



# UTT30P06

*Power MOSFET*

## -60V, -30A P-CHANNEL POWER MOSFET

■ DESCRIPTION

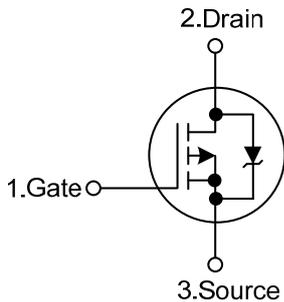
The UTC **UTT30P06** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance. It can also withstand high energy in the avalanche.

The UTC **UTT30P06** is suitable for low voltage and high speed switching applications

■ FEATURES

- \*  $R_{DS(ON)} \leq 50 \text{ m}\Omega @ V_{GS} = -10V, I_D = -15A$
- $R_{DS(ON)} \leq 65 \text{ m}\Omega @ V_{GS} = -4.5V, I_D = -15A$
- \* High Switching Speed

■ SYMBOL

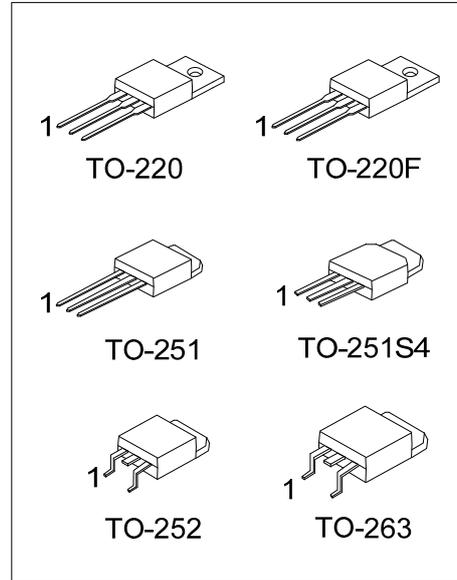


■ ORDERING INFORMATION

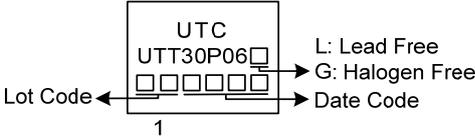
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT30P06L-TA3-T	UTT30P06G-TA3-T	TO-220	G	D	S	Tube
UTT30P06L-TF3-T	UTT30P06G-TF3-T	TO-220F	G	D	S	Tube
UTT30P06L-TM3-T	UTT30P06G-TM3-T	TO-251	G	D	S	Tube
UTT30P06L-TMS4-T	UTT30P06G-TMS4-T	TO-251S4	G	D	S	Tube
UTT30P06L-TN3-R	UTT30P06G-TN3-R	TO-252	G	D	S	Tape Reel
UTT30P06L-TQ2-T	UTT30P06G-TQ2-T	TO-263	G	D	S	Tube
UTT30P06L-TQ2-R	UTT30P06G-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>UTT30P06G-TA3-T</p>	<p>(1) T: Tube, R: Tape Reel                  (2) TA3: TO-220, TF3: TO-220F, TM3: TO-251, TMS4: TO-251S4, TN3: TO-252, TQ2: TO-263                  (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
Drain-Gate Voltage ( $R_{GS}=1.0\text{ M}\Omega$ )		$V_{DGR}$	-60	V
Gate-Source Voltage	Continuous	$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous $T_C=25^{\circ}\text{C}$	$I_D$	-30	A
	Pulsed ( $t_p \leq 10\mu\text{s}$ )	$I_{DM}$	-50	A
Power Dissipation	TO-220/TO-263	$P_D$	89	W
	TO-220F		38	W
	TO-251/TO-251S4		44	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. When surface mounted to an FR4 board using the minimum recommended pad size.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO-263	$\theta_{JA}$	62.5	$^{\circ}\text{C}/\text{W}$
	TO-251/TO-251S4 TO-252		110	$^{\circ}\text{C}/\text{W}$
	TO-220/TO-263		1.4	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220F	$\theta_{JC}$	3.28	$^{\circ}\text{C}/\text{W}$
	TO-251/TO-251S4		2.84	$^{\circ}\text{C}/\text{W}$
	TO-252			

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

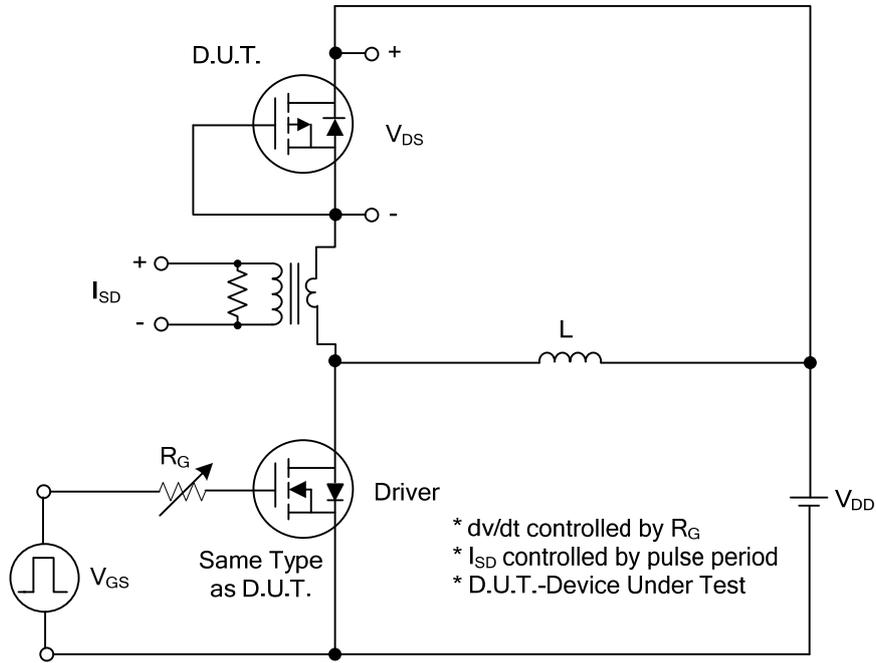
■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> =-0.25mA, V <sub>GS</sub> =0V	-60			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =-60V, V <sub>GS</sub> =0V			-10	μA
Gate- Source Leakage Current	Forward	I <sub>GSS</sub>			+100	nA
	Reverse				-100	nA
<b>ON CHARACTERISTICS (Note 1)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1.1		-2.0	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-15A			50	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-15A			65	mΩ
Drain-Source On-Voltage	V <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-30A			-2.9	V
		V <sub>GS</sub> =-10V, I <sub>D</sub> =-15A, T <sub>J</sub> =150°C			-2.8	V
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =-25V, f=1.0MHz		1478		pF
Output Capacitance	C <sub>OSS</sub>			120		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			108		pF
<b>SWITCHING PARAMETERS (Note 2)</b>						
Total Gate Charge	Q <sub>G</sub>	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-48V, I <sub>D</sub> =-30A I <sub>G</sub> =1mA		40		nC
Gate-Source Charge	Q <sub>GS</sub>			3.6		nC
Gate-Drain Charge	Q <sub>GD</sub>			9.6		nC
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>GS</sub> =-10V, V <sub>DD</sub> =-30V, I <sub>D</sub> =-1.0A, R <sub>G</sub> =9.1Ω		5.6		ns
Rise Time	t <sub>R</sub>			17		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			64		ns
Fall-Time	t <sub>F</sub>			38		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>				-30	A
Maximum Pulsed Drain-Source Diode Forward Current	I <sub>SM</sub>				-50	A
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-30A, V <sub>GS</sub> =0V			-3.0	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>S</sub> =-30A, V <sub>GS</sub> =0V, dI <sub>S</sub> /dt=-100A/μs		175		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>				0.69	

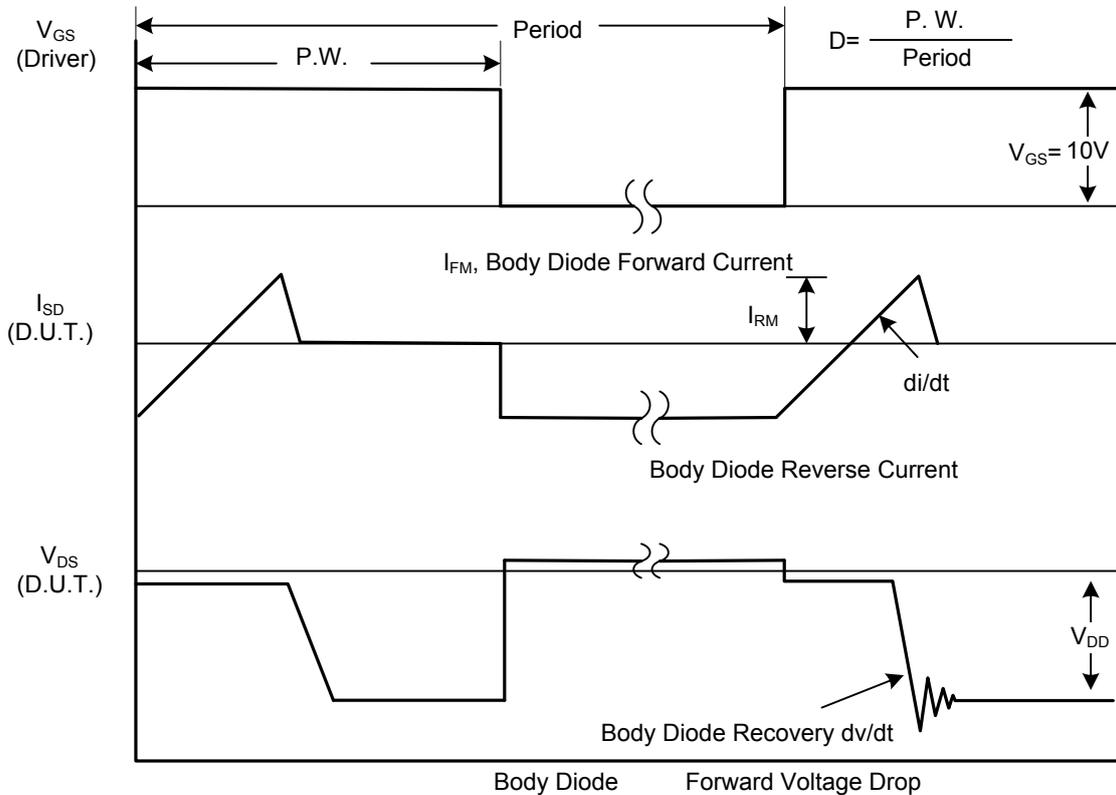
Notes: 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

2. Switching characteristics are independent of operating junction temperature.

■ TEST CIRCUITS AND WAVEFORMS

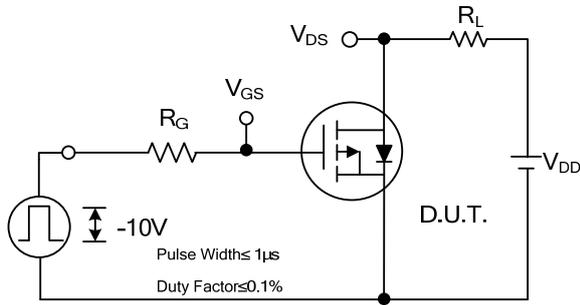


Peak Diode Recovery  $dv/dt$  Test Circuit

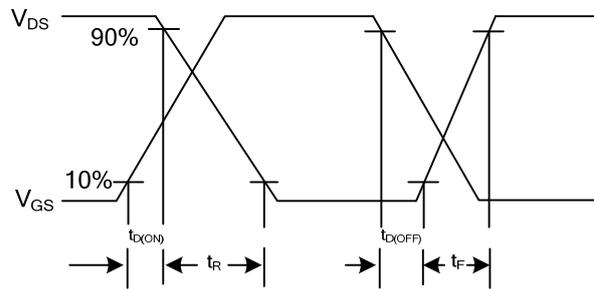


Peak Diode Recovery  $dv/dt$  Waveforms

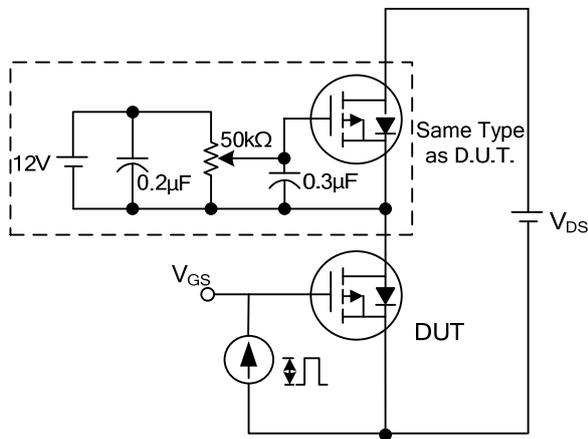
## TEST CIRCUITS AND WAVEFORMS



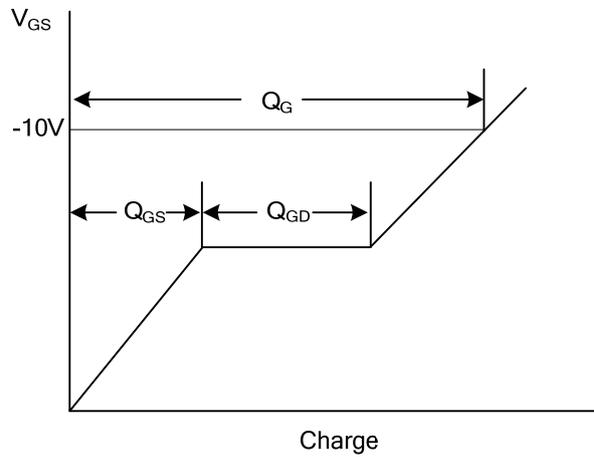
**Switching Test Circuit**



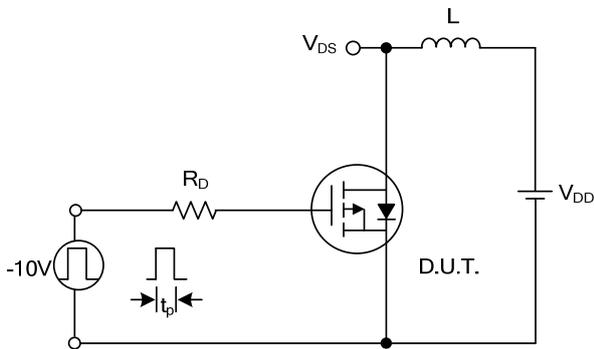
**Switching Waveforms**



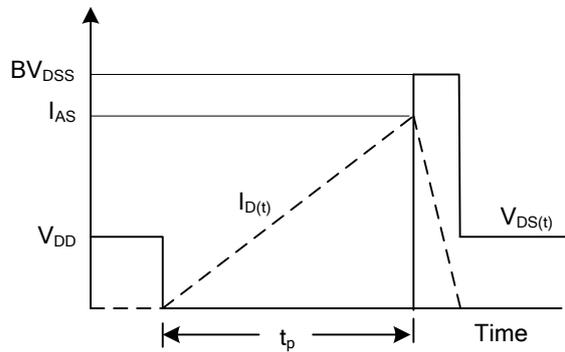
**Gate Charge Test Circuit**



**Gate Charge Waveform**

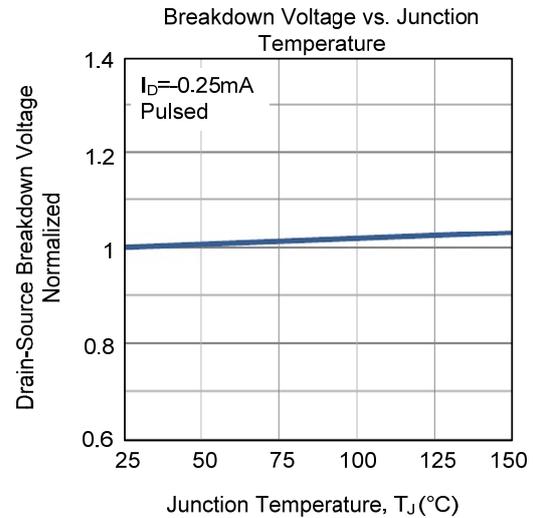
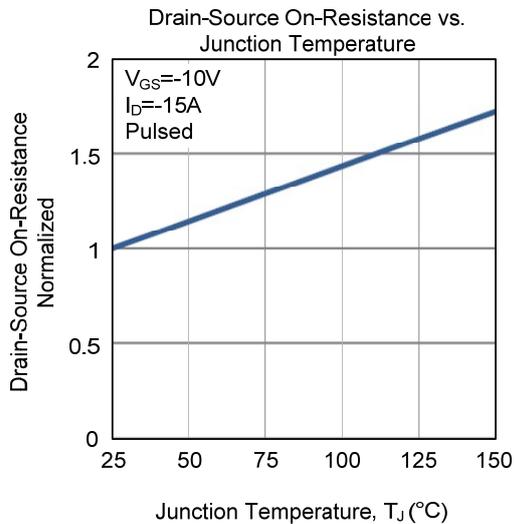
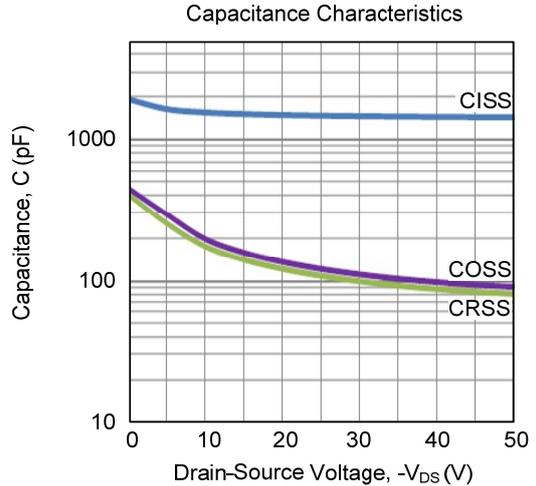
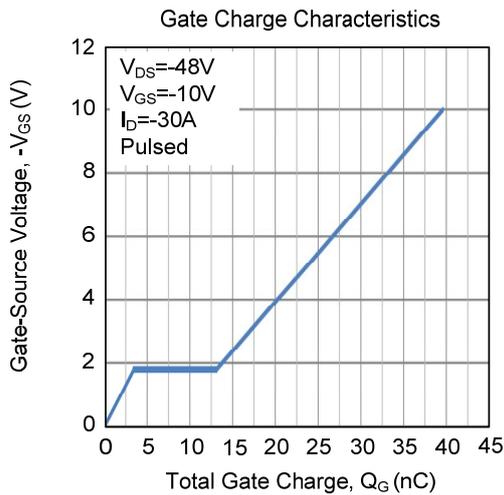
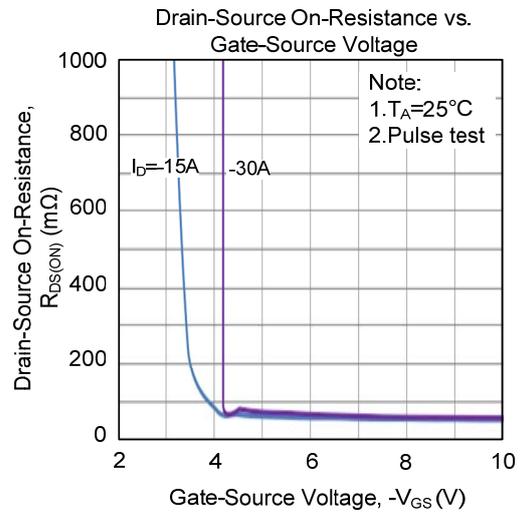
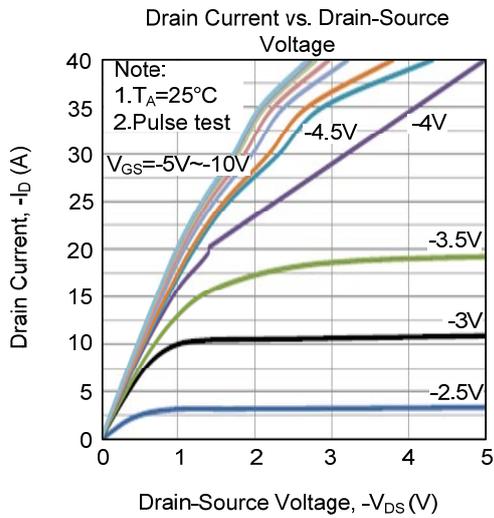


**Unclamped Inductive Switching Test Circuit**

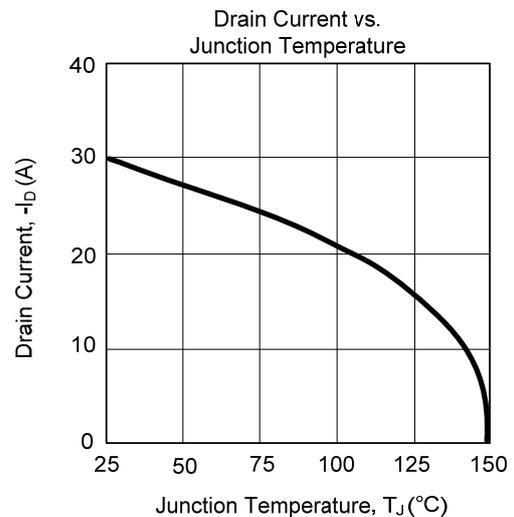
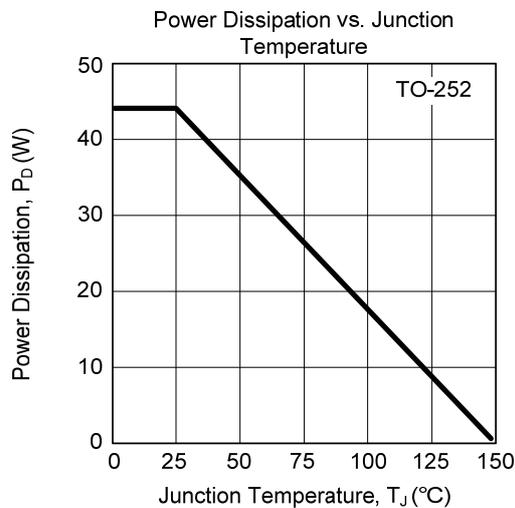
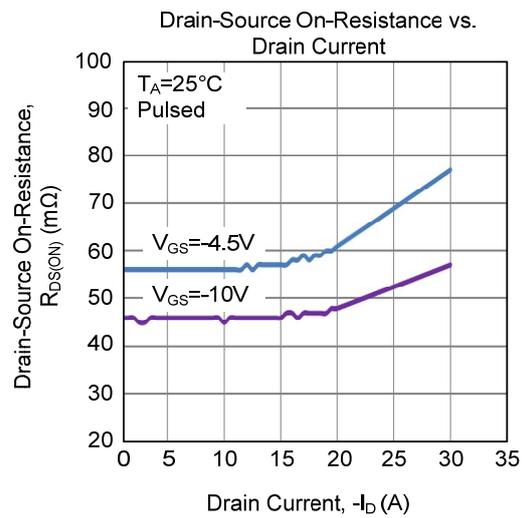
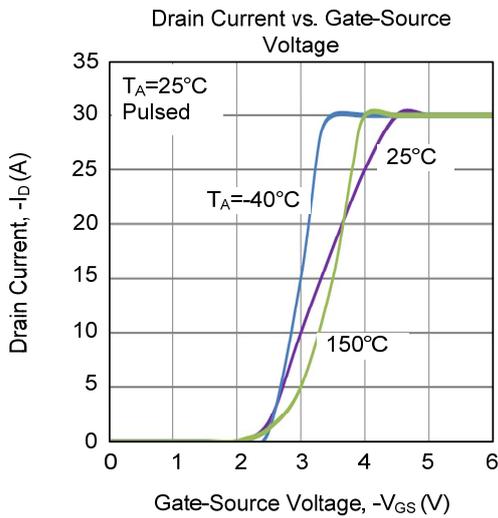
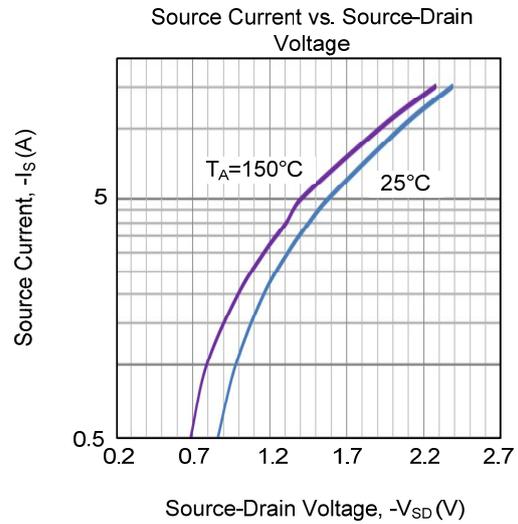
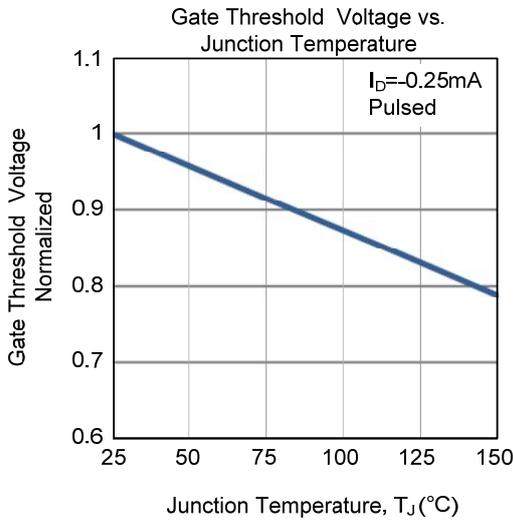


**Unclamped Inductive Switching Waveforms**

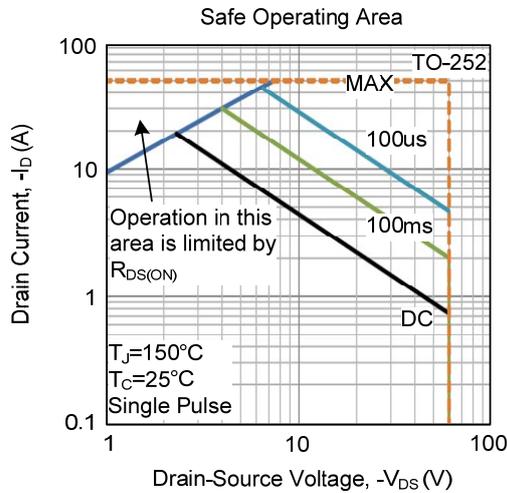
## TYPICAL CHARACTERISTICS



## ■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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