



70N06

Power MOSFET

70 Amps, 60 Volts N-CHANNEL POWER MOSFET

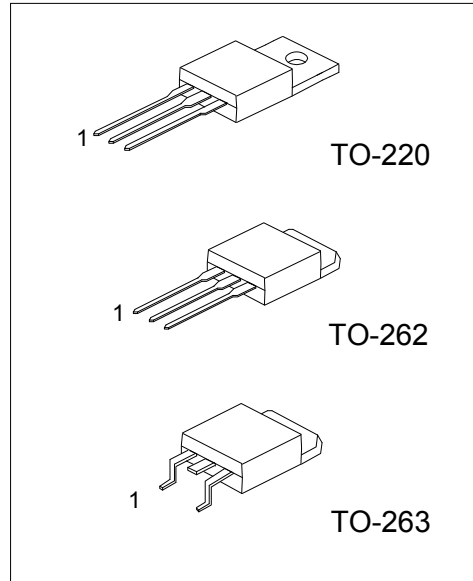
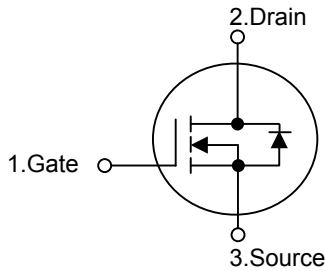
■ DESCRIPTION

The UTC **70N06** 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

- * $R_{DS(ON)} = 15m\Omega @ V_{GS} = 10V$
- * Ultra low gate charge (typical 90 nC)
- * Low reverse transfer Capacitance ($C_{RSS} =$ typical 80 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	
70N06L-TA3-T	70N06G-TA3-T	TO-220	G	D	S	Tube
70N06L-T2Q-T	70N06G-T2Q-T	TO-262	G	D	S	Tube
70N06L-TQ2-T	70N06G-TQ2-T	TO-263	G	D	S	Tube
70N06L-TQ2-R	70N06G-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>70N06L-TA3-T</p> <p>(1) Packing Type (2) Package Type (3) Lead Plating</p>	<p>(1) R: Tape Reel, T: Tube (2) TA3: TO-220, T2Q: TO-262, TQ2: TO-263 (3) G: Halogen Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current	I_D	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	A
Drain Current Pulsed (Note 2)	I_{DM}	280	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	mJ
	Repetitive (Note 2)	E_{AR}	mJ
Peak Diode Recovery dv/dt (Note 4)	dv/dt	10	V/ns
Power Dissipation	P_D	200	W
Junction Temperature	T_J	+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.

Repeativity rating: pulse width limited by junction temperature

$L=0.24\text{mH}$, $I_{AS}=70\text{A}$, $V_{DD}=25\text{V}$, $R_G=20\Omega$, Starting $T_J=25^\circ\text{C}$

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

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	1.2	$^\circ\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0\text{V}$, $I_D = 250\ \mu\text{A}$	60			V	
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 60\text{V}$, $V_{GS} = 0\text{V}$			1	μA	
Gate-Source Leakage Current	I_{GSS}	Forward			100	nA	
		Reverse			-100	nA	
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D = 1\text{mA}$, Referenced to 25°C		0.08		$\text{V}/^\circ\text{C}$	
ON CHARACTERISTICS							
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-State Resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{V}$, $I_D = 35\text{A}$		12	15	$\text{m}\Omega$	
DYNAMIC CHARACTERISTICS							
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
SWITCHING CHARACTERISTICS							
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD} = 30\text{V}$, $V_{GS}=10\text{V}$, $I_D = 70\text{A}$ (Note 1, 2)		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	$V_{DS} = 60\text{V}$, $V_{GS} = 10\text{V}$, $I_D = 48\text{A}$ (Note 1, 2)		90	140	nC	
Gate-Source Charge	Q_{GS}				20	35	nC
Gate-Drain Charge (Miller Charge)	Q_{GD}				30	45	nC

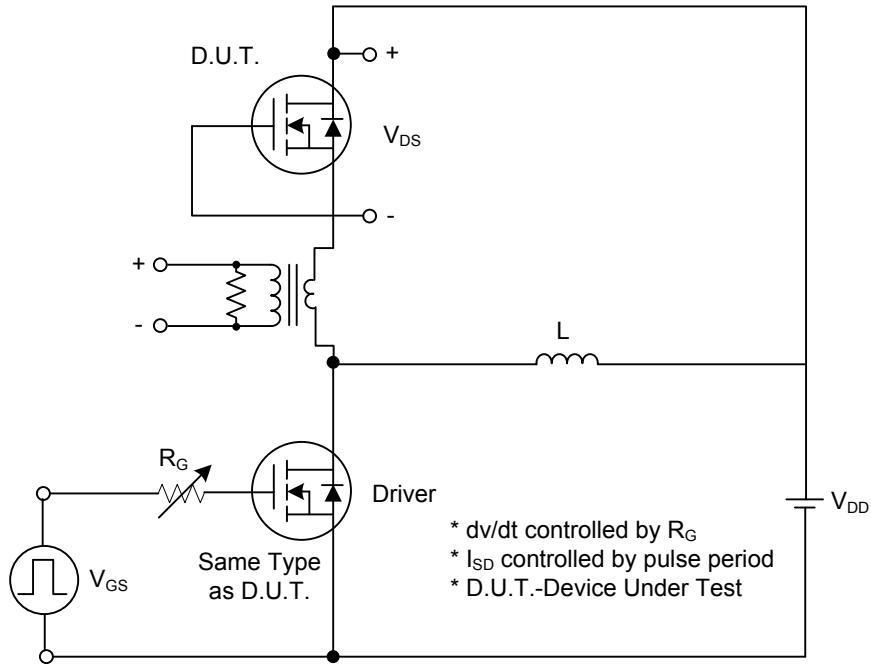
■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 70\text{ A}$			1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I_S				70	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				280	
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, I_S = 70\text{ A}$		90		ns
Reverse Recovery Charge	Q_{RR}	$di_F / dt = 100\text{ A}/\mu\text{s}$		300		μC

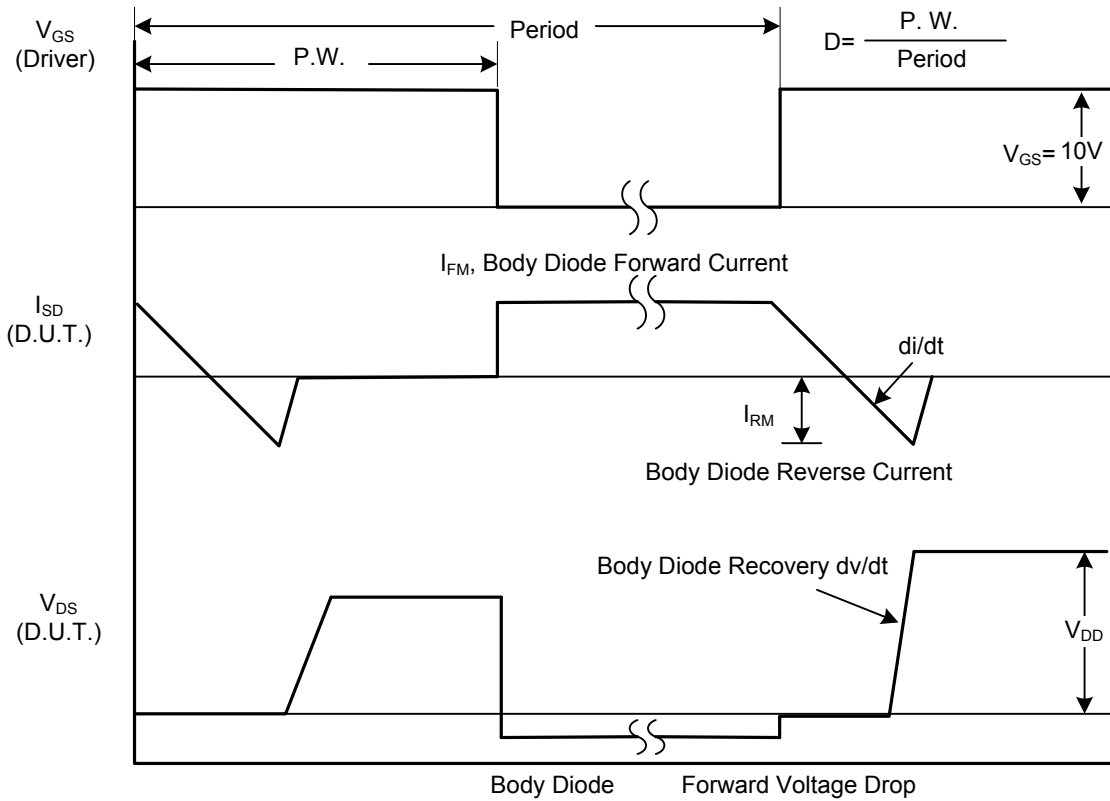
Notes: 1. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



1A Peak Diode Recovery dv/dt Test Circuit



1B Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)

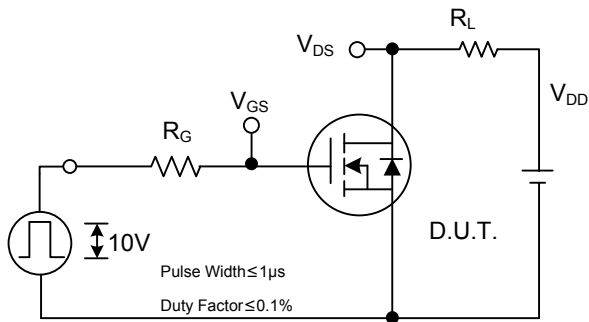


Fig. 2A Switching Test Circuit

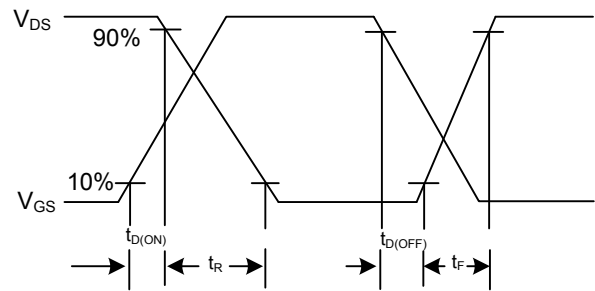


Fig. 2B Switching Waveforms

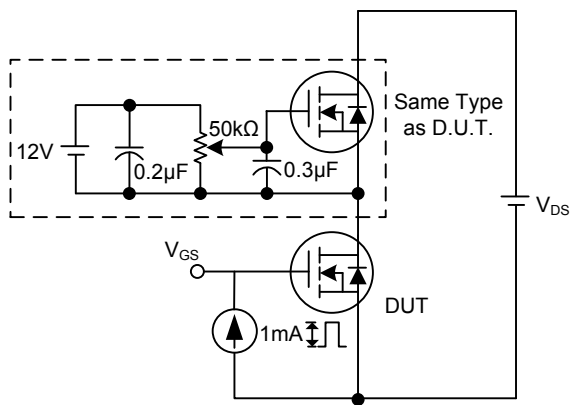


Fig. 3A Gate Charge Test Circuit

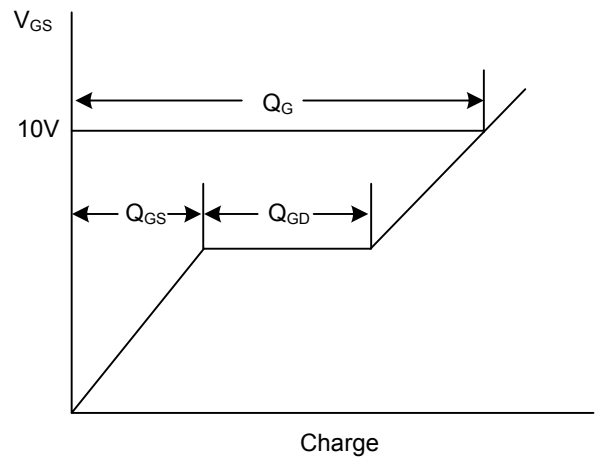


Fig. 3B Gate Charge Waveform

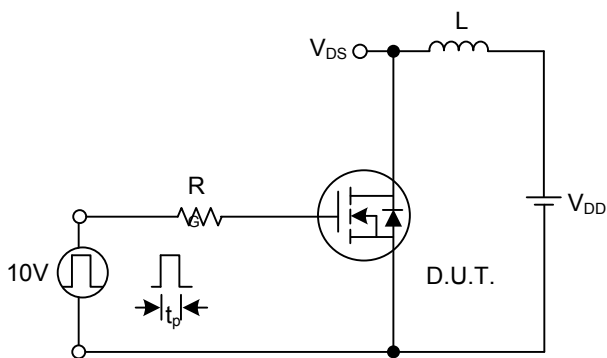


Fig. 4A Unclamped Inductive Switching Test Circuit

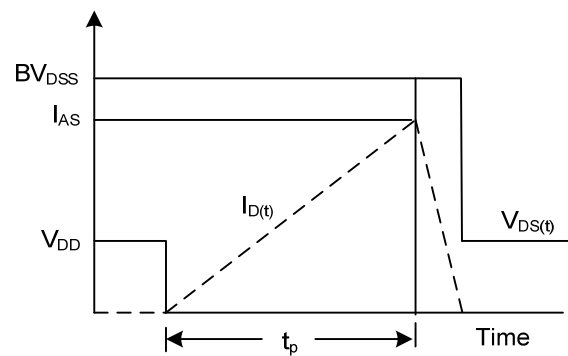
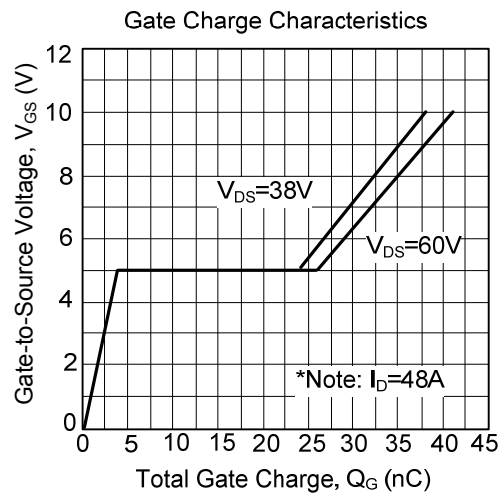
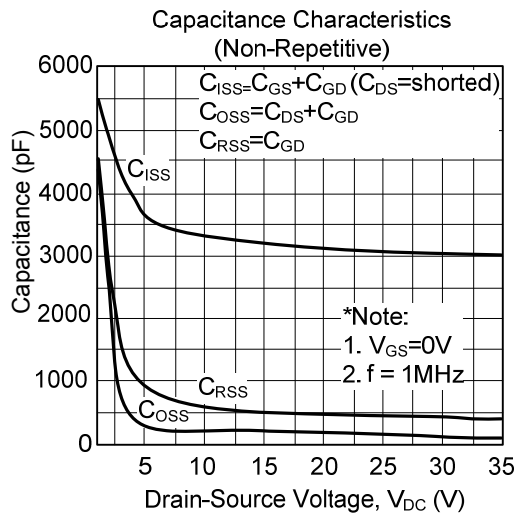
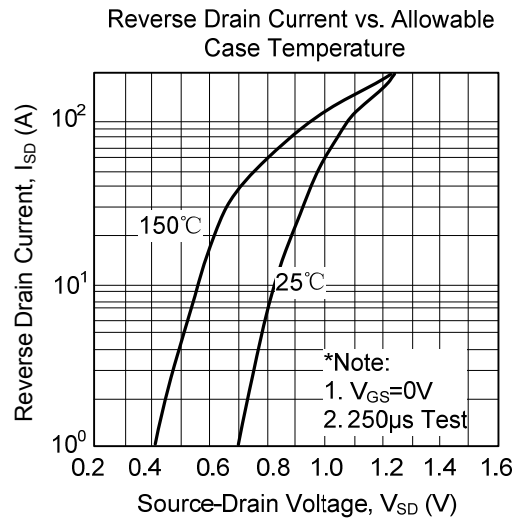
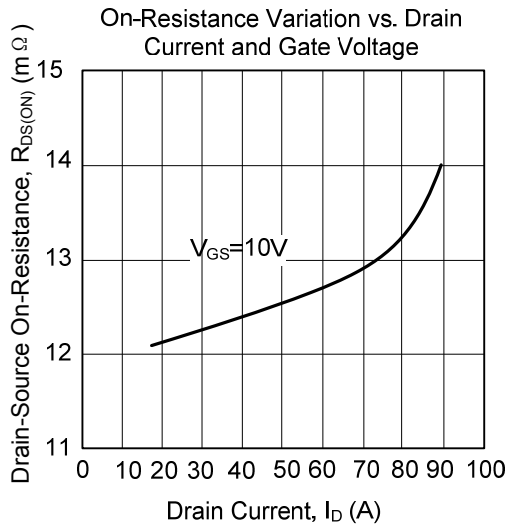
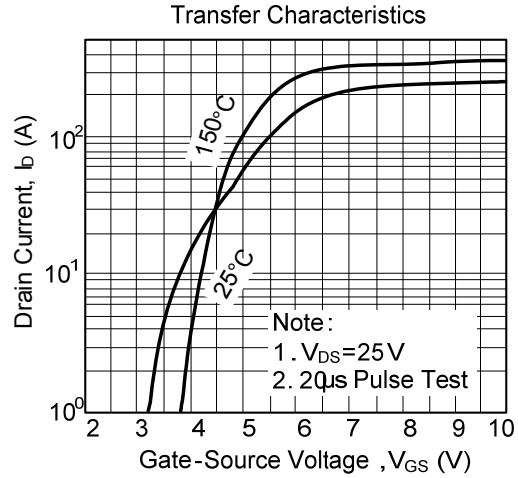
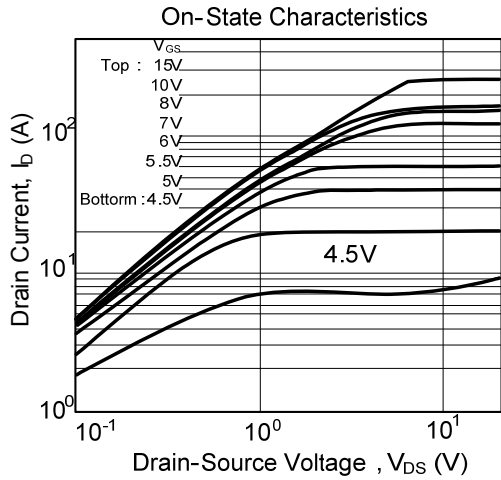
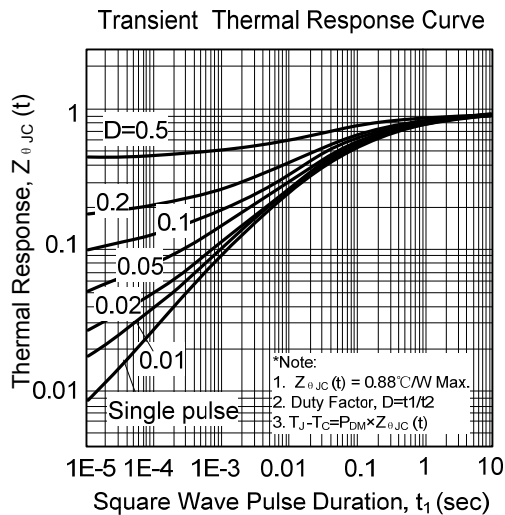
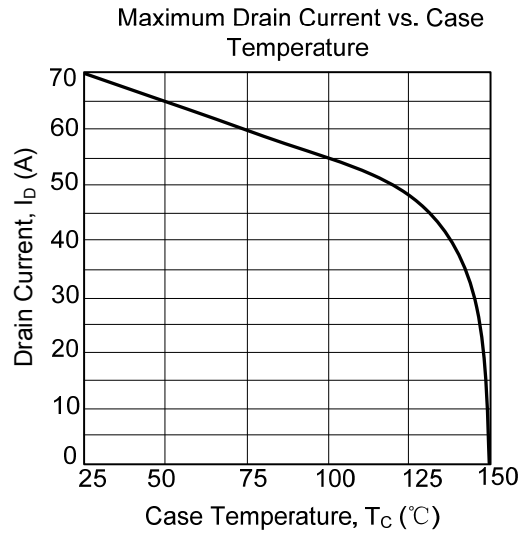
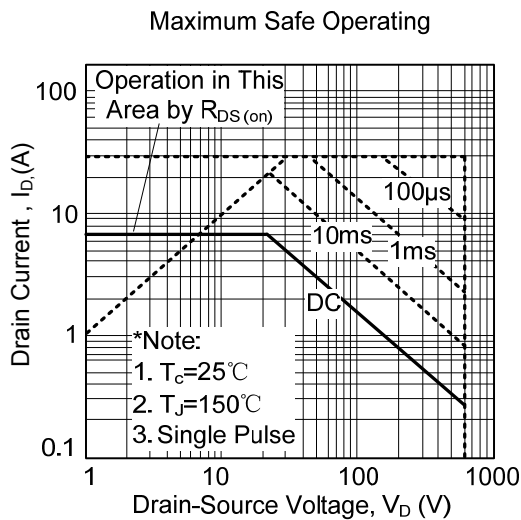
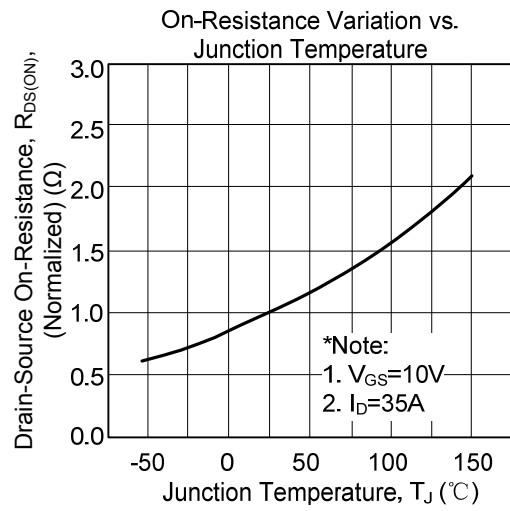
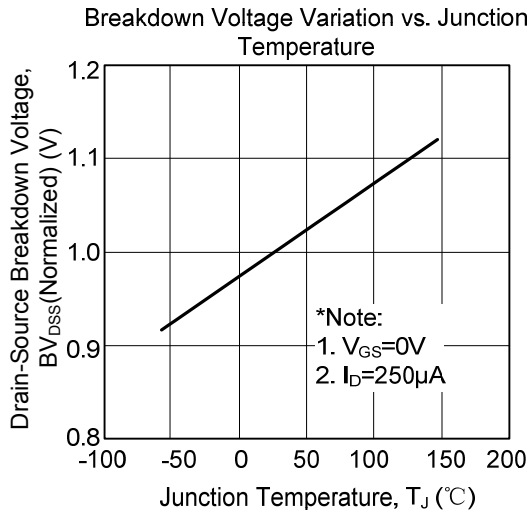


Fig. 4B Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS



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