



## 60N75

## Power MOSFET

### 60Amps, 75Volts N-CHANNEL POWER MOSTFET

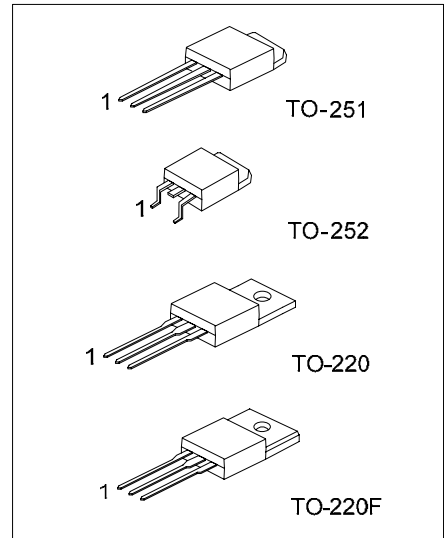
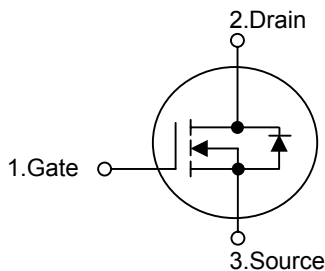
#### DESCRIPTION

The UTC **60N75** is n-channel enhancement mode power field effect transistors with stable off-state characteristics, fast switching speed, low thermal resistance, usually used at telecom and computer application.

#### FEATURES

- \*  $R_{DS(ON)} = 16m\Omega @ V_{GS} = 10V$
- \* Ultra low gate charge ( typical 90 nC )
- \* Low reverse transfer Capacitance (  $C_{RSS} =$  typical 80pF )
- \* Fast switching capability
- \* Avalanche energy Specified
- \* Improved dv/dt capability, high ruggedness

#### SYMBOL



\*Pb-free plating product number: 60N75L

#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
60N75-TA3-T	60N75L-TA3-T	TO-220	G	D	S	Tube
60N75-TF3-T	60N75L-TF3-T	TO-220F	G	D	S	Tube
60N75-TM3-T	60N75L-TM3-T	TO-251	G	D	S	Tube
60N75-TN3-R	60N75L-TN3-R	TO-252	G	D	S	Tape Reel
60N75-TN3-T	60N75L-TN3-T	TO-252	G	D	S	Tube

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

<p>60N75L-TA3-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Plating</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TM3: TO-251, TN3: TO-252 (3) L: Lead Free Plating, Blank: Pb/Sn</p>
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### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage		$V_{DSS}$	75	V
Continuous Drain Current	$T_C = 25$	$I_D$	60	A
	$T_C = 100$		56	A
Drain Current Pulsed (Note 1)		$I_{DM}$	300	A
Gate to Source Voltage		$V_{GS}$	$\pm 20$	V
Avalanche Energy	Single Pulsed (Note 2)	$E_{AS}$	900	mJ
	Repetitive (Note 1)	$E_{AR}$	300	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	15	V/ns
Total Power Dissipation	$T_C = 25$	$P_D$	220	W
	Derating above 25		1.4	W/
Junction Temperature		$T_J$	+150	
Operating Temperature		$T_{OPR}$	-55 ~ +150	
Storage Temperature		$T_{STG}$	-55 ~ +150	

Note: 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.

### ■ THERMAL DATA

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Thermal Resistance Junction-Ambient	$\theta_{JA}$			62.5	/W
Thermal Resistance Junction-Case	$\theta_{JC}$			0.8	/W

### ■ ELECTRICAL CHARACTERISTICS ( $T_C = 25$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	75			V
Breakdown Voltage Temperature Coefficient	$BV_{DSS}/T_J$	$I_D = 1\text{mA}$ , Referenced to 25		0.08		V/
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS} = 75\text{ V}, V_{GS} = 0\text{ V}$			20	$\mu\text{A}$
		$V_{DS} = 75\text{ V}, V_{GS} = 0\text{ V}$ , $T_J = 150$			250	$\mu\text{A}$
Gate-Source Leakage Current	Forward Reverse	$I_{GSS}$	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$		100	nA
		$I_{GSS}$	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$		-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	2.0		4.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 48\text{ A}$			16	m $\Omega$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}$ $f = 1\text{MHz}$		3300		pF
Output Capacitance	$C_{OSS}$			530		pF
Reverse Transfer Capacitance	$C_{RSS}$			80		pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD} = 38\text{ V}, I_D = 48\text{ A}$ , $V_{GS} = 10\text{ V}$ (Note 4, 5)		12		ns
Turn-On Rise Time	$t_R$			79		ns
Turn-Off Delay Time	$t_{D(OFF)}$			80		ns
Turn-Off Fall Time	$t_F$			52		ns
Total Gate Charge	$Q_G$			90	140	
Gate-Source Charge	$Q_{GS}$	$V_{GS} = 10\text{ V}$ (Note 4, 5)		20	35	nC
Gate-Drain Charge (Miller Charge)	$Q_{GD}$			30	45	nC

■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Diode Forward Voltage	$V_{SD}$	$I_S = 48A, V_{GS} = 0V$			1.4	V
Continuous Source Current	$I_S$				75	A
Pulsed Source Current	$I_{SM}$				300	
Reverse Recovery Time	$t_{RR}$	$I_S = 48A, V_{GS} = 0V$		90		ns
Reverse Recovery Charge	$Q_{RR}$	$di_F / dt = 100 A/\mu s$		300		$\mu C$

Note 1. Repeativity rating: pulse width limited by junction temperature

2.  $L=0.24mH, I_{AS}=48A, V_{DD} = 50V, R_G=20\Omega, \text{Starting } T_J=25$

3.  $I_{SD}\leq 48A, di/dt\leq 300A/\mu s, V_{DD}\leq BV_{DSS}, \text{Starting } T_J=25$

4. Pulse Test: Pulse Width $\leq 300\mu s, \text{Duty Cycle}\leq 2\%$

5. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

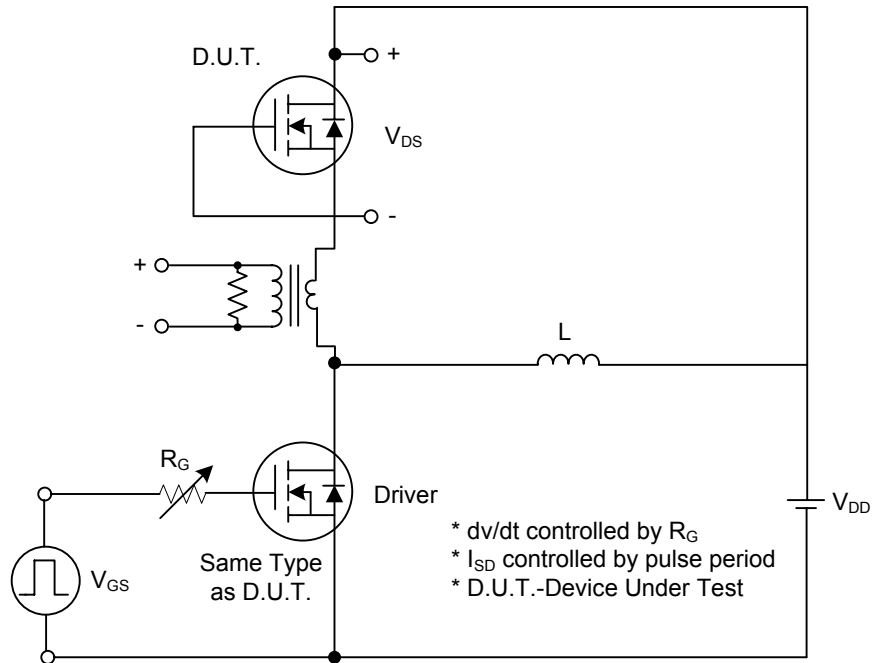


Fig. 1A Peak Diode Recovery dv/dt Test Circuit

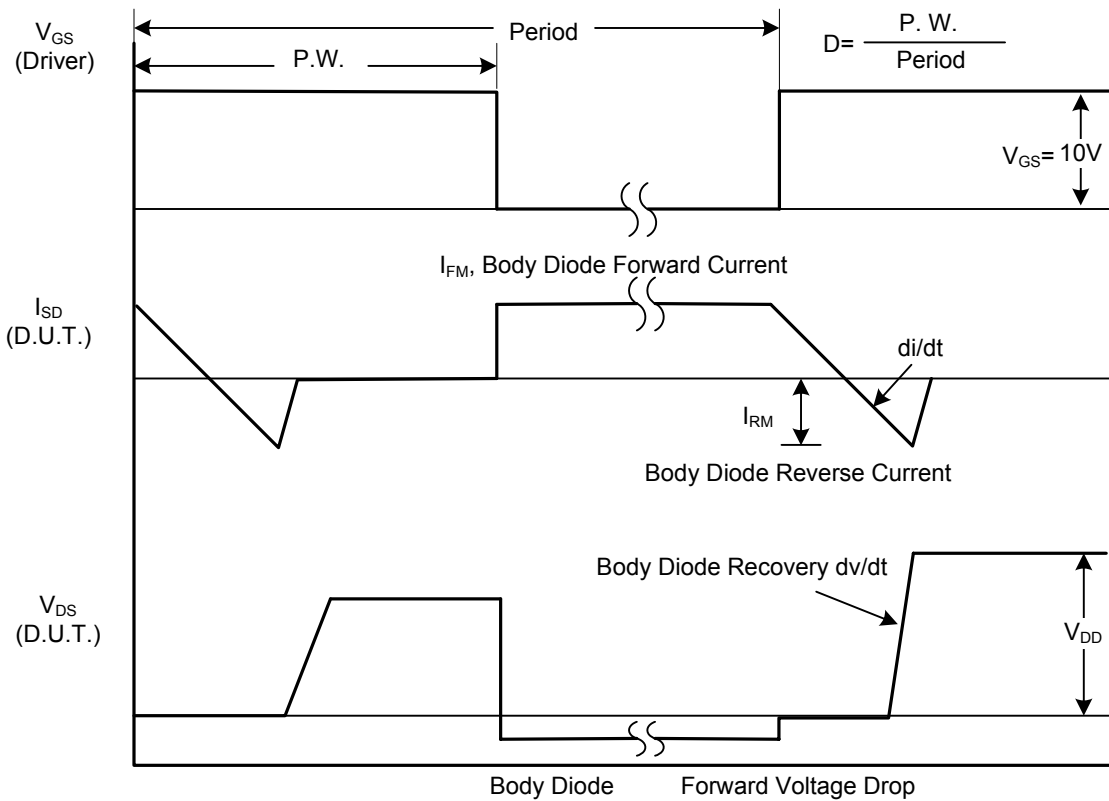


Fig. 1B Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)

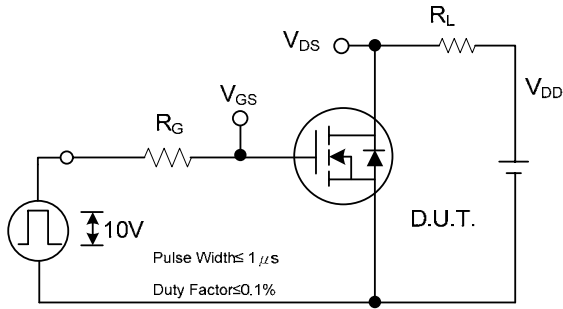


Fig. 2A Switching Test Circuit

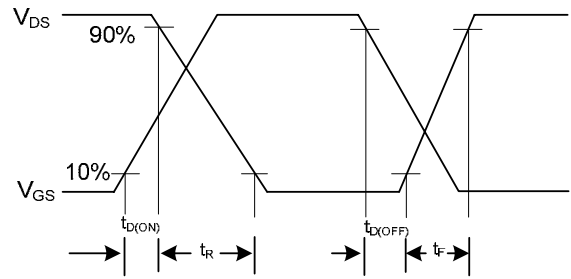


Fig. 2B Switching Waveforms

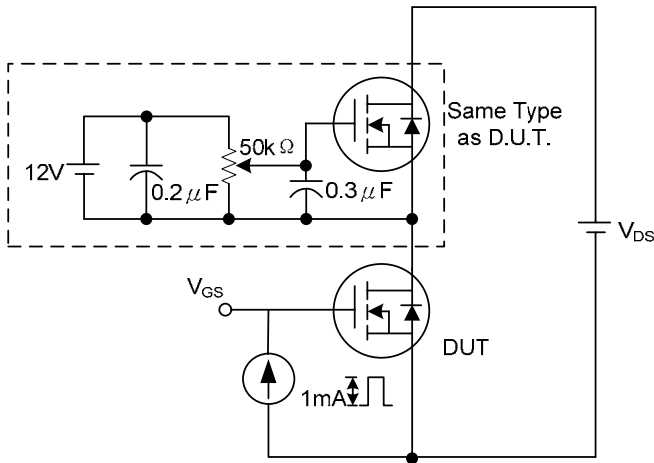


Fig. 3A Gate Charge Test Circuit

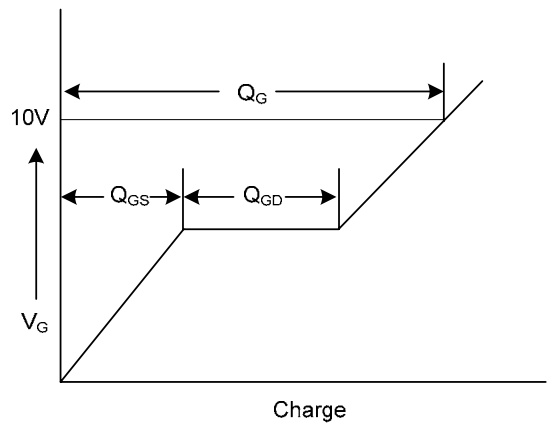


Fig. 3B Gate Charge Waveform

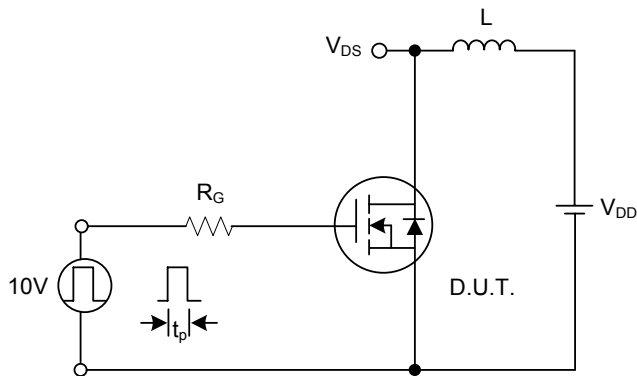


Fig. 4A Unclamped Inductive Switching Test Circuit

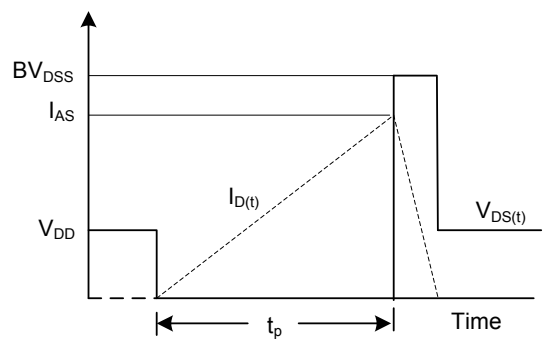
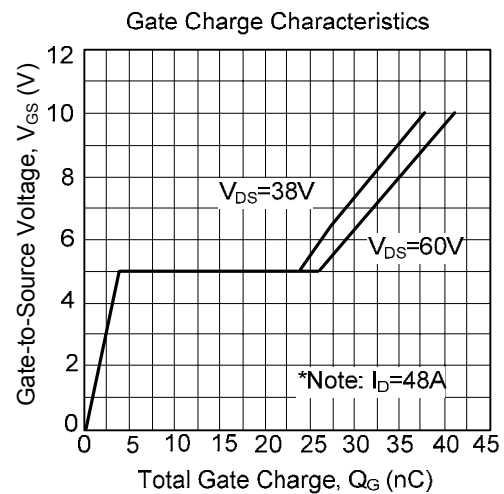
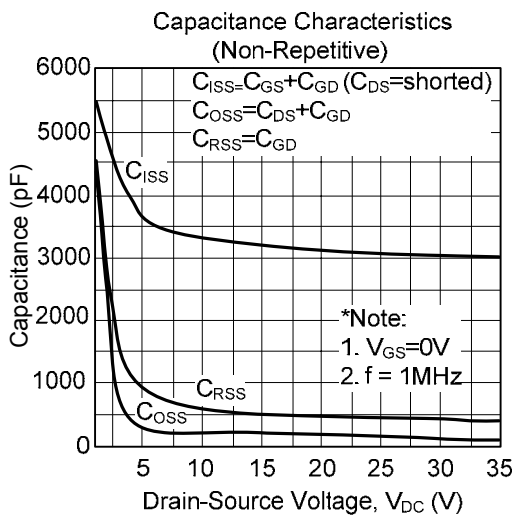
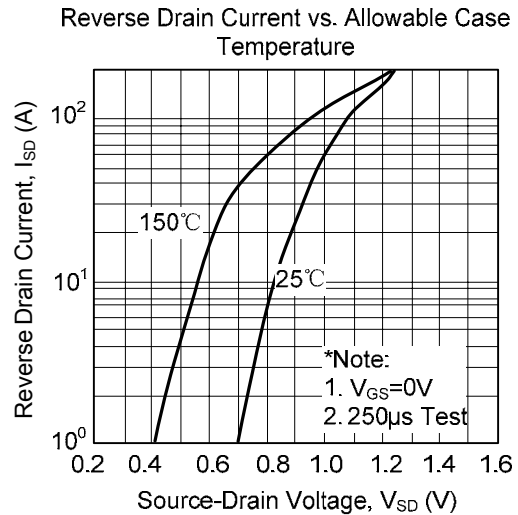
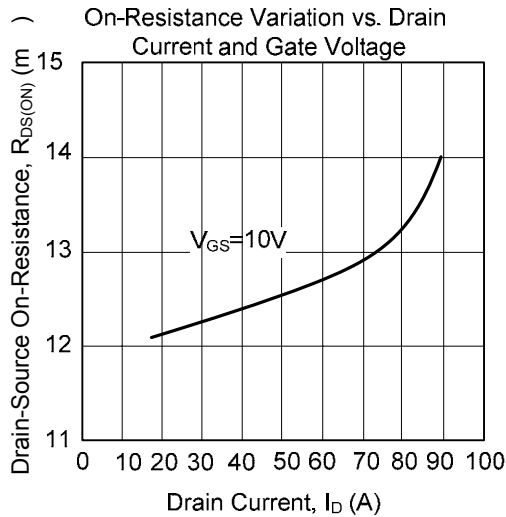
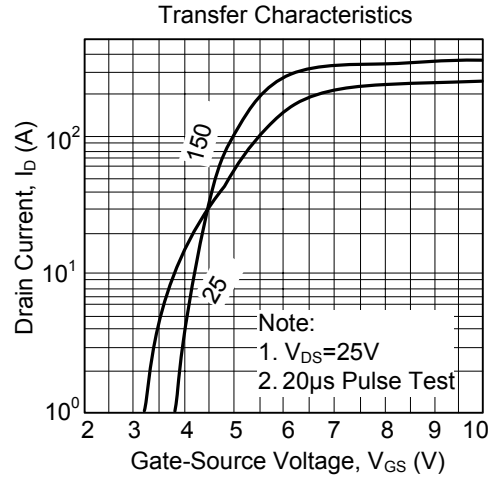
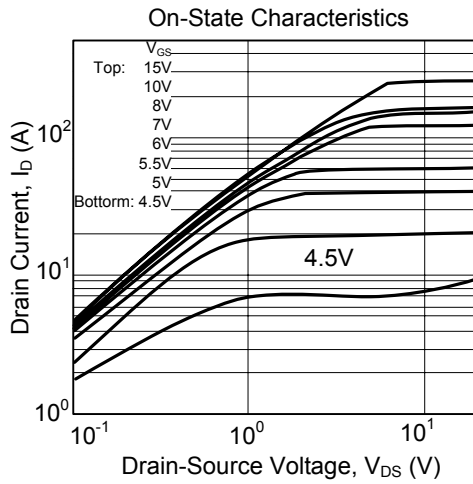
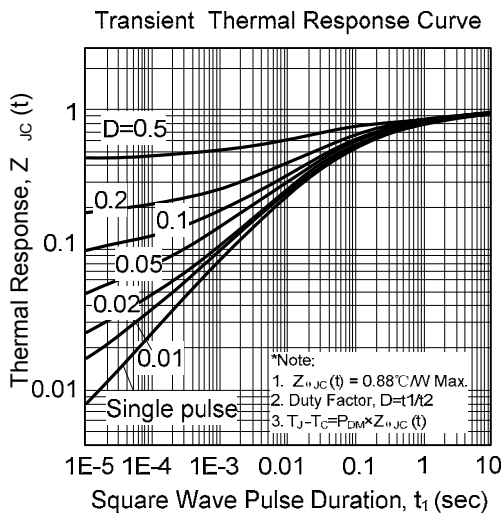
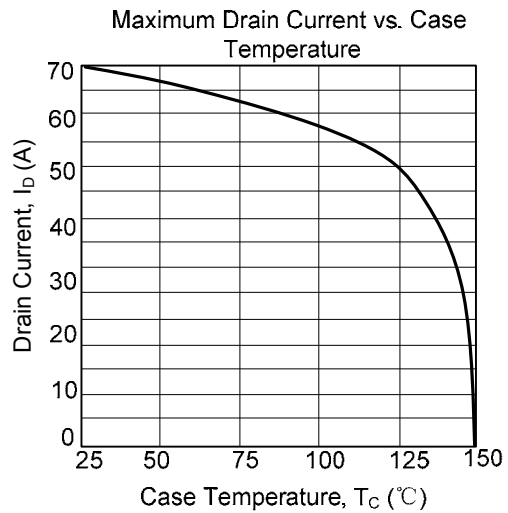
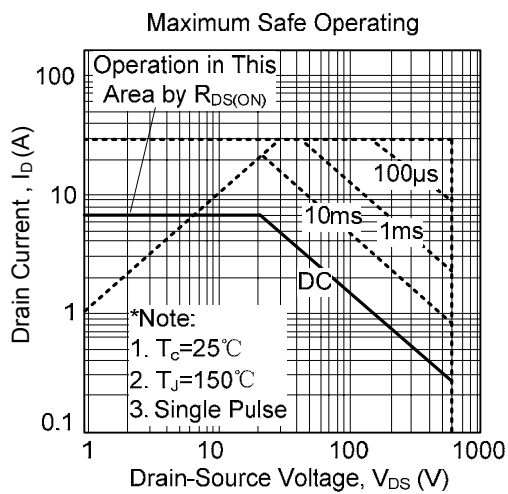
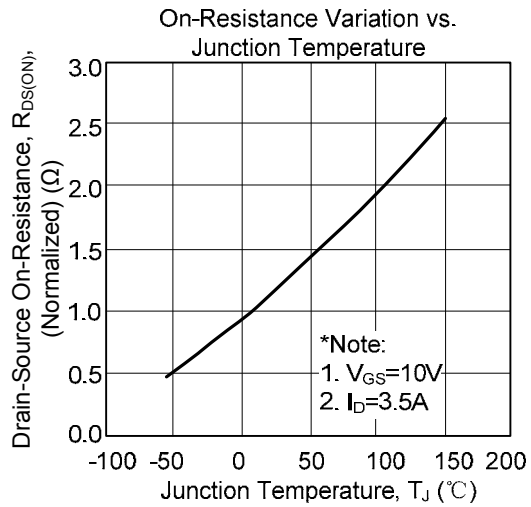
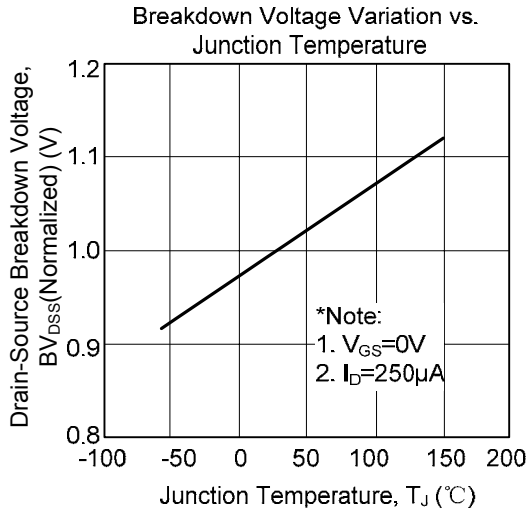


Fig. 4B Unclamped Inductive Switching Waveforms

## TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



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