



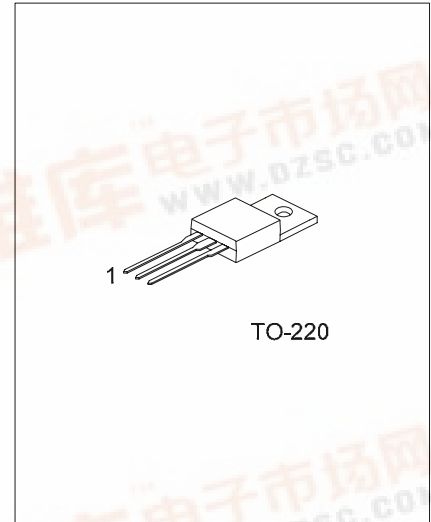
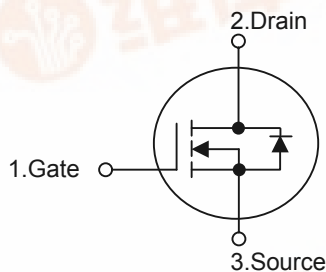
UNISONIC TECHNOLOGIES CO., LTD

60N06**Power MOSFET****60 Amps, 60 Volts****N-CHANNEL POWER MOSFET**■ **DESCRIPTION**

The UTC **60N06** 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**

- * $R_{DS(ON)} = 18m\Omega @ V_{GS} = 10V$
- * Ultra low gate charge (typical 39 nC)
- * Fast switching capability
- * Low reverse transfer Capacitance (C_{RSS} = typical 115 pF)
- * Avalanche energy Specified
- * Improved dv/dt capability, high ruggedness

■ **SYMBOL**

*Pb-free plating product number: 60N06L

■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
60N06-TA3-T	60N06L-TA3-T	TO-220	G	D	S	Tube

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

		(1) T: Tube, R: Tape Reel
		(2) TA3: TO-220
		(3) L: Lead Free Plating, Blank: Pb/Sn

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage		V_{DSS}	60	V
Gate to Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25$	I_D	60	A
	$T_C = 100$		39	A
Drain Current Pulsed (Note 1)		I_{DM}	120	A
Avalanche Energy	Single Pulsed (Note 2)	E_{AS}	1000	mJ
	Repetitive (Note 1)	E_{AR}	180	mJ
Total Power Dissipation		P_D	120	W
Junction Temperature		T_J	+175	
Storage Temperature		T_{STG}	-55 ~ +175	

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	θ_{JA}			62.5	/W
Thermal Resistance Junction-Case	θ_{JC}			1.25	/W

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

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60			V
Drain-Source Leakage Current		I_{DSS}	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS} = 20\text{V}, V_{DS} = 0\text{ V}$			100	nA
	Reverse		$V_{GS} = -20\text{V}, V_{DS} = 0\text{ V}$			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$		14	18	m Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$		2000		pF
Output Capacitance		C_{OSS}			400		pF
Reverse Transfer Capacitance		C_{RSS}			115		pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time		$t_{D(ON)}$	$V_{DD} = 30\text{V}, I_D = 60\text{A}, R_L = 0.5\Omega,$ $V_{GS} = 10\text{V}$ (Note 4, 5)		12	30	ns
Rise Time		t_R			11	30	ns
Turn-Off Delay Time		$t_{D(OFF)}$			25	50	ns
Fall Time		t_F			15	30	ns
Total Gate Charge		Q_G	$V_{DS} = 30\text{V}, V_{GS} = 10\text{ V}$ $I_D = 60\text{A}$ (Note 4, 5)		39	60	nC
Gate-Source Charge		Q_{GS}			12		nC
Gate-Drain Charge (Miller Charge)		Q_{GD}			10		nC

■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Forward Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 60\text{ A}$			1.6	V
Continuous Source Current	I_S				60	A
Pulsed Source Current	I_{SM}				120	
Reverse Recovery Time	t_{RR}	$I_S = 60\text{ A}, V_{GS} = 0\text{ V},$		60		ns
Reverse Recovery Charge	Q_{RR}	$di_F / dt = 100\text{ A}/\mu\text{s}$		3.4		μC

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

2. $L=0.61\text{ mH}$, $I_{AS}=60\text{ A}$, $R_G=20\Omega$, Starting $T_J=25$

3. $I_{SD}\leq 60\text{ A}$, $di/dt\leq 300\text{ A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25$

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

5. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

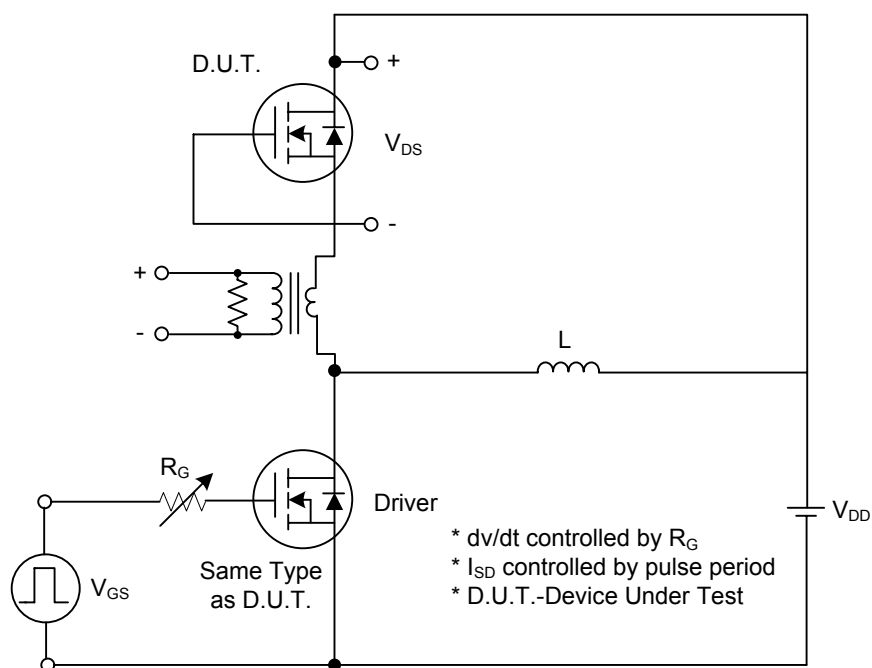


Fig. 1A Peak Diode Recovery dv/dt Test Circuit

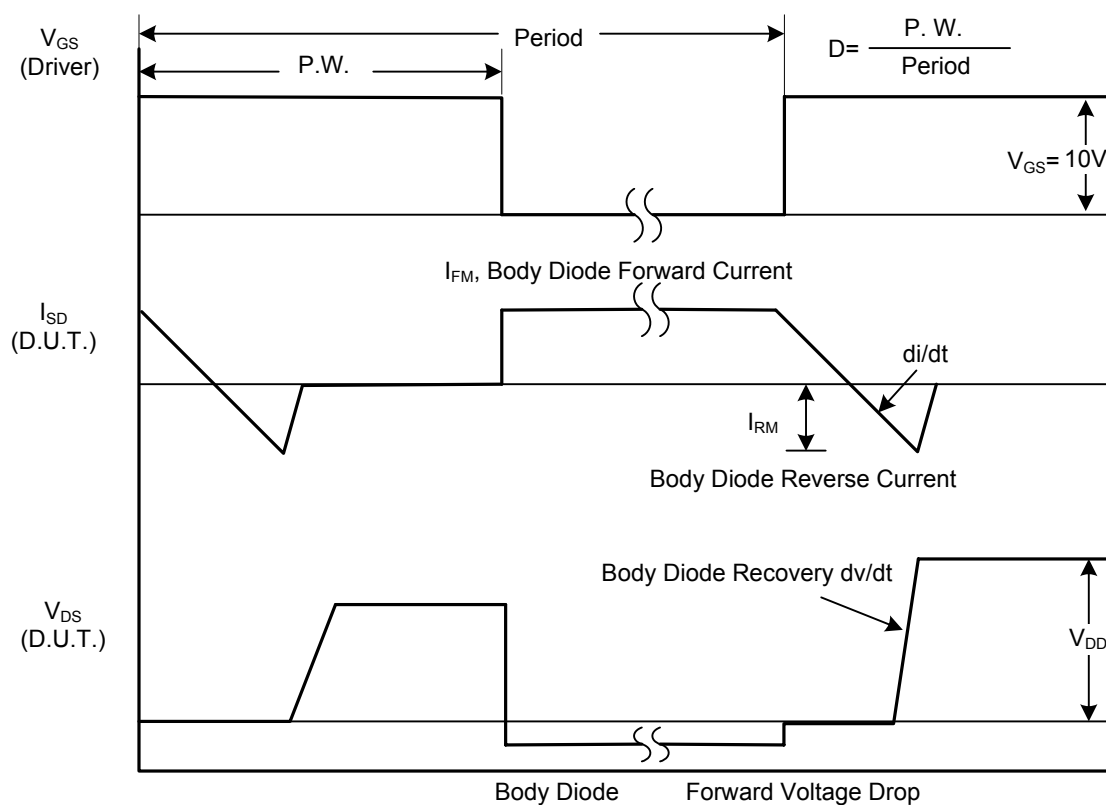


Fig. 1B Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)

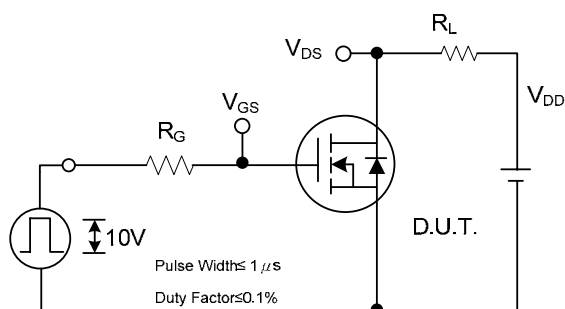


Fig. 2A Switching Test Circuit

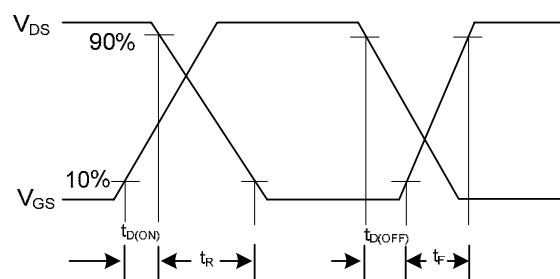


Fig. 2B Switching Waveforms

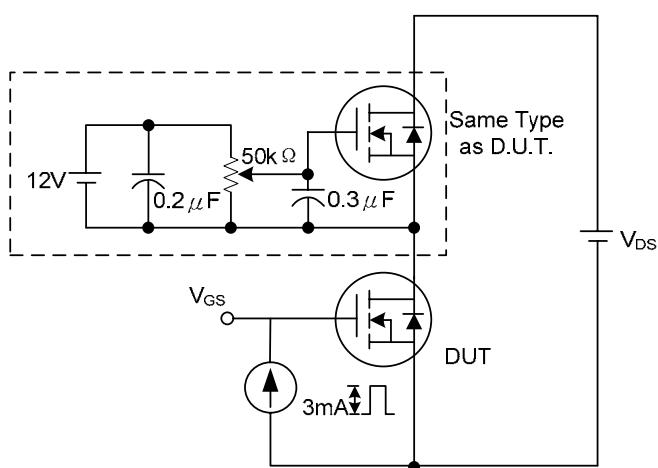


Fig. 3A Gate Charge Test Circuit

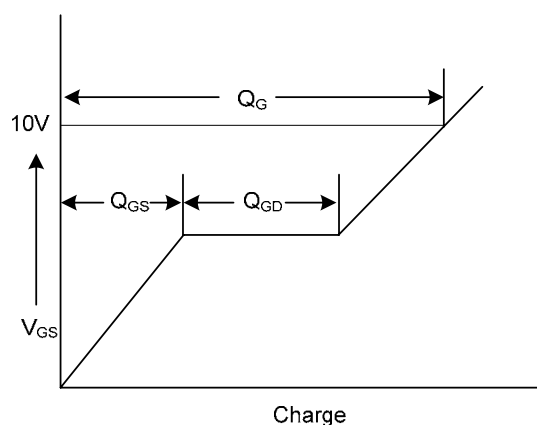


Fig. 3B Gate Charge Waveform

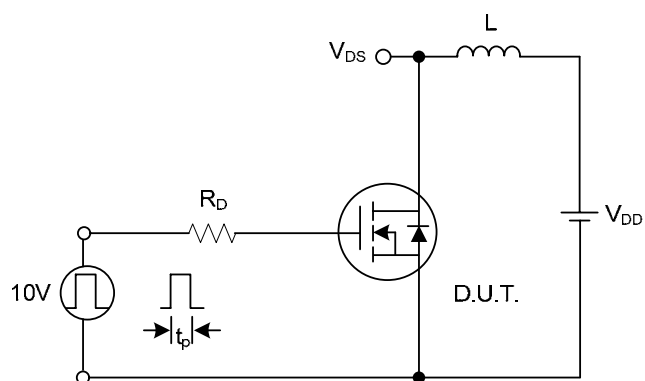


Fig. 4A Unclamped Inductive Switching Test Circuit

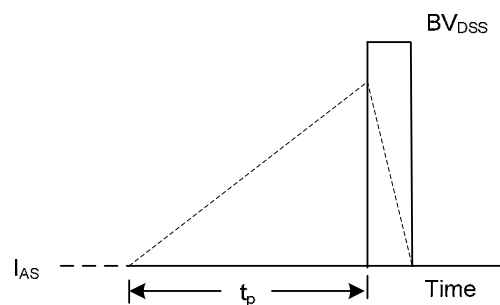
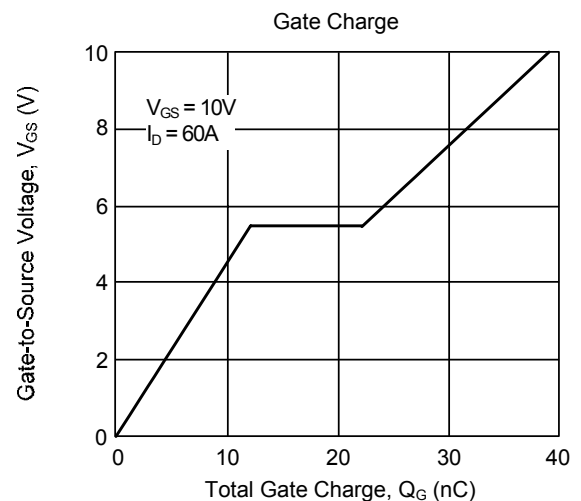
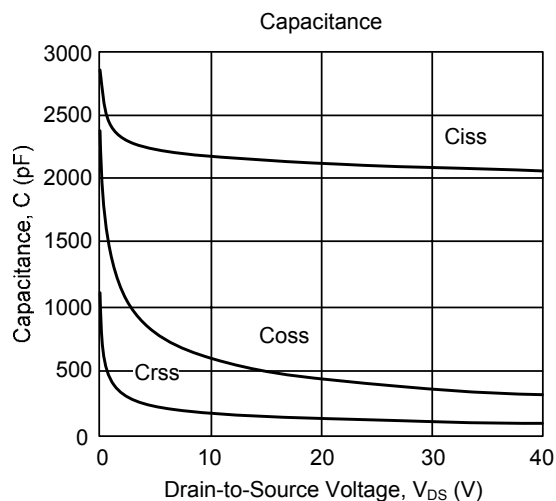
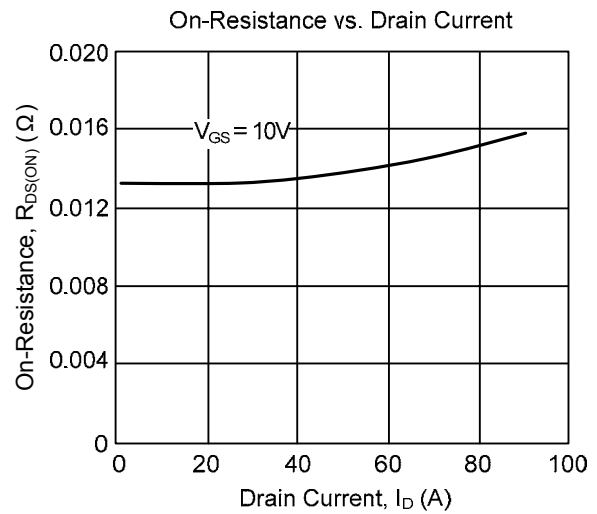
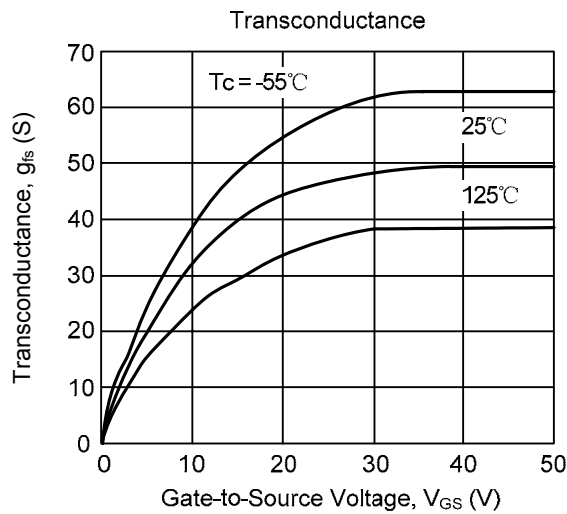
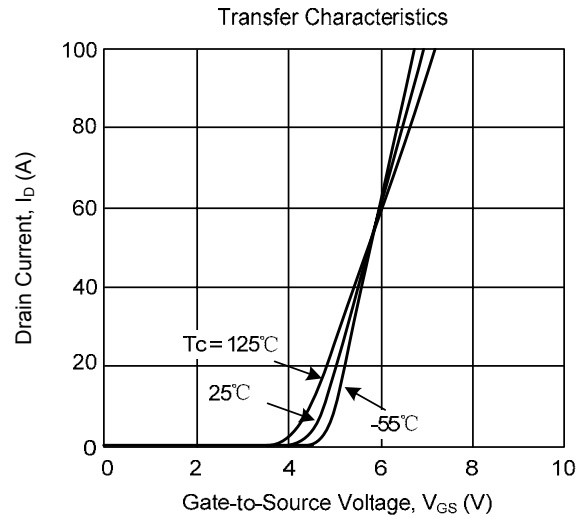
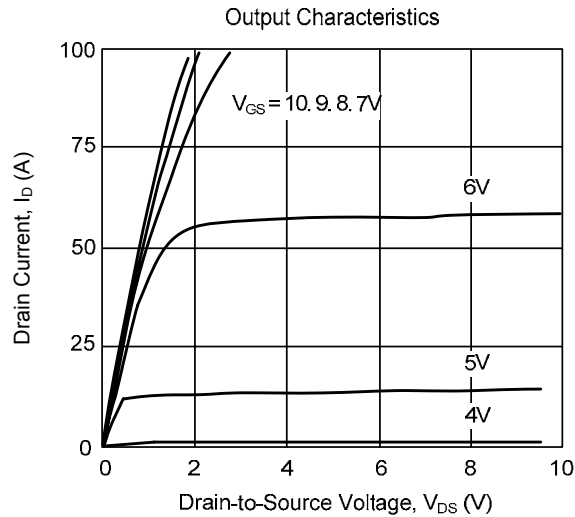
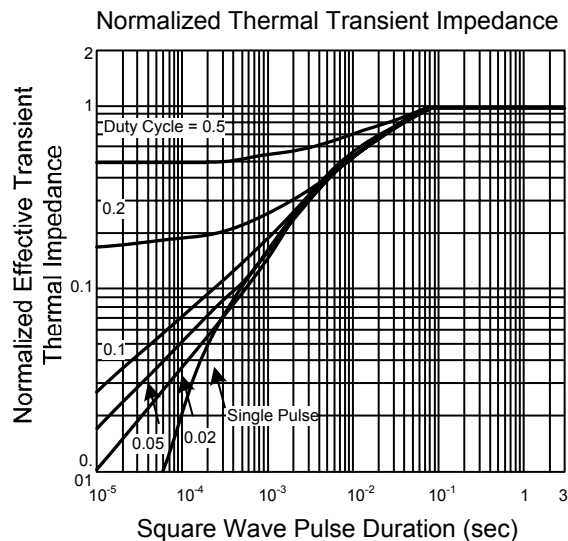
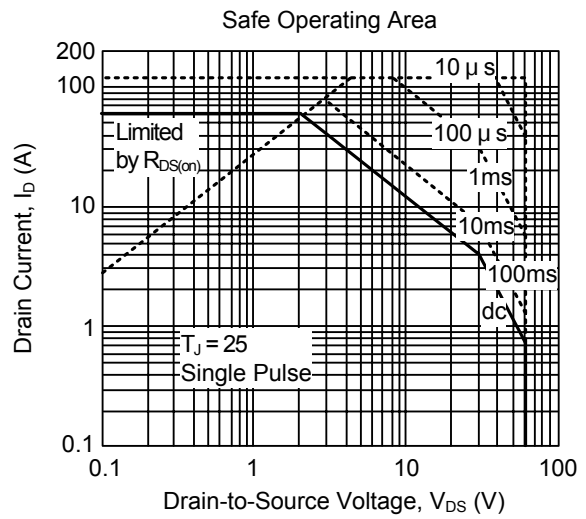
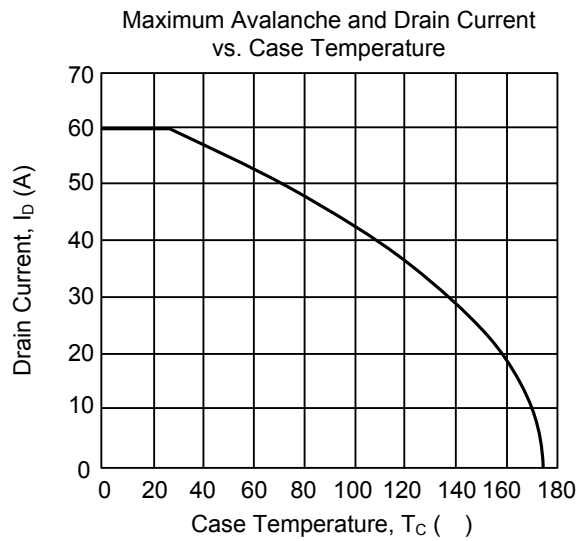
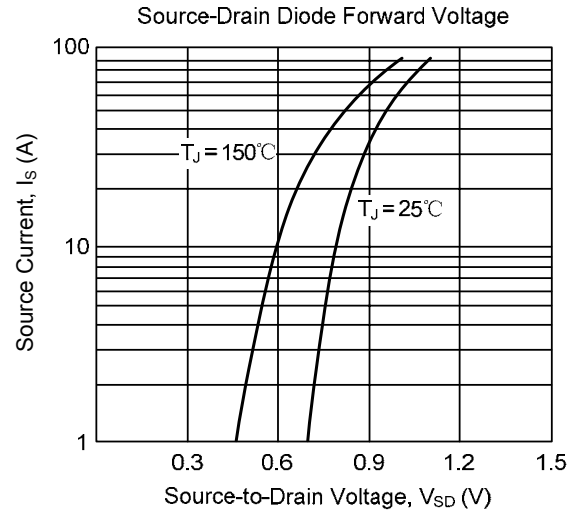
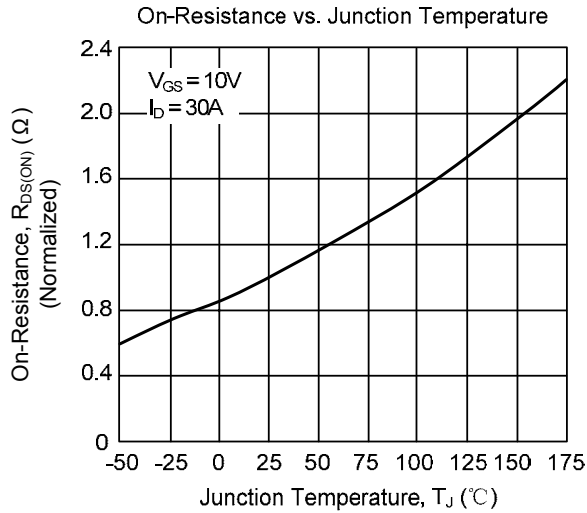


Fig. 4B Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



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