



## UTT100P03

Power MOSFET

### -100A, -30V P-CHANNEL POWER MOSFET

#### DESCRIPTION

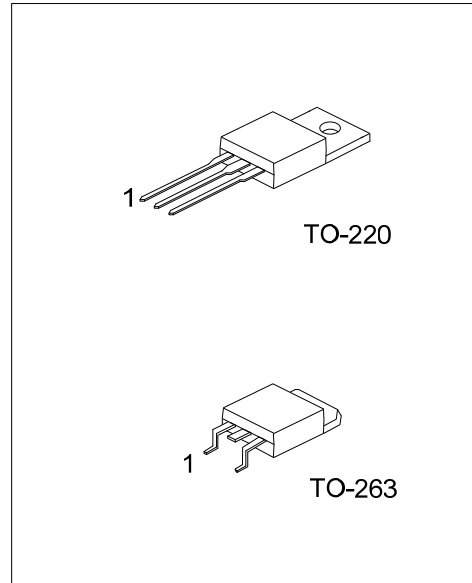
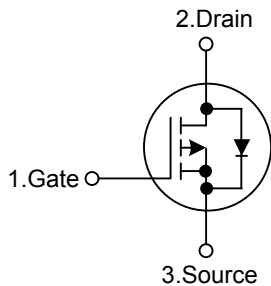
The UTC **UTT100P03** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance. It can also withstand high energy in the avalanche.

The UTC **UTT100P03** is suitable for low voltage and high speed switching applications

#### FEATURES

- \*  $R_{DS(ON)} \leq 4.3m\Omega @ V_{GS}=-10V, I_D=-80A$
- \*  $R_{DS(ON)} \leq 7.6m\Omega @ V_{GS}=-4.5V, I_D=-50A$
- \* High Switching Speed

#### SYMBOL



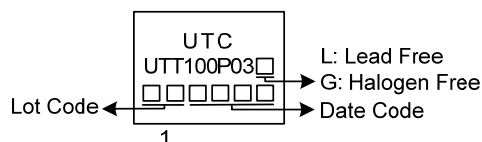
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT100P03L-TA3-T	UTT100P03G-TA3-T	TO-220	G	D	S	Tube
UTT100P03L-TQ2-T	UTT100P03G-TQ2-T	TO-263	G	D	S	Tube
UTT100P03L-TQ2-R	UTT100P03G-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>UTT100P03G-TA3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TQ2: TO-263</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			$V_{DSS}$	-30	V
Gate-Source Voltage			$V_{GSS}$	-16	V
Drain Current	Continuous (Note 2)	$T_C=25^\circ\text{C}$ , $V_{GS}=-10\text{V}$	$I_D$	-100	A
	Pulsed (Note 3)	$T_C=25^\circ\text{C}$	$I_{DM}$	-200	A
Power Dissipation			$P_D$	120	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. Current is limited by bondwire; with a  $\theta_{JC} = 0.65^\circ\text{C/W}$  the chip is able to carry  $I_D=-195\text{A}$  at  $25^\circ\text{C}$ .

3. Defined by design. Not subject to production test.

### ■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	62.5	$^\circ\text{C/W}$
Junction to Case	$\theta_{JC}$	1.04	$^\circ\text{C/W}$

Note: Defined by design. Not subject to production test.

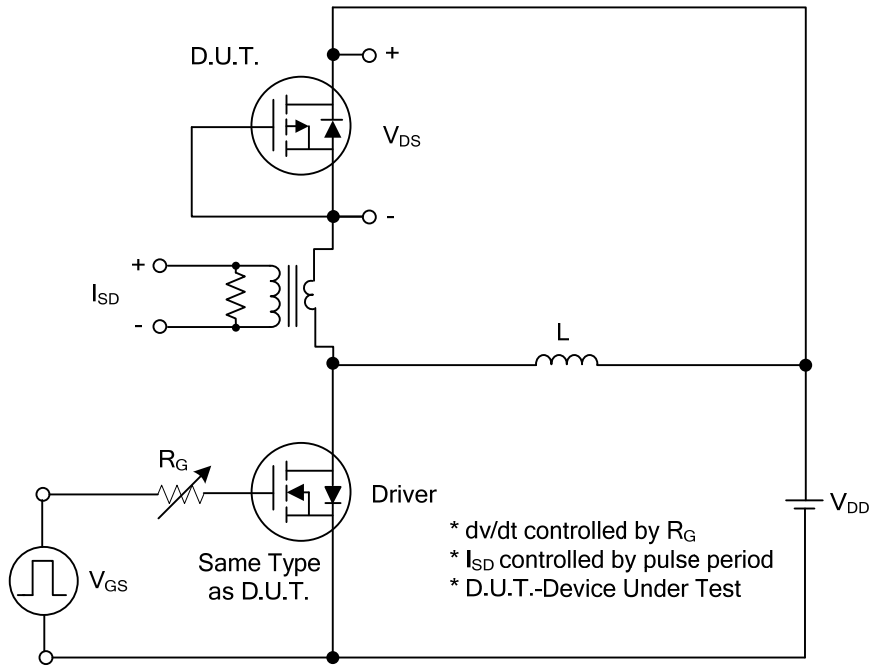
### ■ ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=-250\mu\text{A}$ , $V_{GS}=0\text{V}$	-30			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-30\text{V}$ , $V_{GS}=0\text{V}$ , $T_J=25^\circ\text{C}$		-0.1	-1	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	Forward $V_{GS}=+16\text{V}$ , $V_{DS}=0\text{V}$		+10	+100	nA
		Reverse $V_{GS}=-16\text{V}$ , $V_{DS}=0\text{V}$		-10	-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=-250\mu\text{A}$	-1.0	-1.5	-2.1	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5\text{V}$ , $I_D=-50\text{A}$		5.6	7.6	m $\Omega$
		$V_{GS}=-10$ , $I_D=-80\text{A}$		3.9	4.3	m $\Omega$
<b>DYNAMIC PARAMETERS (Note 1)</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=-25\text{V}$ , $f=1.0\text{MHz}$		9500		pF
Output Capacitance	$C_{OSS}$			1320		pF
Reverse Transfer Capacitance	$C_{RSS}$			920		pF
<b>SWITCHING PARAMETERS (Note 1)</b>						
Total Gate Charge	$Q_G$	$V_{DD}=-15\text{V}$ , $V_{GS}=-10\text{V}$ , $I_D=-100\text{A}$		180		nC
Gate to Source Charge	$Q_{GS}$			28		nC
Gate to Drain Charge	$Q_{GD}$			35		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=-15\text{V}$ , $V_{GS}=-10\text{V}$ , $I_D=-100\text{A}$		16		ns
Rise Time	$t_R$			20		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			175		ns
Fall-Time	$t_F$			126		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$	$T_A = 25^\circ\text{C}$ (Note 1)			-100	A
Maximum Body-Diode Pulsed Current	$I_{SM}$	$T_A = 25^\circ\text{C}$ (Note 1)			-200	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_S=-80\text{A}$ , $V_{GS}=0\text{V}$			-1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$V_R=-30\text{V}$ , $I_F=-30\text{A}$ ,		152		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$	$di_F/dt=100\text{A}/\mu\text{s}$ (Note 1)		0.45		$\mu\text{C}$

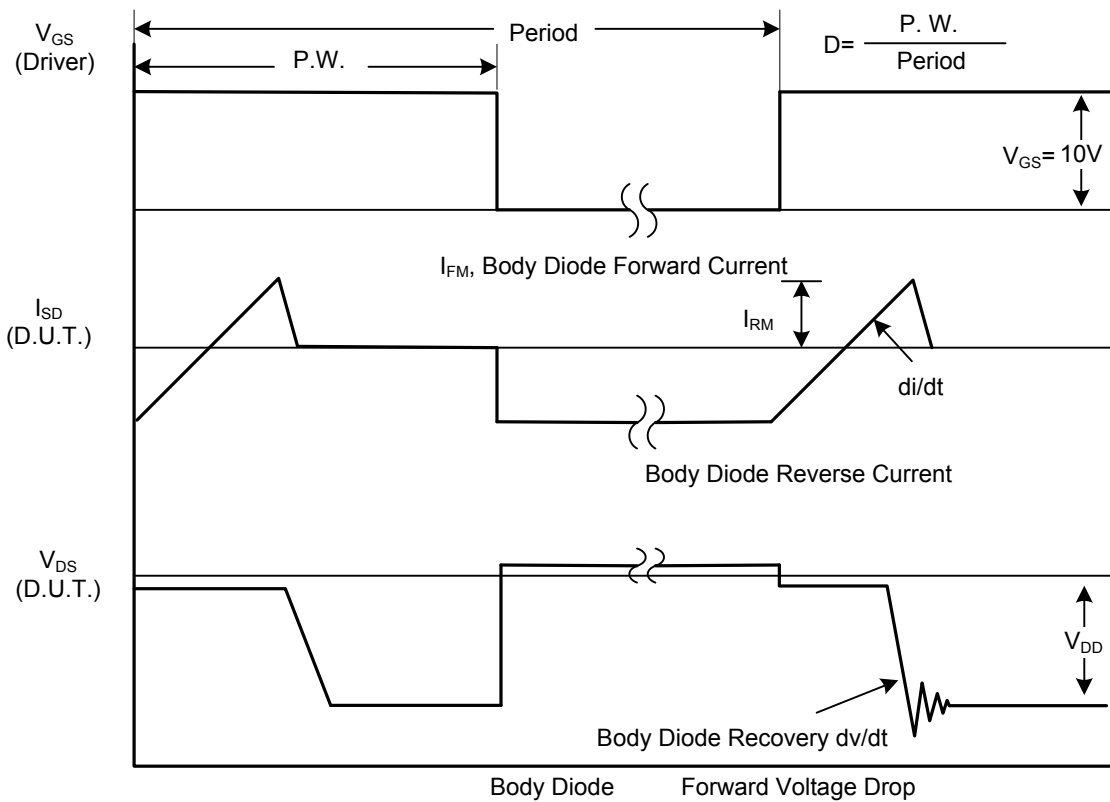
Notes: 1. Defined by design. Not subject to production test.

2. Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm<sup>2</sup> (one layer, 70  $\mu\text{m}$  thick) copper area for drain connection. PCB is vertical in still air.

■ TEST CIRCUITS AND WAVEFORMS

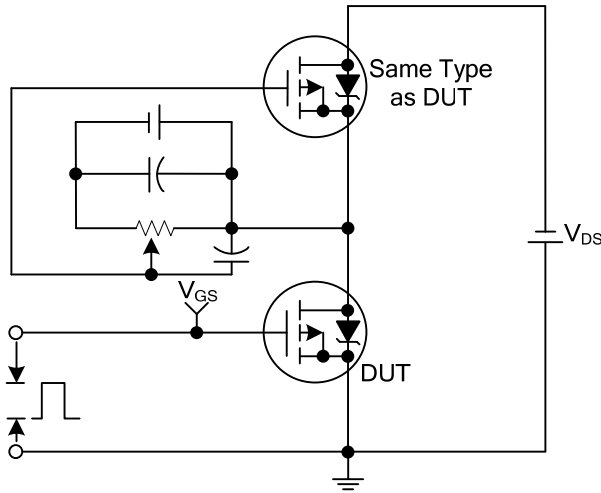


Peak Diode Recovery dv/dt Test Circuit

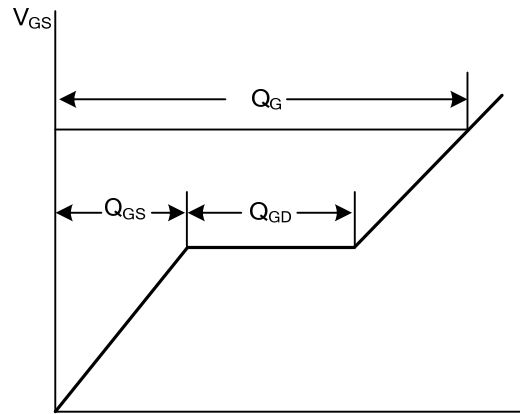


Peak Diode Recovery dv/dt Waveforms

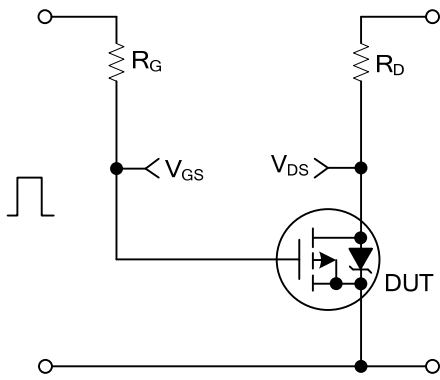
■ TEST CIRCUITS AND WAVEFORMS



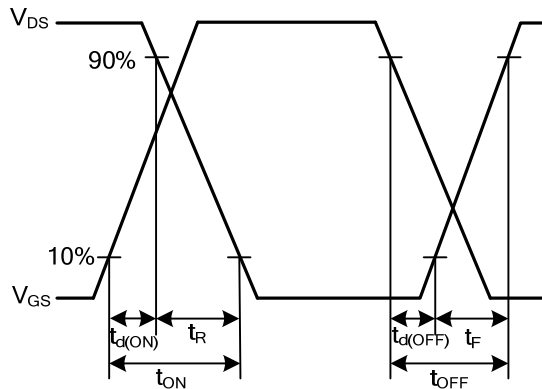
Gate Charge Test Circuit



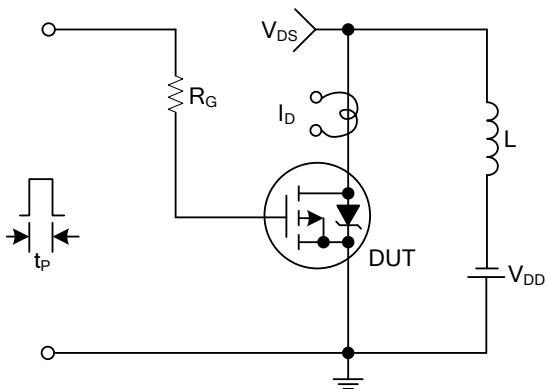
Gate Charge Waveforms



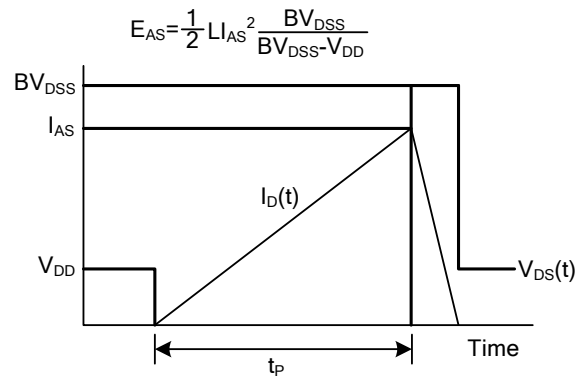
Resistive Switching Test Circuit



Resistive Switching Waveforms

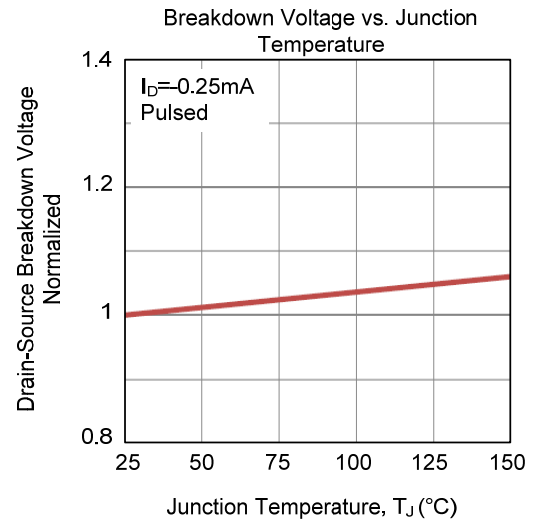
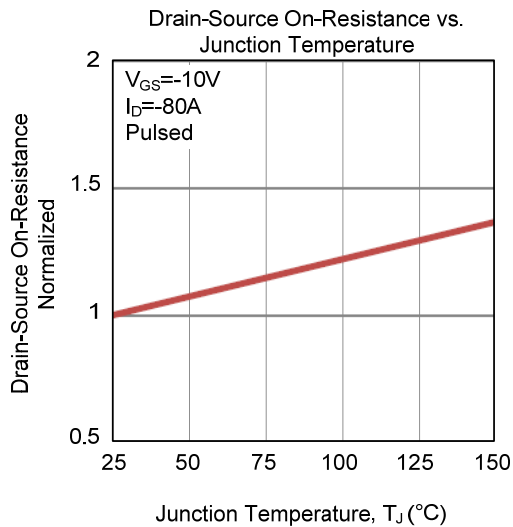
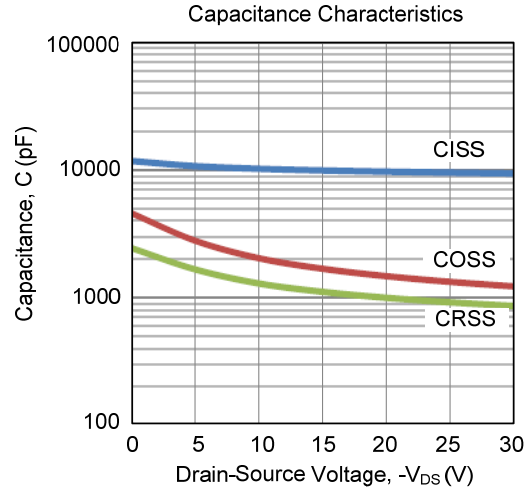
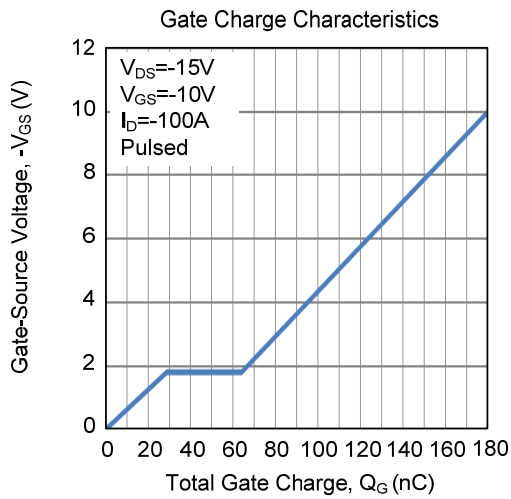
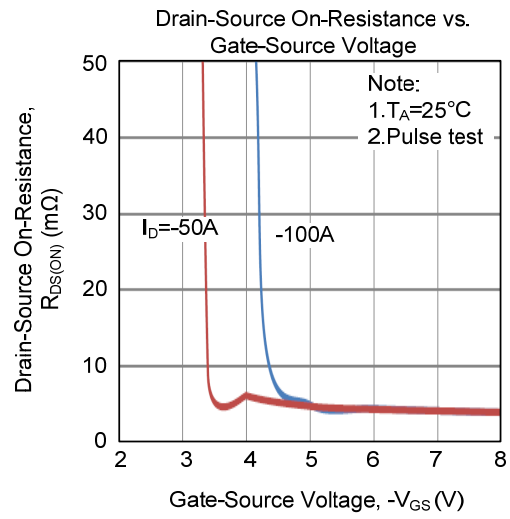
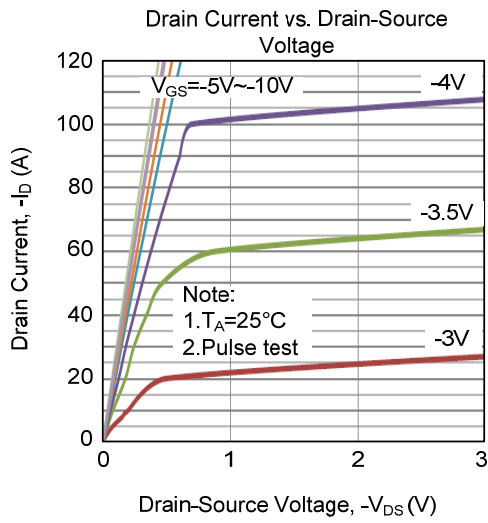


Unclamped Inductive Switching Test Circuit

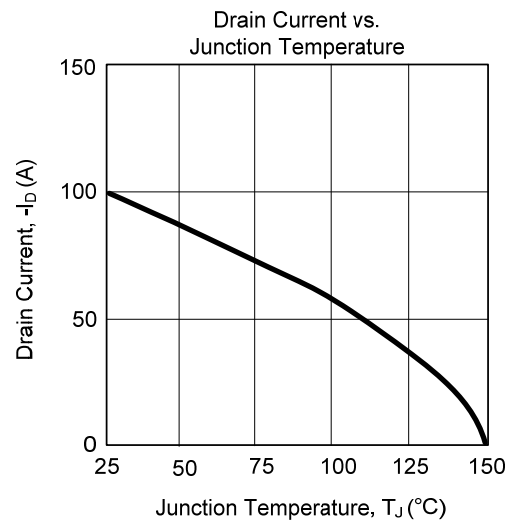
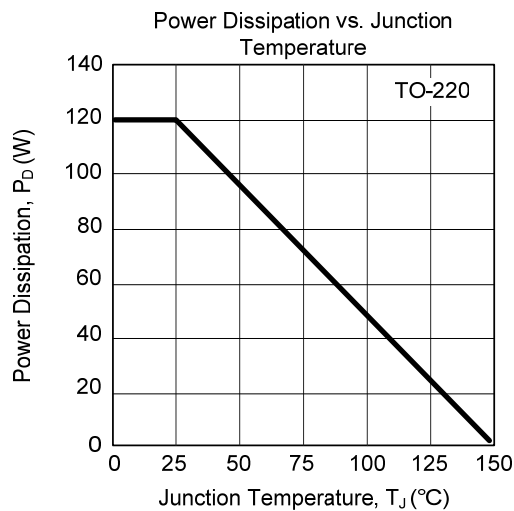
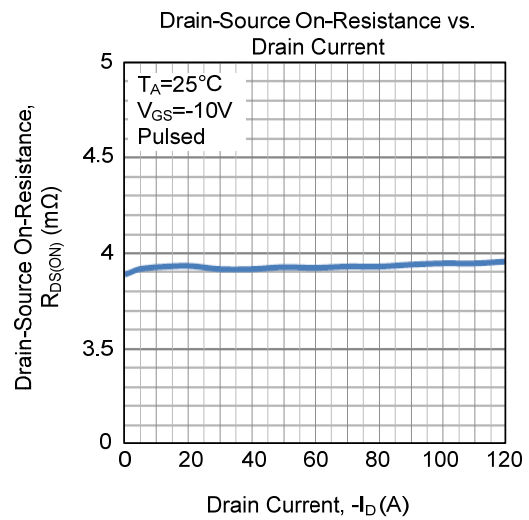
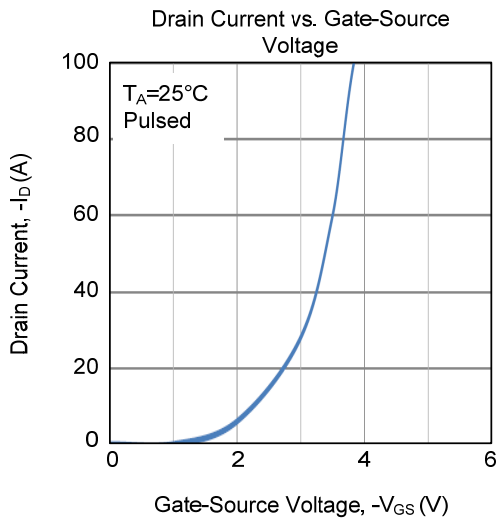
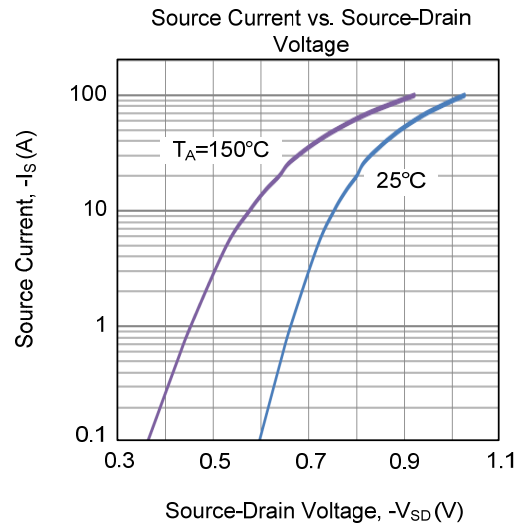
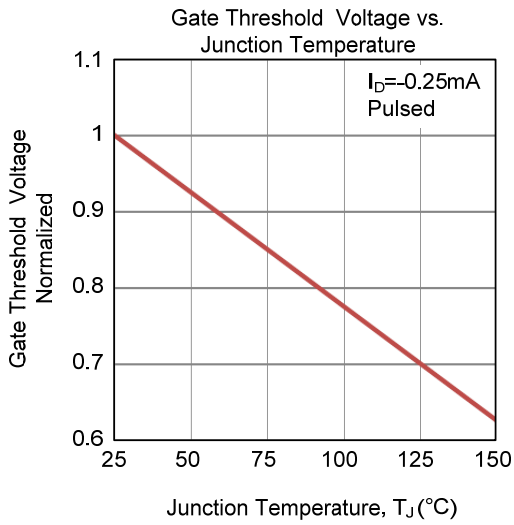


Unclamped Inductive Switching Waveforms

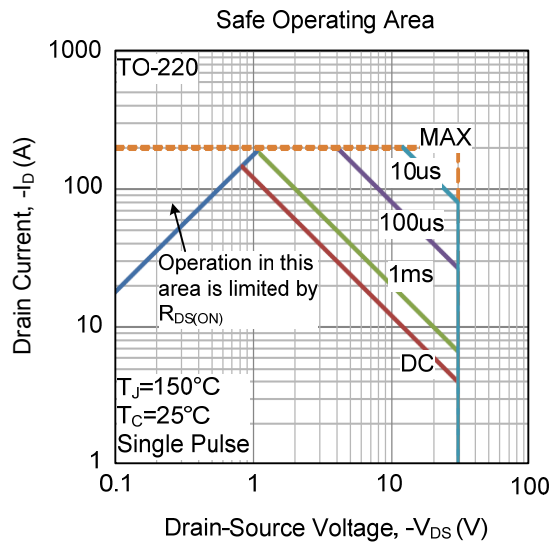
## TYPICAL CHARACTERISTICS



## ■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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