AM1030N

axelite 亞瑟萊特科技股份有限公司 AXElite Technology Co.,Ltd

100V N-Channel MOSFET

❖ GENERAL DESCRIPTION

These N-Channel enhancement mode power field effect transistors are produced using DMOS technology.

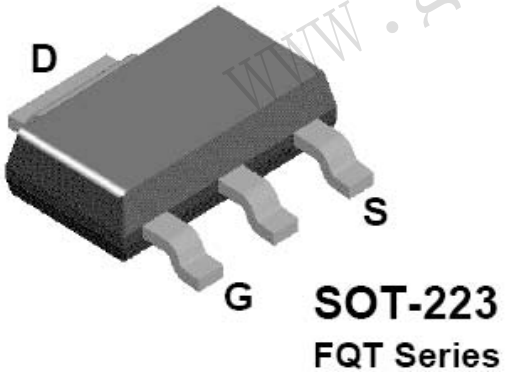
This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for low voltage applications such as audio amplifier, high efficiency switching DC/DC converters, and DC motor control.

❖ FEATURES

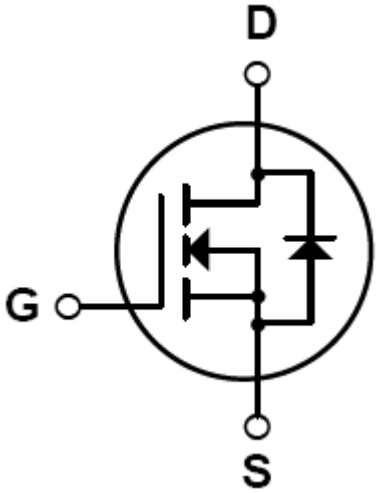
- 3.0A, 100V, $R_{DS(on)}$ = 0.19Ω @V_{GS} = 10 V
- Low gate charge (typical 5.8 nC)
- Low Crss (typical 10 pF)
- Fast switching
- Improved dv/dt capability

❖ PIN ASSIGNMENT

The package of AM1030N is SOT-223; the pin assignment is given by:



SOT-223
FQT Series



❖ ORDER/MARKING INFORMATION

Order Information	Top Marking
AM1030N X X Package Type E: SOT223-3L Packing A : Taping	Logo ← **AM** 1 0 3 0 N → Part number Y WW X → ID code:internal WW:01~52 Year: A=2010 1=2011

❖ ABSOLUTE MAXIMUM RATINGS

Characteristics	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	100	V
Drain Current Continuous (T_C = 25°C)	I_D	3.0	A
Continuous (T_C = 70°C)		2.36	A
Drain Current – Pulsed (Note 1)	I_{DM}	6.8	A
Gate-Source Voltage	V_{GSS}	±25	V
Single Pulsed Avalanche Energy (Note 2)	E_{AS}	50	mJ
Avalanche Current (Note 1)	I_{AR}	3.0	A
Repetitive Avalanche Energy (Note 1)	E_{AR}	0.2	mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	6.0	V/ns
Power Dissipation (T_C = 25°C)	P_D	2.0	W
Derate above 25°C		0.016	W/°C
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	T_L	300	°C
Thermal Resistance, Junction-to-Ambient (Note 4)	$R_{\theta JA}$	62.5	°C/W

Note1: Pulse width limited by max. junction temperature
Note2: Package limitation current is 75A
Note3: Surface mounted on 1 in^2 copper pad of FR4 board
Note4: When mounted on the minimum pad size recommended (PCB Mount)

❖ ELECTRICAL CHARACTERISTICS

(T_C =25°C, unless otherwise specified)

Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 μA	100	-	-	V
Breakdown Voltage Temperature Coefficient	ΔBV_{DSS} / ΔT_J	I_D = 250 μA, Referenced to 25°C	-	0.1	-	V/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100 V, V_{GS} = 0 V	-	-	1	μA
		V_{DS} = 80 V, T_C = 125°C	-	-	10	μA
Gate-Body Leakage Current, Forward	I_{GSSF}	V_{GS} = 25 V, V_{DS} = 0 V	-	-	100	nA
Gate-Body Leakage Current, Reverse	I_{GSSR}	V_{GS} = -25 V, V_{DS} = 0 V	-	-	-100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	1	-	2.5	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.85 A	-	0.13	0.19	Ω
Forward Transconductance	g_{FS}	V_{DS} = 40 V, I_D = 0.85 A (Note 4)	-	1.85	-	S
Dynamic Characteristics						
Input Capacitance	Ciss	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	-	190	250	pF
Output Capacitance	Coss		-	60	75	pF
Reverse Transfer Capacitance	Crss		-	10	13	pF
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 50 V, I_D = 7.3 A, R_G = 25 Ω (Note 4, 5)	-	7	25	ns
Turn-On Rise Time	t_r		-	24	60	ns
Turn-Off Delay Time	$t_{d(off)}$		-	13	35	ns
Turn-Off Fall Time	t_f		-	19	50	ns
Total Gate Charge	Q_g	V_{DS} = 80 V, I_D = 7.3 A, V_{GS} = 10 V (Note 4, 5)	-	5.8	7.5	nC
Gate-Source Charge	Q_{gs}		-	1.4	-	nC
Gate-Drain Charge	Q_{gd}		-	2.5	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain-Source Diode Forward Current	I_S		-	-	3.0	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}		-	-	6.8	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS} = 0V, I_S = 1.7 A	-	-	1.5	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V, I_S = 7.3 A, dIF / dt = 100 A/μs (Note 4)	-	70	-	ns
Reverse Recovery Charge	Q_{rr}		-	150	-	nC

Note1: Repetitive Rating: Pulse width limited by maximum junction temperature
Note2: L = 26mH, I_{AS} = 1.7A, V_{DD} = 25V, R_G = 25 Ω, Starting T_J = 25°C
Note3: I_{SD} ≤ 7.3A, di/dt ≤ 300A/μs, V_{DD} ≤ B_{VDSS}, Starting T_J = 25°C
Note4: Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
Note5: Essentially independent of operating temperature

❖ TYPICAL CHARACTERISTICS

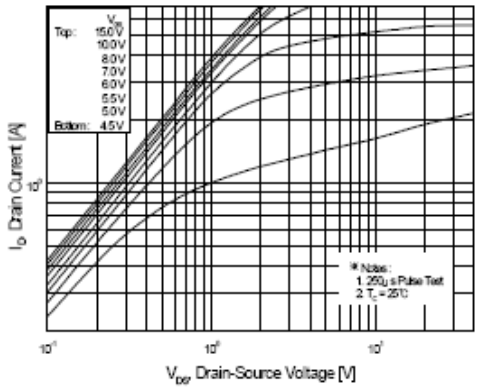


Figure 1. On-Region Characteristics

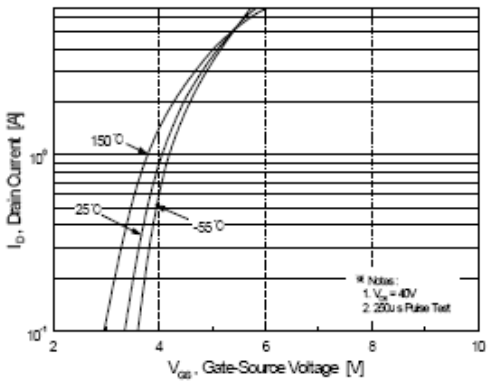


Figure 2. Transfer Characteristics

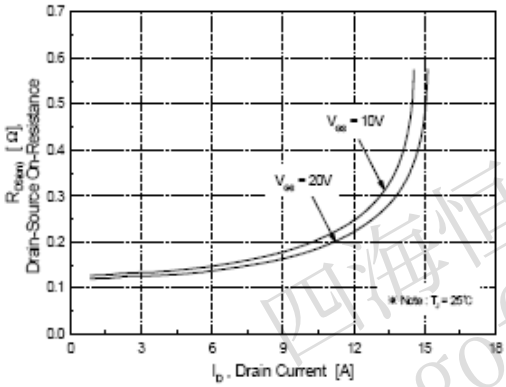


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

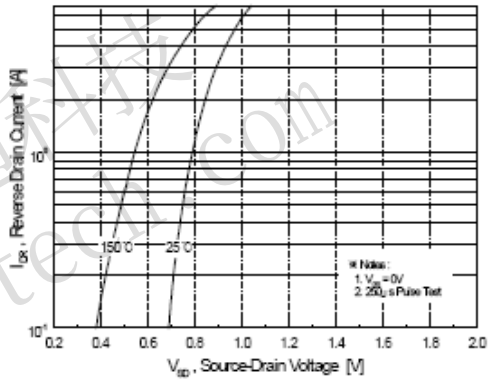


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

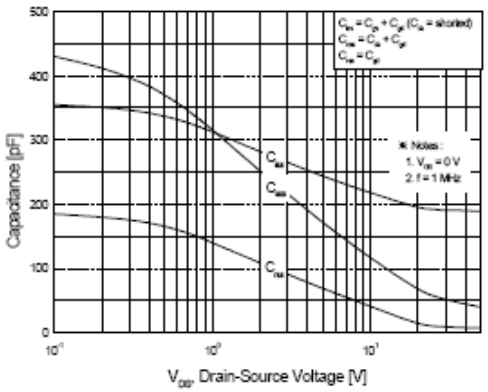


Figure 5. Capacitance Characteristics

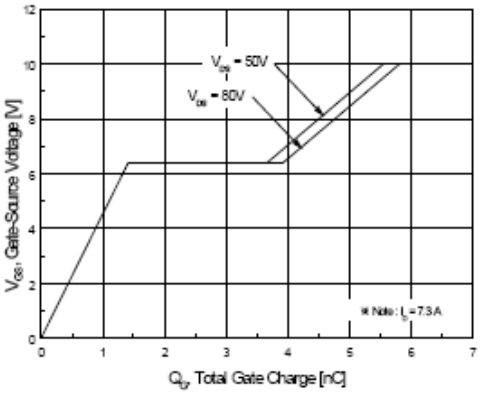


Figure 6. Gate Charge Characteristics

❖ TYPICAL CHARACTERISTICS (CONTINUES)

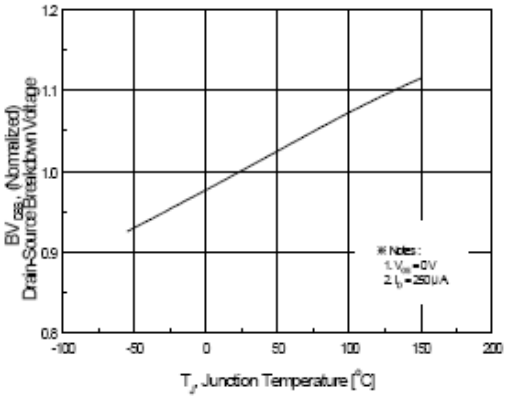


Figure 7. Breakdown Voltage Variation vs. Temperature

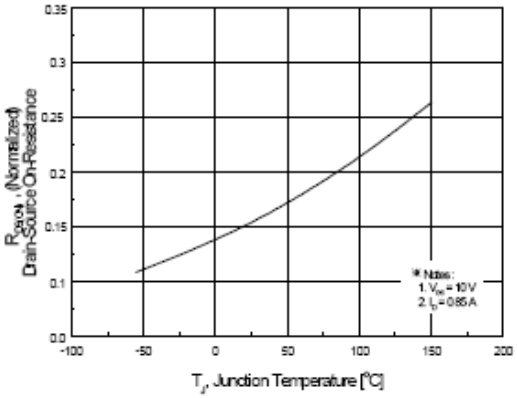


Figure 8. On-Resistance Variation vs. Temperature

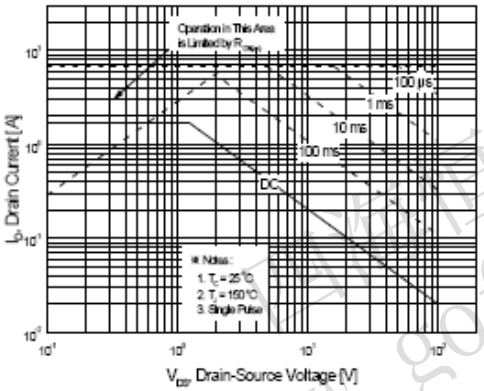


Figure 9. Maximum Safe Operating Area

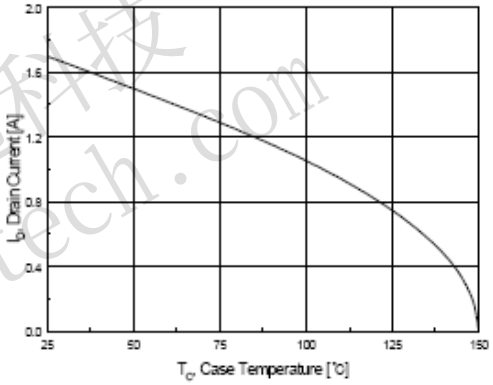


Figure 10. Maximum Drain Current vs. Case Temperature

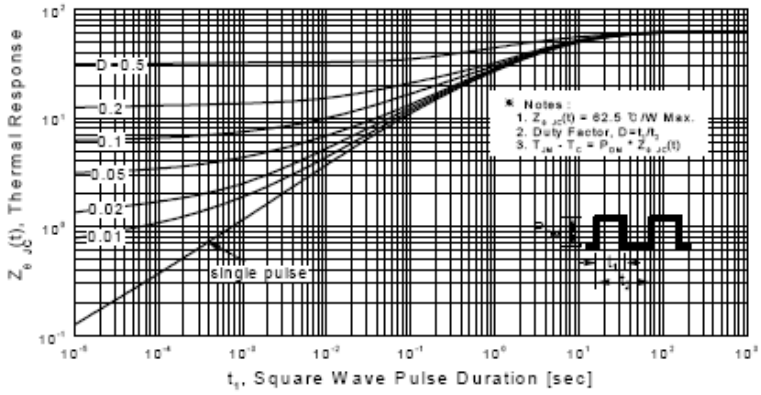
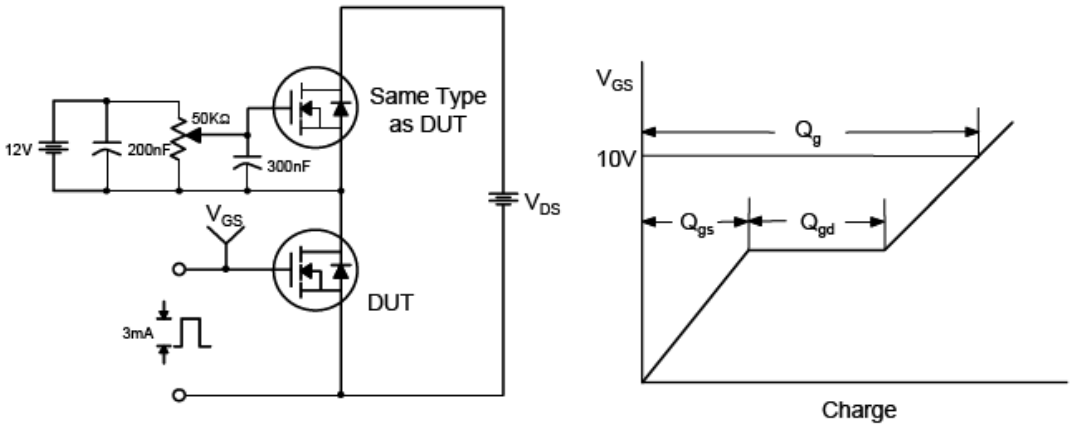
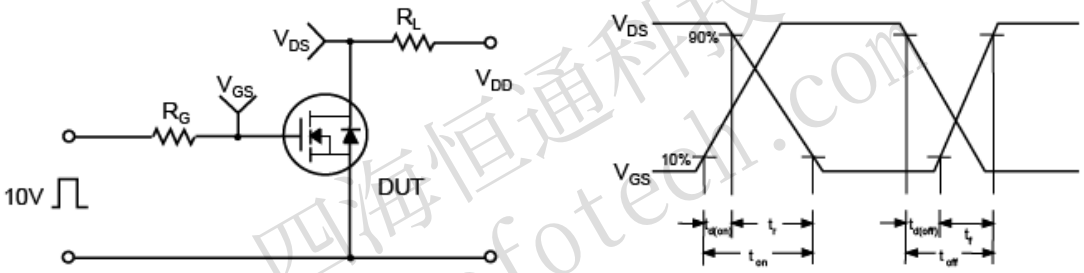


Figure 11. Transient Thermal Response Curve

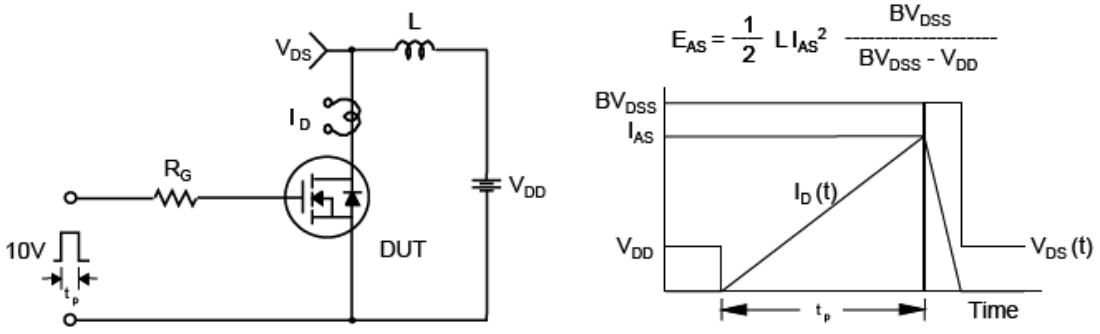
Gate Charge Test Circuit & Waveform



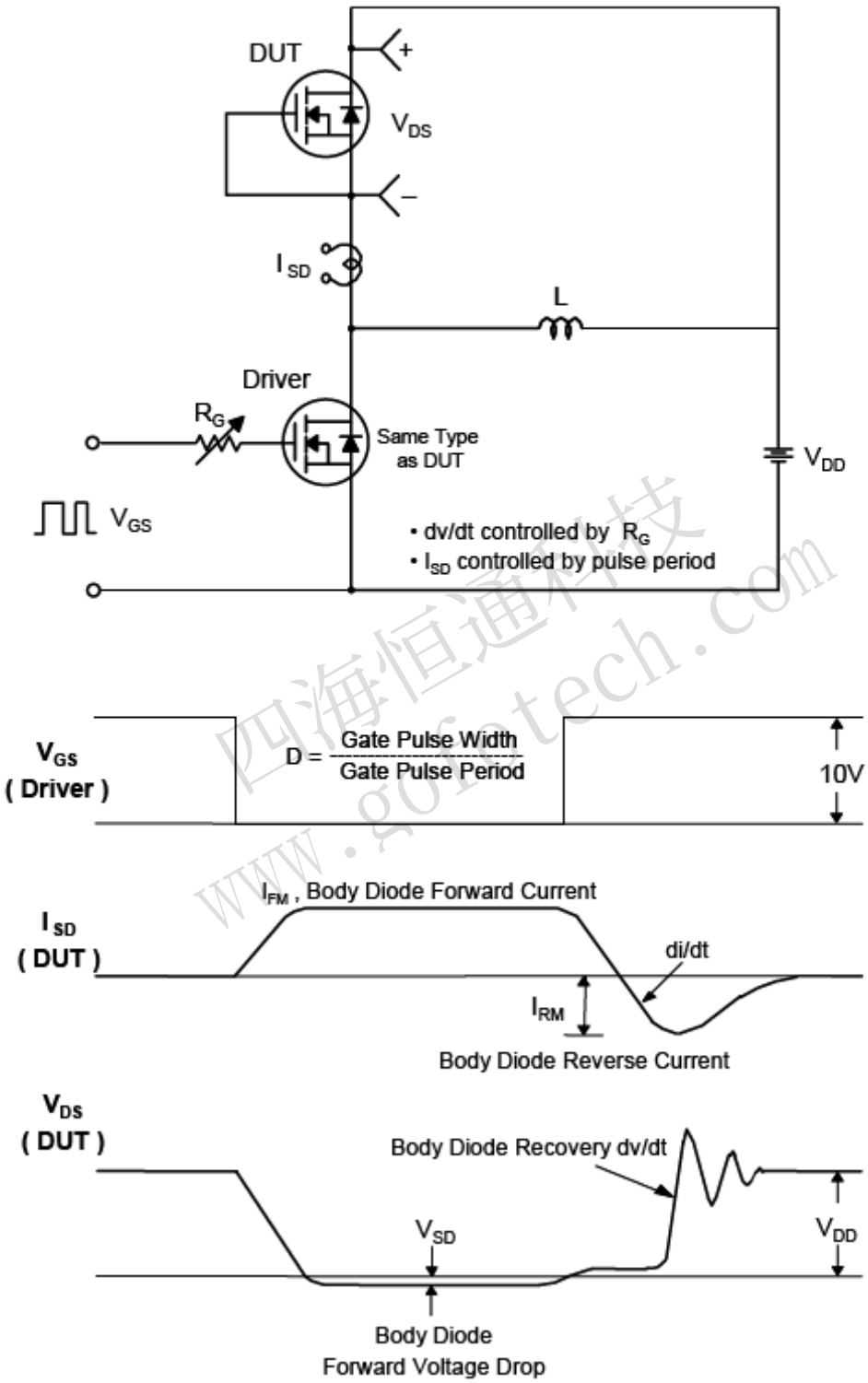
Resistive Switching Test Circuit & Waveforms



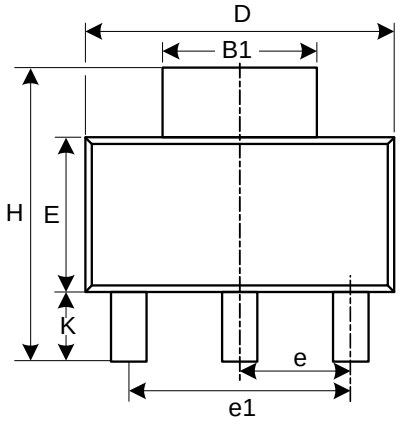
Unclamped Inductive Switching Test Circuit & Waveforms

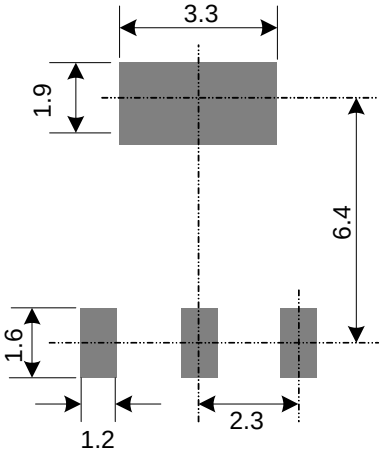


Peak Diode Recovery dv/dt Test Circuit & Waveforms

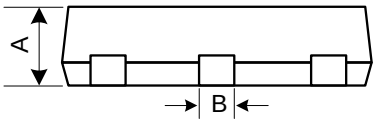


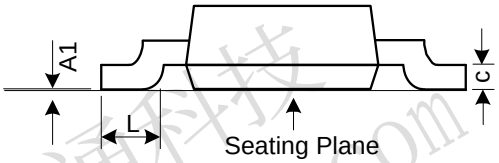
❖ PACKAGE OUTLINES





Land Pattern Recommendation (Unit: mm)





Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	-	-	1.8	-	-	0.071
A1	0.02	0.06	0.1	0.001	0.002	0.004
B	0.66	0.75	0.84	0.026	0.03	0.033
B1	2.9	3	3.1	0.114	0.118	0.122
C	0.23	0.315	0.35	0.009	0.012	0.014
D	6.3	6.5	6.7	0.248	0.256	0.264
E	3.3	3.5	3.7	0.13	0.138	0.146
H	6.7	7	7.3	0.264	0.278	0.287
L	0.75	-	-	0.03	-	-
K	1.5	1.75	2	0.059	0.069	0.079
e	2.3 Basic			0.091 Basic		
e1	4.6 Basic			0.181 Basic		

JEDEC outline: TO-261 AB