

### • General Description

The ZMD68311M combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . Two N Channel MOSFET inside for dual DIE implication.

### • Features

- Advance high cell density Trench technology
- Low  $R_{DS(ON)}$  to minimize conductive loss
- Low Gate Charge for fast switching
- Dual DIE in one package

### • Application

- Power Management in Notebook Computer
- BLDC Motor driver

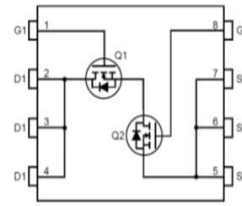
### • Ordering Information:

Part NO.	ZMD68311M
Marking	68311
Packing Information	REEL TAPE
Basic ordering unit (pcs)	5000

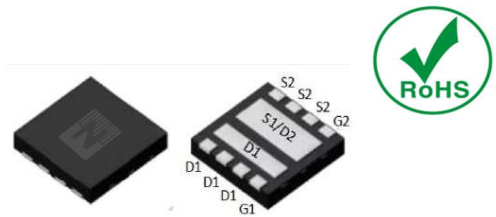
### • Absolute Maximum Ratings ( $T_c = 25^\circ\text{C}$ ) (Q1)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D@T_c=25^\circ\text{C}$	12	A
	$I_D@T_c=75^\circ\text{C}$	9.1	A
	$I_D@T_c=100^\circ\text{C}$	7.5	A
Pulsed Drain Current <sup>①</sup>	$I_{DM}$	36	A
Total Power Dissipation	$P_D@T_c=25^\circ\text{C}$	17	W
Total Power Dissipation	$P_D@T_A=25^\circ\text{C}$	0.9	W
Operating Junction Temperature	$T_J$	-55 to 150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 to 150	$^\circ\text{C}$
Single Pulse Avalanche Energy@L=0.1mH	$E_{AS}$	10	mJ

### • Product Summary



$V_{DS1} = 30\text{V}$   
 $V_{DS2} = 30\text{V}$   
 $R_{DS(ON)1} = 10\text{m}\Omega$   
 $R_{DS(ON)2} = 8\text{m}\Omega$   
 $I_{D1} = 12\text{A}$   
 $I_{D2} = 15\text{A}$



DFN3\*3

**•Thermal resistance(Q1)**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case <sup>②</sup>	R <sub>thJC</sub>	-	-	7.1	° C/W
Thermal resistance, junction - ambient	R <sub>thJA</sub>	-	-	140	° C/W
Soldering temperature, wavesoldering for 10s	T <sub>sold</sub>	-	-	265	° C

**•Electronic Characteristics(Q1)**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250uA	30			V
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250uA	1.2		2.5	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V			1.0	uA
Gate- Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V			±100	nA
Static Drain-source On Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 12A		10	13	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 10A		14	17	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 25V, I <sub>D</sub> = 10A		5		s
Source-drain voltage	V <sub>SD</sub>	I <sub>S</sub> = 12A			1.28	V

**•Electronic Characteristics(Q1)**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 25V f = 1MHz	-	850	-	pF
Output capacitance	C <sub>oss</sub>		-	190	-	
Reverse transfer capacitance	C <sub>rss</sub>		-	100	-	

**•Gate Charge characteristics(T<sub>a</sub> = 25°C)(Q1)**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q <sub>g</sub>	V <sub>DD</sub> = 15V	-	10	-	nC
Gate - Source charge	Q <sub>gs</sub>	I <sub>D</sub> = 12A	-	3.5	-	
Gate - Drain charge	Q <sub>gd</sub>	V <sub>GS</sub> = 10V	-	5	-	

**•Absolute Maximum Ratings (T<sub>C</sub> =25°C) (Q2)**

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V <sub>DS</sub>	30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current	I <sub>D</sub> @T <sub>C</sub> =25°C	15	A
	I <sub>D</sub> @T <sub>C</sub> =75°C	11.4	A
	I <sub>D</sub> @T <sub>C</sub> =100°C	9.5	A
Pulsed Drain Current <sup>①</sup>	I <sub>DM</sub>	45	A
Total Power Dissipation	P <sub>D</sub> @T <sub>C</sub> =25°C	17	W
Total Power Dissipation	P <sub>D</sub> @T <sub>A</sub> =25°C	0.9	W
Operating Junction Temperature	T <sub>J</sub>	-55 to 150	°C
Storage Temperature	T <sub>STG</sub>	-55 to 150	°C
Single Pulse Avalanche Energy@L=0.1mH	E <sub>AS</sub>	32	mJ

**•Thermal resistance(Q2)**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case <sup>②</sup>	R <sub>thJC</sub>	-	-	7.1	° C/W
Thermal resistance, junction - ambient	R <sub>thJA</sub>	-	-	140	° C/W
Soldering temperature, wavesoldering for 10s	T <sub>sold</sub>	-	-	265	° C

**•Electronic Characteristics(Q2)**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30			V
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.2		2.5	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V			1.0	uA
Gate- Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
Static Drain-source On Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =15A		8.0	10.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A		11	14.3	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =25V, I <sub>D</sub> =10A		10		s
Source-drain voltage	V <sub>SD</sub>	I <sub>S</sub> =15A			1.28	V

**•Electronic Characteristics(Q2)**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	$C_{iss}$	$V_{DS}=25V$ $f = 1MHz$	-	1150	-	pF
Output capacitance	$C_{oss}$		-	235	-	
Reverse transfer capacitance	$C_{rss}$		-	120	-	

**•Gate Charge characteristics( $T_a = 25^\circ C$ )(Q2)**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	$Q_g$	$V_{DD} = 15V$	-	12	-	nC
Gate - Source charge	$Q_{gs}$	$I_D = 15A$	-	4	-	
Gate - Drain charge	$Q_{gd}$	$V_{GS} = 10V$	-	6	-	

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

**•characteristics curve(Q1)**

Fig.1 Power Dissipation Derating Curve

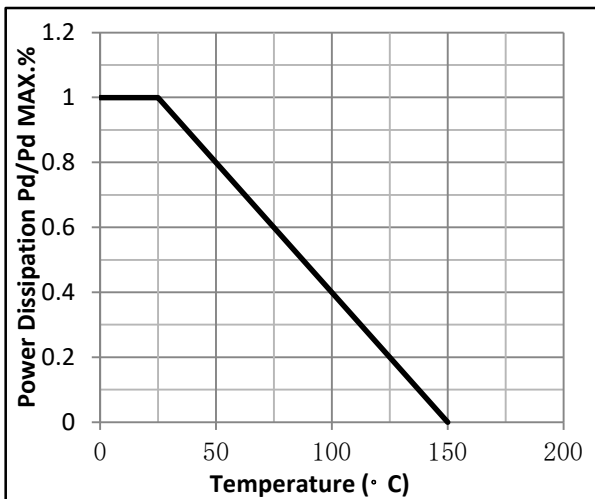


Fig.2 Typical output Characteristics

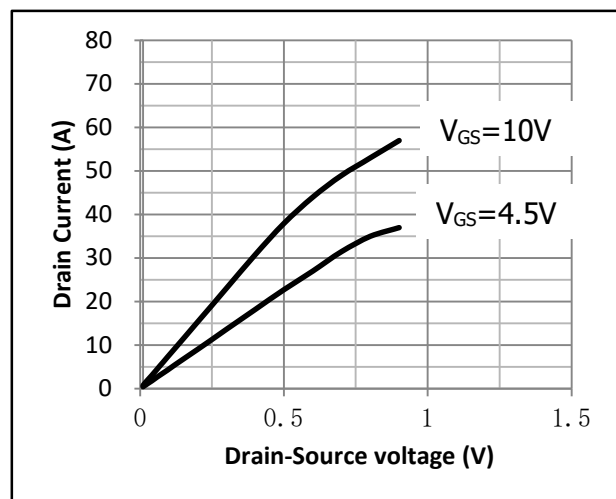


Fig.3 Threshold Voltage V.S Junction Temperature

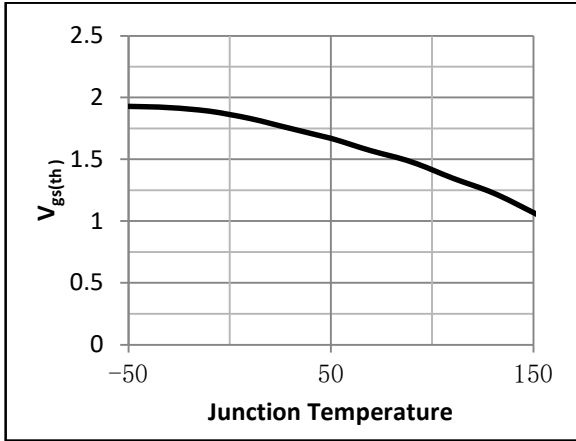


Fig.4 Resistance V.S Drain Current

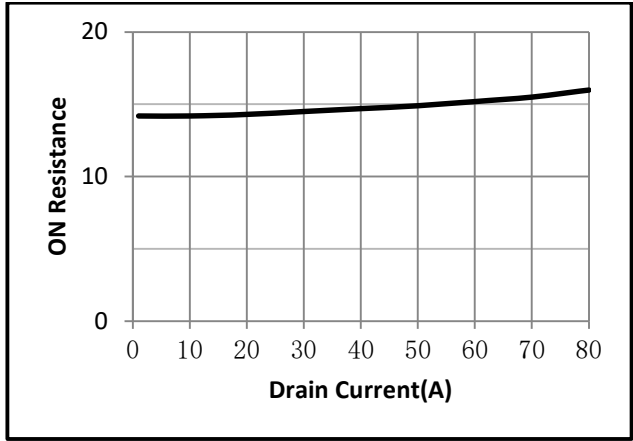


Fig.5 On-Resistance VS Gate Source Voltage

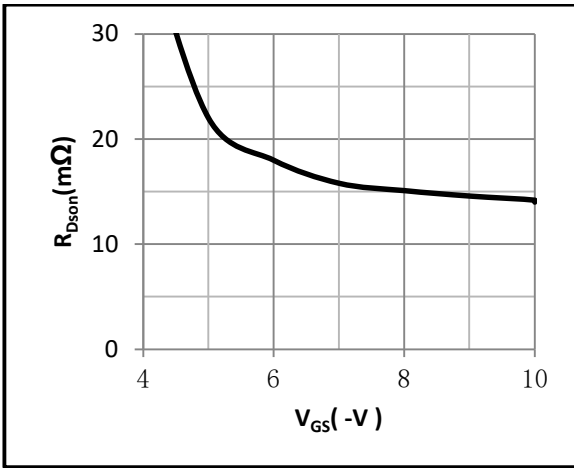
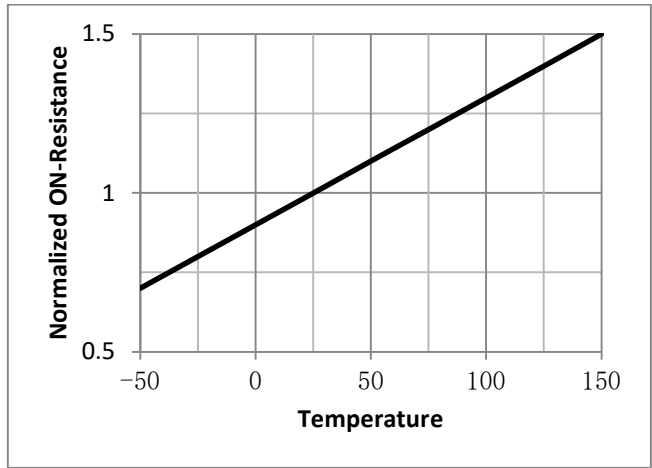


Fig.6 On-Resistance V.S Junction Temperature



●characteristics curve(Q2)

Fig.1 Power Dissipation

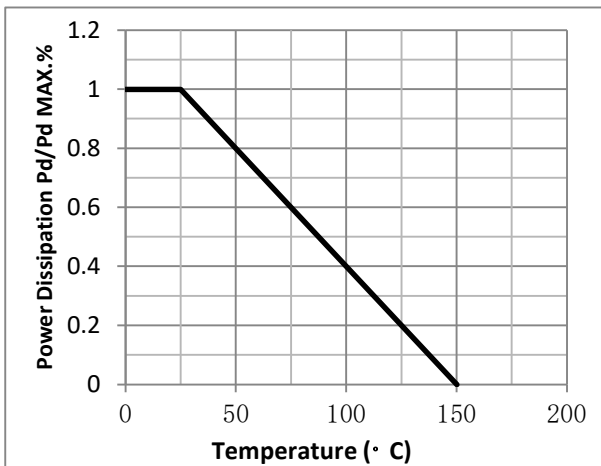


Fig.2 Typical output Characteristics

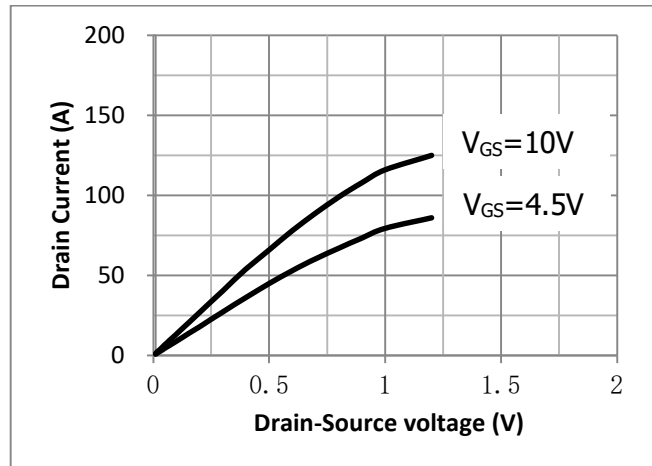


Fig.3 Threshold Voltage V.S Junction Temperature

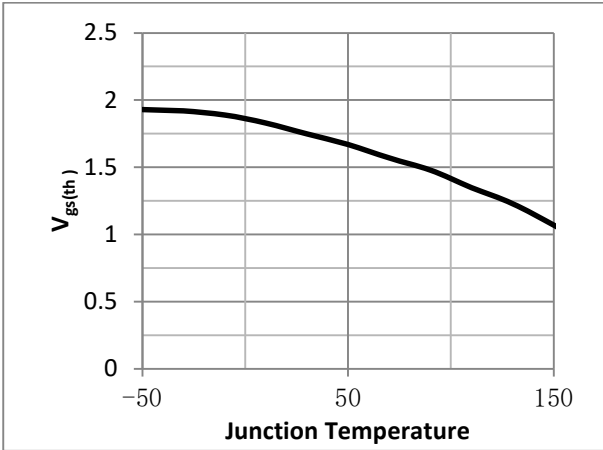


Fig.4 Resistance V.S Drain Current

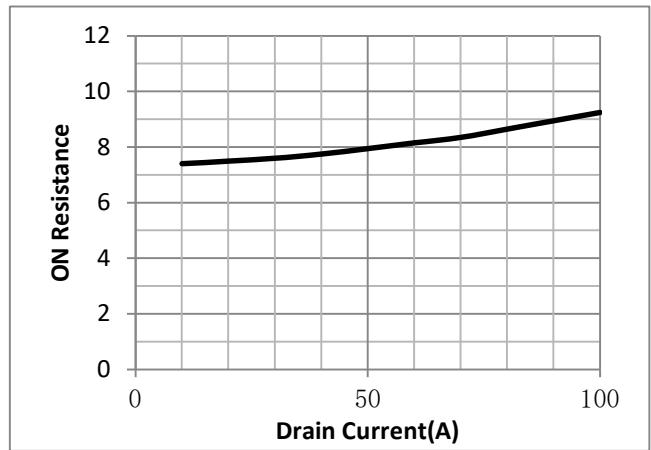


Fig.5 On-Resistance VS Gate Source Voltage

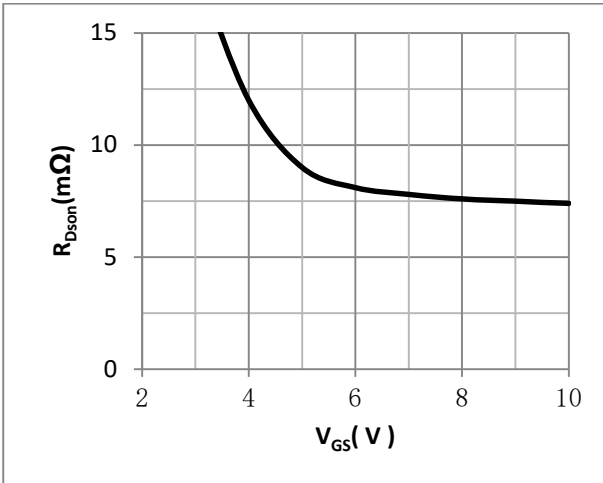
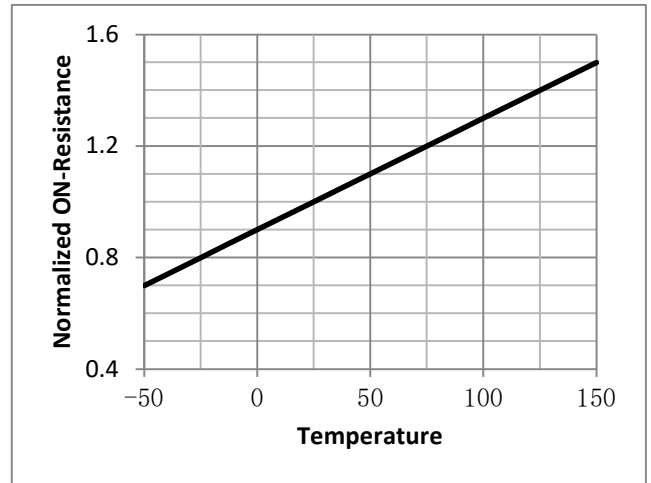


Fig.6 On-Resistance V.S Junction Temperature



•Test Circuit

Fig.1 Gate Charge Measurement Circuit

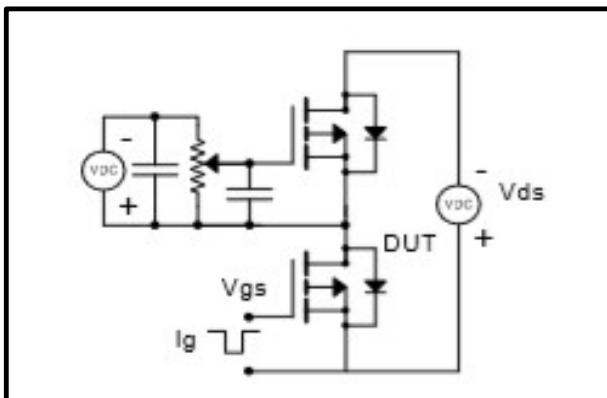


Fig.2 Gate Charge Waveform

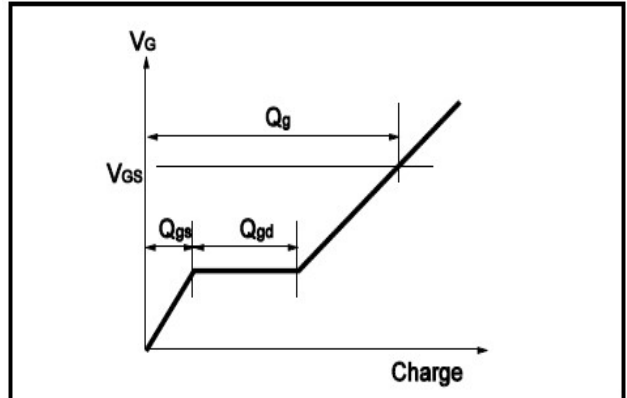


Fig.3 Switching Time Measurement Circuit

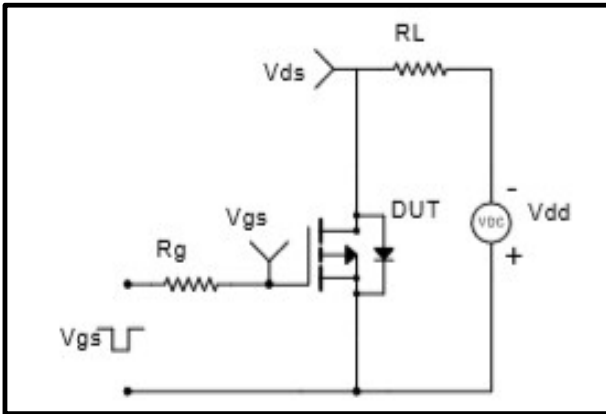


Fig.4 Switching Time Waveform

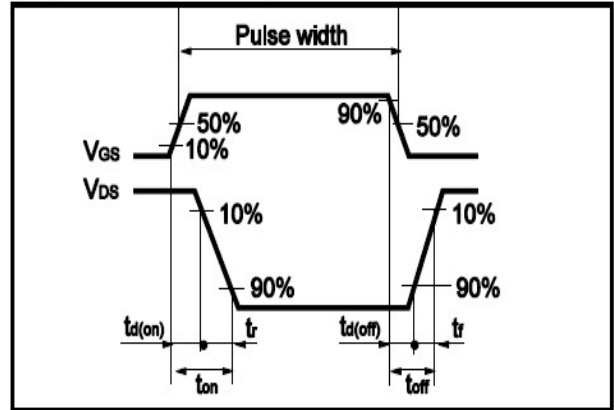


Fig.5 Avalanche Measurement Circuit

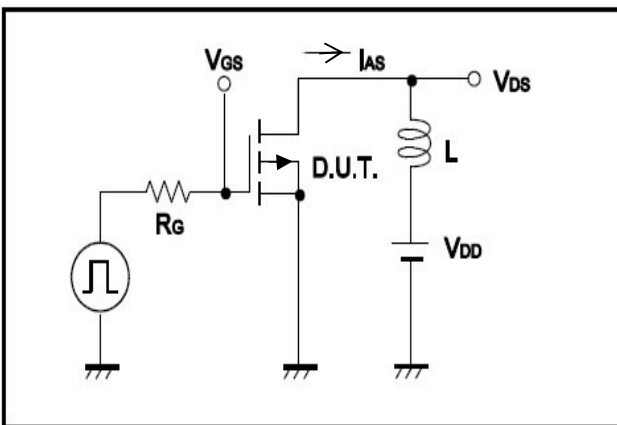
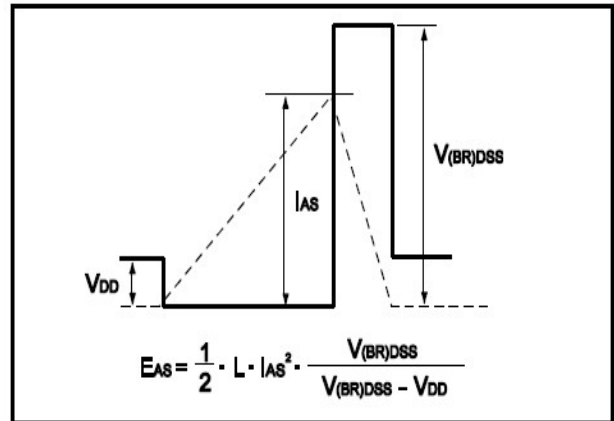


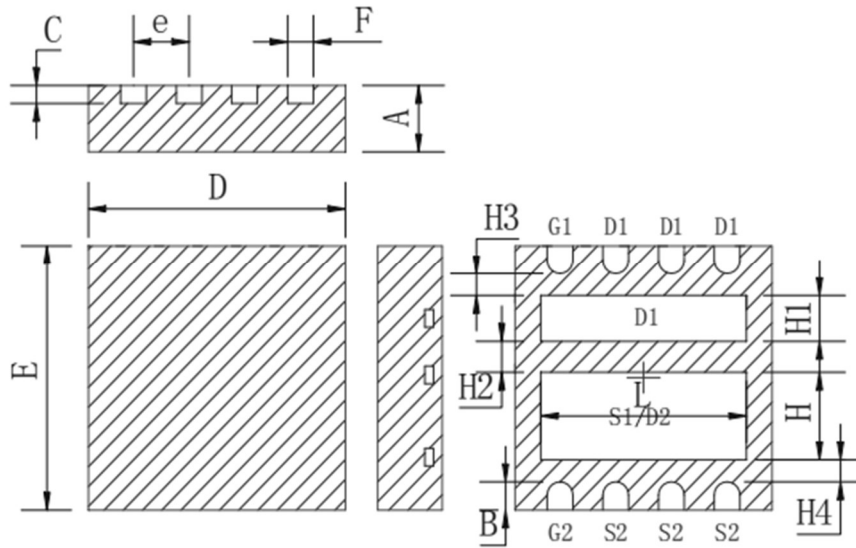
Fig.6 Avalanche Waveform





•Dimensions (DFN3×3)

Unit: mm



Symbol	Min	Typ	Max
A	0.70	0.75	0.80
B	0.27	0.32	0.37
C	0.153	0.203	0.253
D	2.90	3.00	3.10
E	2.90	3.00	3.10
e	0.60	0.65	0.70
F	0.25	0.30	0.35
H	0.89	0.99	1.09
H1	0.42	0.52	0.62
H2	0.25	0.35	0.45
H3	0.15	0.25	0.35
H4	0.15	0.25	0.35
L	2.30	2.40	2.50