

• General Description

It combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for This device is ideal for motor driver, load switch and DC-DC applications.

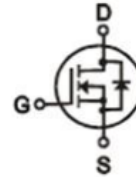
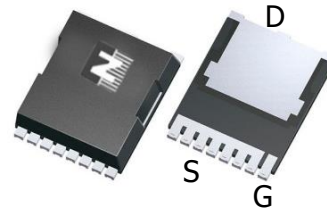
• Features

- Advance Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

• Application

- BLDC Motor driver
- Load Switch
- DC-DC
- Battery protection

• Product Summary


 $V_{DS}=60V$
 $R_{DS(ON)} = 1.1m\Omega$
 $I_D=280A$


TOLL

• Ordering Information:

Part NO.	ZMS011N06HR
Marking	ZMS011N06H
Packing Information	REEL TAPE
Basic ordering unit (pcs)	800

• Absolute Maximum Ratings ($T_C=25^\circ C$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D@T_C=25^\circ C$	280	A
	$I_D@T_C=75^\circ C$	212	A
	$I_D@T_C=100^\circ C$	176	A
Pulsed Drain Current ^①	I_{DM}	780	A
Total Power Dissipation	$P_D@T_C=25^\circ C$	156	W
Total Power Dissipation ^②	$P_D@T_A=25^\circ C$	3.1	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ C$
Storage Temperature	T_{STG}	-55 to 150	$^\circ C$
Single Pulse Avalanche Energy@L=0.1mH	E_{AS}	240	mJ
ESD Level (HBM)		CLASS 2	

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	0.8	$^{\circ}C/W$
Thermal resistance, junction - ambient ^②	R_{thJA}	-	-	40	$^{\circ}C/W$
Soldering temperature, wave soldering for 10s	T_{sold}	-	-	265	$^{\circ}C$

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	60			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	2.0		4.0	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 60V, V_{GS} = 0V$			1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 55A$		1.1	1.5	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = 25V, I_D = 10A$		45		s
Source-drain voltage	V_{SD}	$I_S = 55A$			1.28	V

•Dynamic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	$f = 1MHz,$ $V_{DS} = 25V$	-	7650	-	μF
Output capacitance	C_{oss}		-	4430	-	
Reverse transfer capacitance	C_{rss}		-	572	-	
Gate Resistance	R_g	$f = 1MHz$		1.6		Ω
Total gate charge	Q_g	$V_{DD} = 15V$ $I_D = 20A$ $V_{GS} = 10V$	-	142	-	nC
Gate - Source charge	Q_{gs}		-	42	-	
Gate - Drain charge	Q_{gd}		-	29	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{GS} = 10V,$ $V_{DS} = 15V$ $R_G = 3.3\Omega,$ $I_D = 20A$		30		ns
Turn-ON Rise time	t_r			12		ns
Turn-Off Delay time	$t_{D(off)}$			65		ns
Turn-Off Fall time	t_f			14		ns
Reverse Recovery Time	t_{RR}	$V_{DD} = 30V,$ $dI_S/dt = 100A/s,$ $I_S = 50A$		210		ns
Reverse Recovery Charge	Q_{RR}			200		ns

Fig.1 Power Dissipation

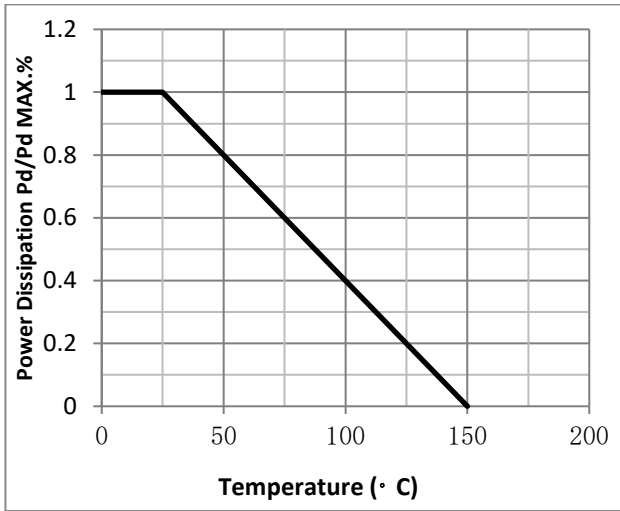


Fig.2 Typical output Characteristics

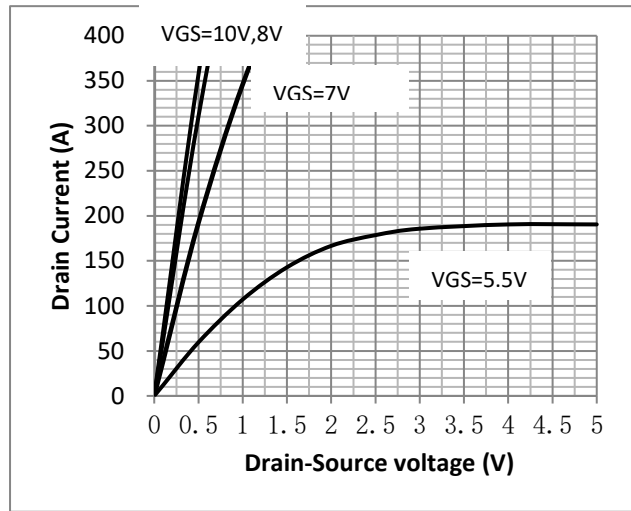


Fig.3 Threshold Voltage V.S Junction Temperature

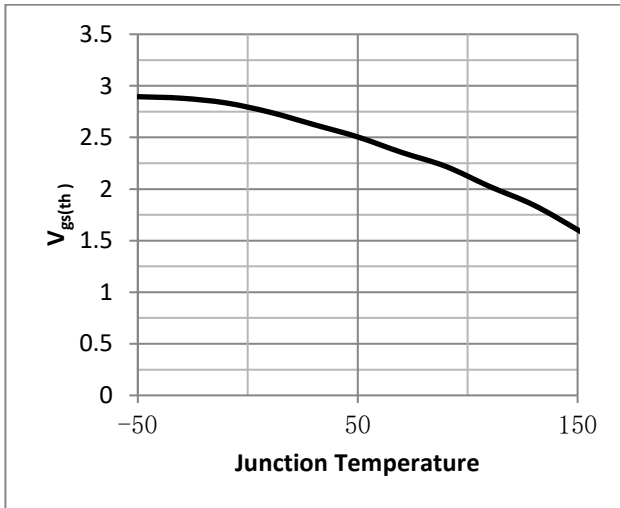


Fig.4 Resistance V.S Drain Current

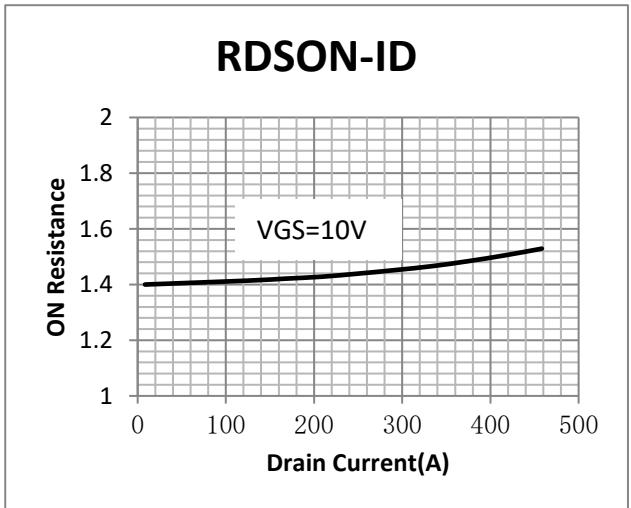


Fig.5 On-Resistance VS Gate Source Voltage

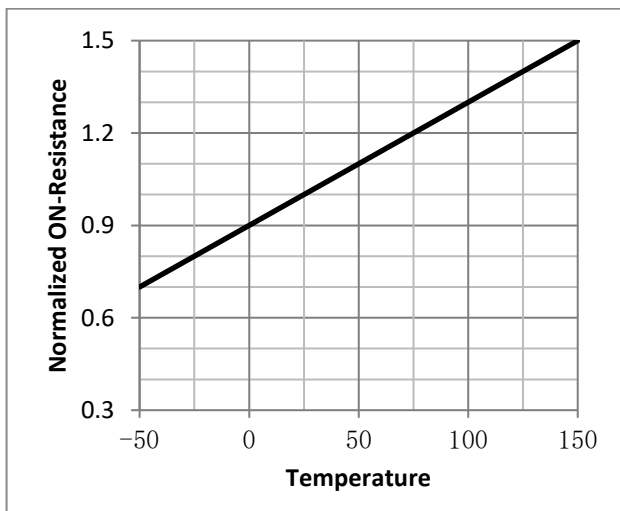


Fig.6 On-Resistance V.S Junction Temperature

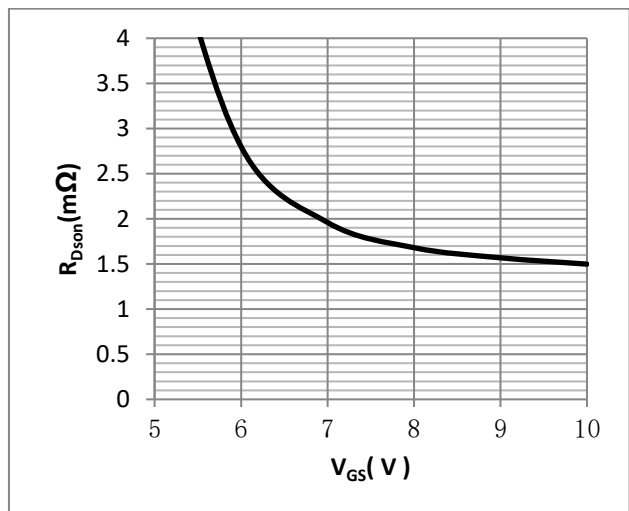


Fig.7 Gate Charge Characteristics

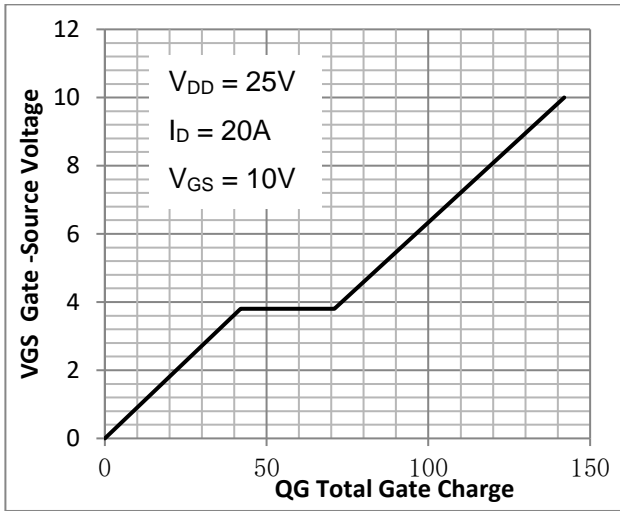


Fig.8 Capacitance vs V_{DS}

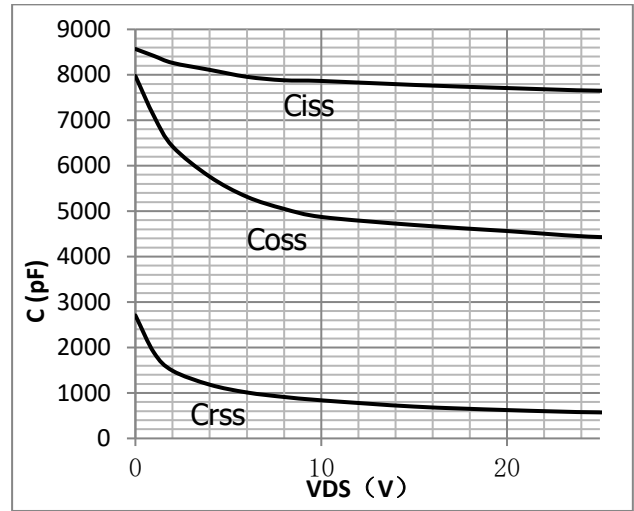


Fig.9 SOA Maximum Safe Operating Area

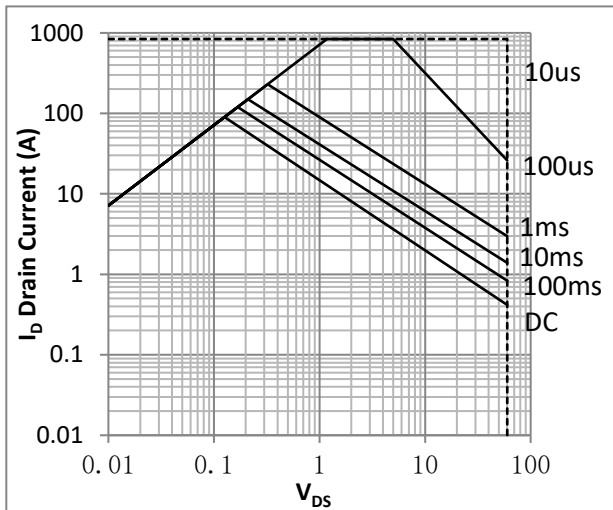


Fig.10 I_D -Junction Temperature

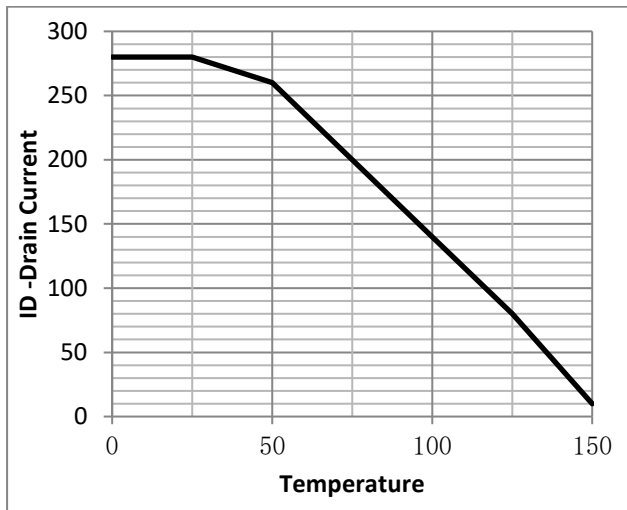


Figure 11. Diode Forward Voltage vs. Current

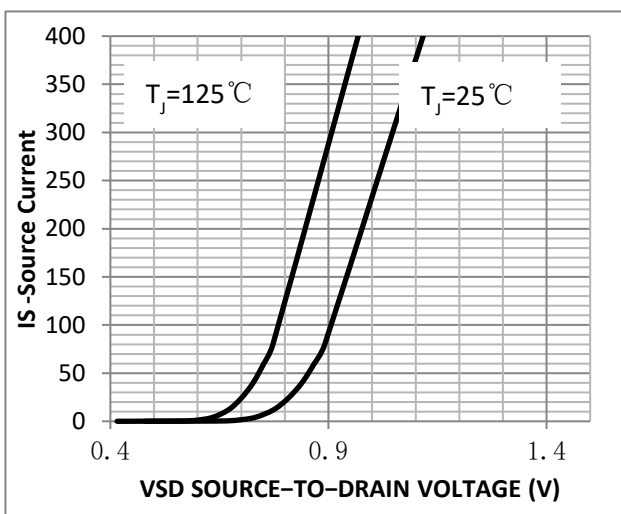


Figure 12. Transfer Characteristics

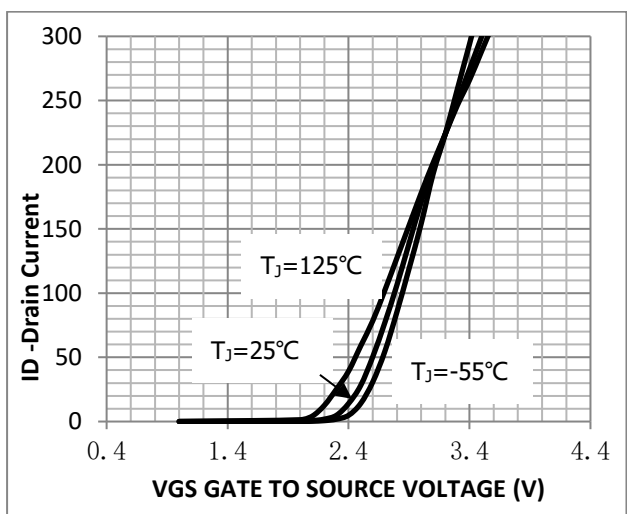


Fig.13 Switching Time Measurement Circuit

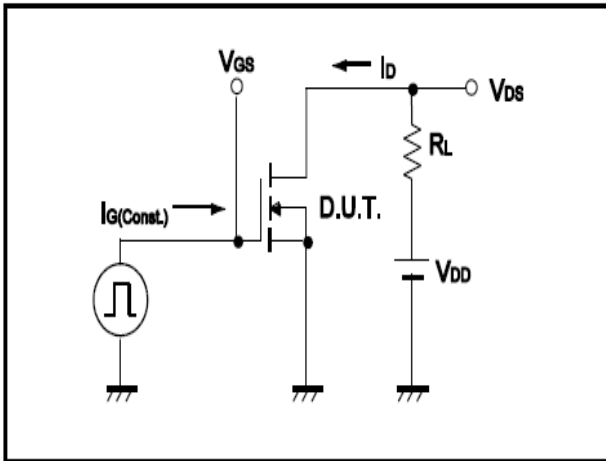


Fig.14 Gate Charge Waveform

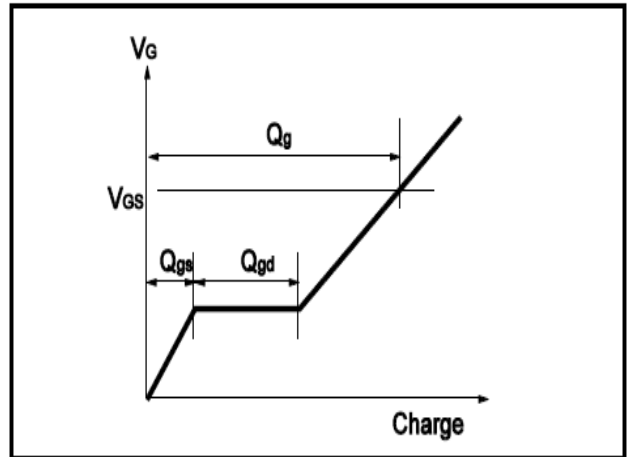


Fig.15 Resistive Switching Test Circuit

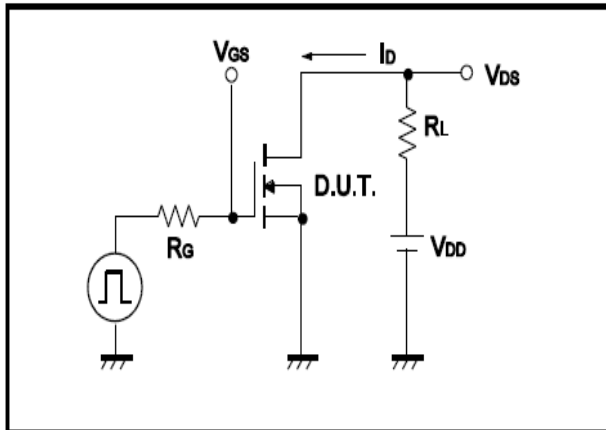


Fig.16 Resistive Switching Test Waveform

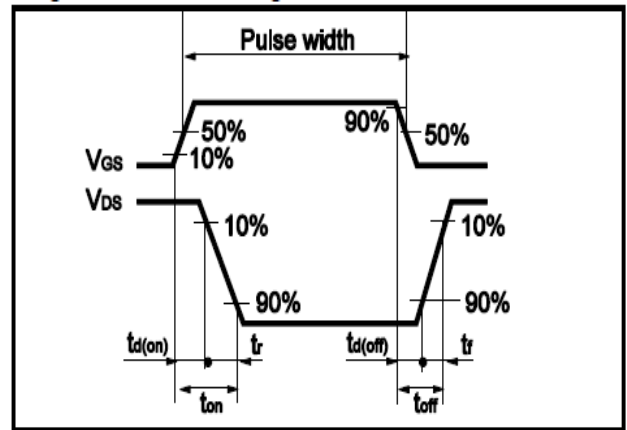


Fig.17 Avalanche Measurement Circuit

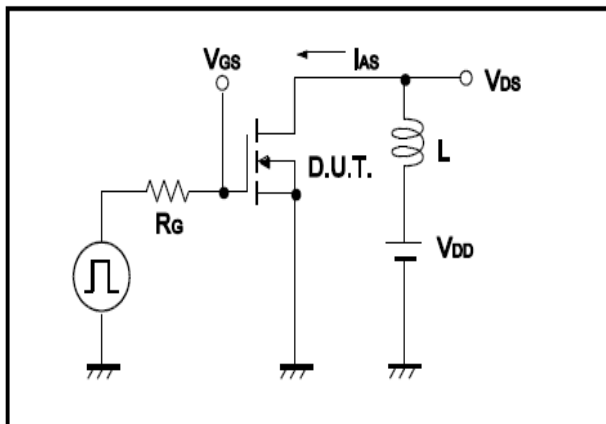
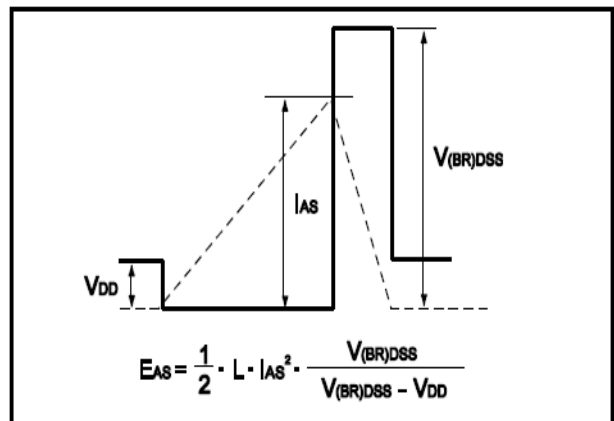


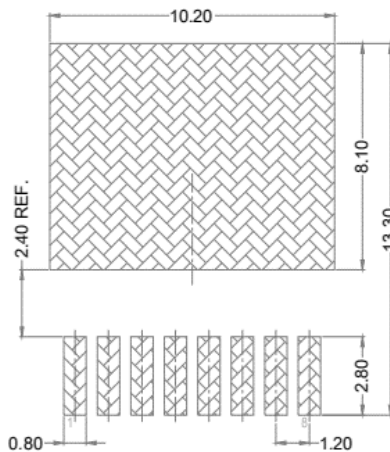
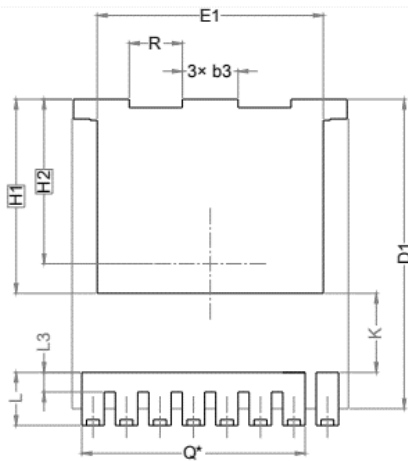
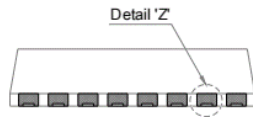
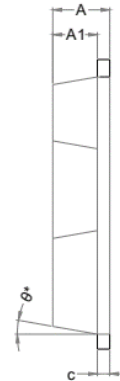
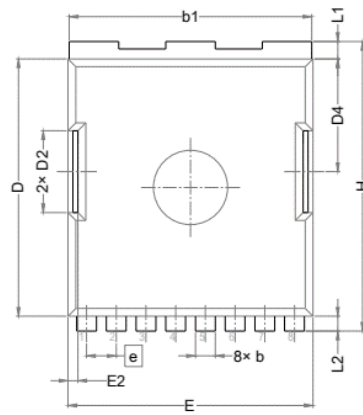
Fig.18 Avalanche Waveform





•Dimensions (TOLL)

Unit: mm



SYMBOL	DIMENSIONS		
	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
A1	1.70	1.80	1.90
b	0.70	0.80	0.90
b1	9.70	9.80	9.90
b3	1.90	2.00	2.10
c	0.40	0.50	0.60
D	10.28	10.38	10.48
D1	10.98	11.08	11.18
D2	3.20	3.30	3.40
D4	4.45	4.55	4.65
E	9.80	9.90	10.00
E1	8.00	8.10	8.20
E2	0.30	0.40	0.50
e	1.20 BSC		
H	11.58	11.68	11.78
H1	6.95 BSC		
H2	5.89 BSC		
i	0.10 REF.		
j	0.46 REF.		
K	2.80 REF.		
L	1.60	1.90	2.10
L1	0.60	0.70	0.80
L2	0.50	0.60	0.70
L3	0.60	0.70	0.80
N	8		
Q	6.80 REF.		
R	1.80	1.90	2.00
theta	10° REF.		



Note: ① Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$;

② Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;