



# UTT25P10

**Power MOSFET**

## -25A, -100V P-CHANNEL POWER MOSFET

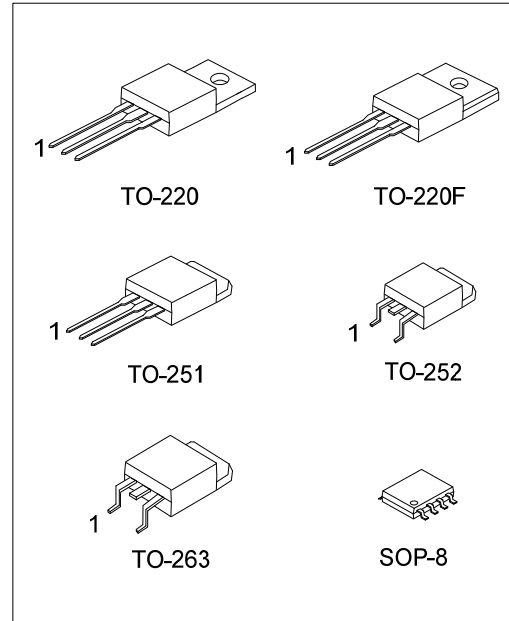
■ DESCRIPTION

The UTC **UTT25P10** 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, and it can also withstand high energy in the avalanche.

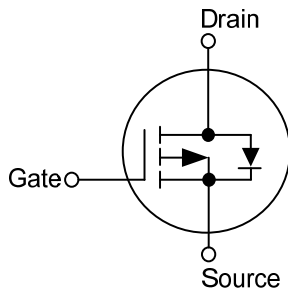
This UTC **UTT25P10** is suitable for motor drivers, switching regulators, converters and relay drivers, etc.

■ FEATURES

- \*  $R_{DS(ON)} \leq 98 \text{ m}\Omega @ V_{GS}=-10\text{V}, I_D=-10\text{A}$
- $R_{DS(ON)} \leq 110 \text{ m}\Omega @ V_{GS}=-4.5\text{V}, I_D=-10\text{A}$
- \* High Switching Speed



■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT25P10L-TA3-T	UTT25P10G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UTT25P10L-TF3-T	UTT25P10G-TF3-T	TO-220F	G	D	S						Tube
UTT25P10L-TM3-T	UTT25P10G-TM3-T	TO-251	G	D	S						Tube
UTT25P10L-TN3-R	UTT25P10G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UTT25P10L-TQ2-T	UTT25P10G-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
UTT25P10L-TQ2-R	UTT25P10G-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
UTT25P10L-S08-R	UTT25P10G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UTT25P10G-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, TF3: TO-220F, TM3: TO-251 TN3: TO-252, TQ2: TO-263, S08: SOP-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING

TO-220 / TO-220F / TO-251 / TO-252 / TO-263	SOP-8

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

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage (Note 2)		$V_{DSS}$	-100	V	
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V	
Drain Current	Continuous	$I_D$	TO-220/TO-263/ TO-220F/ TO-251/TO-252	-25	A
			SOP-8	-7	
	Pulsed (Note 2)	$I_{DM}$	TO-220/TO-263/ TO-220F/ TO-251/TO-252	-50	A
			SOP-8	-14	
Single Pulsed Avalanche Energy (Note 3)		$E_{AS}$	36	mJ	
Power Dissipation	TO-220/TO-263	$P_D$	100	W	
	TO-220F		30	W	
	TO-251/TO-252		50	W	
	SOP-8		5	W	
Junction Temperature		$T_J$	-55 ~ +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.  $L = 0.1\text{mH}$ ,  $I_{AS} = -26.7\text{A}$ ,  $V_{DD} = -50\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Case	TO-220/TO-263	$\theta_{JC}$	1.25	$^{\circ}\text{C}/\text{W}$
	TO-220F		4.17	$^{\circ}\text{C}/\text{W}$
	TO-251/TO-252		2.5	$^{\circ}\text{C}/\text{W}$
	SOP-8		25 (Note)	$^{\circ}\text{C}/\text{W}$

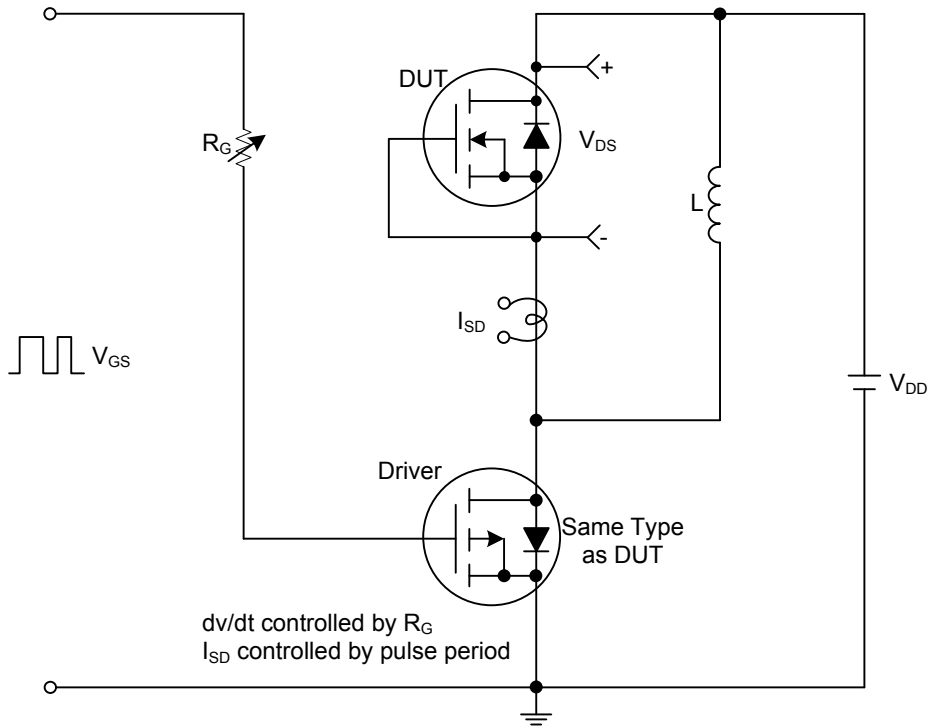
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

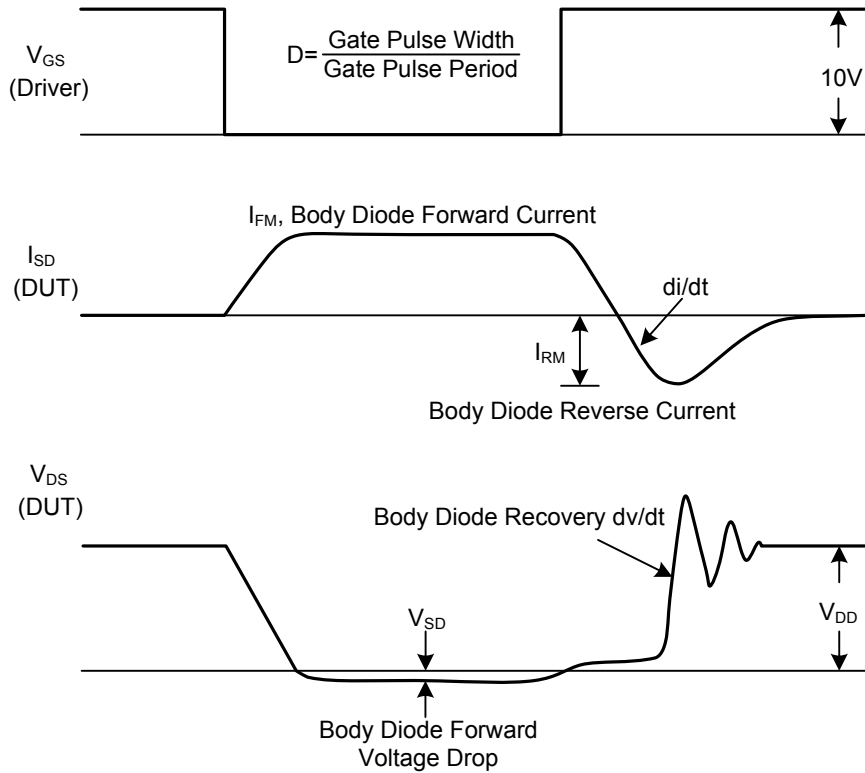
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage		$BV_{DSS}$	$I_D = -250\mu\text{A}, V_{GS} = 0\text{V}$	-100			V
Drain-Source Leakage Current		$I_{DSS}$	$V_{DS} = \text{Rated } BV_{DSS}, V_{GS} = 0\text{V}$			-1	$\mu\text{A}$
			$V_{DS} = 0.8 \times \text{Rated } BV_{DSS}, V_{GS} = 0\text{V}, T_c = 125^\circ\text{C}$			-25	
Gate- Source Leakage Current	Forward	$I_{GSS}$	$V_{GS} = +20\text{V}, V_{DS} = 0\text{V}$			+100	nA
	Reverse		$V_{GS} = -20\text{V}, V_{DS} = 0\text{V}$			-100	nA
<b>ON CHARACTERISTICS</b>							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	-1.0		-3.0	V
Static Drain-Source On-State Resistance	TO-220/TO-263	$R_{DS(ON)}$	$V_{GS} = -10\text{V}, I_D = -10\text{A}$			98	$\text{m}\Omega$
	TO-220F		$V_{GS} = -4.5\text{V}, I_D = -10\text{A}$			110	$\text{m}\Omega$
	TO-251/TO-252		$V_{GS} = -10\text{V}, I_D = -7\text{A}$			98	$\text{m}\Omega$
	SOP-8		$V_{GS} = -4.5\text{V}, I_D = -7\text{A}$			110	$\text{m}\Omega$
<b>DYNAMIC PARAMETERS</b>							
Input Capacitance		$C_{ISS}$	$V_{GS} = 0\text{V}, V_{DS} = -25\text{V}, f = 1\text{MHz}$		3450		pF
Output Capacitance		$C_{OSS}$			159		pF
Reverse Transfer Capacitance		$C_{RSS}$			135		pF
<b>SWITCHING PARAMETERS</b>							
Total Gate Charge		$Q_G$	$V_{GS} = -10\text{V}, V_{DS} = -80\text{V}, I_D = -25\text{A}$		70		nC
Gate to Source Charge		$Q_{GS}$			14		nC
Gate to Drain Charge		$Q_{GD}$			10		nC
Turn-ON Delay Time		$t_{D(ON)}$	$V_{GS} = -10\text{V}, V_{DS} = -50\text{V}, I_D = -25\text{A}, R_G = 3\Omega$		11		ns
Rise Time		$t_R$			18		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			68		ns
Fall-Time		$t_F$			28		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>							
Drain-Source Diode Forward Voltage (Note 1)		$V_{SD}$	$I_{SD} = -25\text{A}$			-1.4	V
Reverse Recovery Time		$t_{rr}$	$I_F = -25\text{A}, V_{GS} = 0\text{V}$		82		ns
Reverse Recovery Charge		$Q_{rr}$	$dI_F/dt = 100\text{A}/\mu\text{s}$		220		nC

Note: Pulse test: pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .

## TEST CIRCUITS AND WAVEFORMS

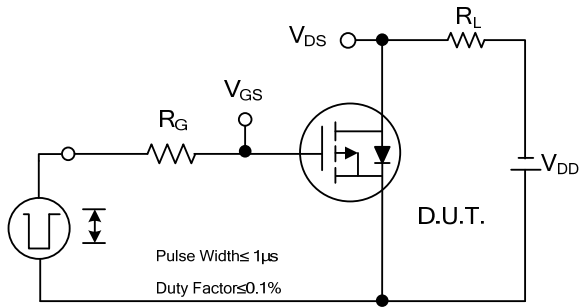


**Peak Diode Recovery dv/dt Test Circuit**

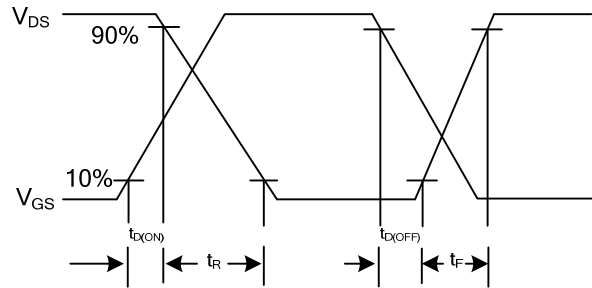


**Peak Diode Recovery dv/dt Test Circuit and Waveforms**

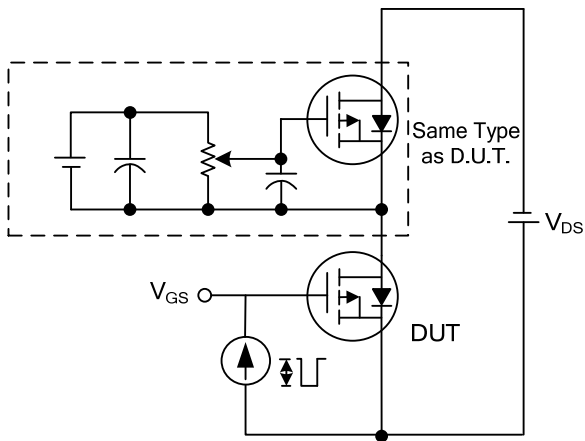
## TEST CIRCUITS AND WAVEFORMS



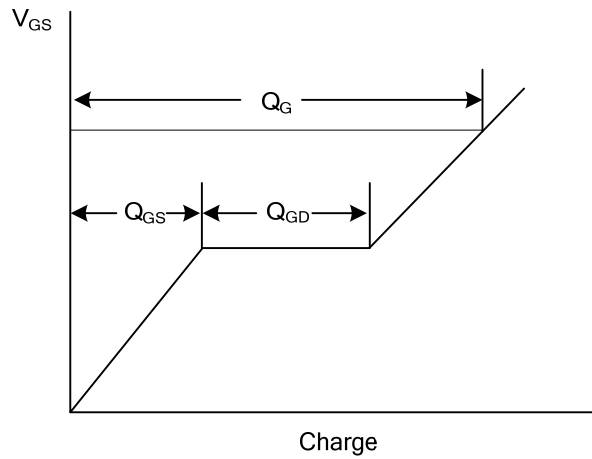
**Switching Test Circuit**



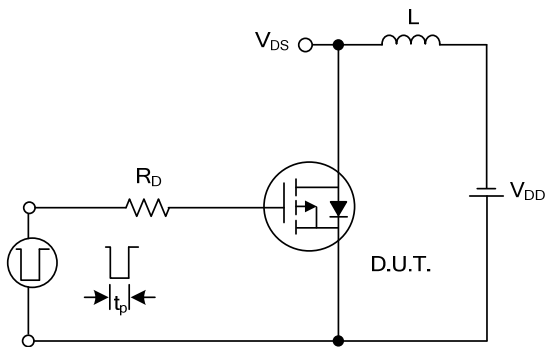
**Switching Waveforms**



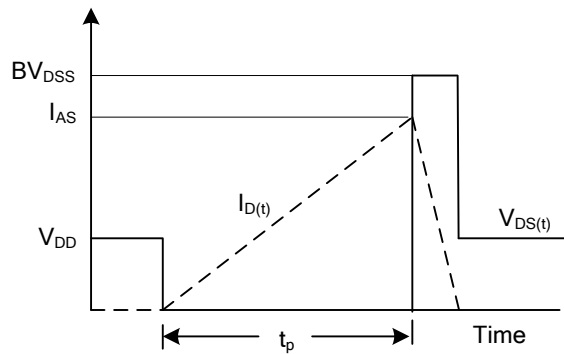
**Gate Charge Test Circuit**



**Gate Charge Waveform**

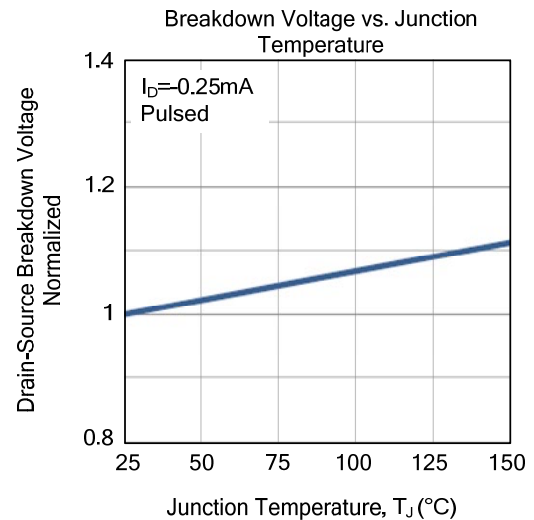
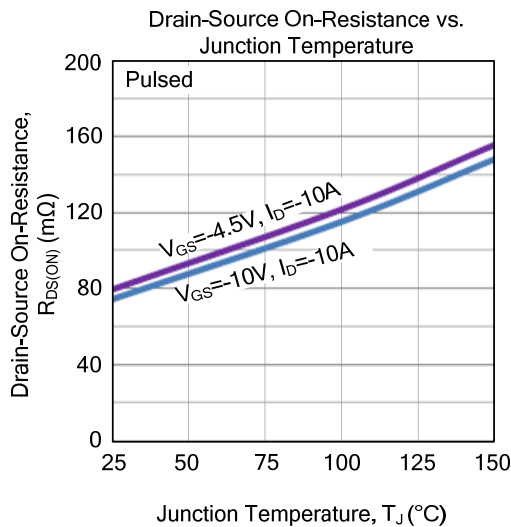
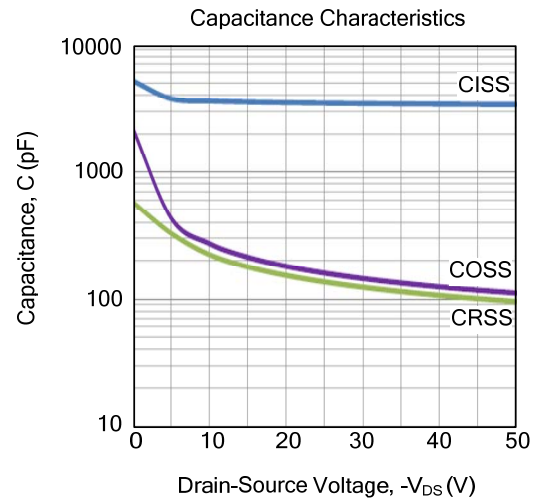
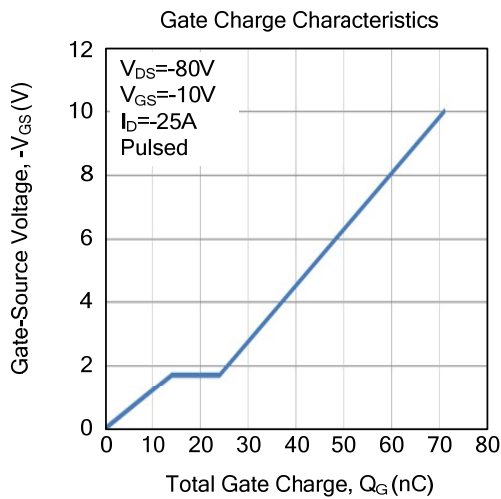
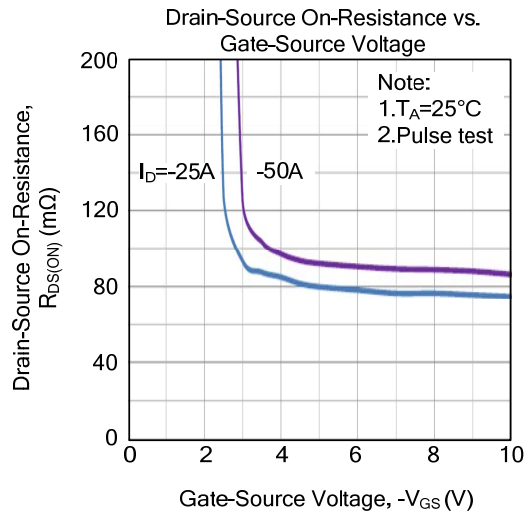
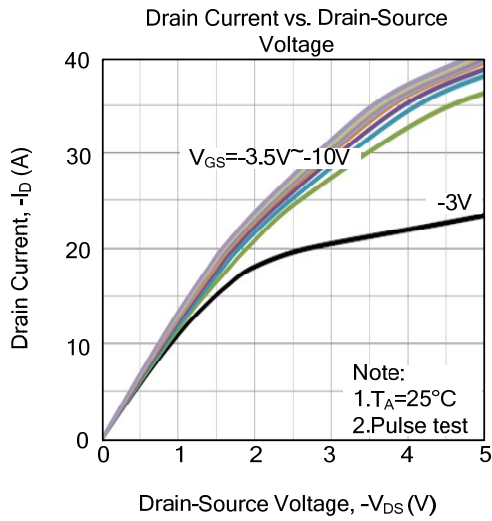


**Unclamped Inductive Switching Test Circuit**

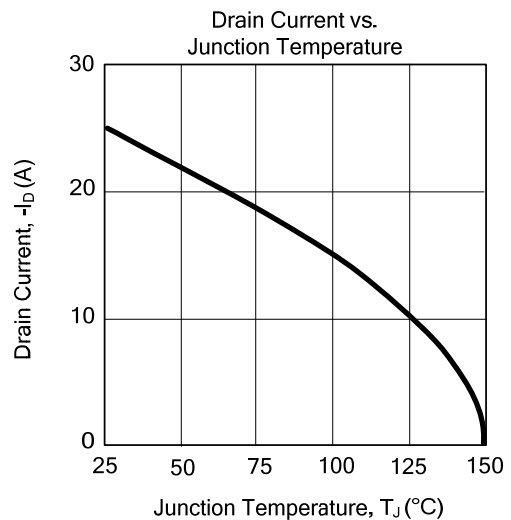
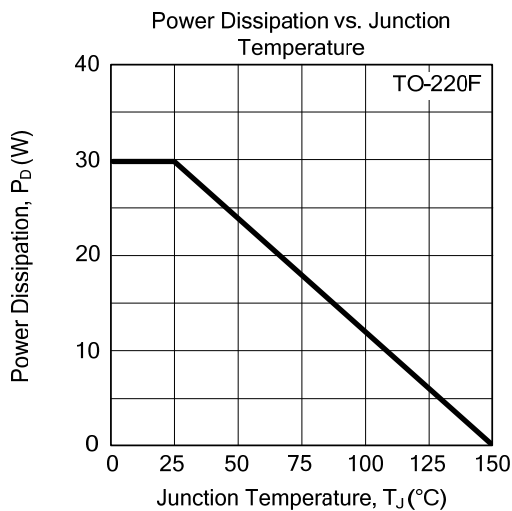
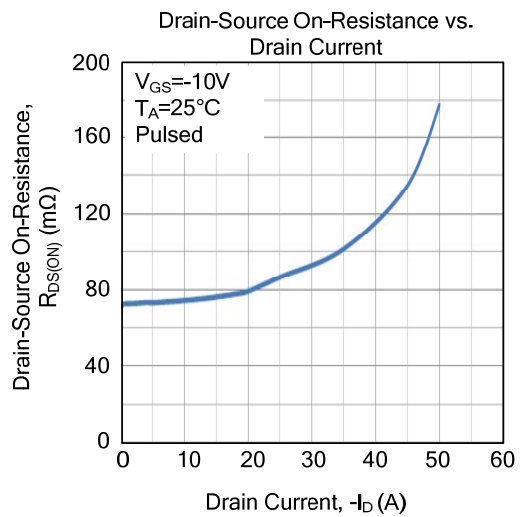
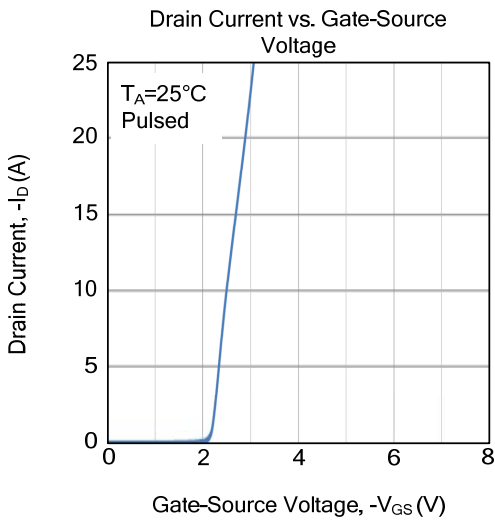
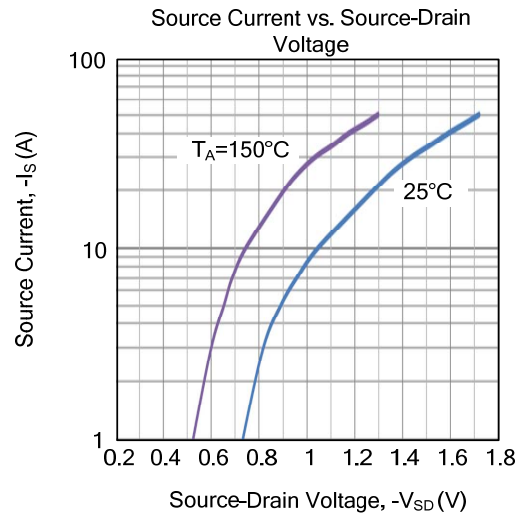
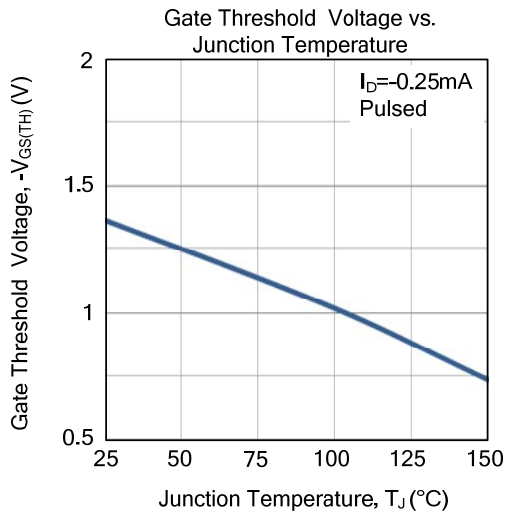


**Unclamped Inductive Switching Waveforms**

## TYPICAL CHARACTERISTICS

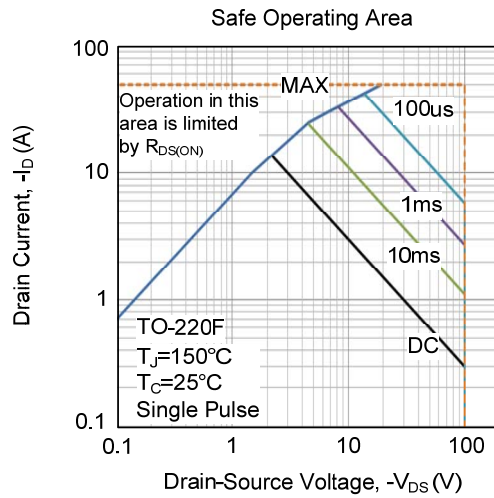


### ■ TYPICAL CHARACTERISTICS (Cont.)





## ■ TYPICAL CHARACTERISTICS (Cont.)



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