



UTT50N06

Power MOSFET

**50A, 60V N-CHANNEL
POWER MOSFET**

■ DESCRIPTION

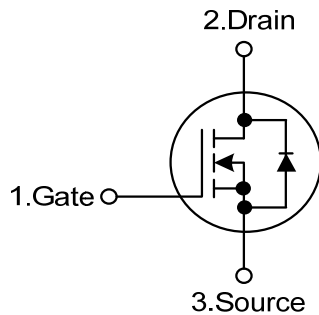
The UTC **UTT50N06** is an N-channel power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance.

The UTC **UTT50N06** is generally applied in low power switching mode power appliances and electronic ballast.

■ FEATURES

- * $R_{DS(ON)} < 20m\Omega @ V_{GS}=10V, I_D = 50A$
- * High Switching Speed
- * Improved dv/dt capability

■ SYMBOL

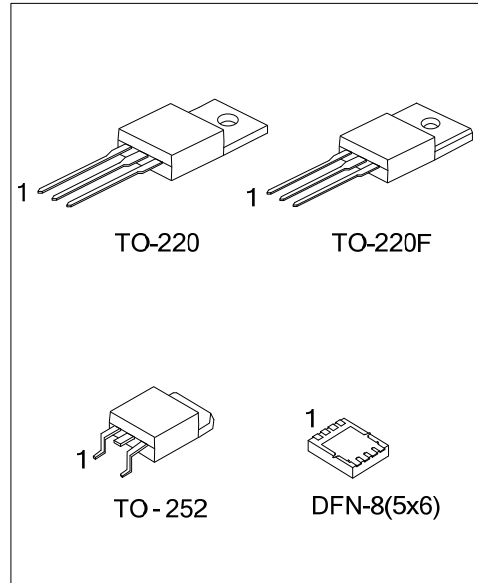


■ ORDERING INFORMATION

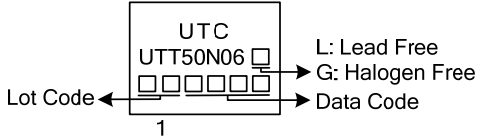
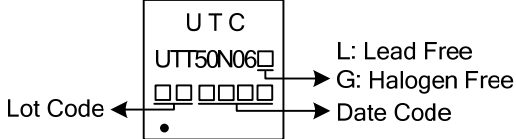
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT50N06L-TA3-T	UTT50N06G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UTT50N06L-TF3-T	UTT50N06G-TF3-T	TO-220F	G	D	S	-	-	-	-	-	Tube
UTT50N06L-TN3-R	UTT50N06G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UTT50N06L-K08-5060-R	UTT50N06G-K08-5060-R	DFN-8(5x6)	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UTT50N06L-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, TN3: TO-252, K08-5060: DFN-8(5x6)</p> <p>(3) L: Lead Free, G: Halogen Free and Lead Free</p>
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MARKING

TO-220 / TO-220F / TO-252	DFN-8(5×6)
 <p>UTC UTT50N06 □ □ □ □ □ □ Lot Code ← → Data Code 1 L: Lead Free G: Halogen Free</p>	 <p>UTC UTT50N06 □ □ □ □ □ □ Lot Code ← → Date Code • L: Lead Free G: Halogen Free</p>

■ ABSOLUTE MAXIMUM RATINGS (Unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	I_D	50	A
	$T_C = 100^\circ\text{C}$		35	A
Pulsed Drain Current (Note 2)		I_{DM}	200	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	120	mJ
	Repetitive (Note 2)	E_{AR}	13	mJ
Peak Diode Recovery dv/dt		dv/dt	3.5	V/ns
Power Dissipation ($T_C=25^\circ\text{C}$)	TO-220	P_D	100	W
	TO-220F		65	W
	TO-252		46	W
	DFN-8(5×6)		20.8	W
Junction Temperature		T_J	+150	°C
Operation and Storage Temperature		T_{STG}	-55 ~ +150	°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 T_J

3. $L=0.1\text{mH}$, $I_{AS}=50\text{A}$, $V_{DD}=25\text{V}$, $R_G=20\Omega$, Starting $T_J=25^\circ\text{C}$

4. $I_{SD} \leq 30\text{A}$, $V_{DS}=0\text{V}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62	°C/W
	TO-252		100	°C/W
	DFN-8(5×6)		65	°C/W
Junction to Case	TO-220	θ_{JC}	1.24	°C/W
	TO-220F		1.92	°C/W
	TO-252		2.7	°C/W
	DFN-8(5×6)		6 (Note)	°C/W

Note: The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

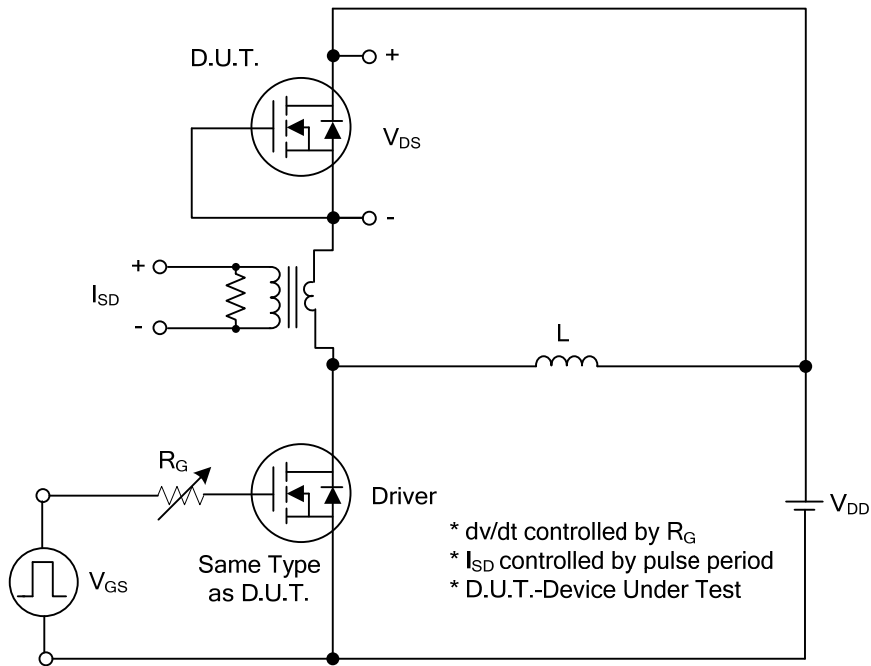
■ ELECTRICAL CHARACTERISTICS (T_C = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0 V, I _D = 250 μA	60			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} = 20V, V _{DS} = 0 V		100	nA
	Reverse		V _{GS} = -20V, V _{DS} = 0 V		-100	nA
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.07		V/°C
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} = V _{GS} , I _D = 250 μA	1.0		3.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = 10 V, I _D = 50A		13	20	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{GS} = 0 V, V _{DS} = 25 V f = 1MHz		2000		pF
Output Capacitance	C _{OSS}			550		pF
Reverse Transfer Capacitance	C _{RSS}			150		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q _G	V _{DS} =50V, V _{GS} =10V, I _D =1.3A I _G = 100μA (Note1, 2)		75		nC
Gate-Source Charge	Q _{GS}			96		nC
Gate-Drain Charge	Q _{GD}			10		nC
Turn-On Delay Time	t _{D(ON)}	V _{DS} =30V, V _{GS} =10V, I _D =0.5A, R _G =25Ω (Note1, 2)		40		ns
Turn-On Rise Time	t _R			100		ns
Turn-Off Delay Time	t _{D(OFF)}			90		ns
Turn-Off Fall Time	t _F			80		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				50	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				200	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S = 50A, V _{GS} = 0 V			1.5	V
Body Diode Reverse Recovery Time	t _{rr}	I _S =30A, V _{GS} =0V,		70		ns
Body Diode Reverse Recovery Charge	Q _{rr}	dI _S /dt=100A/μs		90		nC

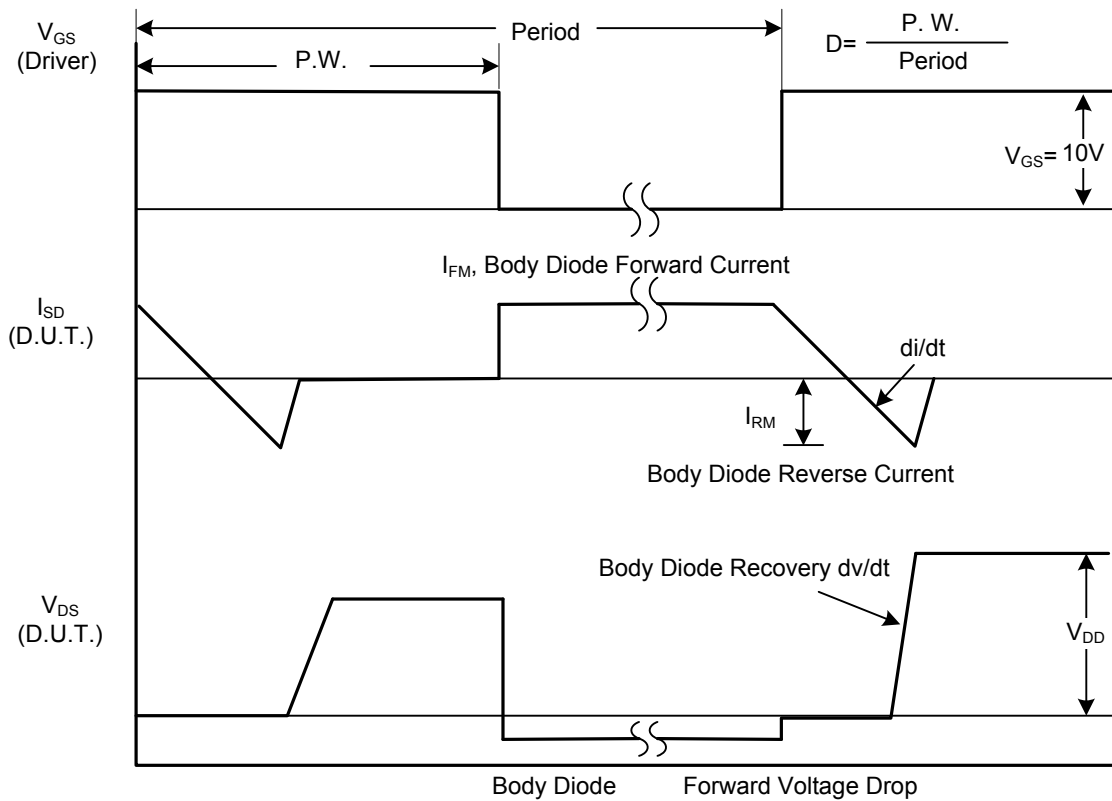
Notes: 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

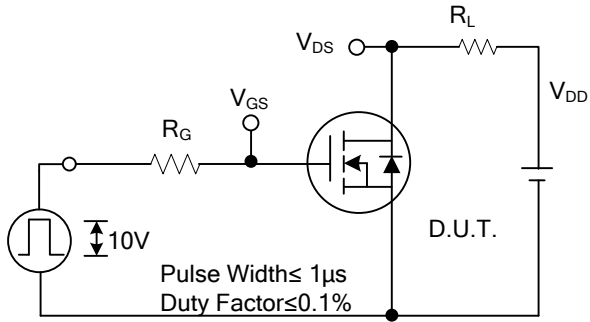


Peak Diode Recovery dv/dt Test Circuit

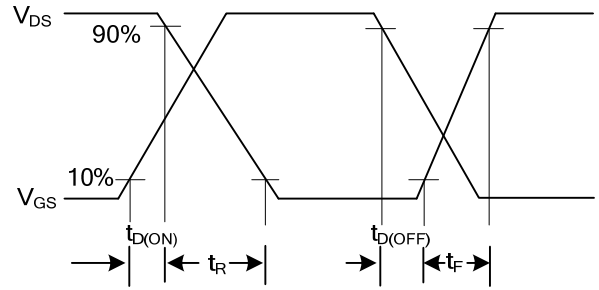


Peak Diode Recovery dv/dt Waveforms

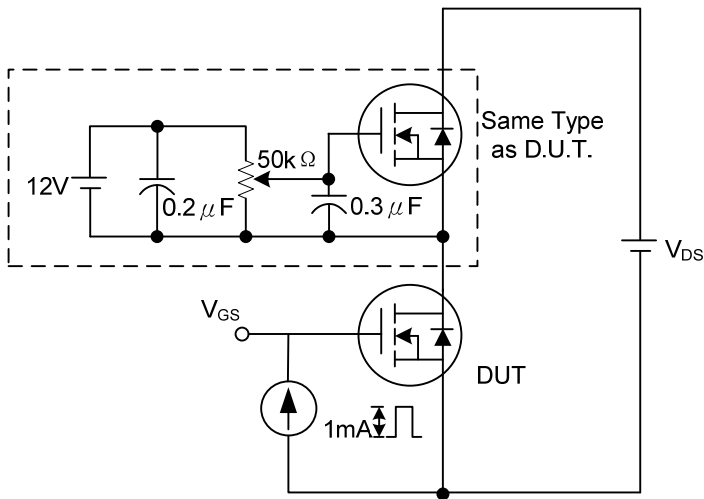
TEST CIRCUITS AND WAVEFORMS(Cont.)



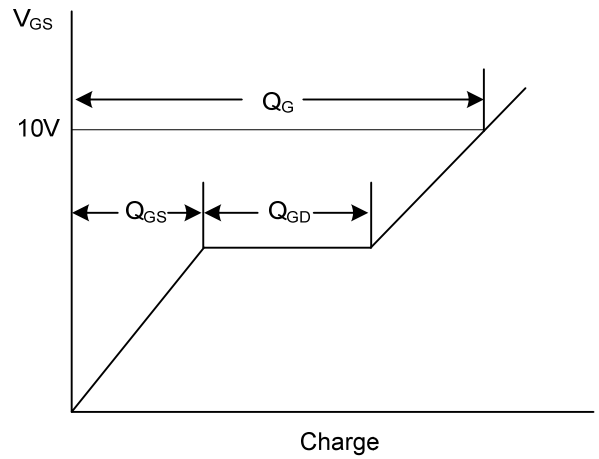
Switching Test Circuit



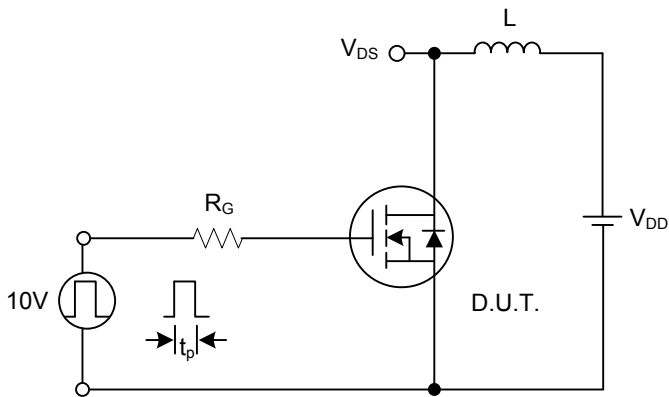
Switching Waveforms



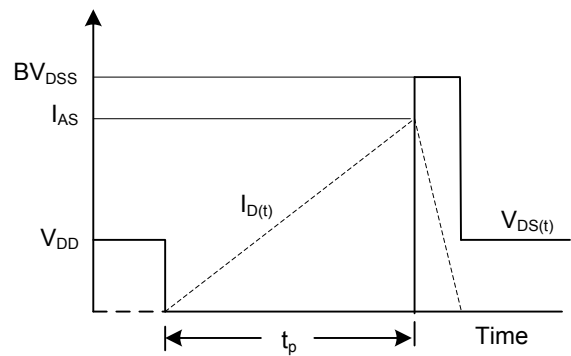
Gate Charge Test Circuit



Gate Charge Waveform

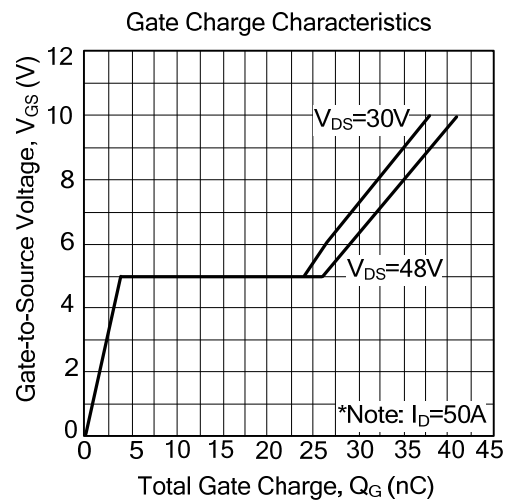
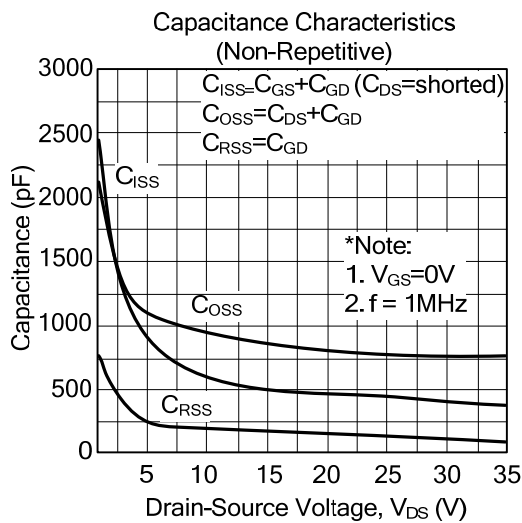
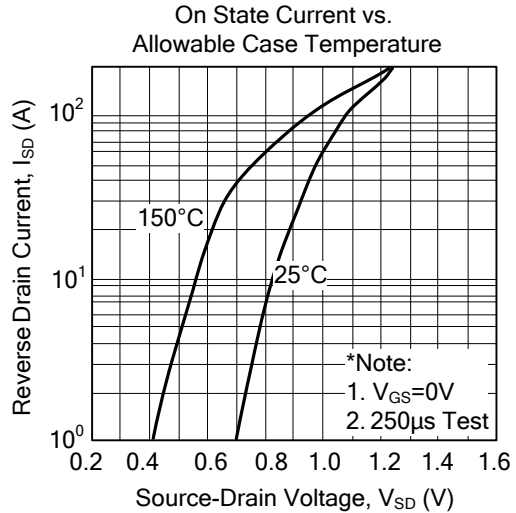
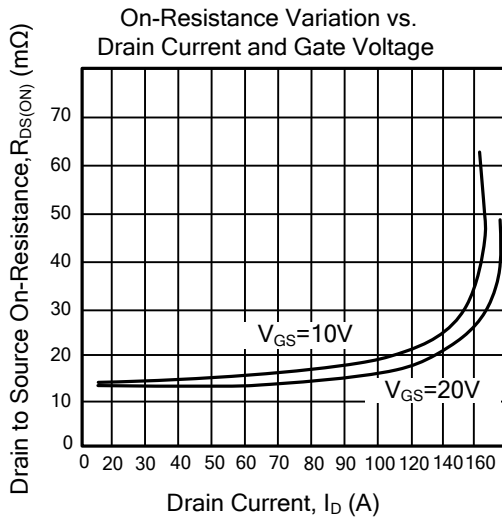
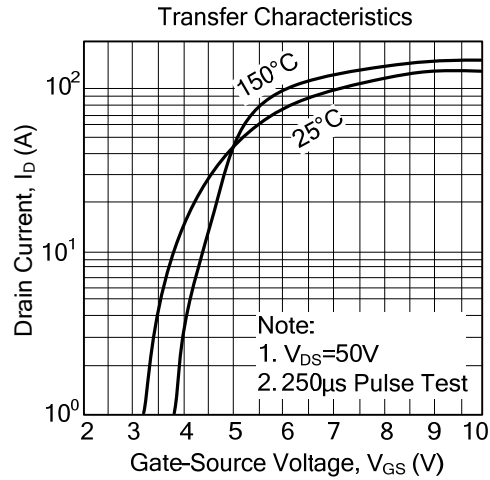
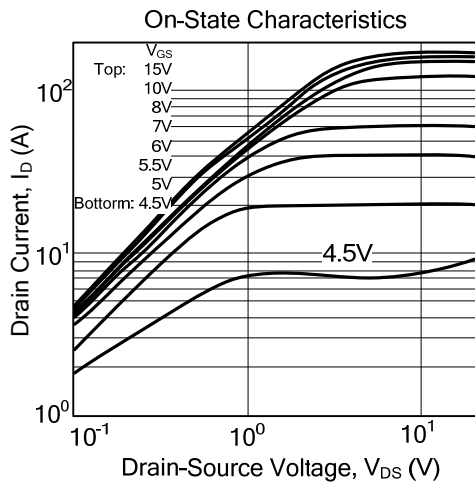


Unclamped Inductive Switching Test Circuit

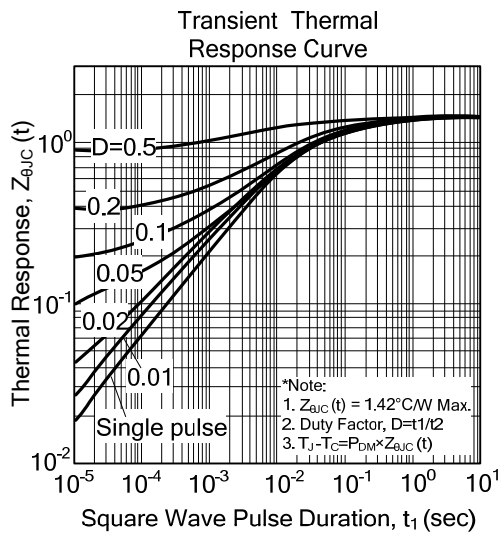
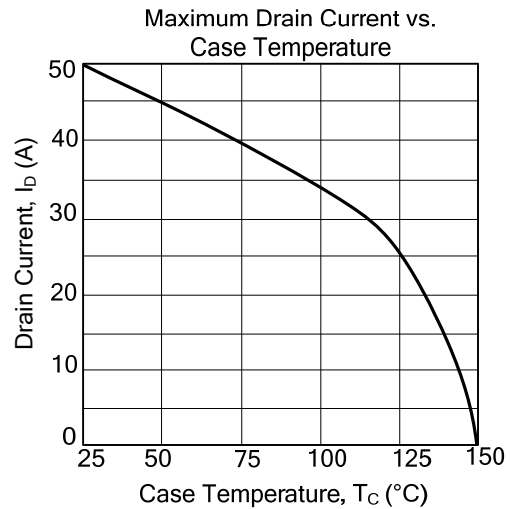
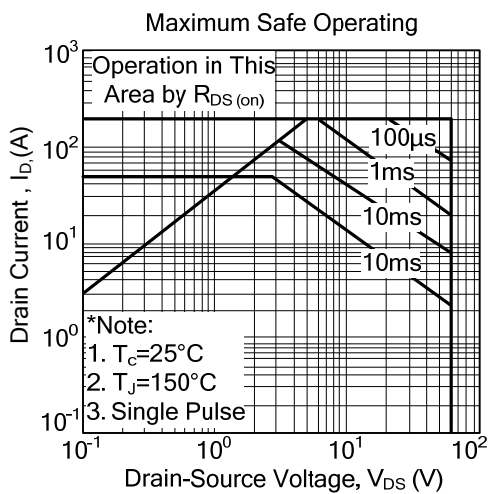
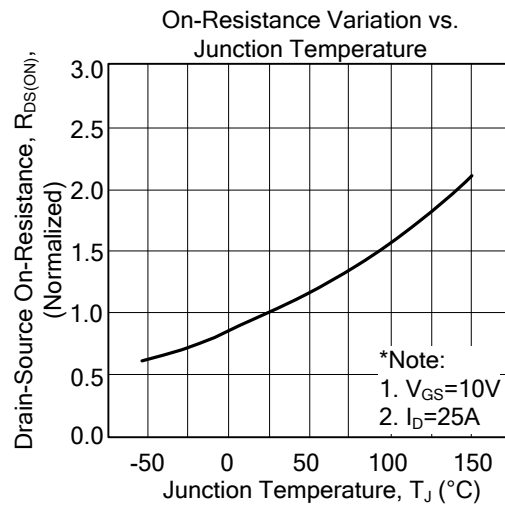
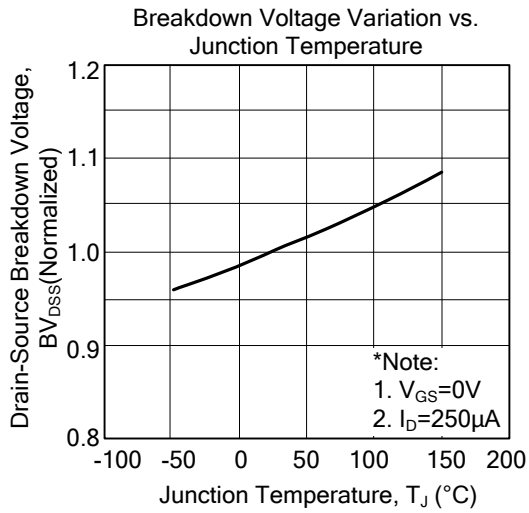


Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



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