



8N65

Power MOSFET

8A, 650V N-CHANNEL POWER MOSFET

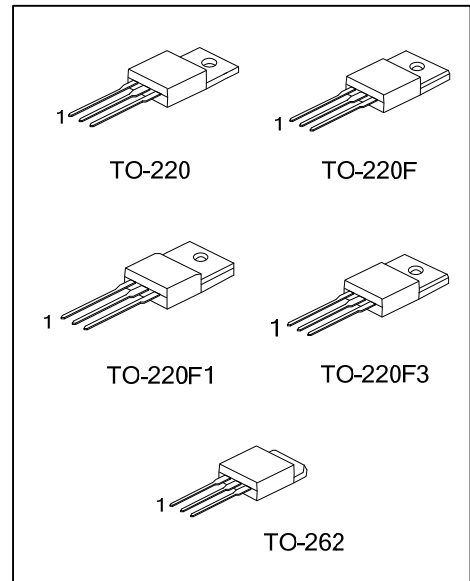
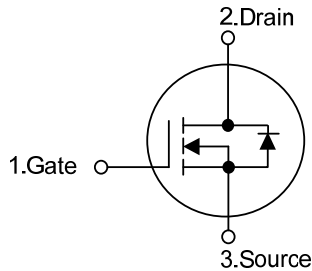
■ DESCRIPTION

The UTC **8N65** is a high voltage and high current power MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics. This power MOSFET is usually used in high speed switching applications at power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

■ FEATURES

- * $R_{DS(ON)} < 1.4\Omega @ V_{GS} = 10V$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

■ SYMBOL



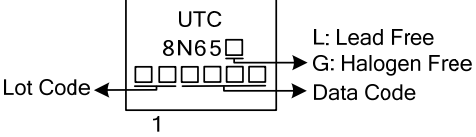
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
8N65L-TA3-T	8N65G-TA3-T	TO-220	G	D	S	Tube
8N65L-TF3-T	8N65G-TF3-T	TO-220F	G	D	S	Tube
8N65L-TF1-T	8N65G-TF1-T	TO-220F1	G	D	S	Tube
8N65L-TF3T-T	8N65G-TF3T-T	TO-220F3	G	D	S	Tube
8N65L-T2Q-T	8N65G-T2Q-T	TO-262	G	D	S	Tube

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

<p>8N65L-TA3-T</p>	<p>(1) T: Tube (2) TA3: TO-220 ,TF3: TO-220F, TF1: TO-220F1, TF3T: TO-220F3, T2Q: TO-262 (3) L: Lead Free, G: Halogen Free</p>
--------------------	--

■ MARKING INFORMATION

PACKAGE	MARKING
TO-220 TO-220F TO-220F1 TO-220F3 TO-262	 <p> UTC 8N65 Lot Code ← [] [] [] [] [] → Data Code 1 L: Lead Free G: Halogen Free </p>

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	650	V
Gate-Source Voltage		V_{GSS}	± 30	V
Avalanche Current (Note 2)		I_{AR}	8	A
Drain Current	Continuous	I_D	8	A
	Pulsed (Note 2)	I_{DM}	32	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	230	mJ
	Repetitive (Note 2)	E_{AR}	14.7	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220/TO-262	P_D	147	W
	TO-220F/TO-220F1		48	W
	TO-220F3			
Junction Temperature		T_J	+150	$^\circ\text{C}$
Operating 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. Repetitive Rating : Pulse width limited by T_J

3. $L=7.1\text{mH}$, $I_{AS}=8\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

4. $I_{SD} \leq 8\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220/TO-262	θ_{JC}	0.85	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		2.6	$^\circ\text{C}/\text{W}$
	TO-220F3			

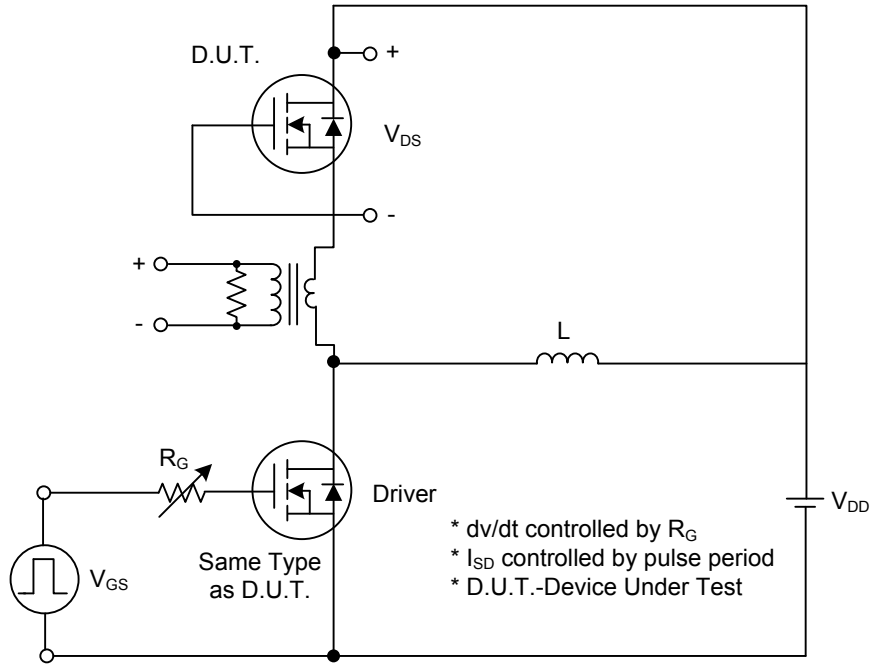
■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0 V, I _D = 250 μA	650			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = 650 V, V _{GS} = 0 V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS}			100	nA
	Reverse					
		V _{GS} = -30 V, V _{DS} = 0 V			-100	nA
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D = 250 μA, Referenced to 25°C		0.7		V/°C
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} = V _{GS} , I _D = 250 μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = 10 V, I _D = 4 A		1.2	1.4	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} = 25 V, V _{GS} = 0V, f = 1MHz		1145	1255	pF
Output Capacitance	C _{OSS}			118	135	pF
Reverse Transfer Capacitance	C _{RSS}			19	25	pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 325V, I _D = 8A, R _G = 25Ω (Note 1, 2)		84	100	ns
Turn-On Rise Time	t _R			100	130	ns
Turn-Off Delay Time	t _{D(OFF)}			275	320	ns
Turn-Off Fall Time	t _F			64.5	140	ns
Total Gate Charge	Q _G	V _{DS} = 520V, I _D = 8A, V _{GS} = 10 V (Note 1, 2)		115	130	nC
Gate-Source Charge	Q _{GS}			12		nC
Gate-Drain Charge	Q _{GD}			40		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} = 0 V, I _S = 8A			1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I _S				8	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				32	A
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, I _S = 8A, dI _F /dt = 100 A/μs (Note 2)		365		ns
Reverse Recovery Charge	Q _{RR}			3.4		μC

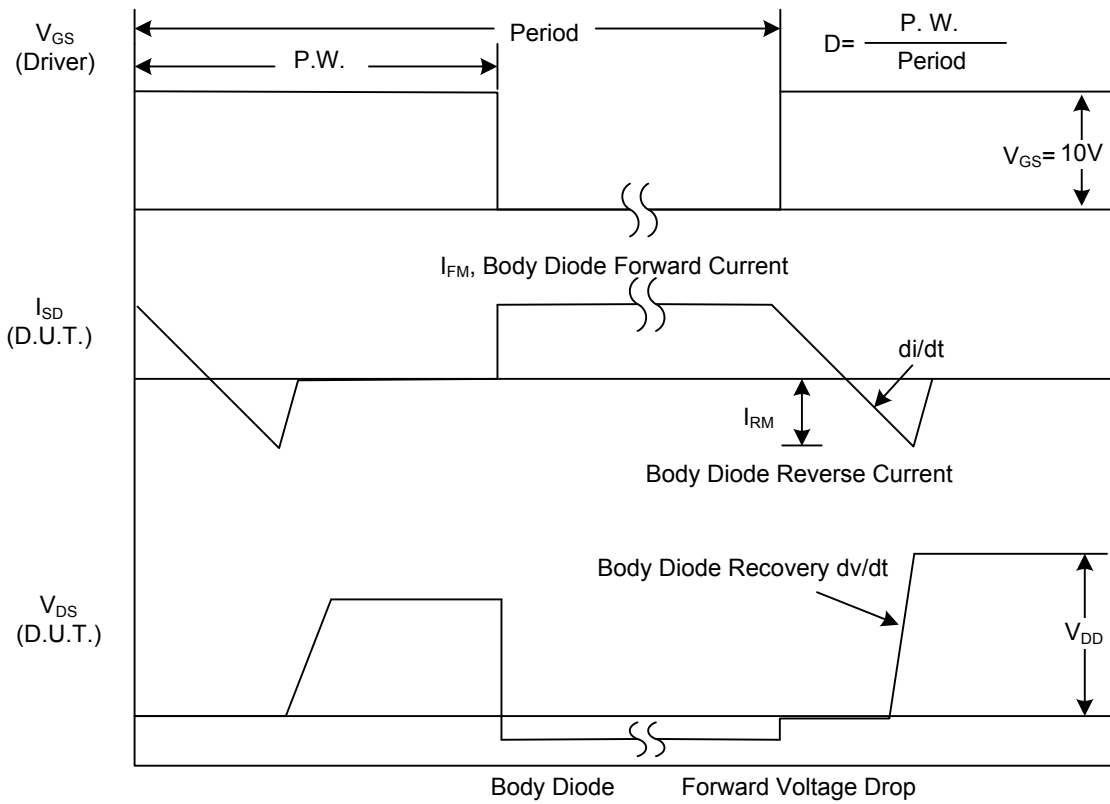
Notes: 1. Pulse Test: Pulse width ≤ 300 μs, Duty cycle ≤ 2%

2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

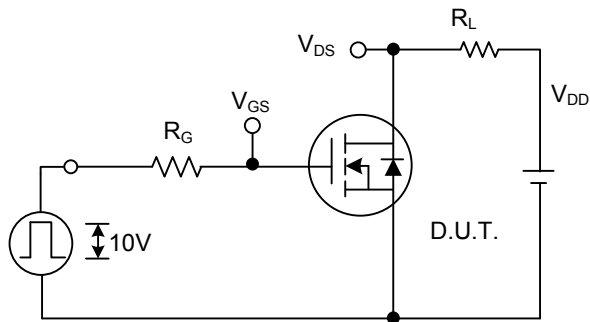


Peak Diode Recovery dv/dt Test Circuit

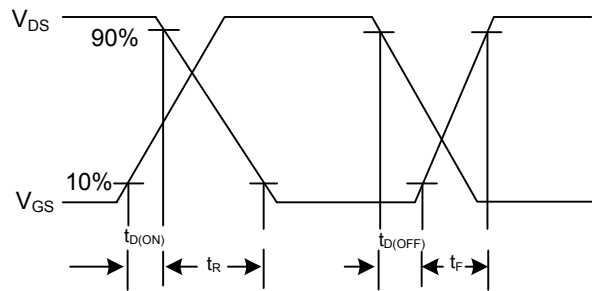


Peak Diode Recovery dv/dt Waveforms

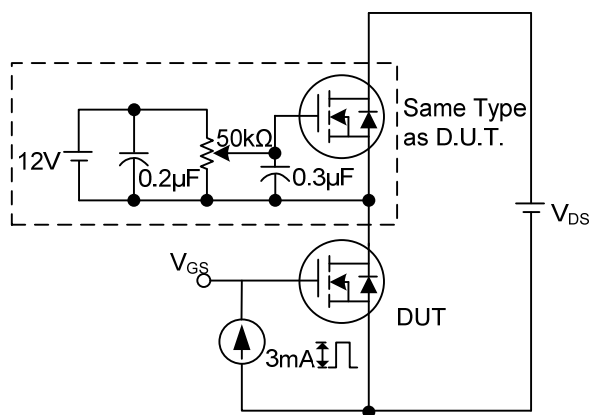
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



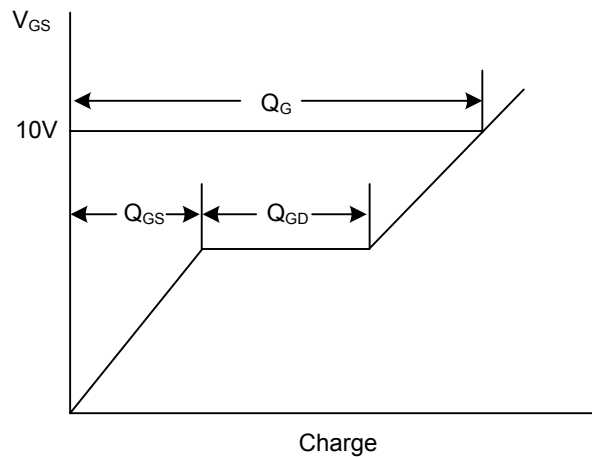
Switching Test Circuit



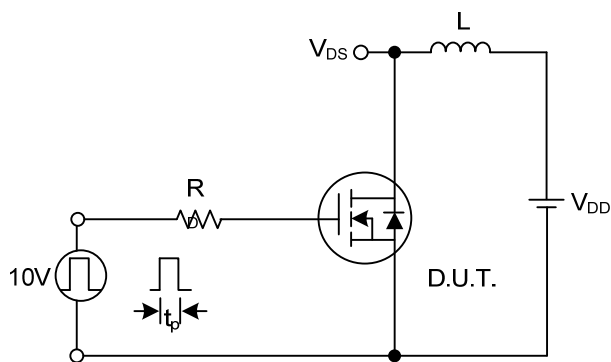
Switching Waveforms



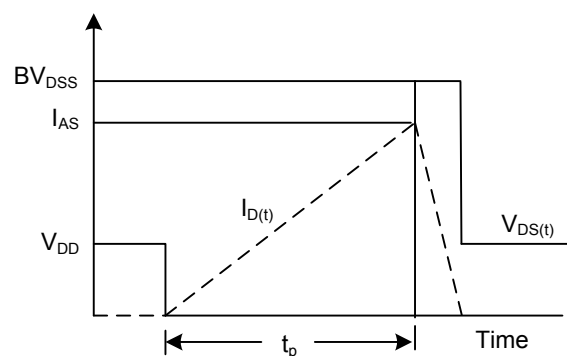
Gate Charge Test Circuit



Gate Charge Waveform

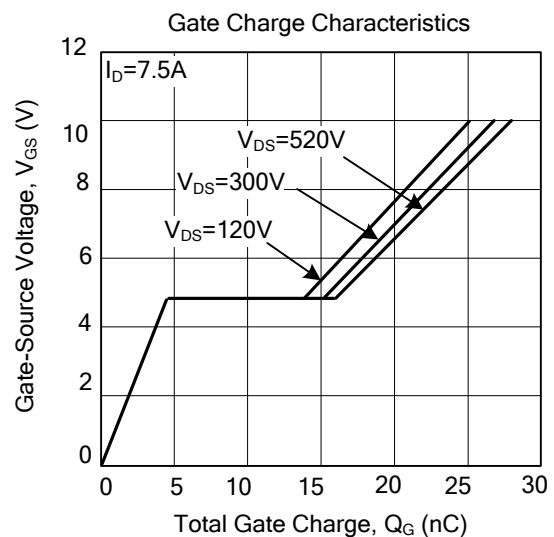
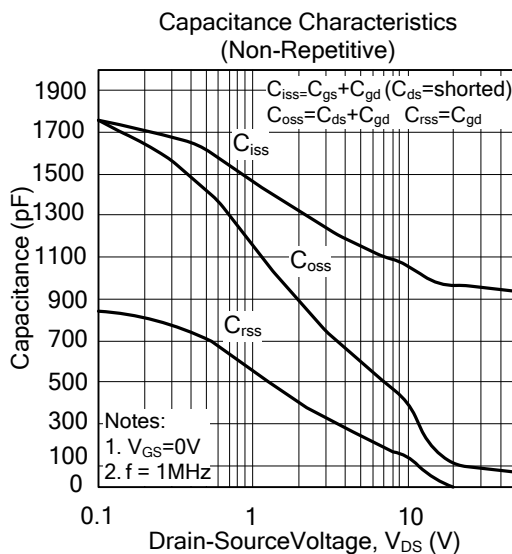
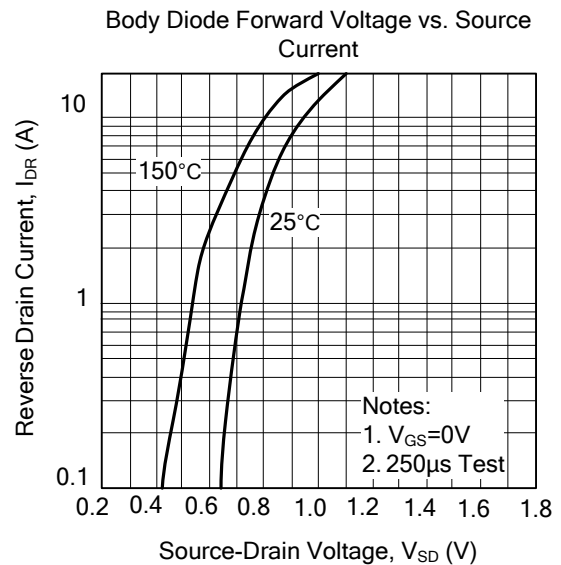
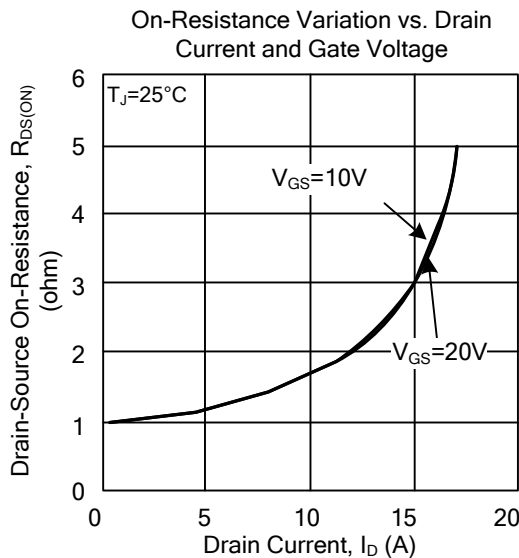
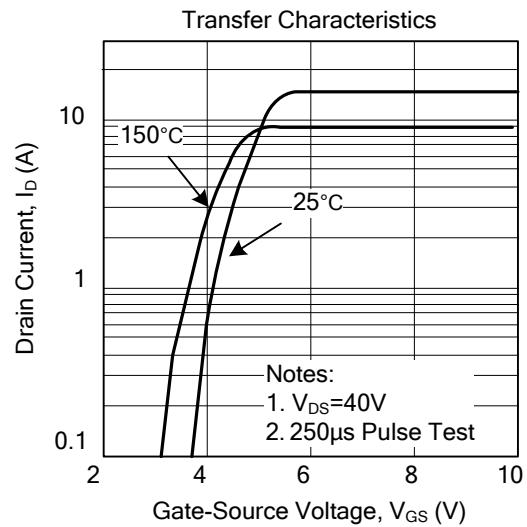
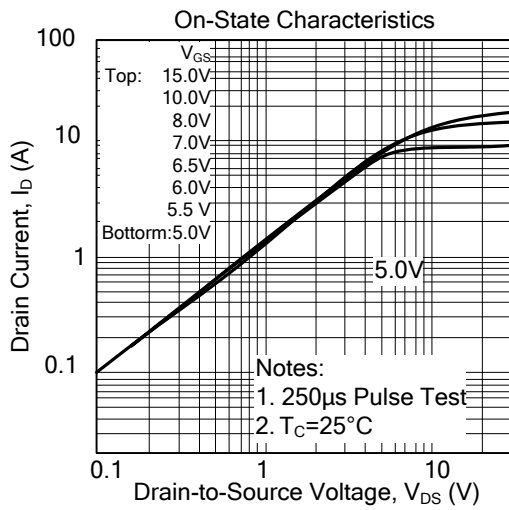


Unclamped Inductive Switching Test Circuit

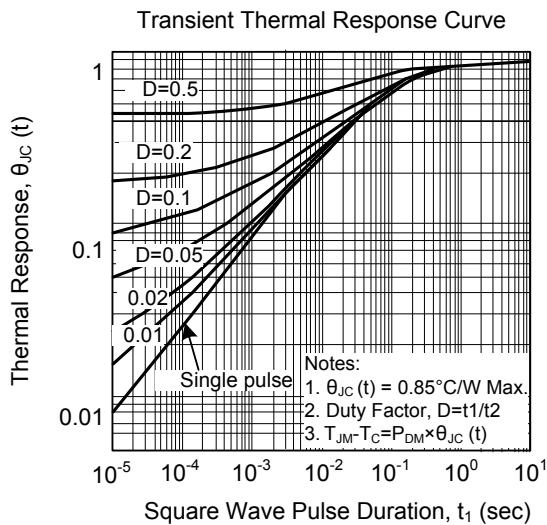
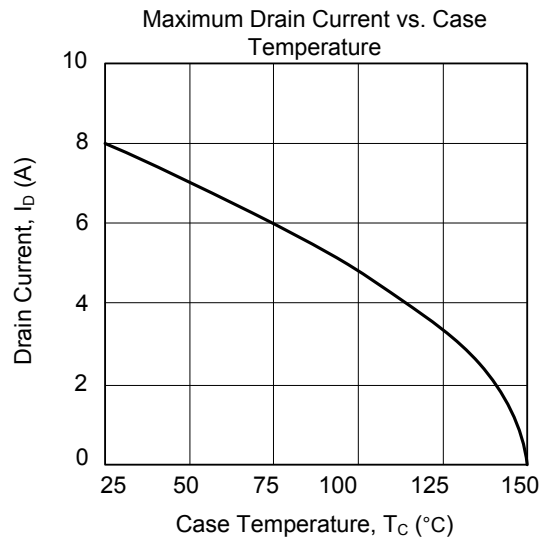
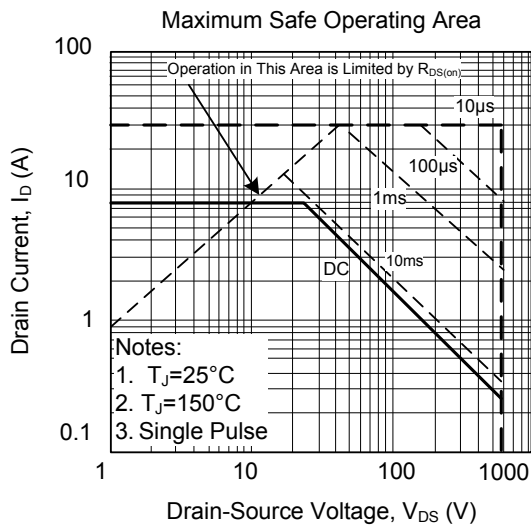
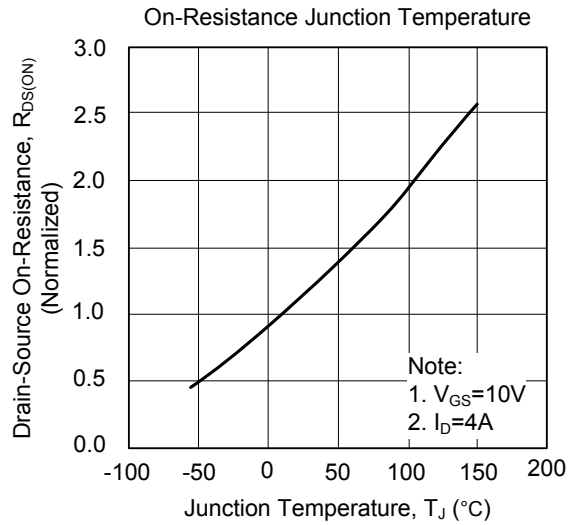
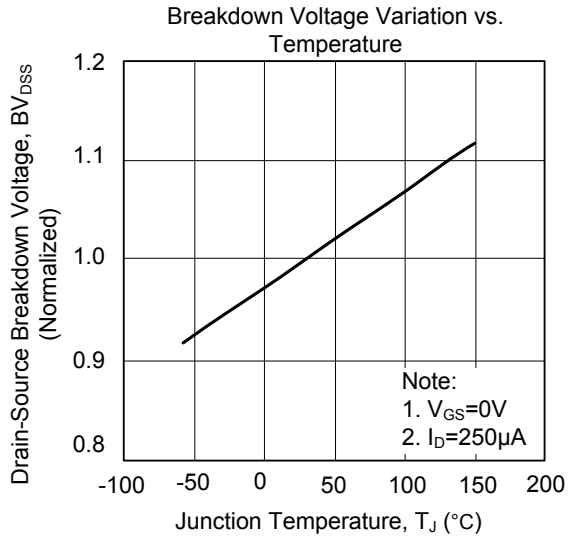


Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.