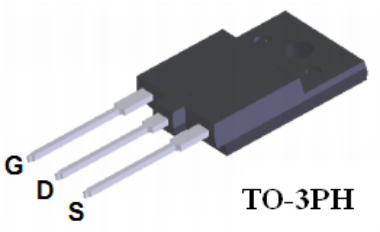
1500V N-Channel MOSFET

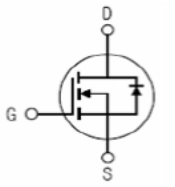
General Description

This Power MOSFET is produced using advanced self-aligned planar technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices can be used in various power switching circuit for system miniaturization and higher efficiency.



Inner Equivalent Principium Chart



Features

3A, 1500V, R_{DS}(on)typ. = 5Ω@VGS = 10 V Id=1.5A
Low gate charge (typical 37nC)
Low reverse transfer capacitance (typical2.8pf)
Fast switching
100% avalanche tested

Absolute Maximum Ratings T_C = 25 ℃ unless otherwise noted

Symbol	Parameter		JFQM3N150C	Units
V_{DSS}	Drain – Source Voltage		1500	V
I_D	Drain Current	Continuous (T_C = 25 ℃)	3	A
		Continuous (T_C = 100 ℃)	1.8	A
I_{DM}	Drain Current - Pulsed (Note 1)		12	A
V_{GSS}	Gate – Source Voltage		±30	V
EAS	Single Pulsed Avalanche Energy (Note 2)		225	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)		5	V/ns
P_D	Power Dissipation (T_C = 25 ℃)		32	W
T_J,T_{STG}	Operating and Storage Temperature Range		-55 to +150	℃
T_L	Maximum lead temperature for soldering purposes 1/8" frome case for 5 seconds		300	℃
V_{ISOL}	Isolation test voltage (RMS,f = 50 Hz, t = 500ms)		2.5	KV

*Drain current limited by maximum junction temperature.

Thermal characteristics

Symbol	Parameter	JFQM3N150C	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	3.8	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	40	℃/W

Electrical Characteristics T_C = 25 ℃ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain – Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	1500	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature Coefficient	I_D = 250 uA, Referenced to 25℃	--	1.5	--	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 1500 V, V_{GS} = 0 V	--	--	25	uA
		V_{DS} = 1200 V, Tc = 125 ℃	--	--	500	uA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30 V, V_{GS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V, V_{GS} = 0 V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage (Note 4)	V_{DS} = V_{GS}, I_D = 250 uA	3.0	--	5.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance (Note 4)	V_{GS} = 10 V, I_D = 1.5A	--	5	8	Ω
g_{FS}	Forward Transconductance (Note 4)	V_{DS} = 30 V, I_D = 1.5 A	--	4.5	--	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	1938	--	pF
C_{oss}	Output Capacitance		--	104	--	pF
C_{rss}	Reverse Transfer Capacitance		--	2.8	--	pF
Rg	Gate resistance	F= 1.0 MHz		4.0		Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS} = 750 V, I_D = 3.0 A , R_G = 10Ω , V_{GS} = 10 V (Note 4,5)	--	35	--	ns
t_r	Turn-On Rise Time		--	19	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	56	--	ns
t_f	Turn-Off Fall Time		--	30	--	ns
Q_g	Total Gate Charge	V_{DS} = 750 V, I_D = 3.0 A V_{GS} = 10 V (Note 4,5)	--	37	--	nC
Q_{gs}	Gate-Source Charge		--	10	--	nC
Q_{gd}	Gate-Drain Charge		--	14	--	nC
Drain – Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	3	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	12	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 3.0 A	--	--	1.5	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_S = 3.0 A dI_F/dt = 100 A/us (Note 4)	--	880	--	ns
Q_{rr}	Reverse Recovery Charge		--	6.5	--	uC

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature
2. L = 10.0mH , I_{AS} = 6.7A, R_G = 25Ω, Starting T_J = 25℃
3. I_{SD} ≤ 3.0A, di/dt ≤ 100A/us, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. Pulsed Test : Pulsed width ≤300us, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

Characteristics Curve

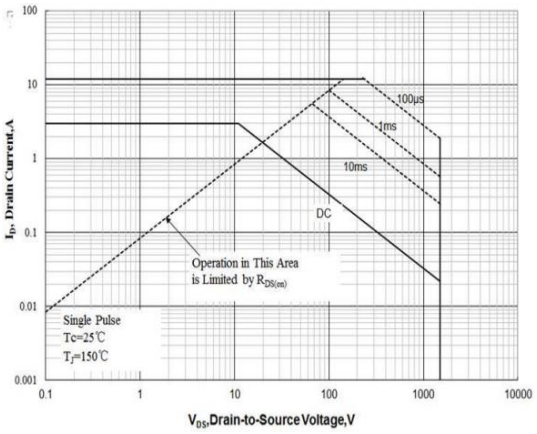


Figure 1 Maximum Forward Bias Safe Operating Area

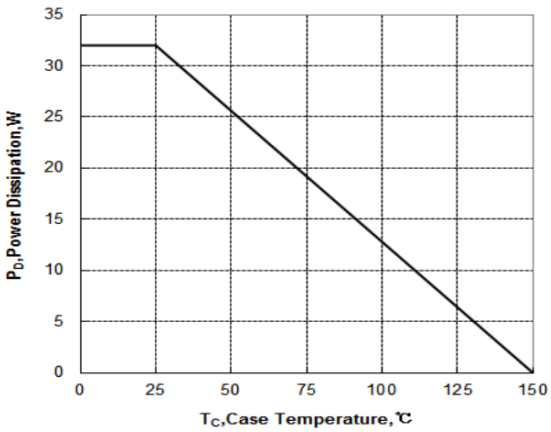


Figure 2 Maximum Power dissipation vs Case Temperature

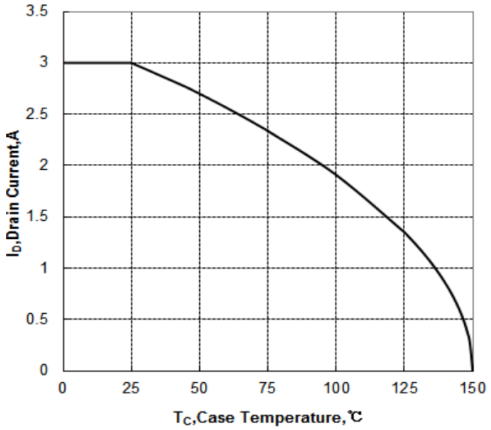


Figure 3 Maximum Continuous Drain Current vs Case Temperature

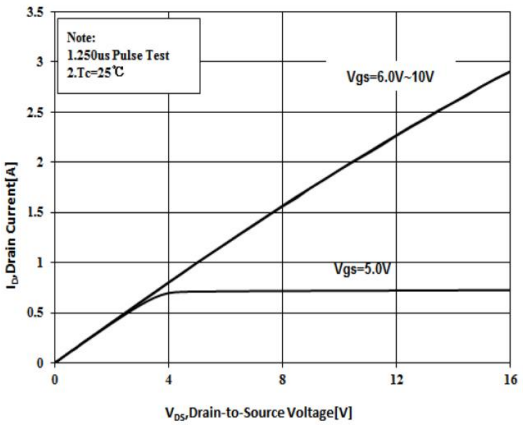


Figure 4 Typical Output Characteristics

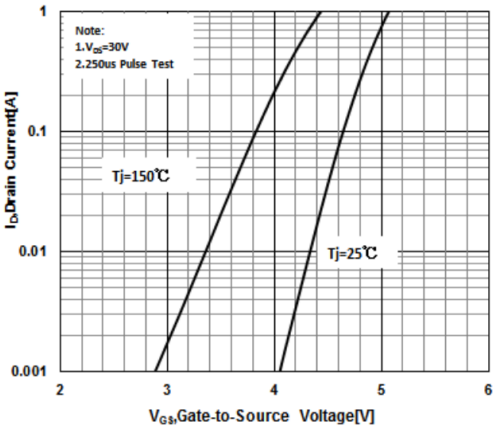


Figure 5 Typical Transfer Characteristics

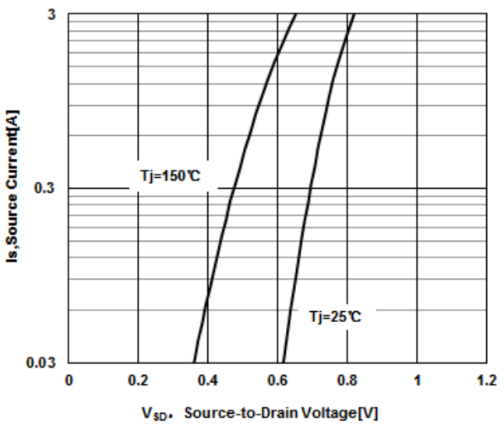


Figure 6 Typical Body Diode Transfer Characteristics

Characteristics Curve

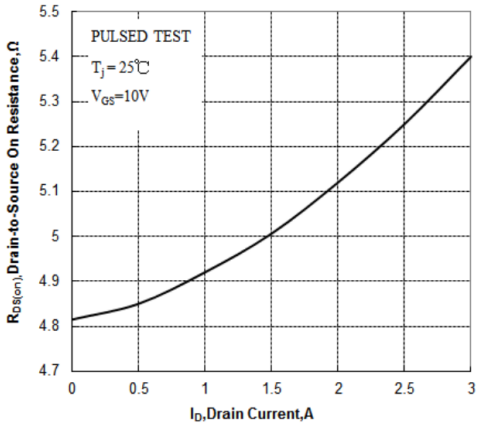


Figure 7 Typical Drain to Source ON Resistance vs Drain Current

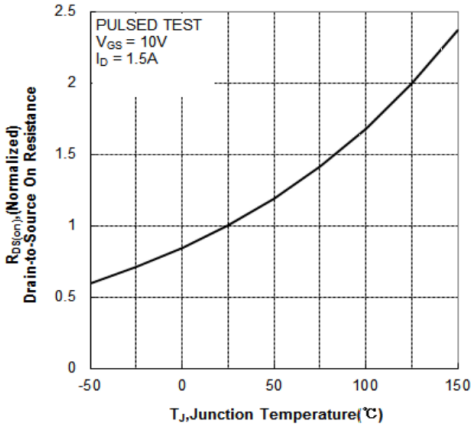


Figure 8 Typical Drian to Source on Resistance vs Junction Temperature

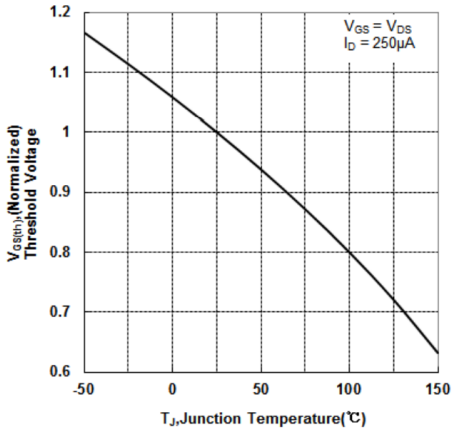


Figure 9 Typical Theshold Voltage vs Junction Temperature

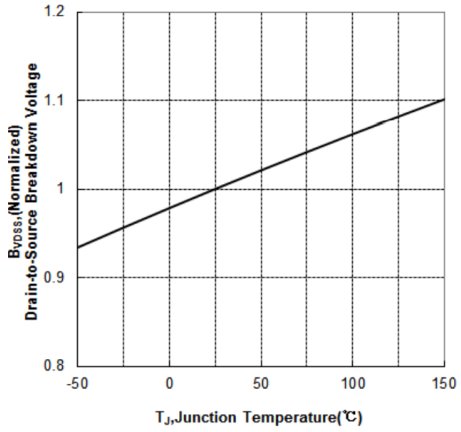


Figure 10 Typical Breakdown Voltage vs Junction Temperature

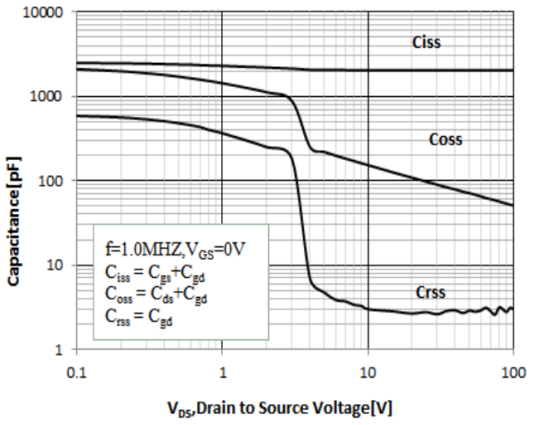


Figure 11 Typical Capacitance vs Drain to Source Voltage

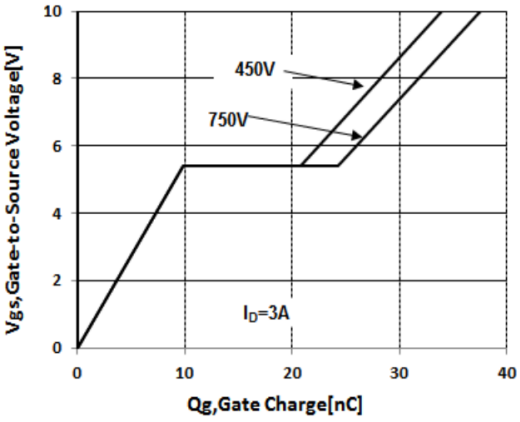


Figure 12 Typical Gate Charge vs Gate to Source Voltage

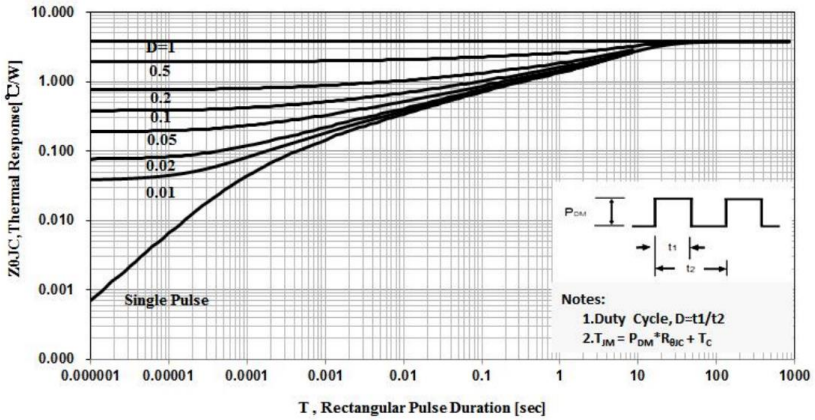
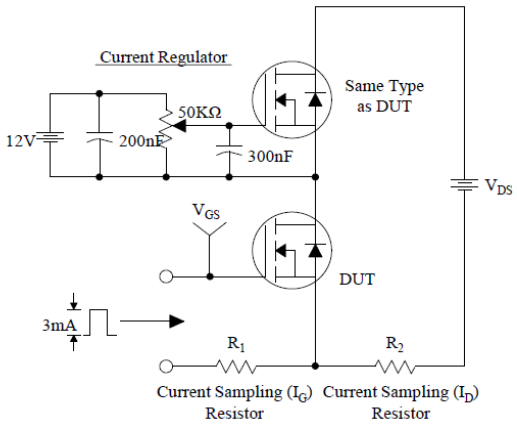
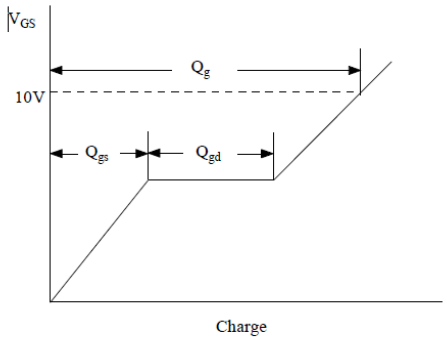


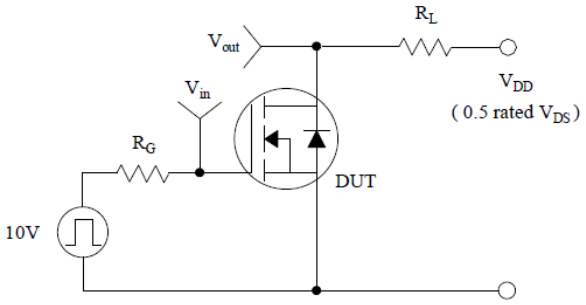
Figure 13 Maximum Effective Thermal Impedance , Junction to Case

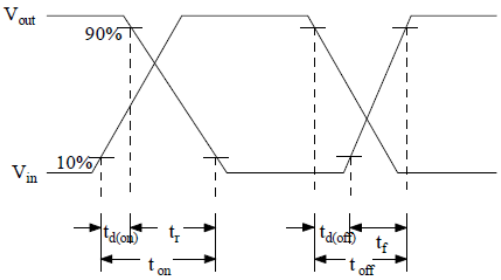
Test Circuit & Waveform



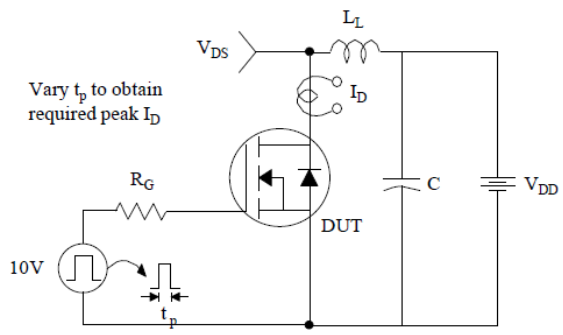


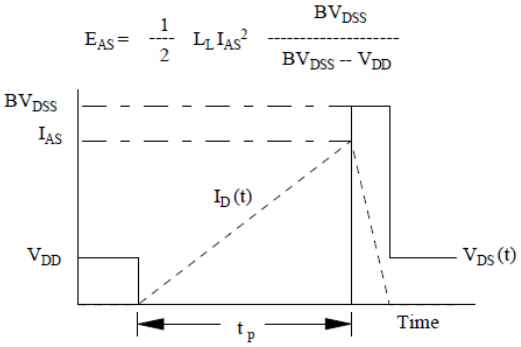
Gate Charge Test Circuit & Waveform





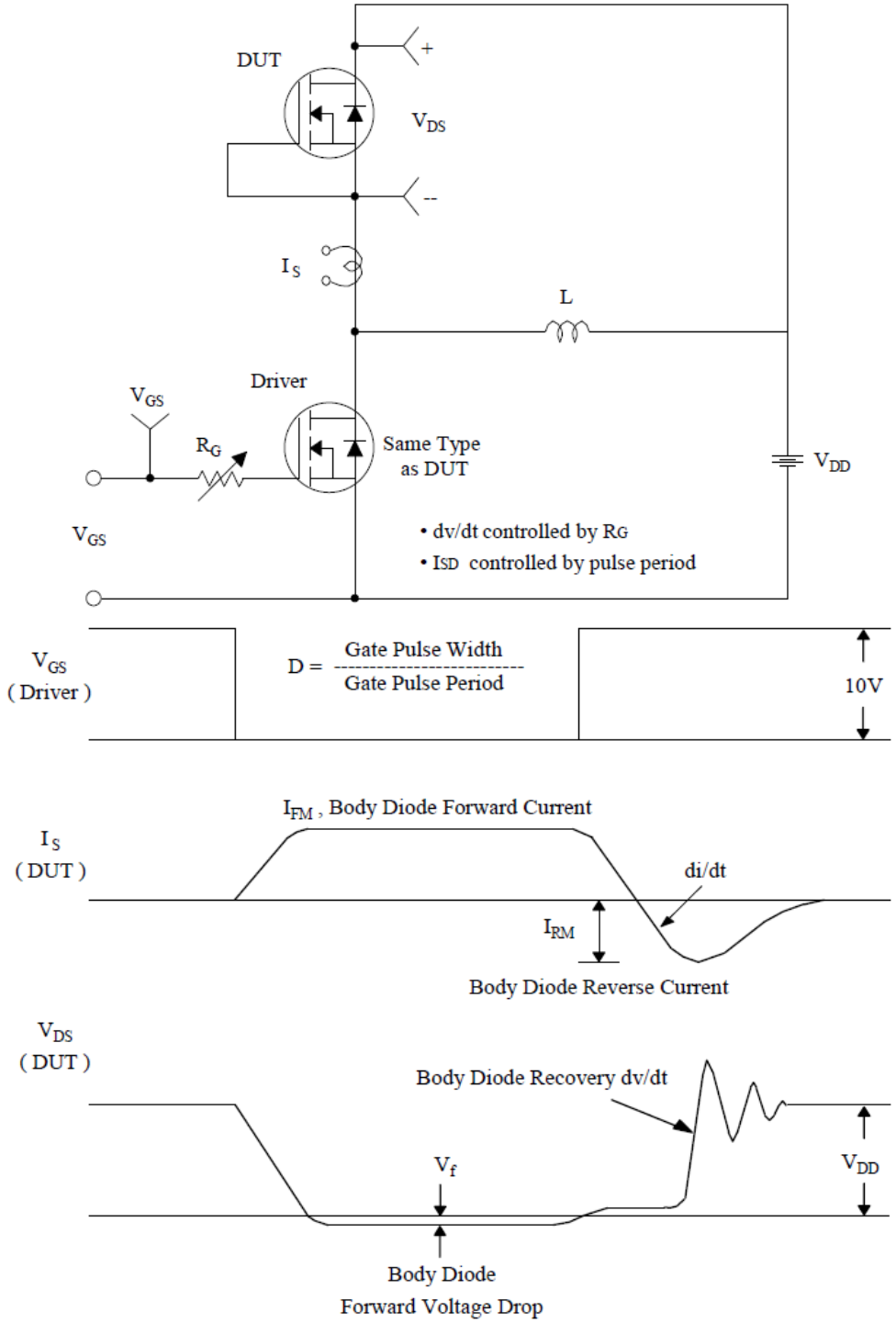
Resistive Switching Test Circuit & Waveforms





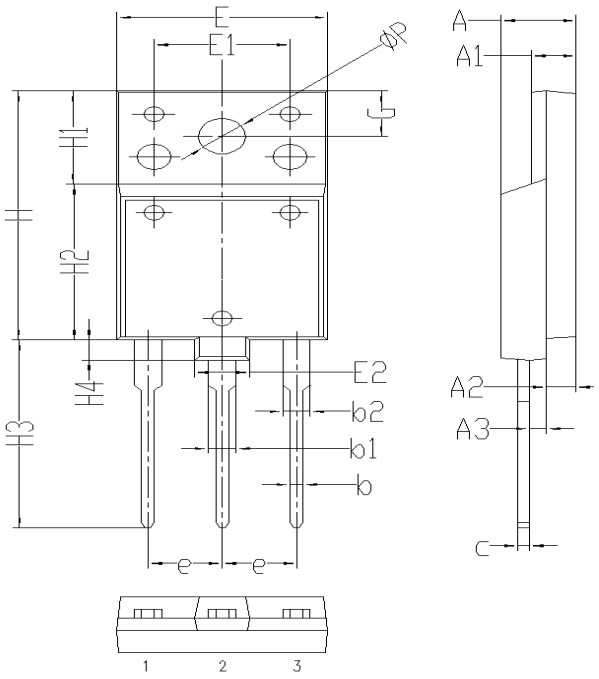
Unclamped Inductive Switching Test Circuit & Waveforms

Test Circuit & Waveform



Peak Diode Recovery dv/dt Test Circuit & Waveforms

Package Information



Symbol	单位 mm		
	Min	**Nom**	Max
A	5.35	5.55	5.75
A1	2.80	3.00	3.20
A2	1.90	2.10	2.30
A3	1.10	1.30	1.50
b	0.65	0.75	0.85
b1	1.80	2.00	2.20
b2	1.80	2.00	2.20
c	0.70	0.90	1.10
e	5.25	5.45	5.65
E	15.3	15.5	15.7
E1	9.80	10.0	10.2
E2	3.80	4.00	4.20
H	24.3	24.5	24.7
H1	9.00	9.20	9.40
H2	15.1	15.3	15.5
H3	18.5	19.0	19.5
H4	1.80	2.00	2.20
H5	4.80	5.00	5.20
G	4.3	4.5	4.7
ΦP	3.40	3.60	3.80

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