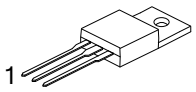
淄博圣诺

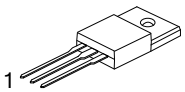
10N60 10N65

Power MOSFET

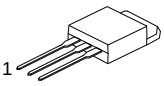
10 Amps, 600/650 Volts
N-CHANNEL POWER MOSFET



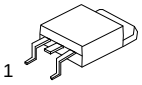
TO-220



ITO-220/TO-220F



TO-262/I^2PAK



TO-263/D^2PAK

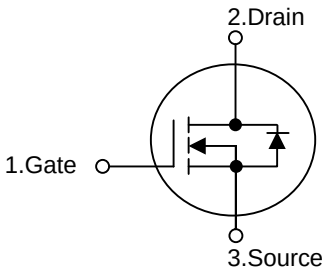
■ DESCRIPTION

10N60 10N65 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 have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

■ FEATURES

* 10A, 600V, $R_{DS(ON)}$ =0.73Ω@V_{GS} =10V
* Low gate charge (typical 44 nC)
* Low Crss (typical 18 pF)
* Fast switching
* 100% avalanche tested
* Improved dv/dt capability

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number	Package	Pin Assignment		
		1	2	3
10N60	TO-220	G	D	S
	ITO-220/TO-220F	G	D	S
10N65	TO-262/I^2PAK	G	D	S
	TO-263/D^2PAK	G	D	S

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

Part No.	Package	Packing
10N6*-TU	TO-220	50pcs / Tube
10N6*-TU	ITO-220/TO-220F	50pcs / Tube
10N6*-TU	TO-262	50pcs / Tube
10N6*-TU	TO-263	50pcs / Tube
10N6*-TR	TO-263	800pcs / 13" Reel

淄博圣诺

10N60 10N65

Power MOSFET

■ ABSOLUTE MAXIMUM RATINGS (T_C = 25°C, unless otherwise specified)

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage		10N60	V_{DSS}	600	V
		10N65		650	V
Gate-Source Voltage			V_{GSS}	±30	V
Avalanche Current (Note 2)			I_{AR}	10	A
Drain Current	Continuous		I_D	10	A
	Pulsed (Note 2)		I_{DM}	38.0	A
Avalanche Energy	Single Pulsed (Note 3)		E_{AS}	700	mJ
	Repetitive (Note 2)		E_{AR}	15.6	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	4.5	V/ns
Power Dissipation	TO-220		P_D (T_C = 25°C)	156	W
	TO-220F			50	W
	TO-263/D^2PAK			178	W
Junction Temperature			T_J	+150	°C
Ambient Operating Temperature			T_{OPR}	-55 ~ +150	°C
Storage Temperature			T_{STG}	-55 ~ +150	°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=7.3mH, I_{AS}=10A, V_{DD}=50V, R_G=25 Ω, Starting T_J = 25°C
4. I_{SD}≤9.5A, di/dt≤200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction-to-Ambient	TO-262/I^2PAK	θ_{JA}	62.5	℃/W
	TO-263/D^2PAK		62.5	
	TO-220		62.5	
	ITO-220/TO-220F		62.5	
Junction-to-Case	TO-262/I^2PAK	θ_{Jc}	0.85	℃/W
	TO-263/D^2PAK		0.85	
	TO-220		0.85	
	ITO-220/TO-220F		2.60	

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

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	10N60	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	600			V
	10N65			650			V
Drain-Source Leakage Current		I_{DSS}	V_{DS} = 600V, V_{GS} = 0V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS} = 30V, V_{DS} = 0V			100	nA
	Reverse		V_{GS} = -30V, V_{DS} = 0V			-100	nA
Breakdown Voltage Temperature Coefficient		$\triangle BV_{DSS}/\triangle T_J$	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 = 250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS} = 10V, I_D =4.75A		0.6	0.73	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS} =25V, V_{GS} =0V,f =1MHz		1570	2040	pF
Output Capacitance		C_{OSS}			166	215	pF
Reverse Transfer Capacitance		C_{RSS}			18	24	pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time		$t_{D\ (ON)}$	V_{DD} =300V, I_D =10A, R_G=25Ω (Note 1, 2)		23	55	ns
Turn-On Rise Time		t_R			69	150	ns
Turn-Off Delay Time		$t_{D(OFF)}$			144	300	ns
Turn-Off Fall Time		t_F			77	165	ns
Total Gate Charge		Q_G	V_{DS}=480V, V_{GS}=10V, I_D=10A (Note 1, 2)		44	57	nC
Gate-Source Charge		Q_{GS}			6.7		nC
Gate-Drain Charge		Q_{GD}			18.5		nC
DRAIN-SOURCE DIODE CHARACTERISTICS							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS} = 0 V, I_{SD} = 10 A			1.4	V
Continuous Drain-Source Current		I_{SD}				10	A
Pulsed Drain-Source Current		I_{SM}				38	A
Reverse Recovery Time		t_{RR}	V_{GS} = 0 V, I_{SD} = 10A, di/dt = 100 A/μs (Note1)		420		ns
Reverse Recovery Charge		Q_{RR}			4.2		μC

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle≤2%
2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

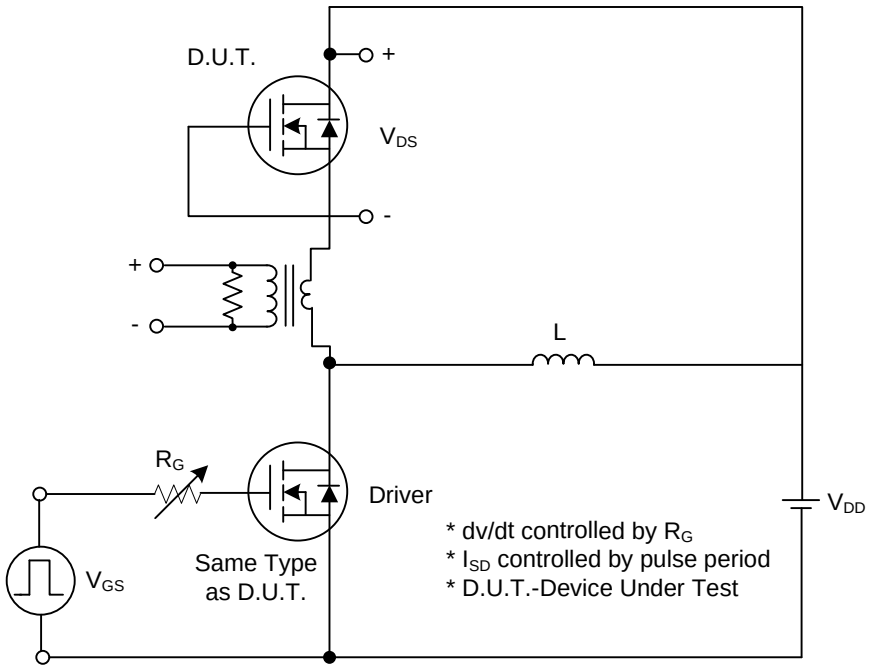


Fig. 1A Peak Diode Recovery dv/dt Test Circuit

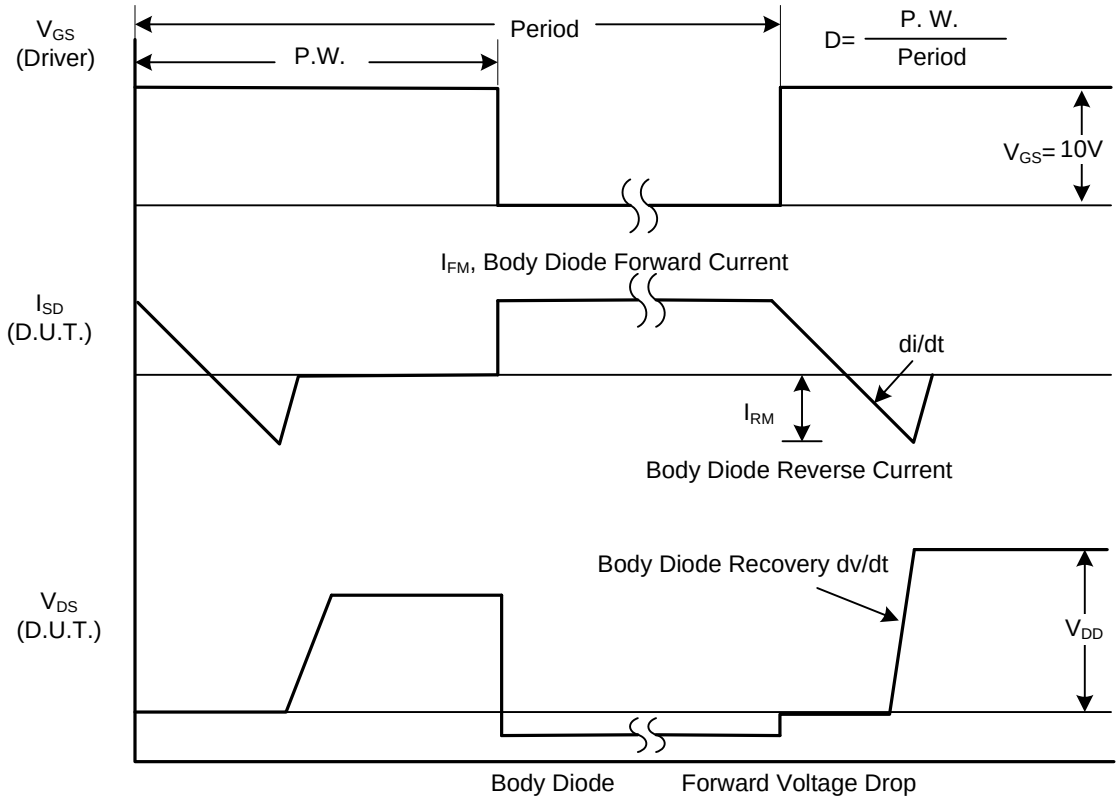


Fig. 1B Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)

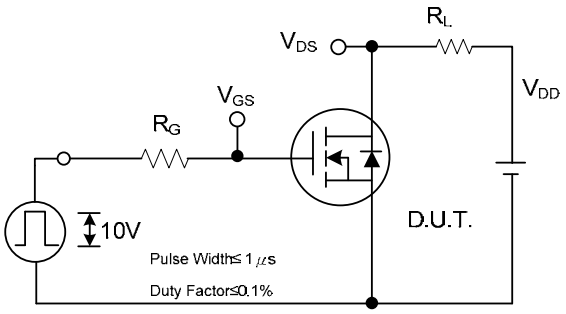


Fig. 2A Switching Test Circuit

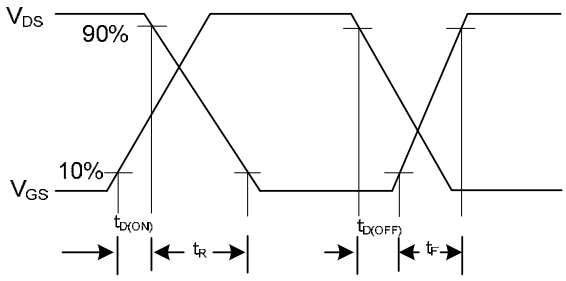


Fig. 2B Switching Waveforms

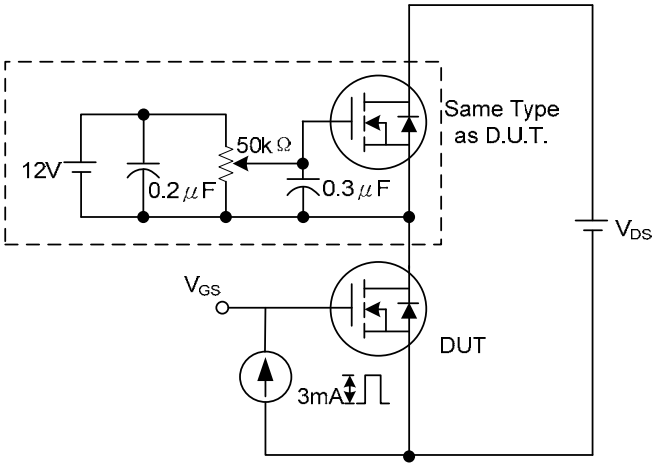


Fig. 3A Gate Charge Test Circuit

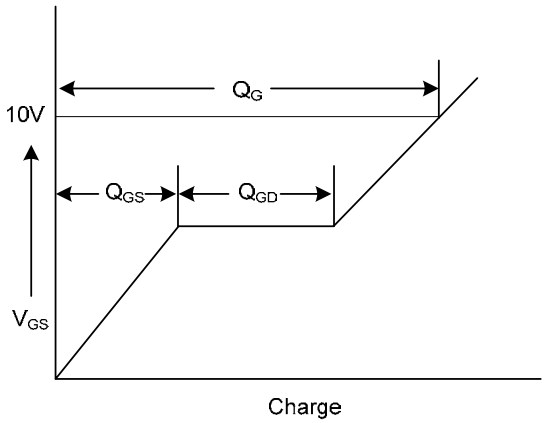


Fig. 3B Gate Charge Waveform

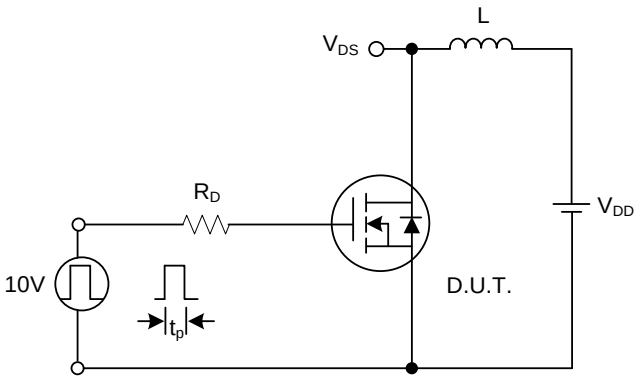


Fig. 4A Unclamped Inductive Switching Test Circuit

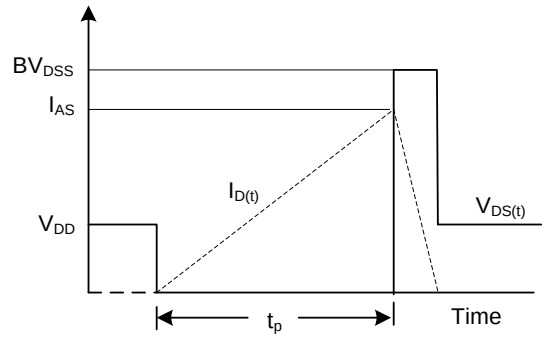
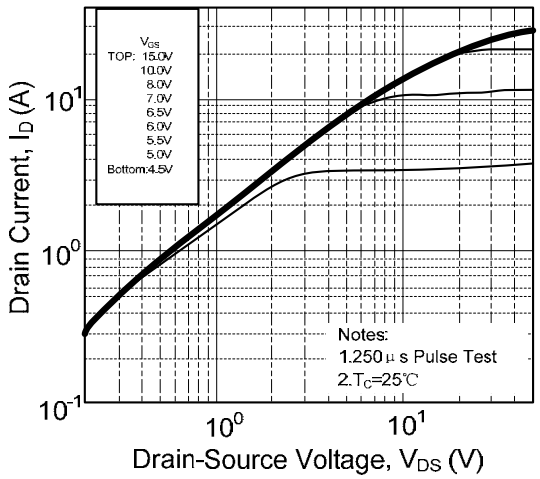


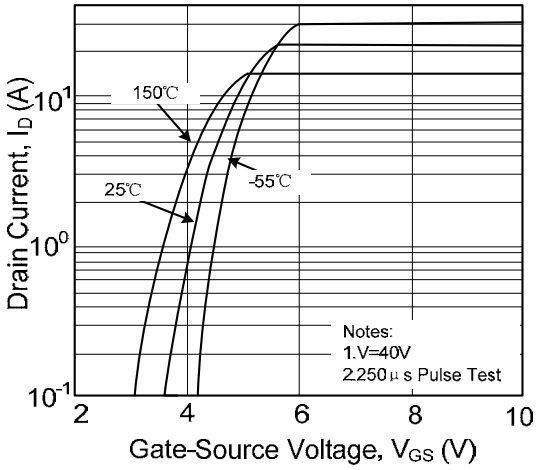
Fig. 4B Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

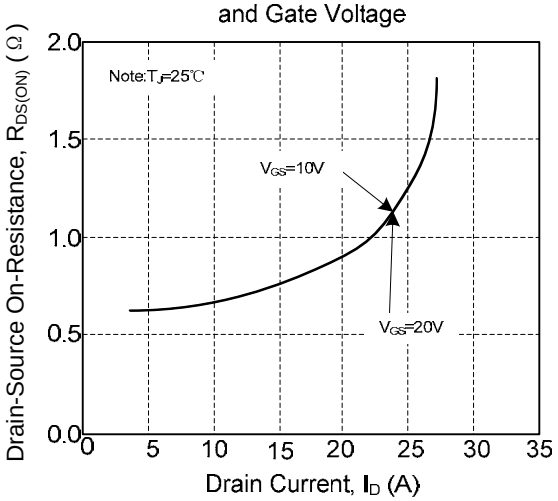
On-Region Characteristics



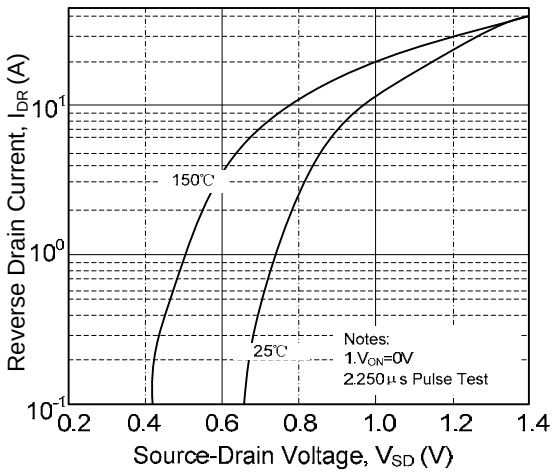
Transfer Characteristics



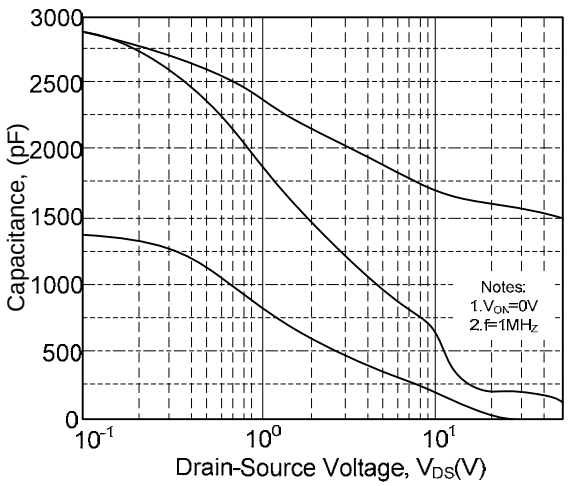
On-Resistance Variation vs. Drain Current and Gate Voltage



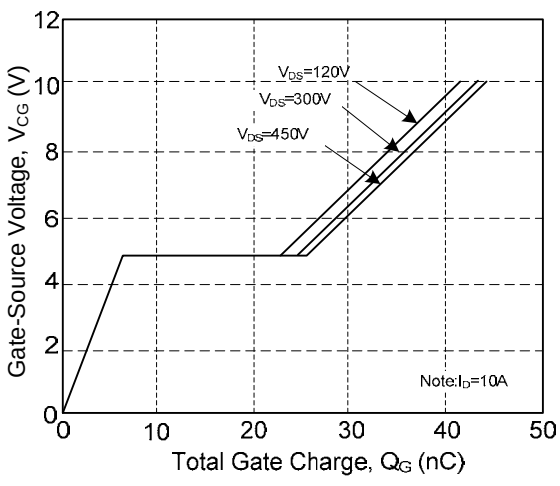
Body Diode Forward Voltage Variation with Source Current and Temperature



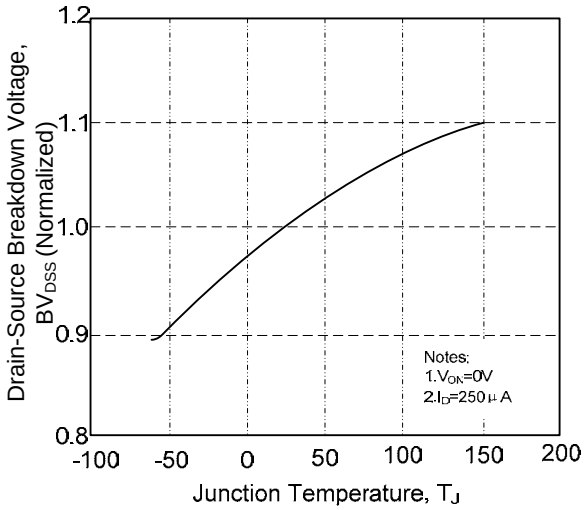
Capacitance Characteristics



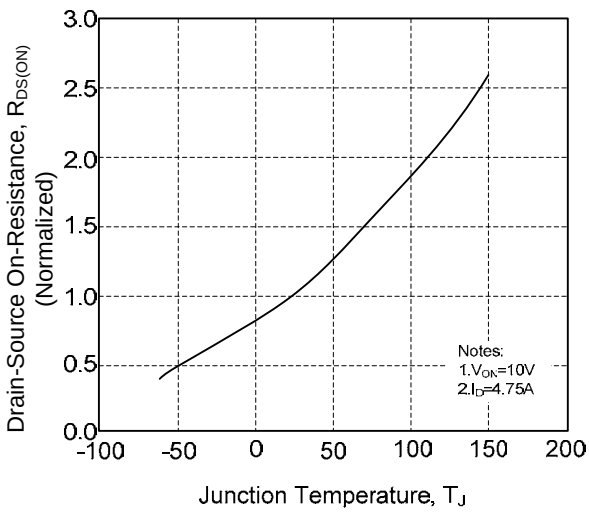
Gate Charge Characteristics



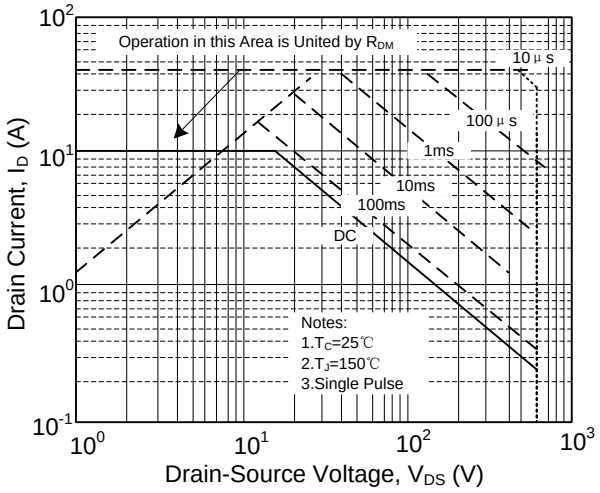
Breakdown Voltage Variation vs. Temperature



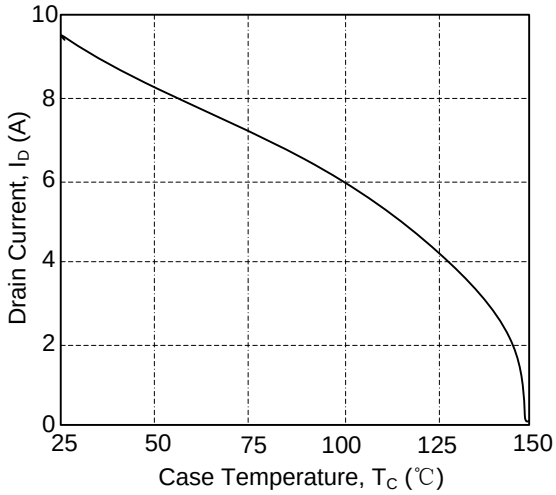
On-Resistance Variation vs. Temperature



Maximum Safe Operating Area



Maximum Drain Current vs. Case Temperature



Transient Thermal Response Curve