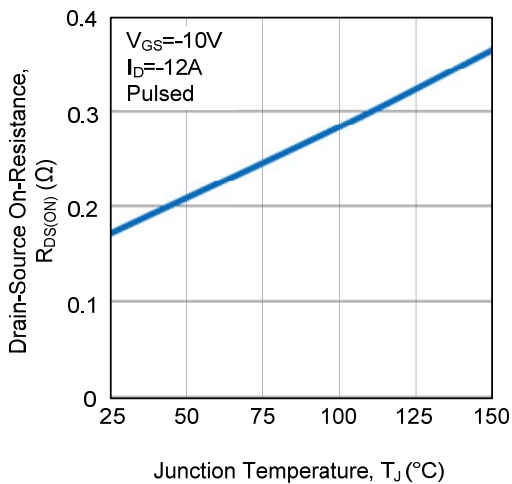
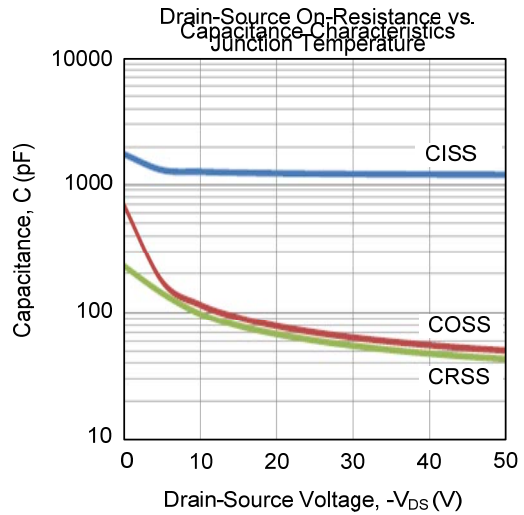
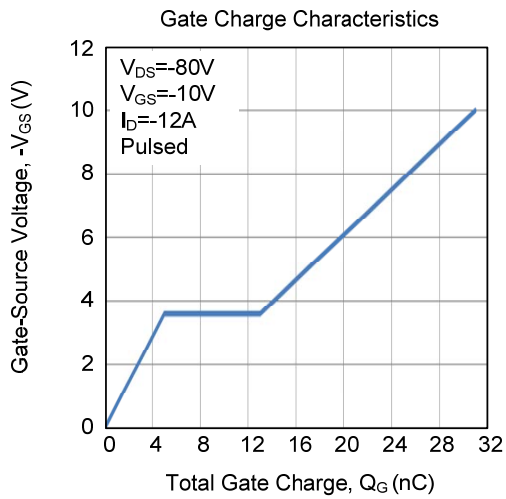
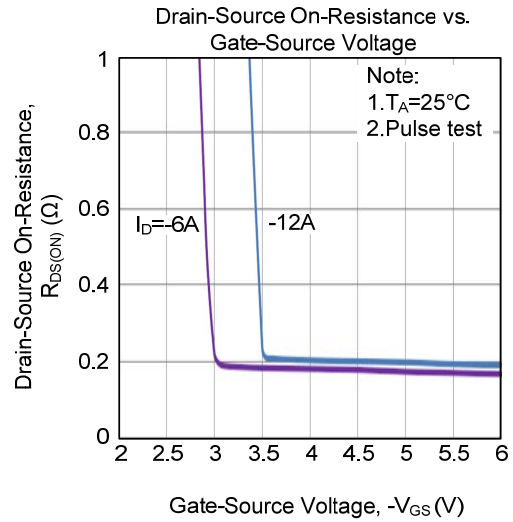
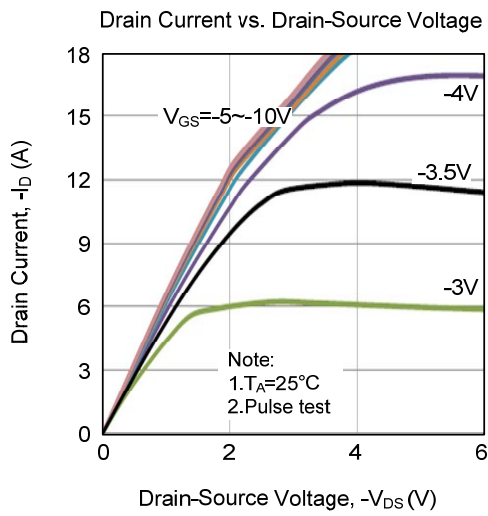


*** $V_{GS} = 5V$ for Logic Level and 3V Drive Devices

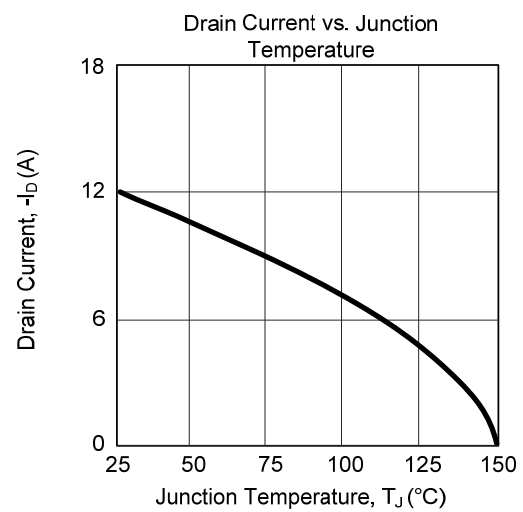
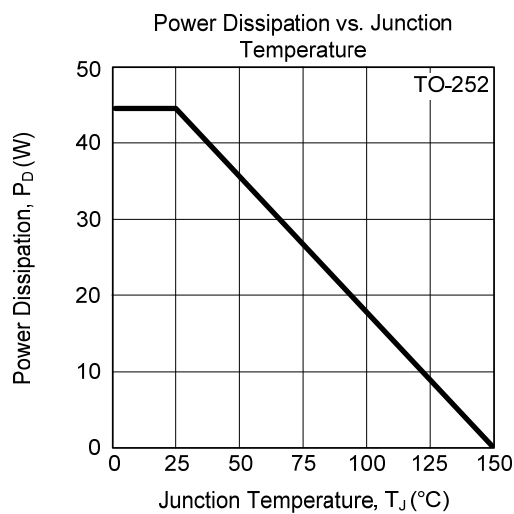
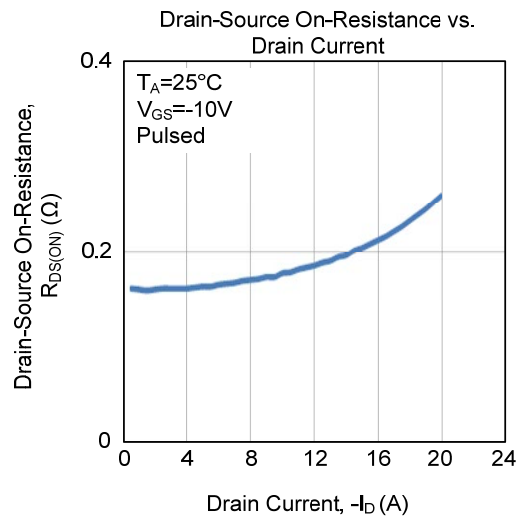
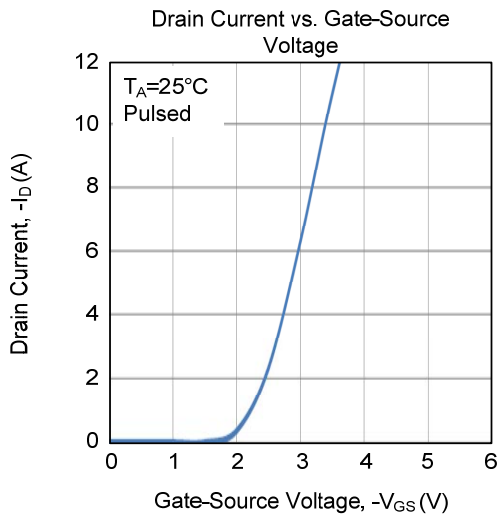
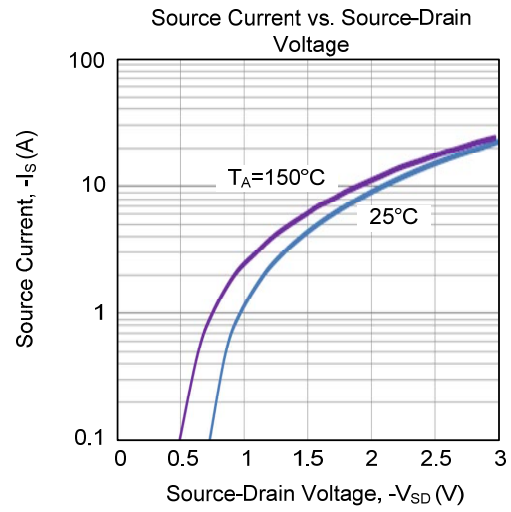
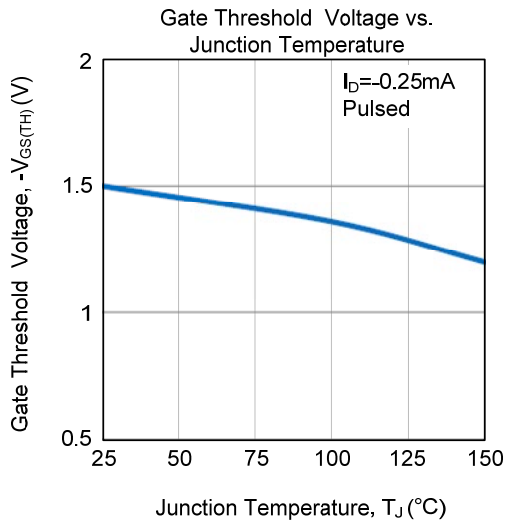
For N and P Channel Power MOSFET

- Notes: 1. Repetitive rating; pulse width limited by max. junction temperature.
 2. $V_{DD} = -25V$, starting $T_J = 25^\circ C$, $L = 2.7mH$, $R_G = 25\Omega$, $I_{AS} = -12A$. (See Figure 2)
 3. $I_{SD} \le -12A$, $di/dt \le 200A/\mu s$, $V_{DD} \le BV_{DSS}$, $T_J \le 175^\circ C$

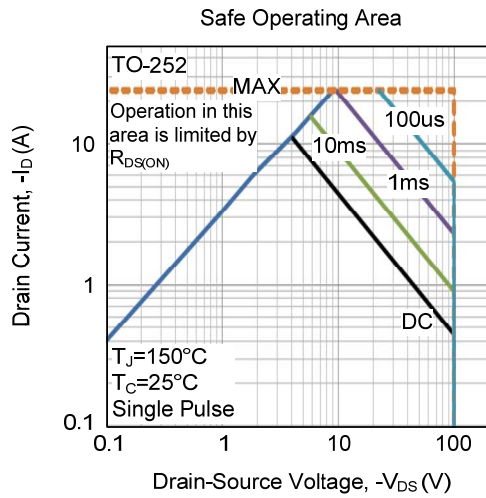
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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