



## UTT50P06

Power MOSFET

### -50A, -60V P-CHANNEL (D-S) POWER MOSFET

#### DESCRIPTION

The UTC **UTT50P06** 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.

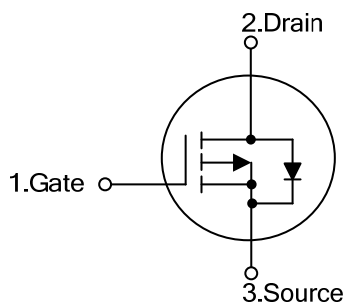
This UTC **UTT50P06** is suitable for load switch, etc.

#### FEATURES

\*  $R_{DS(ON)} < 15m\Omega @ V_{GS}=-10V, I_D=-17A$

\* High Switching Speed

#### SYMBOL

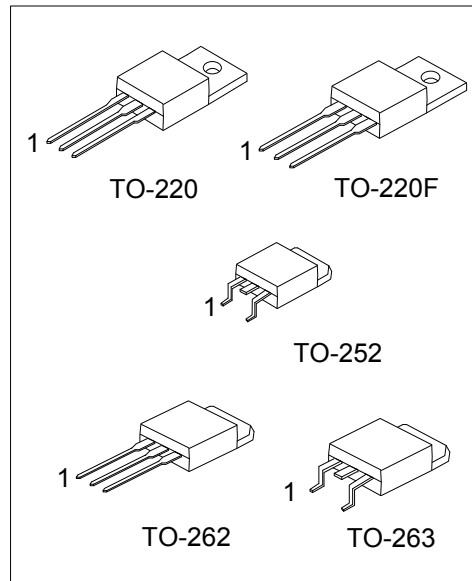


#### ORDERING INFORMATION

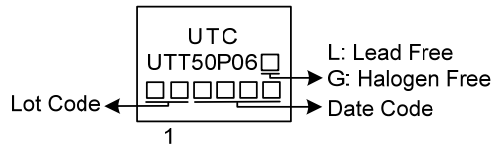
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT50P06L-TA3-T	UTT50P06G-TA3-T	TO-220	G	D	S	Tube
UTT50P06L-TF3-T	UTT50P06G-TF3-T	TO-220F	G	D	S	Tube
UTT50P06L-TN3-R	UTT50P06G-TN3-R	TO-252	G	D	S	Tape Reel
UTT50P06L-T2Q-T	UTT50P06G-T2Q-T	TO-262	G	D	S	Tube
UTT50P06L-TQ2-T	UTT50P06G-TQ2-T	TO-263	G	D	S	Tube
UTT50P06L-TQ2-R	UTT50P06G-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>UTT50P06G-TA3-T</p>	<p>(1) T: Tube, R: Tape Reel  (2) TF1: TO-220F1, TF3: TO-220F, TN3: TO-252,  T2Q: TO-262, TQ2: TO-263  (3) G: Halogen-Free and Lead Free, L: Lead Free</p>
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## MARKING



FLYING 汎翔國際有限公司  
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■ ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ , 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 ( $T_J=175^\circ\text{C}$ )	$T_C=25^\circ\text{C}$	$I_D$	-50 (Note 5)	A
		$T_C=125^\circ\text{C}$		-27.5	A
	Pulsed		$I_{DM}$	-80	A
Avalanche Current			$I_{AR}$	-50	A
Single Pulse Avalanche Energy (Note 2)		L=0.1mH	$E_{AS}$	125	mJ
Power Dissipation	$T_C=25^\circ\text{C}$	TO-220	$P_D$	113 (Note 4)	W
		TO-262			
		TO-263			
		TO-220F			
	$T_A=25^\circ\text{C}$	TO-252		38	W
		TO-220		50	W
		TO-262		2.5 (Note 3, 4)	W
		TO-263			
TO-220F	2				
TO-252	1.13				
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. Duty cycle  $\leq 1\%$ .
3. When Mounted on 1" square PCB (FR-4 material).
4. See SOA curve for voltage derating.
5. Package limited.

■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT		
Junction to Ambient	TO-220	$\theta_{JA}$	62.5	$^\circ\text{C/W}$		
	TO-220F					
	TO-262					
	TO-263					
	TO-252				110	$^\circ\text{C/W}$
Junction to Case	TO-220	$\theta_{JC}$	1.1	$^\circ\text{C/W}$		
	TO-262					
	TO-263					
	TO-220F				3.3	$^\circ\text{C/W}$
	TO-252				2.5	$^\circ\text{C/W}$

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

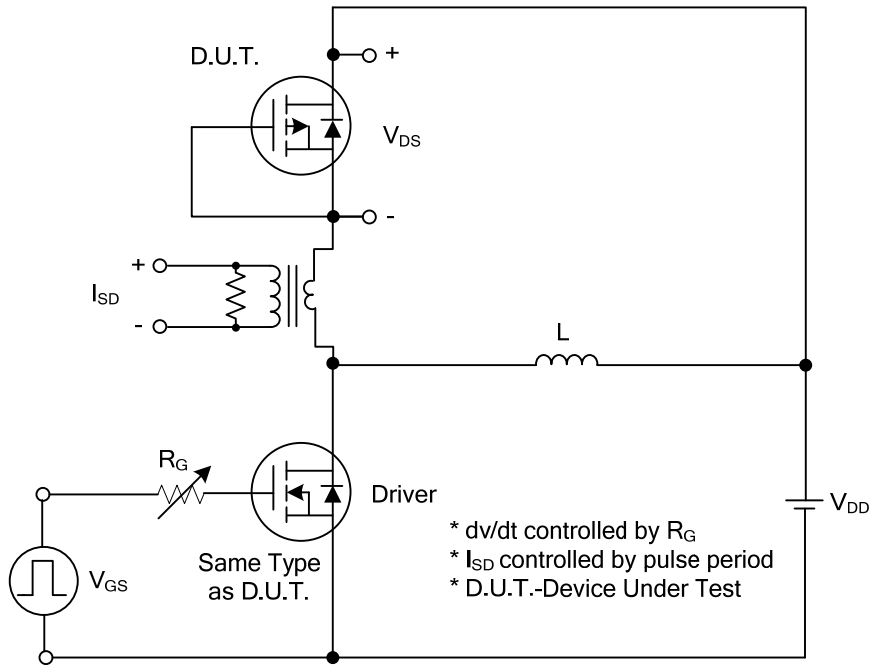
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-60			V
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1		-3	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =-60V, V <sub>GS</sub> =0V			-1	μA
Gate- Source Leakage Current	Forward	I <sub>GSS</sub>			+100	nA
	Reverse				-100	nA
<b>ON CHARACTERISTICS</b>						
Static Drain-Source On-State Resistance (Note 1)	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-17A			15	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-14A			20	
On State Drain Current (Note 1)	I <sub>D(ON)</sub>	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-5V	-50			A
<b>DYNAMIC PARAMETERS (Note 2)</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =-25V, f=1MHz		5470		pF
Output Capacitance	C <sub>OSS</sub>			542		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			346		pF
<b>SWITCHING PARAMETERS (Note 2, 3)</b>						
Total Gate Charge	Q <sub>G</sub>	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-30V, I <sub>D</sub> =-50A		110		nC
Gate to Source Charge	Q <sub>GS</sub>			19		nC
Gate to Drain Charge	Q <sub>GD</sub>			28		nC
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =-30V, R <sub>L</sub> =0.6Ω, I <sub>D</sub> ≈ -50A, V <sub>GE</sub> =-10V, R <sub>G</sub> =6Ω		19		ns
Rise Time	t <sub>R</sub>			22		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			120		ns
Fall-Time	t <sub>F</sub>			65		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS (T<sub>C</sub>=25°C) (Note 2)</b>						
Maximum Body-Diode Continuous Current	I <sub>S</sub>				-50	A
Maximum Body-Diode Pulsed Current	I <sub>SM</sub>				-80	A
Drain-Source Diode Forward Voltage (Note 1)	V <sub>SD</sub>	I <sub>F</sub> =-50A, V <sub>GS</sub> =0V			-1.6	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =-30A, dI/dt=100A/μs		55		ns

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

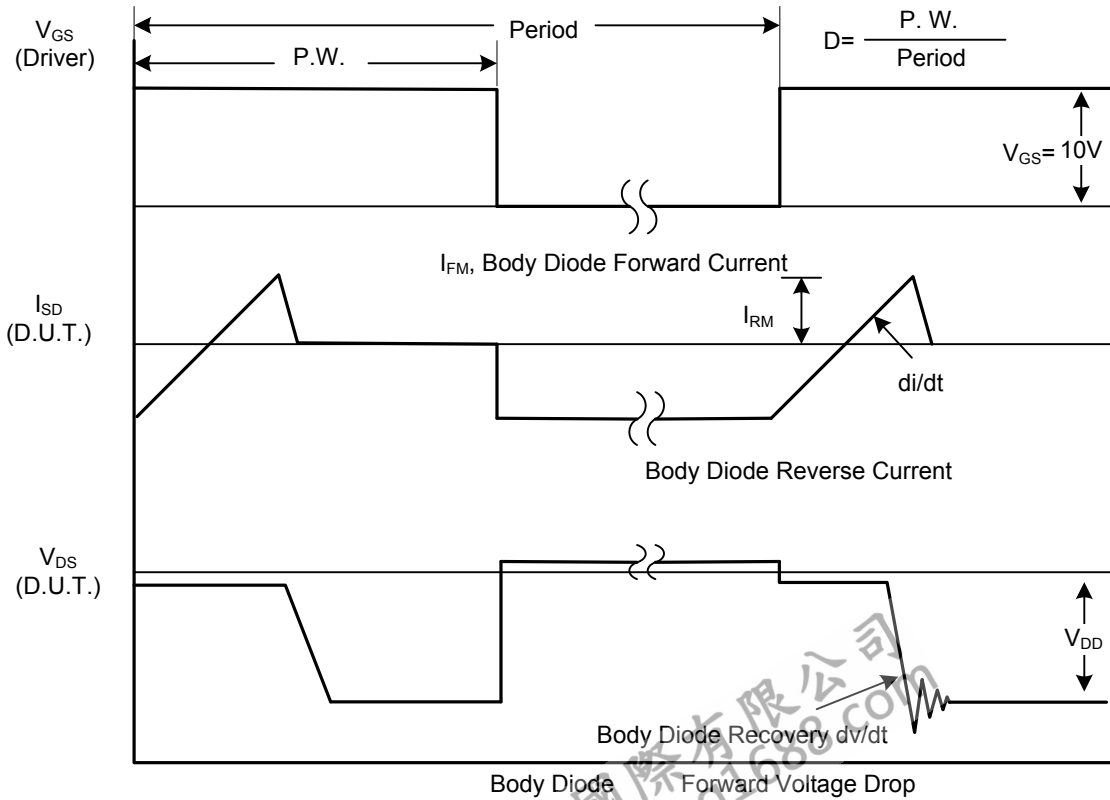
2. Guaranteed by design, not subject to production testing.

3. Independent of operating temperature.

TEST CIRCUITS AND WAVEFORMS

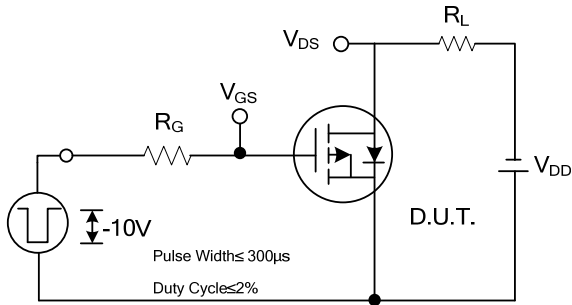


Peak Diode Recovery dv/dt Test Circuit

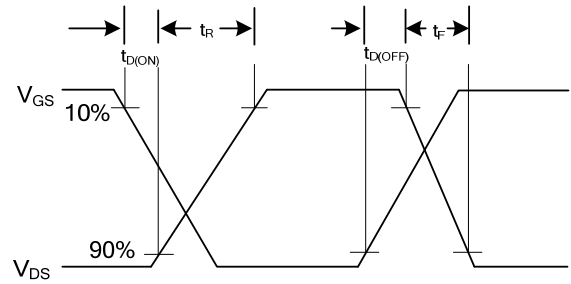


Peak Diode Recovery dv/dt Waveforms

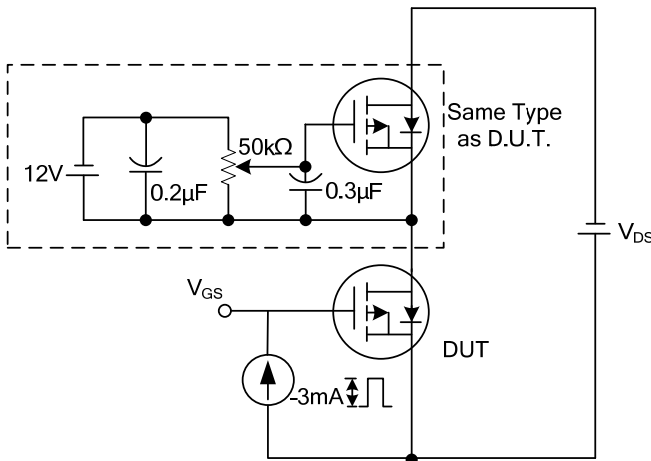
## TEST CIRCUITS AND WAVEFORMS



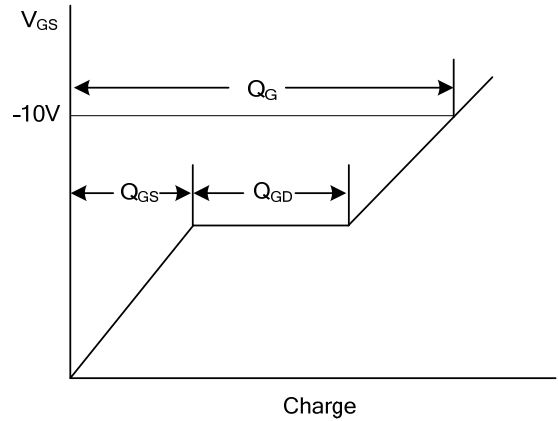
Switching Test Circuit



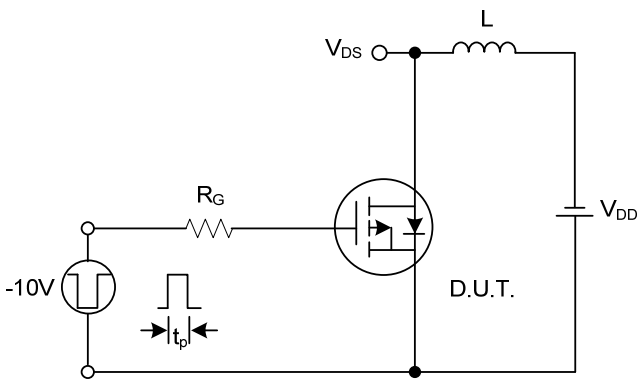
Switching Waveforms



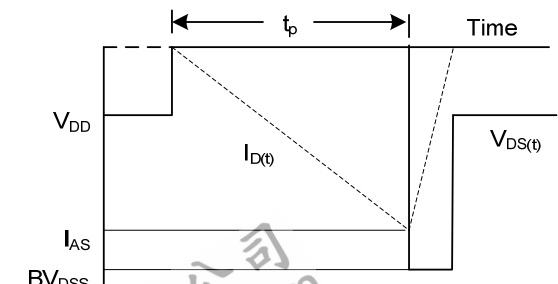
Gate Charge Test Circuit



Gate Charge Waveform

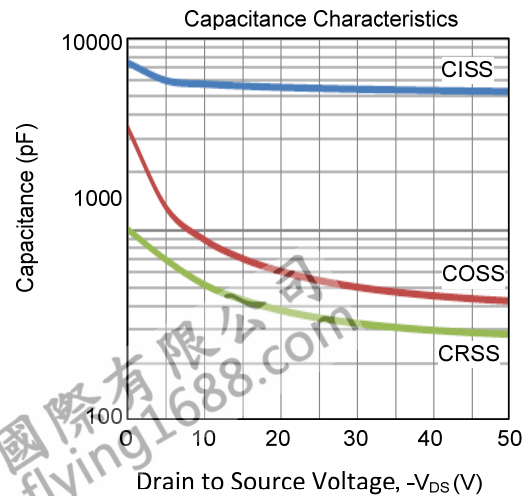
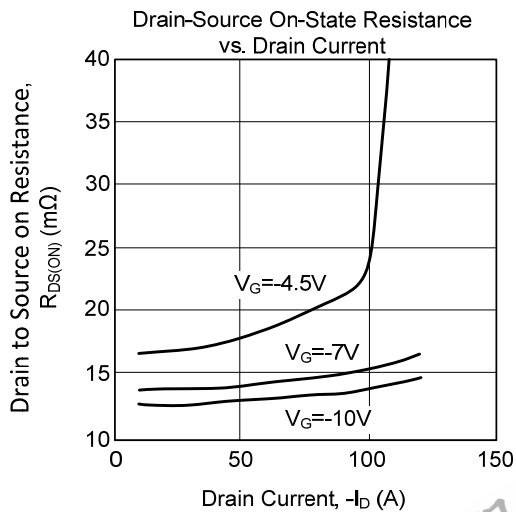
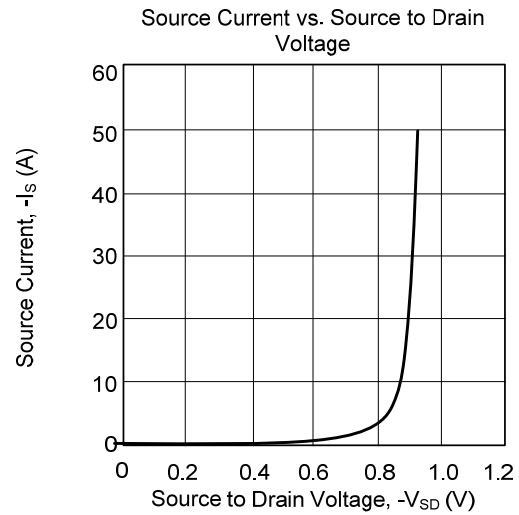
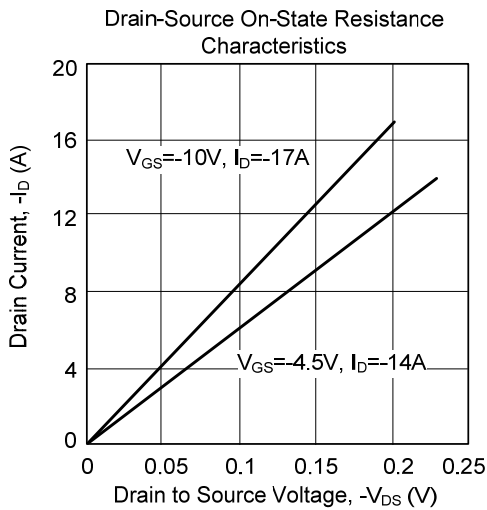
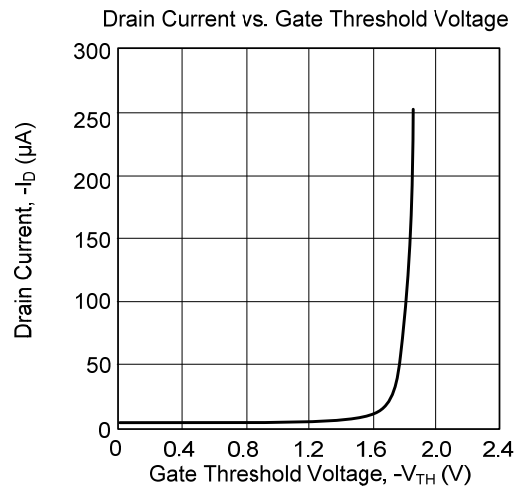
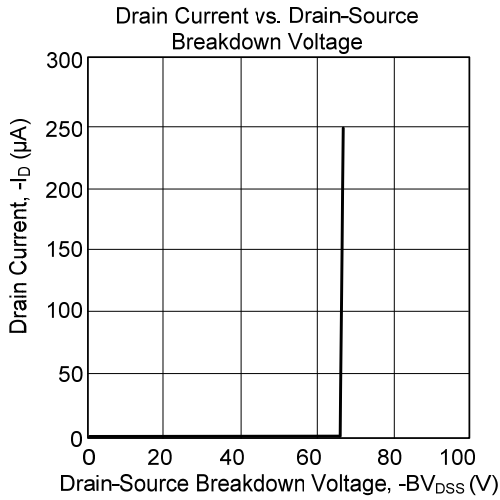


Unclamped Inductive Switching Test Circuit

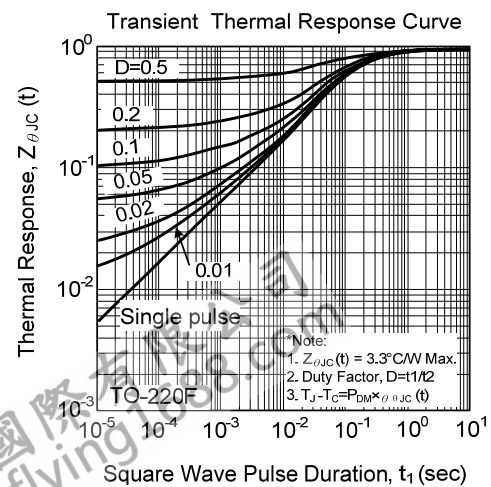
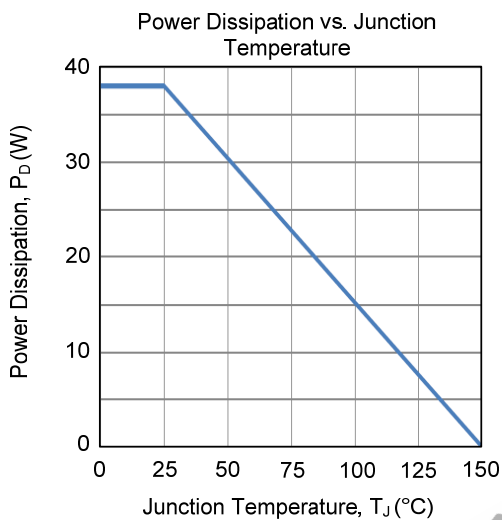
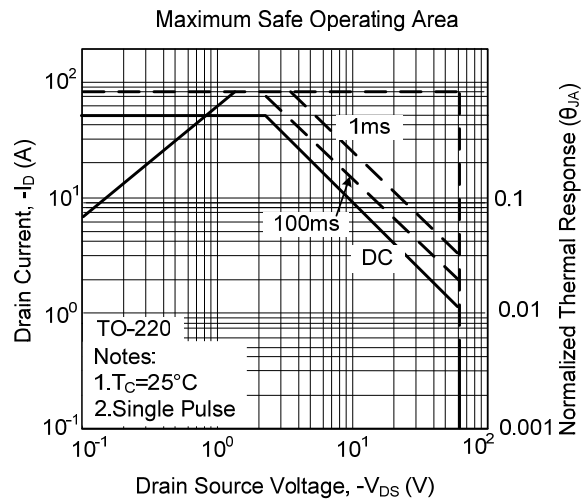
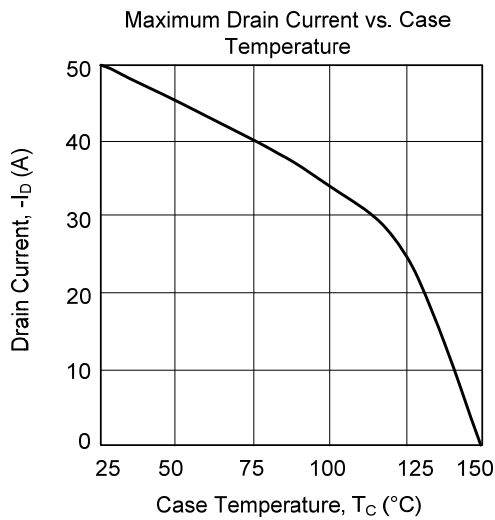
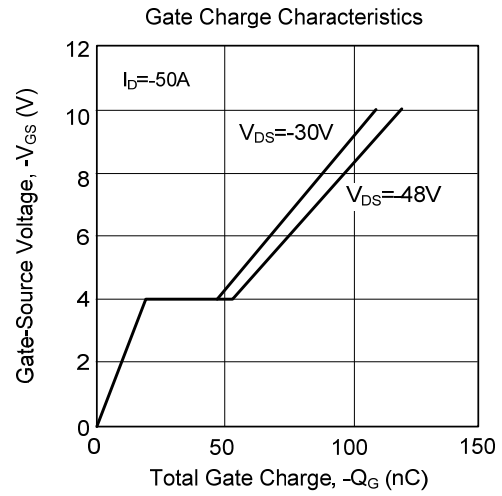
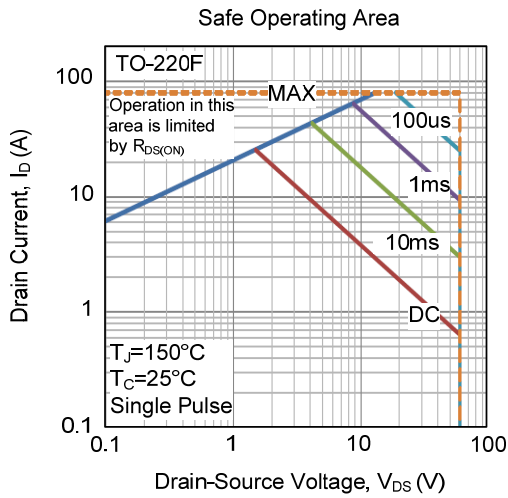


Unclamped Inductive Switching Waveforms

## TYPICAL CHARACTERISTICS



## TYPICAL CHARACTERISTICS (Cost.)





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