



70N06

Power MOSFET

70 Amps, 60 Volts N-CHANNEL POWER MOSFET

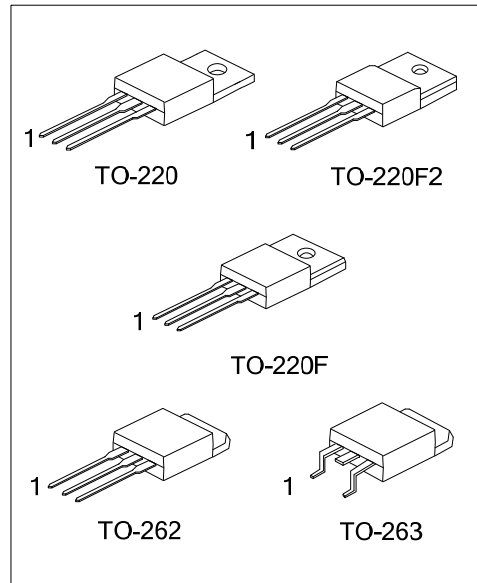
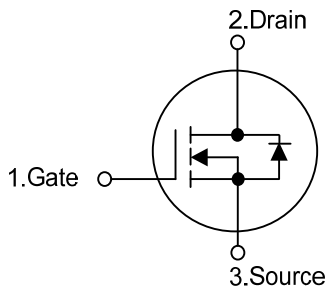
■ DESCRIPTION

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

- * $R_{DS(ON)} < 15m\Omega @ V_{GS} = 10V$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability

■ SYMBOL



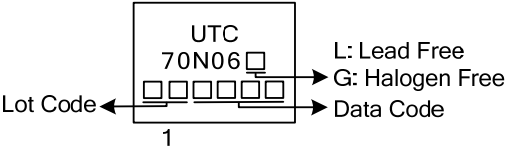
■ ORDERING INFORMATION

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-TF3-T	70N06G-TF3-T	TO-220F	G	D	S	Tube
70N06L-TF2-T	70N06G-TF2-T	TO-220F2	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) R: Tape Reel, T: Tube (2) TA3: TO-220, TF3: TO-220F, TF2: TO-220F2 T2Q: TO-262, TQ2: TO-263 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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MARKING



■ ABSOLUTE MAXIMUM RATINGS

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	70	A
	$T_C = 100^\circ\text{C}$		56	A
Drain Current Pulsed (Note 2)		I_{DM}	280	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	600	mJ
	Repetitive (Note 2)	E_{AR}	20	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	10	V/ns
Power Dissipation	TO-220/TO-262/TO-263	P_D	104	W
	TO-220F		36	W
	TO-220F2		38	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.

2. Repeativity rating: pulse width limited by junction temperature

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

4. $I_{SD}\leq 48\text{A}$, $di/dt\leq 300\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, 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	TO-220/TO-262	θ_{JC}	1.2	$^\circ\text{C}/\text{W}$
	TO-263			
	TO-220F		3.47	$^\circ\text{C}/\text{W}$
	TO-220F2		3.28	$^\circ\text{C}/\text{W}$

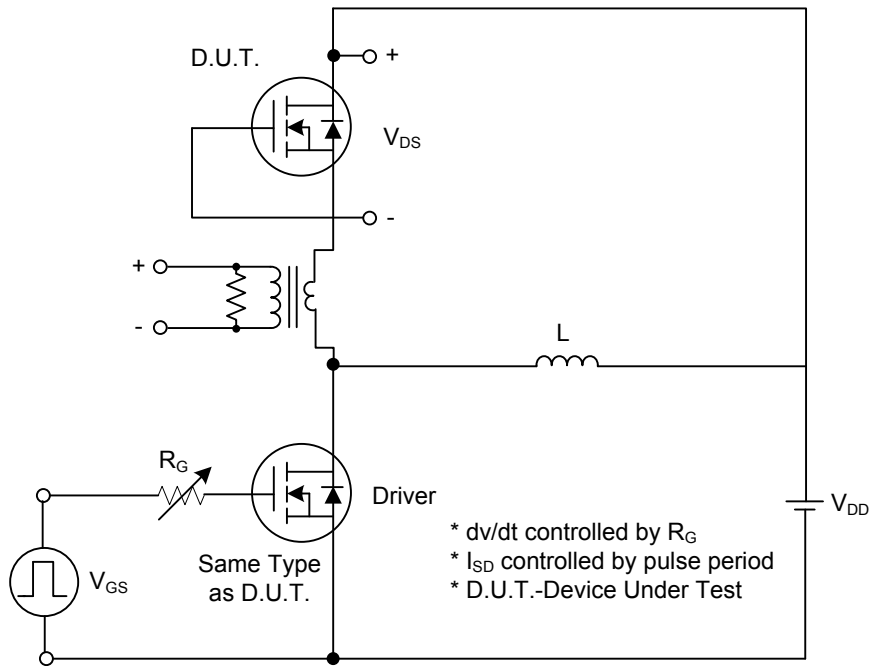
■ ELECTRICAL CHARACTERISTICS (T_c=25°C, unless otherwise specified)

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			1	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = 20V, V _{DS} = 0 V			100	nA
		V _{GS} = -20V, V _{DS} = 0 V			-100	nA
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D = 1mA, Referenced to 25°C		0.08		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 = 35 A			15	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{GS} = 0 V, V _{DS} = 25 V f = 1MHz		1800	2000	pF
Output Capacitance	C _{OSS}			800	900	pF
Reverse Transfer Capacitance	C _{RSS}			130	150	pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 30V, V _{GS} =10V, I _D = 1 A (Note 1, 2)		90	120	ns
Turn-On Rise Time	t _R			350	400	ns
Turn-Off Delay Time	t _{D(OFF)}			260	300	ns
Turn-Off Fall Time	t _F			260	300	ns
Total Gate Charge	Q _G	V _{DS} = 60V, V _{GS} = 10 V, I _D = 48A (Note 1, 2)		210	250	nC
Gate-Source Charge	Q _{GS}			50		nC
Gate-Drain Charge (Miller Charge)	Q _{GD}			120		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} = 0 V, I _S = 70A			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 V, I _S = 70A		90		ns
Reverse Recovery Charge	Q _{RR}	dI _F / dt = 100 A/μs		300		μC

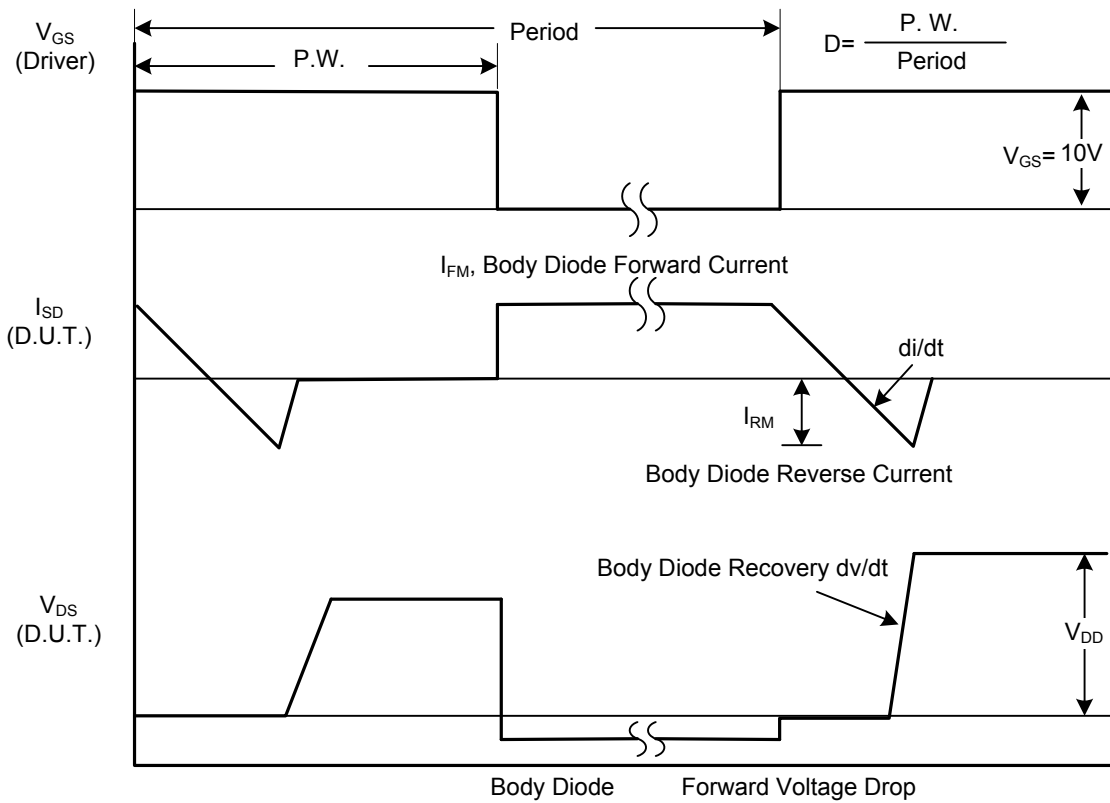
Notes: 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

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.)

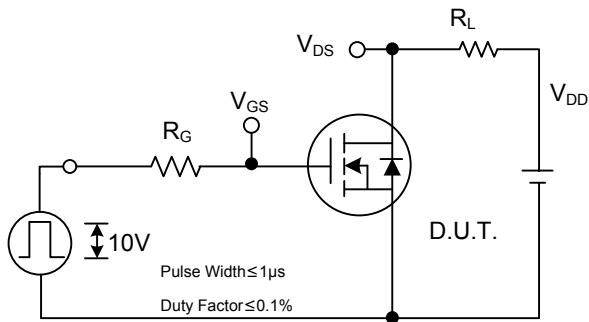


Fig. 2A Switching Test Circuit

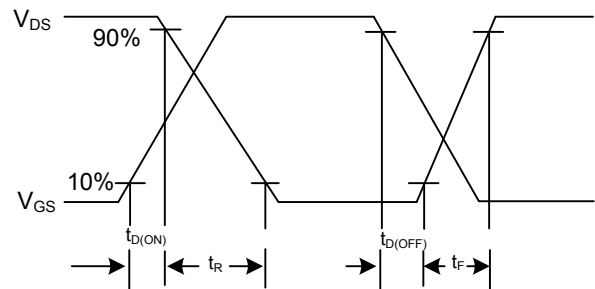


Fig. 2B Switching Waveforms

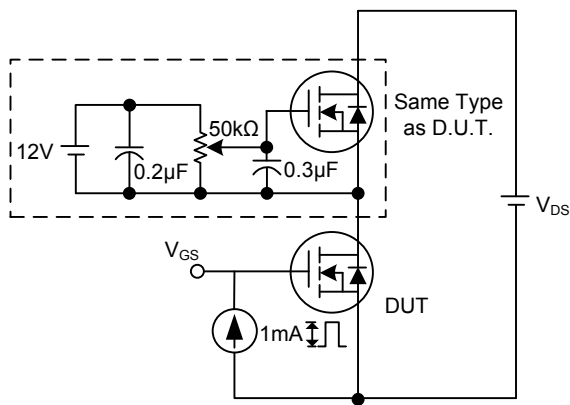


Fig. 3A Gate Charge Test Circuit

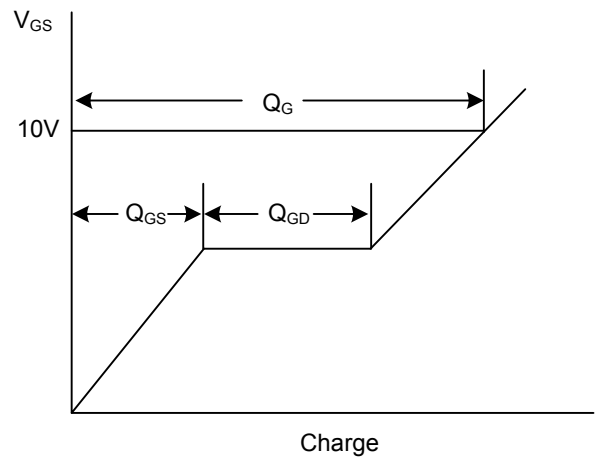


Fig. 3B Gate Charge Waveform

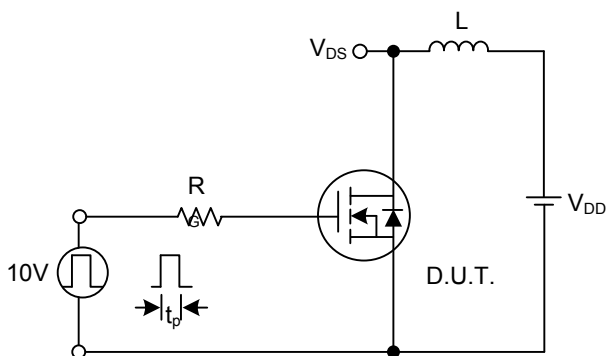


Fig. 4A Unclamped Inductive Switching Test Circuit

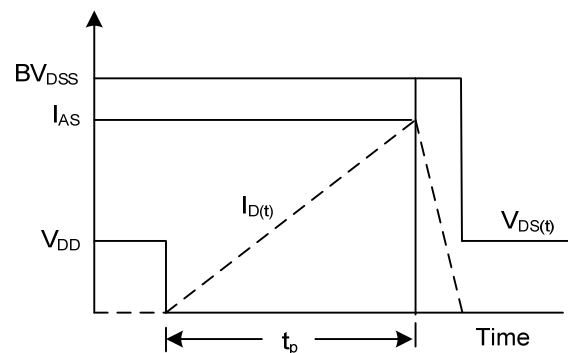
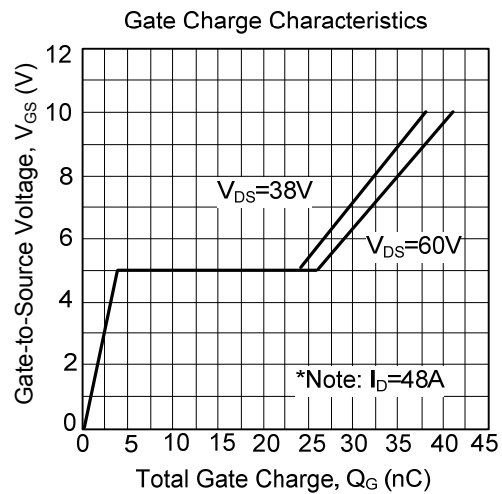
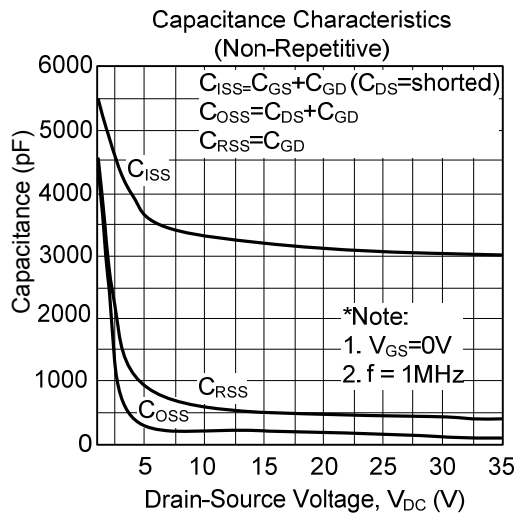
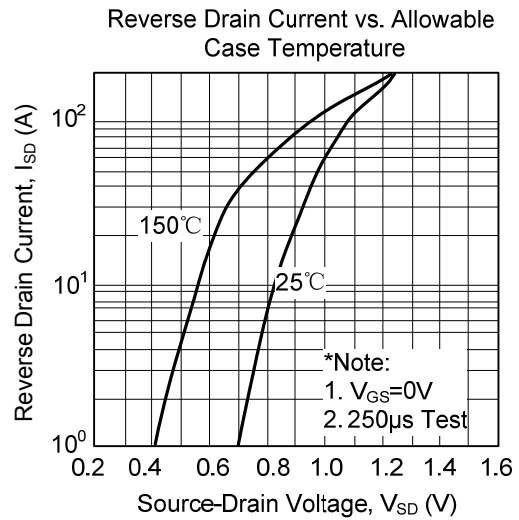
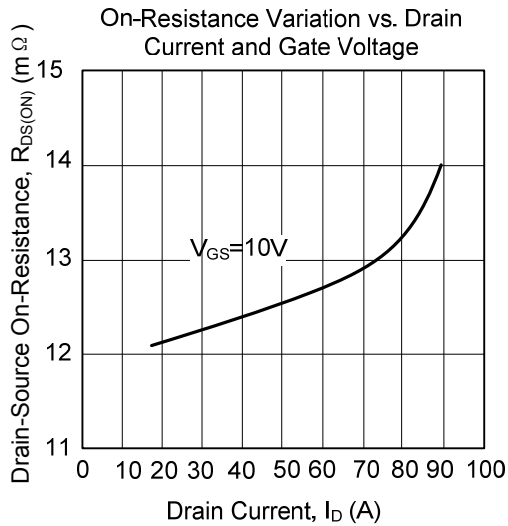
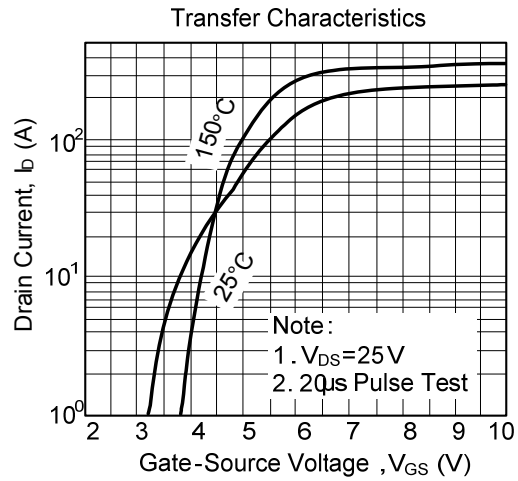
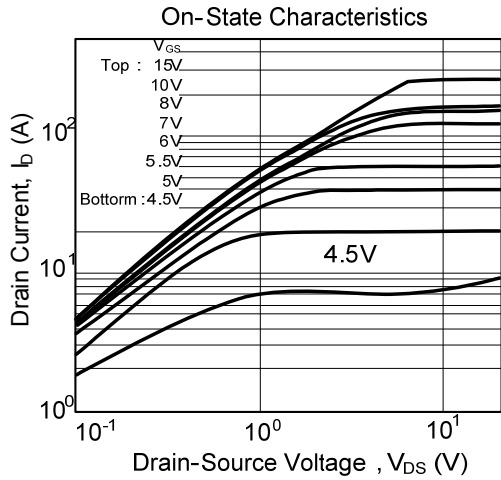
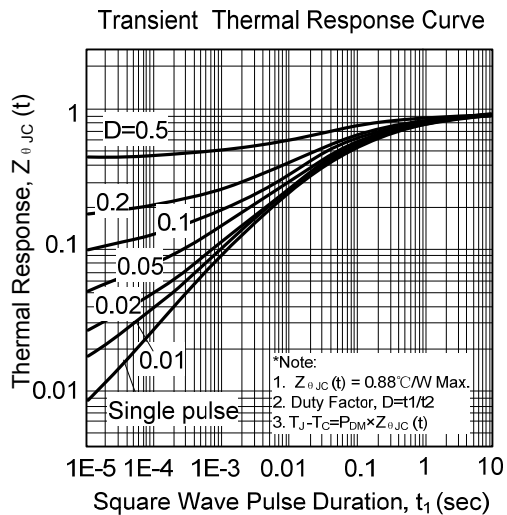
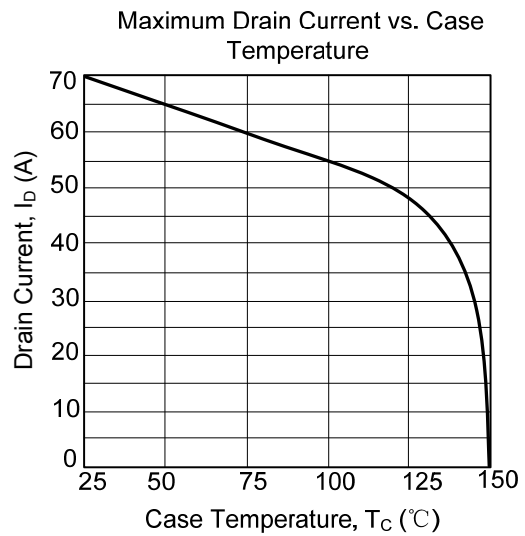
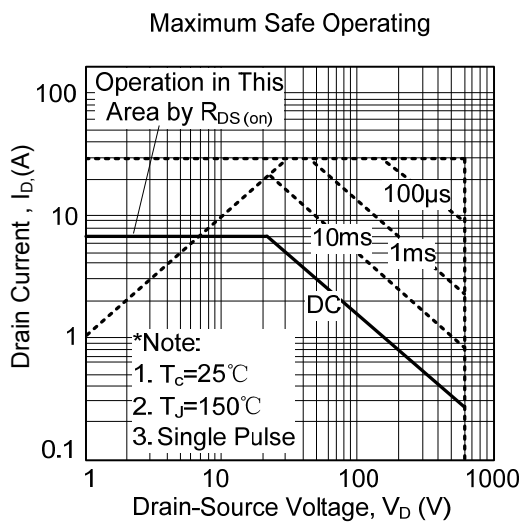
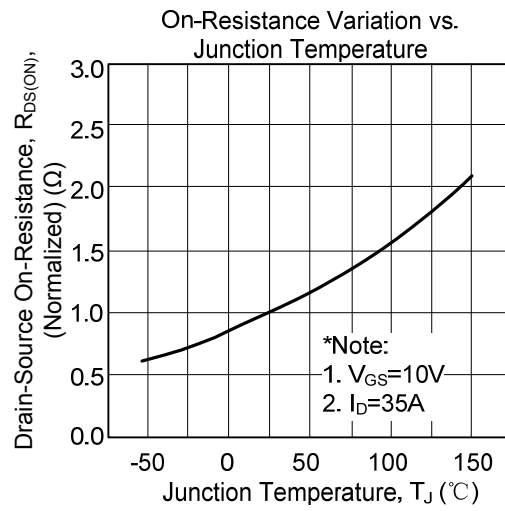
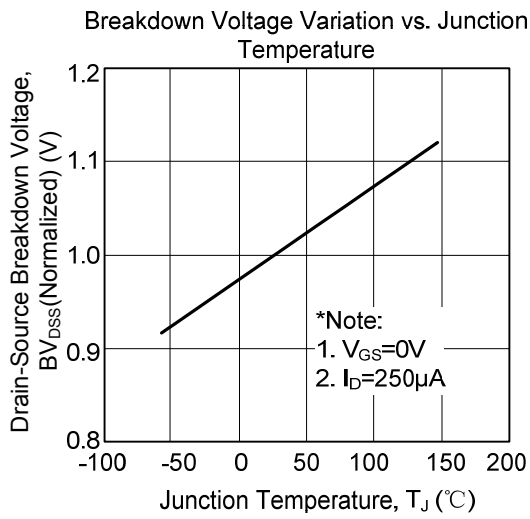


Fig. 4B Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS



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