● 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 load switch and battery protection applications.

● Features

■ Advance high cell density Trench technology

■Low $R_{DS(ON)}$ to minimize conductive loss

■Low Gate Charge for fast switching

■Low Thermal resistance

■Wettable Flanks

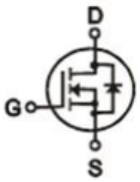
●Application

■SMPS 2nd Synchronous Rectifier

■POL application

■BLDC Motor driver

● Product Summary

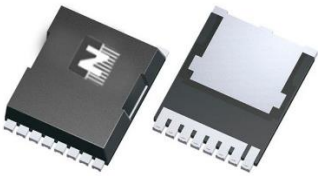


V_{DS} =30V

$R_{DS(ON)}$ =1.0mΩ

I_D =304A

RoHS



TOLL

●Ordering Information:

Part NO.	ZMS006N03R
Marking	ZMS006N03
Packing Information	REEL TAPE
Basic ordering unit (pcs)	800

●Absolute Maximum Ratings (T_C=25℃)

Parameter	**Symbol**	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D @T_C=25℃	304①	A
	I_D @T_C=75℃	258	A
	I_D @T_C=100℃	191	A
Pulsed Drain Current ②	I_{DM}	912	A
Total Power Dissipation	P_D@T_C=25℃	250	W
Total Power Dissipation③	P_D@T_A=25℃	4.2	W
Operating Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃
Single Pulse Avalanche Energy (L=0.5mH, VGS=10V, Rg=25Ω,TJ=25	E_{AS}	1120	mJ
Single Pulse Avalanche Energy (L=0.1mH,VGS=10V,Rg=25Ω,TJ=25	E_{AS}	450	mJ

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	0.5	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	30	° C/W
Soldering temperature, wave soldering for 10s	T_{sold}	-	-	265	° C

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D =250uA	30			V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS}, I_D =250uA	1.2		2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS} =0V			1.0	uA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS} =0V			±100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=100A		1.0	1.3	mΩ
		V_{GS}=4.5V, I_D=70A		1.6	2.1	mΩ
Forward Transconductance	g_{FS}	V_{DS} =25V, I_D=100A		32		s
Source-drain voltage	V_{SD}	Is=24A			1.28	V

●Dynamic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	Ciss	f = 1MHz, V_{DS}=25V	-	6558	-	pF
Output capacitance	Coss		-	1354	-	
Reverse transfer capacitance	Crss		-	121	-	
Gate Risistance	R_g	f = 1MHz		2.2		Ω
Total gate charge	Qg	V_{DD} =20V, I_D = 20A, V_{GS} = 10V	-	114	-	nC
Gate - Source charge	Qgs		-	11	-	
Gate - Drain charge	Qgd		-	33	-	
Turn-ON Delay time	$t_{D(on)}$	V_{GS}=10V, V_{DS}=15V, R_G =6Ω, I_D =25A		26		ns
Turn-ON Rise time	t_r			27		ns
Turn-Off Delay time	$t_{D(off)}$			68		ns
Turn-Off Fall time	t_f			16		ns
Reverse Recovery Time	t_{RR}	V_{DD} = 20 V, dI_S/dt = 100 A/s, I_S = 30 A		68		ns
Charge Time	t_a			25		ns
Discharge Time	t_b			29		ns
Reverse Recovery Charge	Q_{RR}			98		nC

Fig.1 Power Dissipation

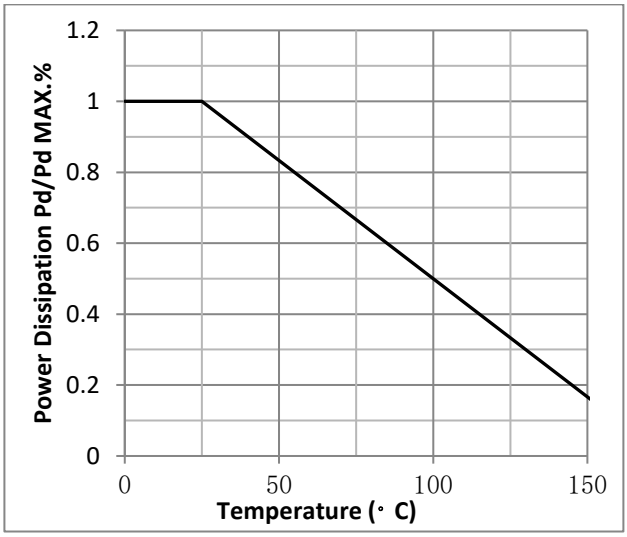


Fig.2 Typical output Characteristics

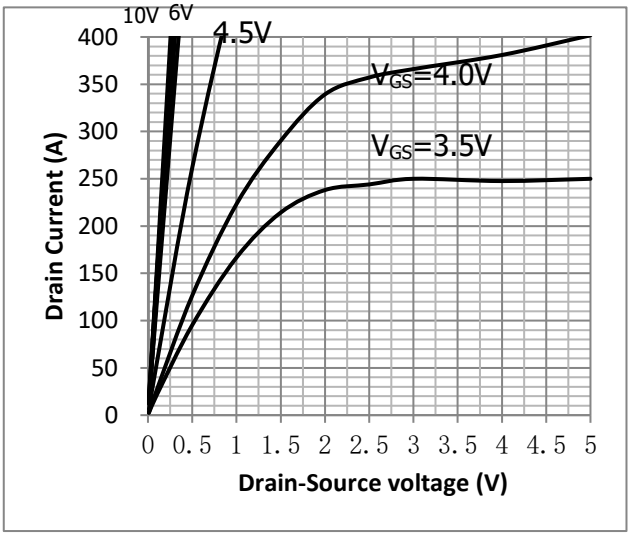


Fig.3 Threshold Voltage V.S Junction Temperature

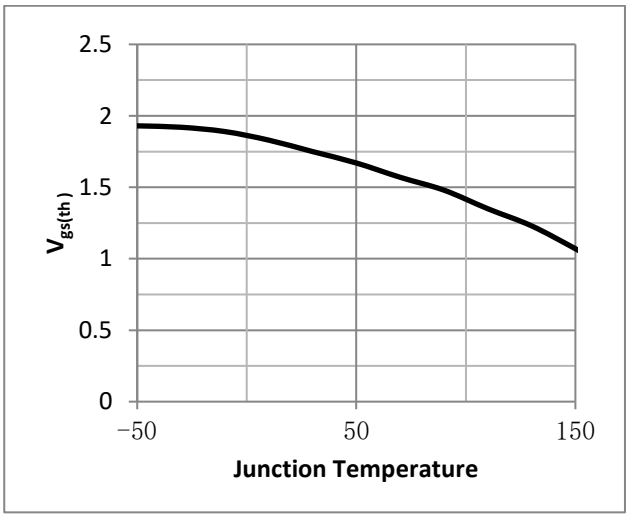


Fig.4 Resistance V.S Drain Current

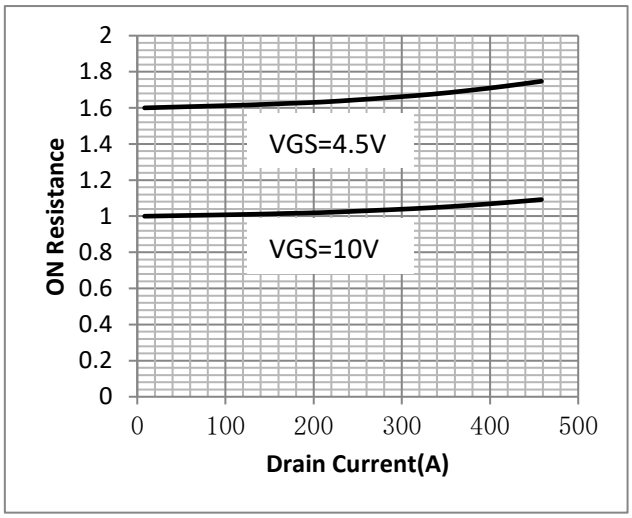


Fig.5 On-Resistance VS Gate Source Voltage

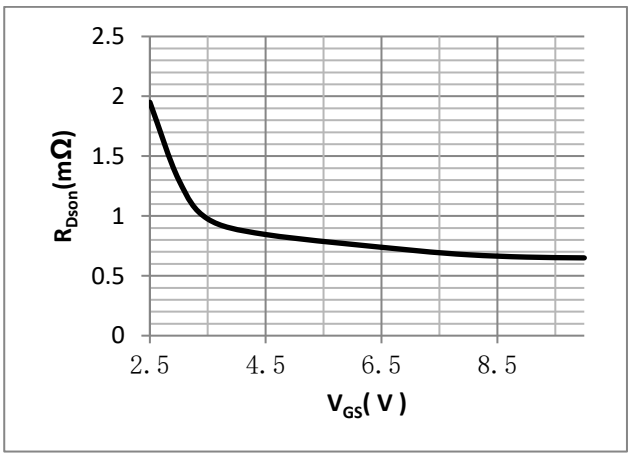


Fig.6 On-Resistance V.S Junction Temperature

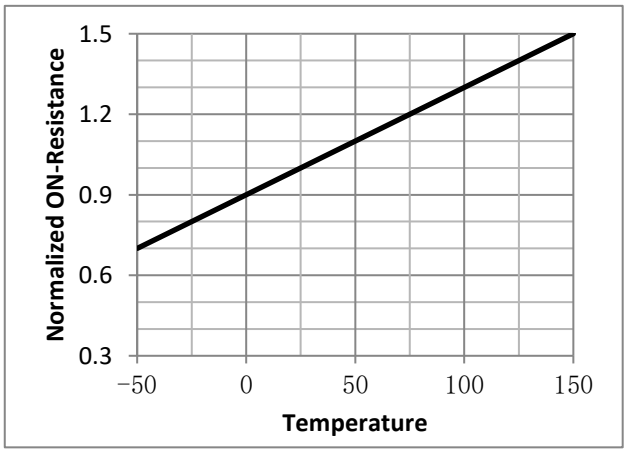


Fig.7 Gate Charge Characteristics

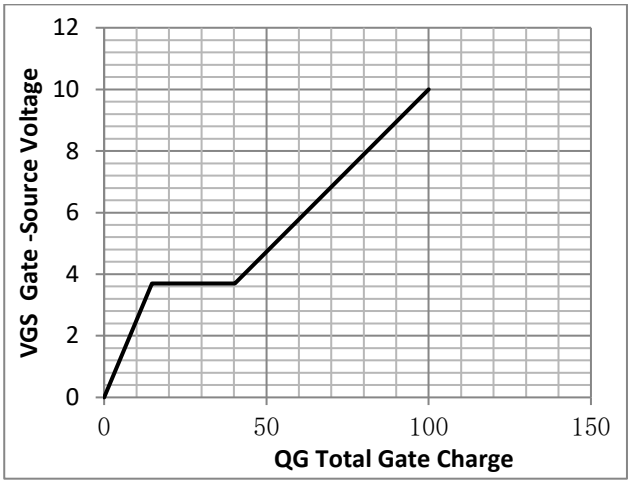


Fig.8 Capacitance vs Vds

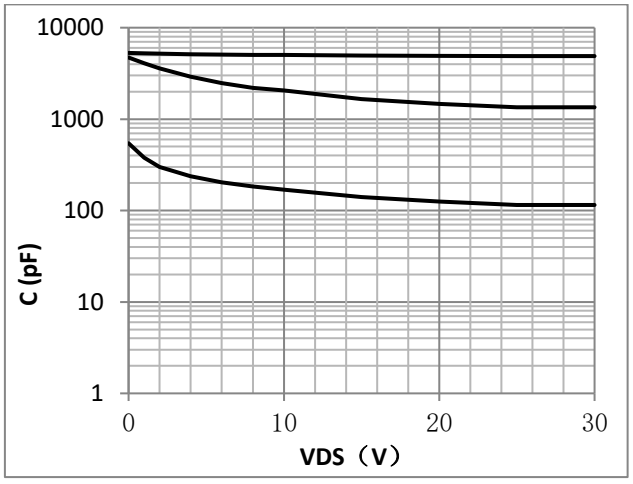


Fig.9 Diode Forward Voltage vs. Current

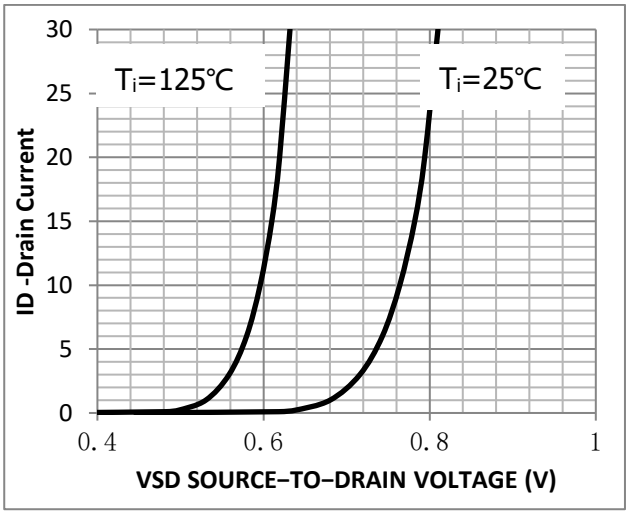


Fig.10 Capacitance Variation

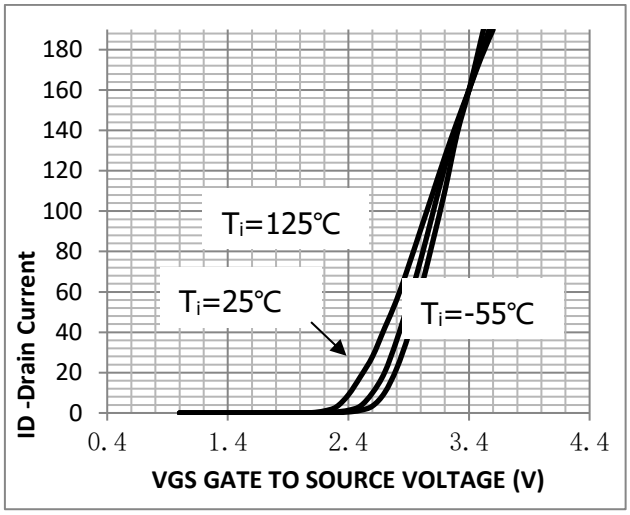


Fig.11 SOA Maximum Safe Operating Area

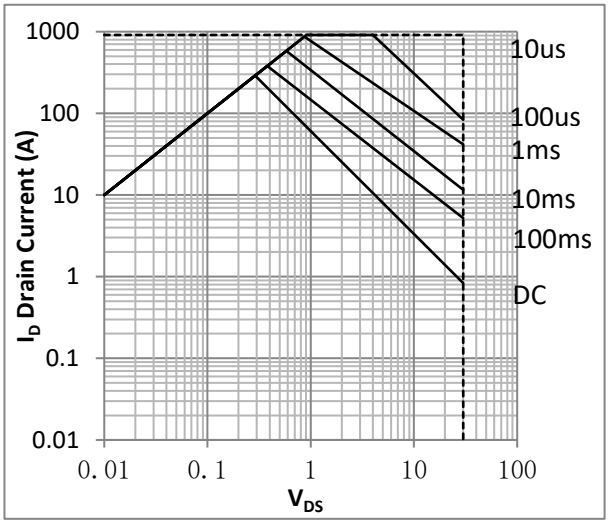


Fig.12 ID-Junction Temperature

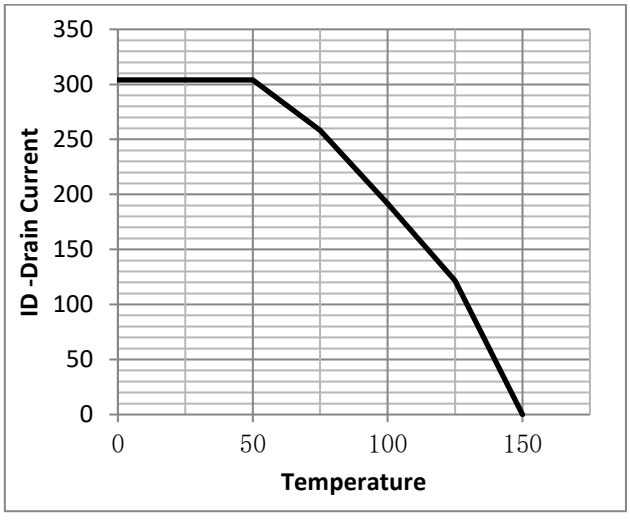


Fig.13 Normalized Maximum Transient Thermal Impedance

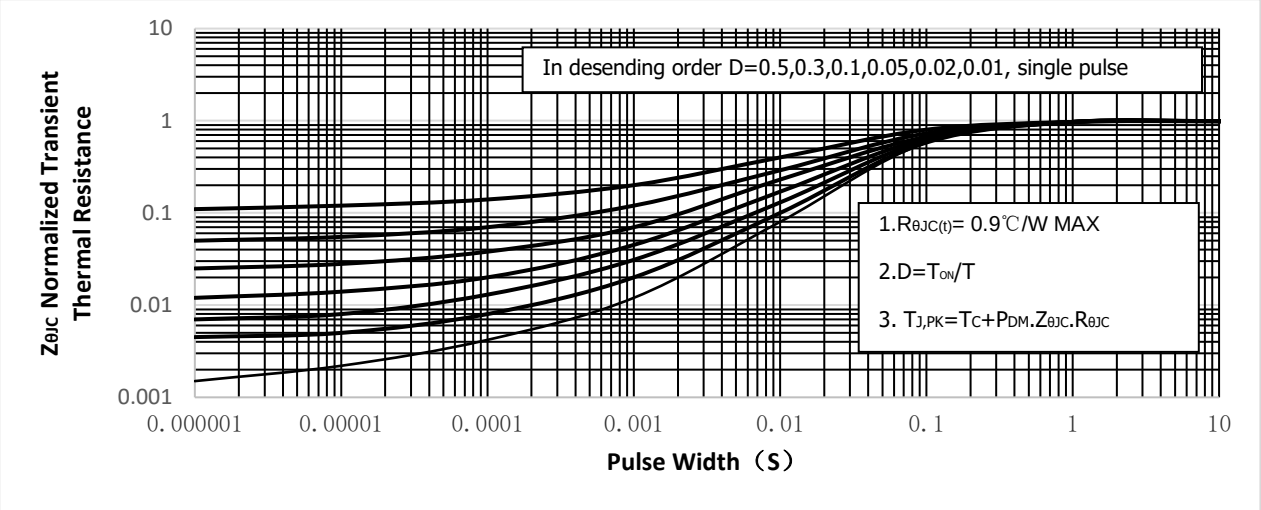


Fig.14 Switching Time Measurement Circuit

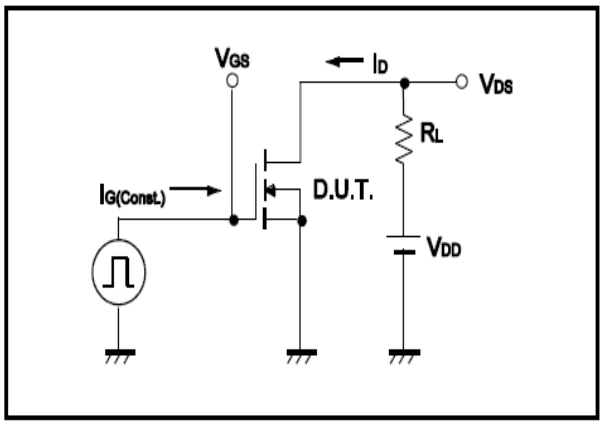


Fig.15 Gate Charge Waveform

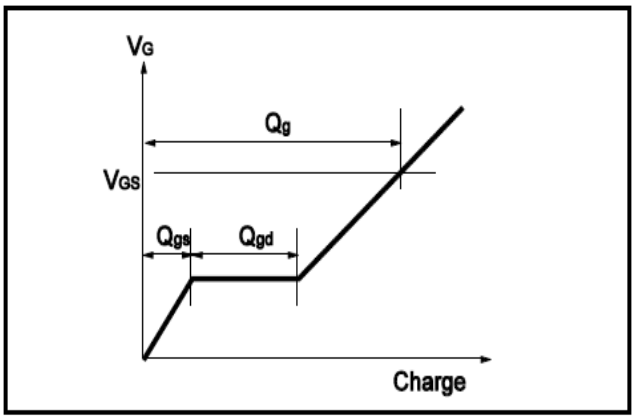


Fig.16 Resistive Switching Test Circuit

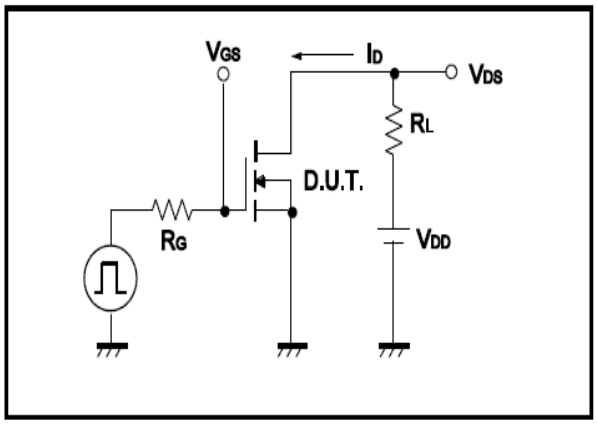


Fig.17 Resistive Switching Test Waveform

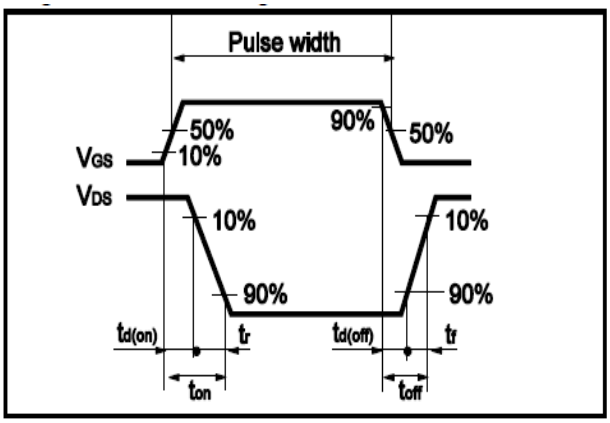


Fig.18 Avalanche Measurement Circuit

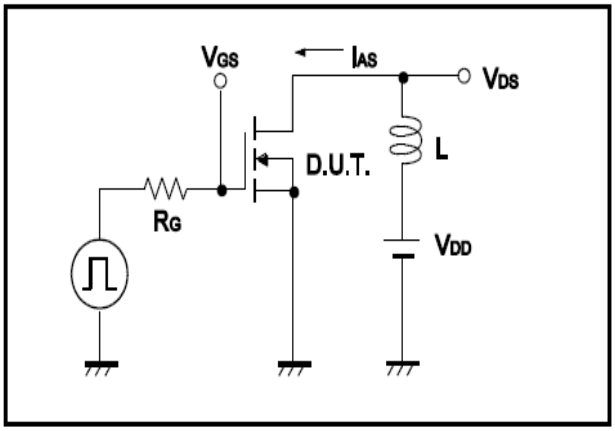
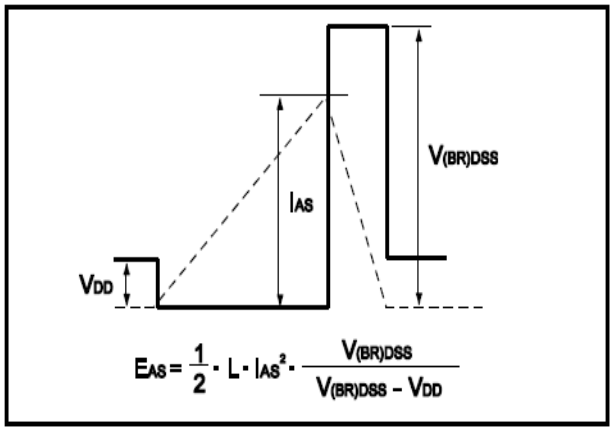
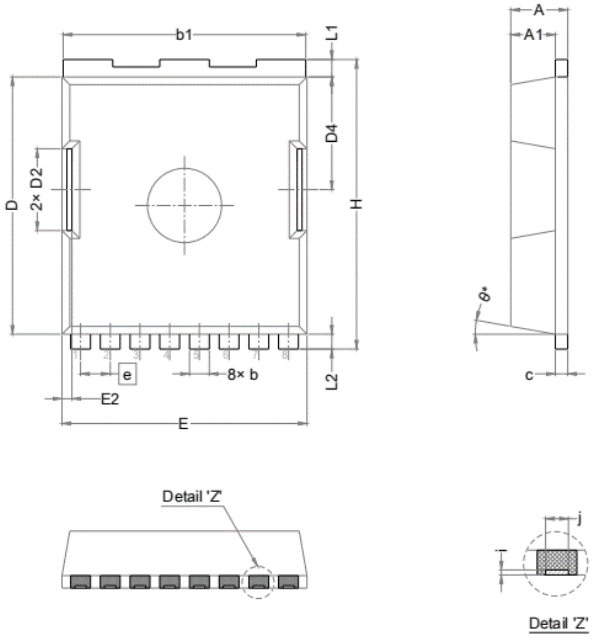


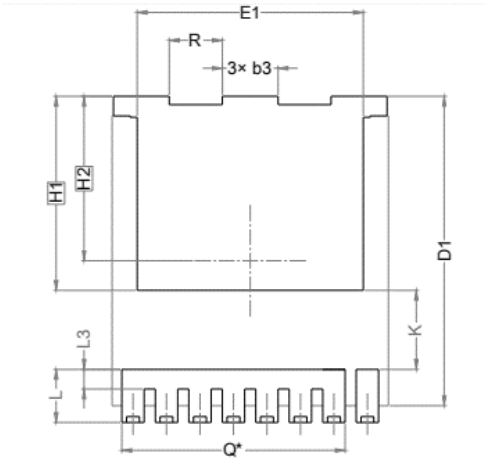
Fig.19 Avalanche Waveform

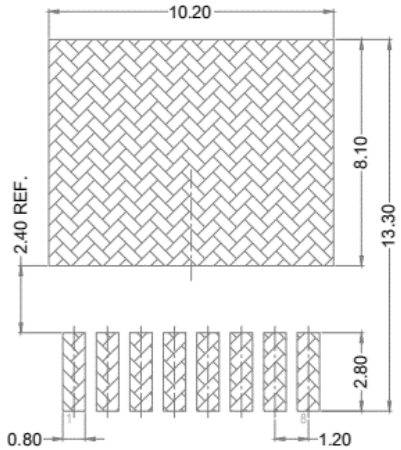


●Dimensions (TOLL)

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
θ	10° REF.		

Note:

① Limited by bonding wire

②Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2% ;

③Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate；