



**UTT30N06**

*Power MOSFET*

**30A, 60V N-CHANNEL  
POWER MOSFET**

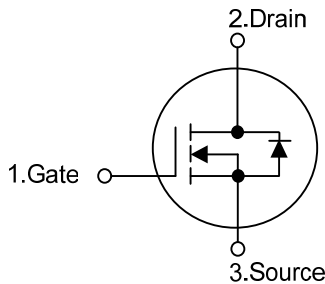
■ DESCRIPTION

The UTC **UTT30N06** is a low voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and excellent avalanche characteristics. This power MOSFET is usually used in automotive applications of power supplies, high efficient DC to DC converters and battery operated products.

■ FEATURES

- \*  $R_{DS(ON)} < 40m\Omega @ V_{GS} = 10V, I_D = 15A$
- \* Low reverse transfer Capacitance (  $C_{RSS} = \text{typical } 80\text{ pF}$  )
- \* Fast switching capability
- \* Avalanche energy specified
- \* Improved dv/dt capability

■ SYMBOL

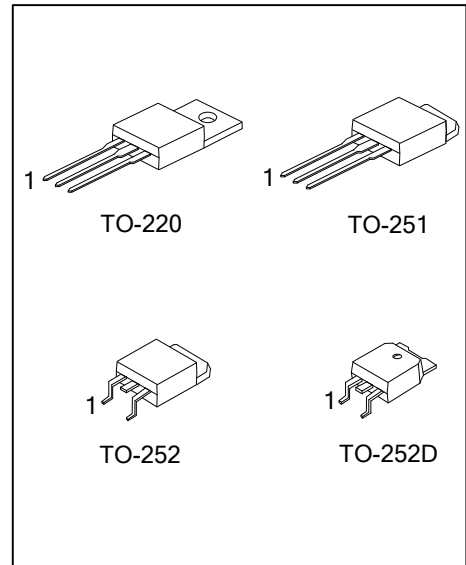


■ ORDERING INFORMATION

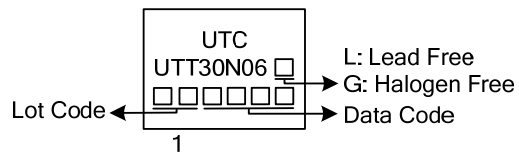
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT30N06L-TA3-T	UTT30N06G-TA3-T	TO-220	G	D	S	Tube
UTT30N06L-TM3-T	UTT30N06G-TM3-T	TO-251	G	D	S	Tube
UTT30N06L-TN3-R	UTT30N06G-TN3-R	TO-252	G	D	S	Tape Reel
UTT30N06L-TND-R	UTT30N06G-TND-R	TO-252D	G	D	S	Tape Reel

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

<p>UTT30N06L-TA3-T</p>	<p>(1) T: Tube, R: Tape Reel                  (2) TA3: TO-220, TM3: TO-251, TN3: TO-252, TND: TO-252D                  (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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## MARKING



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■ ABSOLUTE MAXIMUM RATINGS ( $T_C=25^{\circ}\text{C}$ , 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	$I_D$	$T_C = 25^{\circ}\text{C}$	30	A
			$T_C = 100^{\circ}\text{C}$	21.3	A
	Pulsed (Note 1)		$I_{DM}$	120	A
Avalanche Energy	Single Pulsed (Note 2)		$E_{AS}$	45	mJ
Peak Diode Recovery $dv/dt$ (Note 3)		$dv/dt$	7.5	V/ns	
Power Dissipation	TO-220	$P_D$	89	W	
	TO-251/TO-252/TO-252D		44		
Junction Temperature		$T_J$	+150	$^{\circ}\text{C}$	
Operation Temperature		$T_{OPR}$	-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. Repeativity rating: pulse width limited by junction temperature

3.  $L=0.1\text{mH}$ ,  $I_{AS}=30\text{A}$ ,  $V_{DD}=25\text{V}$ ,  $R_G=20\Omega$ , Starting  $T_J=25^{\circ}\text{C}$

4.  $I_{SD}\leq 50\text{A}$ ,  $di/dt\leq 300\text{A}/\mu\text{s}$ ,  $V_{DD}\leq BV_{DSS}$ , Starting  $T_J=25^{\circ}\text{C}$

■ THERMAL DATA

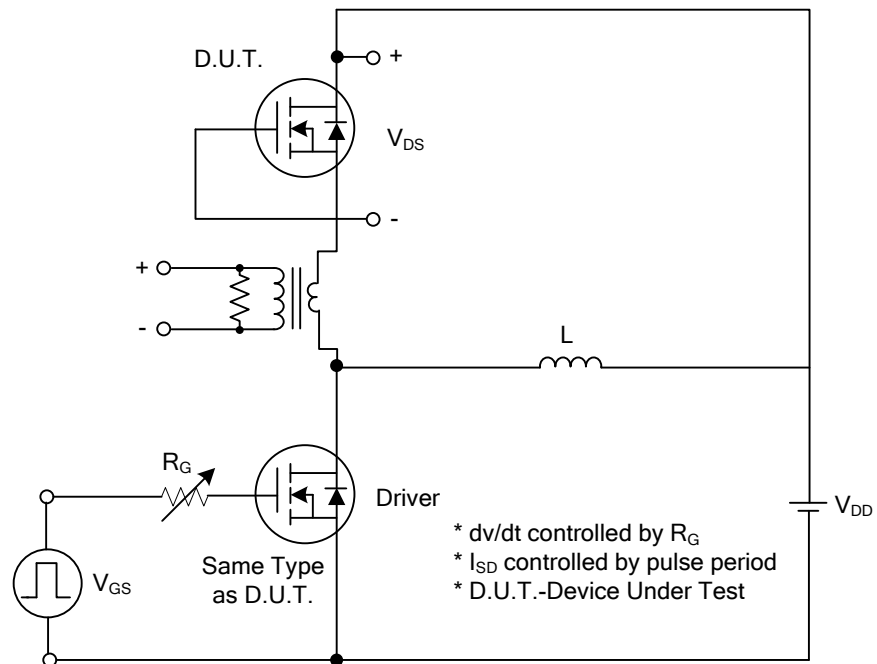
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	$\theta_{JA}$	62	$^{\circ}\text{C}/\text{W}$
	TO-251/TO-252/TO-252D		110	
Junction to Case	TO-220	$\theta_{JC}$	1.4	$^{\circ}\text{C}/\text{W}$
	TO-251/TO-252/TO-252D		2.85	

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

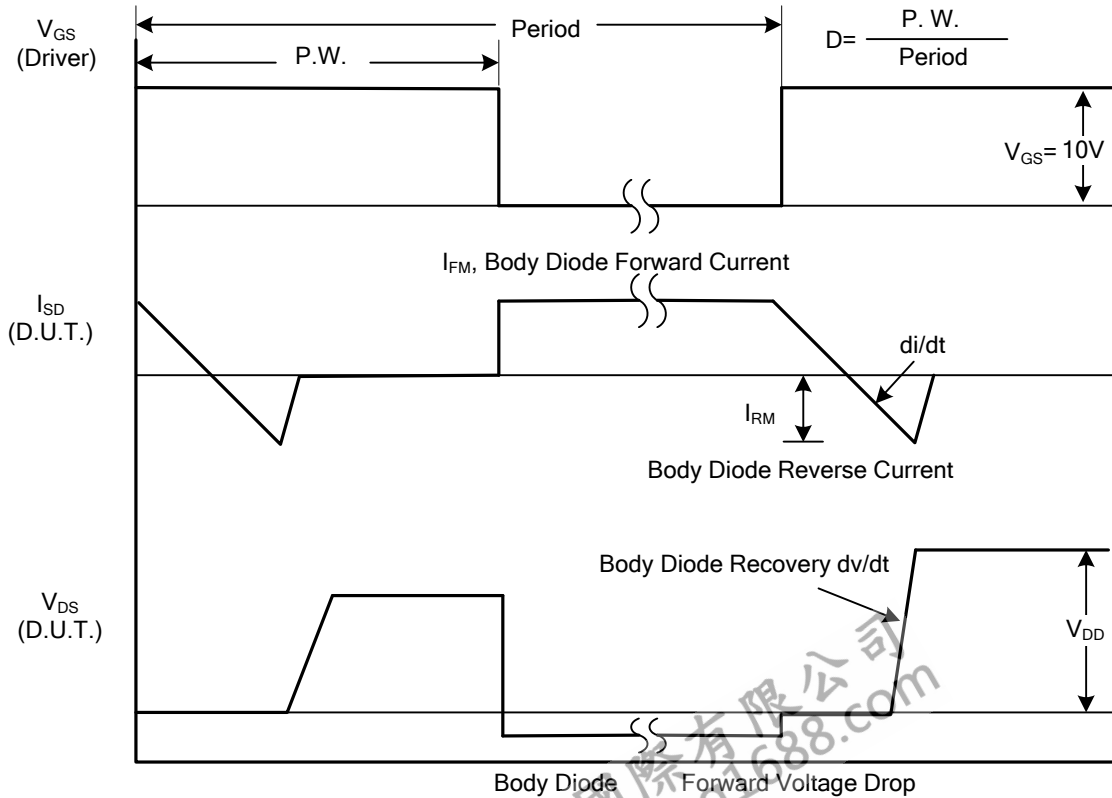
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	60			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V			10	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub> V <sub>GS</sub> = 20V, V <sub>DS</sub> = 0 V			100	nA
	Reverse		V <sub>GS</sub> = -20V, V <sub>DS</sub> = 0 V			-100
Breakdown Voltage Temperature Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	I <sub>D</sub> =250μA, Referenced to 25°C		0.06		V/°C
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1.0		3.0	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A		32	40	mΩ
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1MHz		800	1000	pF
Output Capacitance	C <sub>OSS</sub>			130	200	pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			80	100	pF
<b>SWITCHING CHARACTERISTICS</b>						
Total Gate Charge	Q <sub>G</sub>	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 24A (Note 1, 2)		80	100	nC
Gate-Source Charge	Q <sub>GS</sub>			15		nC
Gate-Drain Charge	Q <sub>GD</sub>			50		nC
Turn-On Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> = 30V, I <sub>D</sub> = 1.0 A, V <sub>GS</sub> = 10V (Note 1, 2)		35	70	ns
Turn-On Rise Time	t <sub>R</sub>			40	80	ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>			220	280	ns
Turn-Off Fall Time	t <sub>F</sub>			100	120	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>				120	A
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 30A			1.4	V
Reverse Recovery Time	t <sub>rr</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 30A,		40		ns
Reverse Recovery Charge	Q <sub>rr</sub>	di <sub>F</sub> / dt = 100 A/μs (Note 1)		70		μC

Notes: 1. Pulse Test : Pulse width ≤300μs, Duty cycle ≤ 2%  
2. Essentially independent of operating temperature

## TEST CIRCUITS AND WAVEFORMS

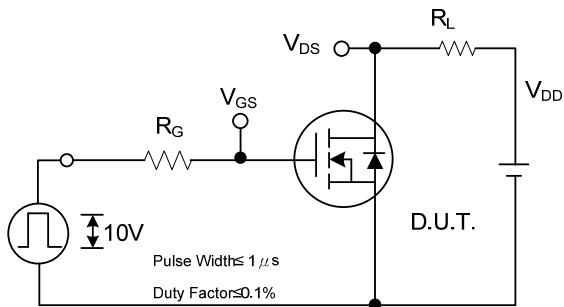


Peak Diode Recovery  $dv/dt$  Test Circuit

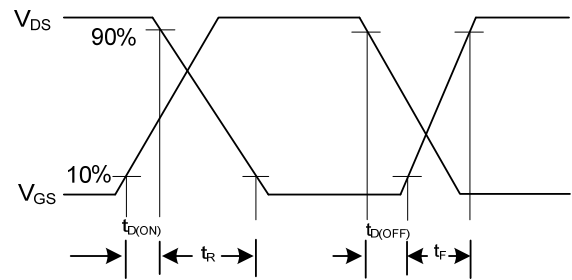


Peak Diode Recovery  $dv/dt$  Waveforms

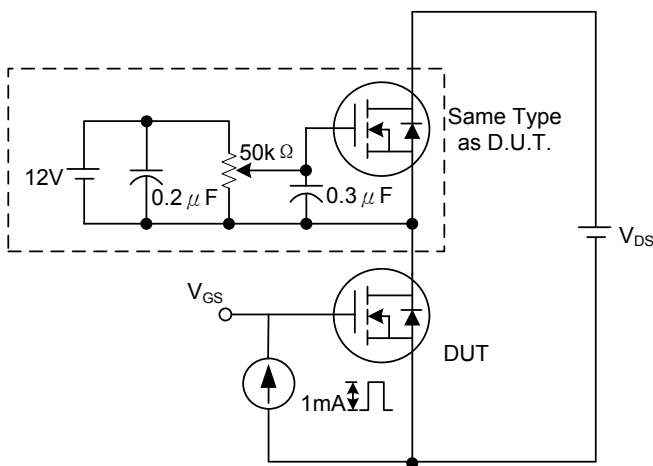
## TEST CIRCUITS AND WAVEFORMS (Cont.)



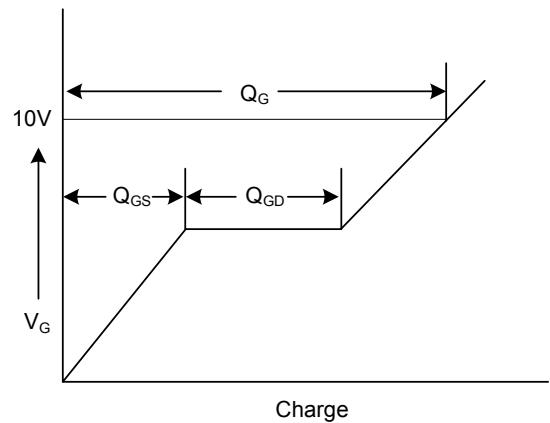
Switching Test Circuit



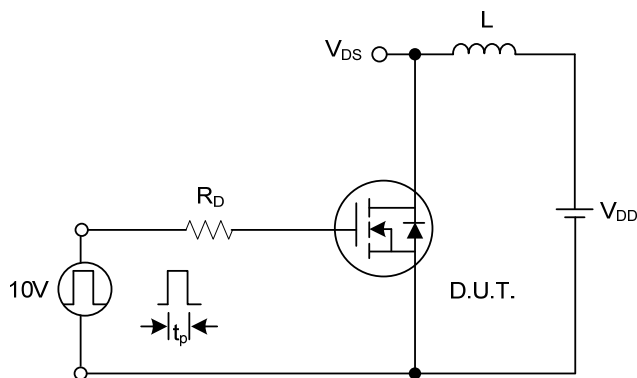
Switching Waveforms



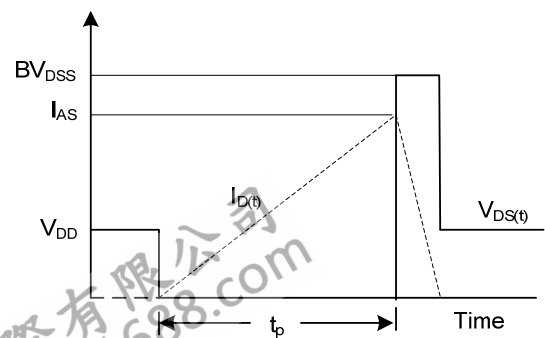
Gate Charge Test Circuit



Gate Charge Waveform

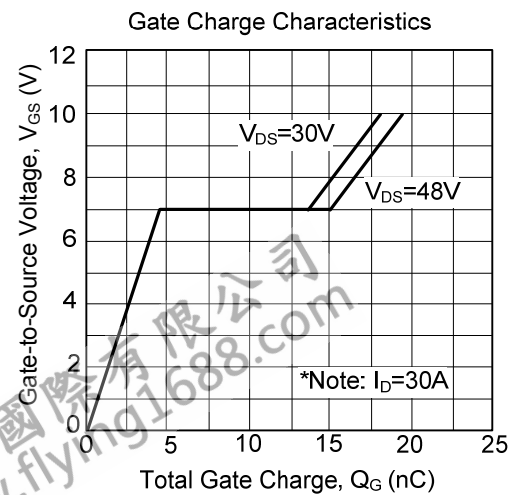
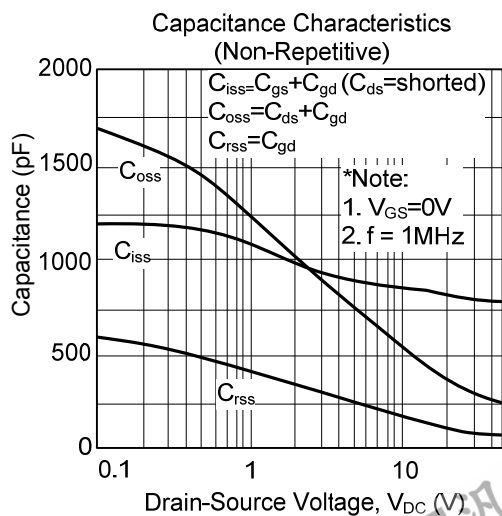
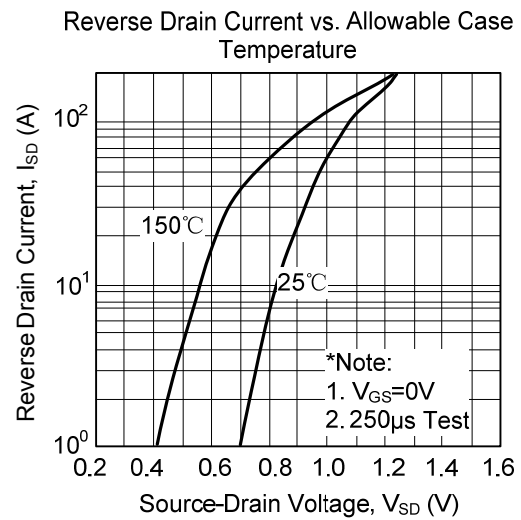
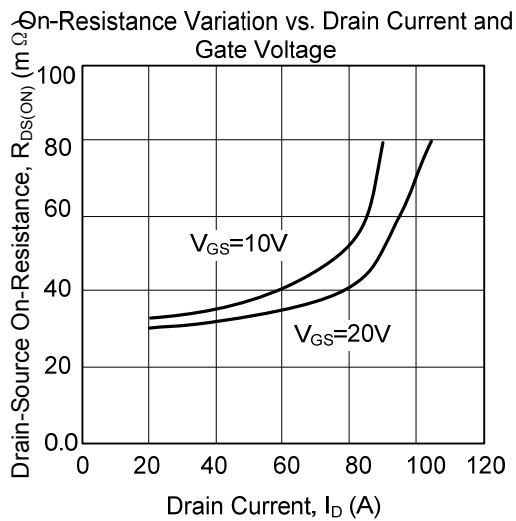
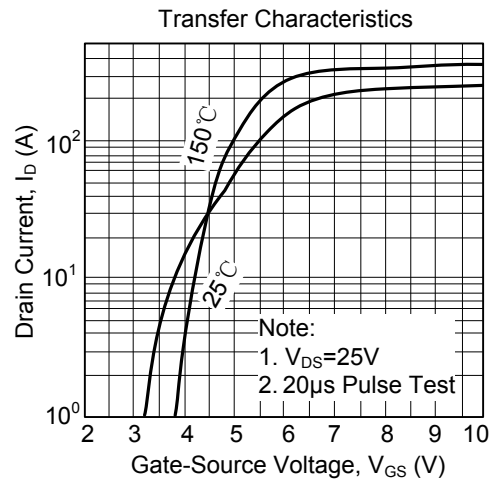
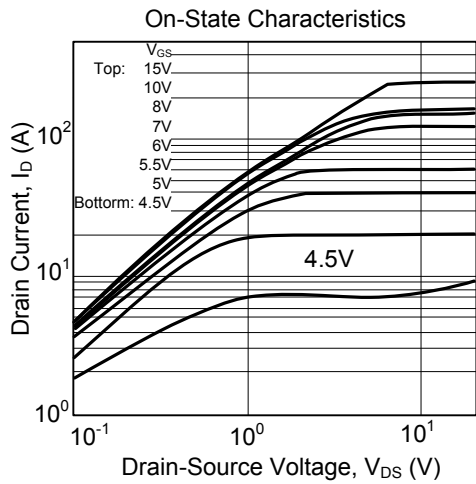


Unclamped Inductive Switching Test Circuit

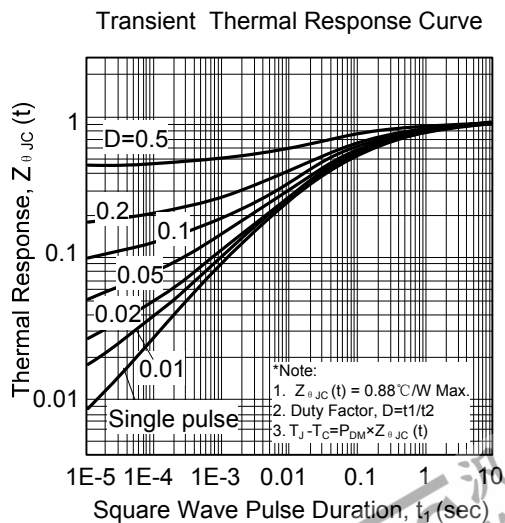
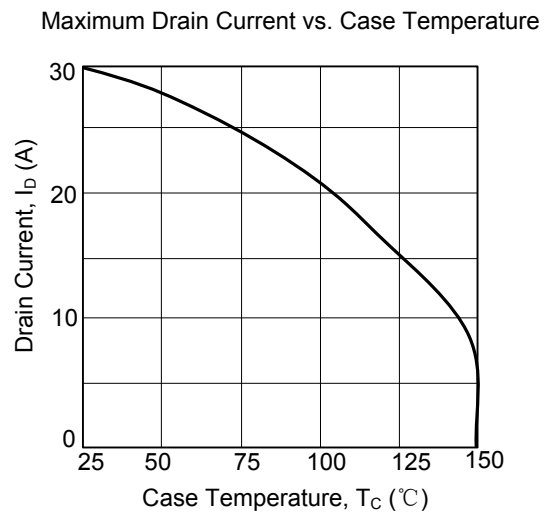
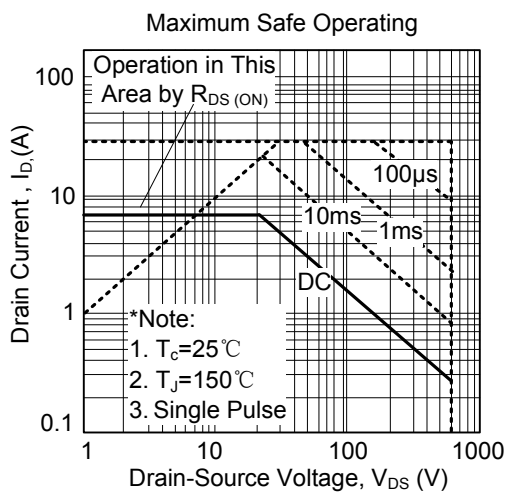
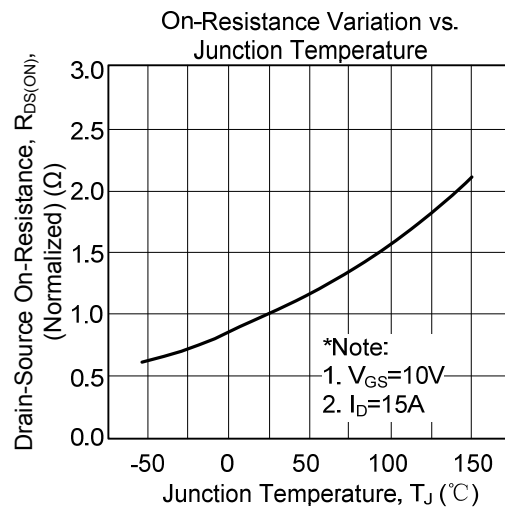
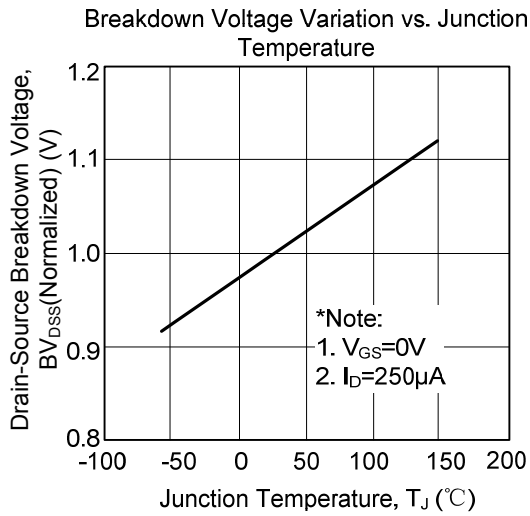


Unclamped Inductive Switching Waveforms

## TYPICAL CHARACTERISTICS



## TYPICAL CHARACTERISTICS(Cont.)





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