

**• General Description**

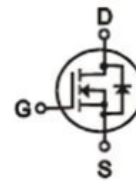
It combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . This device is ideal for load switch and battery protection applications.

**• Features**

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

**• Application**

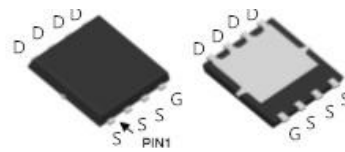
- MB/VGA Vcore
- SMPS 2<sup>nd</sup> Synchronous Rectifier
- POL application
- BLDC Motor driver

**• Product Summary**


$V_{DS} = 30V$

$R_{DS(ON)} = 1.45m\Omega$

$I_D = 115A$


**DFN5 x 6**
**• Ordering Information:**

Part NO.	ZM019N03NC
Marking	ZM019N03
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

**• Absolute Maximum Ratings (TC=25°C)**

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	20	V
Continuous Drain Current	$I_D @ TC=25^\circ C$	115	A
	$I_D @ TC=75^\circ C$	87	A
	$I_D @ TC=100^\circ C$	72	A
Pulsed Drain Current ①	$I_{DM}$	300	A
Total Power Dissipation(TC=25°C)	$P_D @ TC=25^\circ C$	80	W
Total Power Dissipation(TA=25°C)	$P_D @ TA=25^\circ C$	3.2	W
Operating Junction Temperature	$T_J$	-55 to 150	°C
Storage Temperature	$T_{STG}$	-55 to 150	°C
Single Pulse Avalanche Energy	$E_{AS}$	400	mJ



### •Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	$R_{thJC}$	-	-	1.5	$^{\circ}C/W$
Thermal resistance, junction - ambient	$R_{thJA}$	-	-	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	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2		2.5	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V$			1.0	$\mu A$
Gate- Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=24A$		1.45	1.9	m $\Omega$
		$V_{GS}=4.5V, I_D=12A$		2.1	2.7	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=25V, I_D=10A$		35		S
Source-drain voltage	$V_{SD}$	$I_S=24A$			1.28	V

### •Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	$C_{iss}$	$f = 1MHz,$ $V_{DS}=25V$	-	5200	-	pF
Output capacitance	$C_{oss}$		-	650	-	
Reverse transfer capacitance	$C_{rss}$		-	500	-	

### •Gate Charge characteristics( $T_a = 25^{\circ}C$ )

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Resistance	$R_g$	$f = 1MHz$		1.0		$\Omega$
Total gate charge	$Q_g$	$V_{DD} = 25V$ $I_D = 8A$ $V_{GS} = 10V$	-	104	-	nC
Gate - Source charge	$Q_{gs}$		-	14	-	
Gate - Drain charge	$Q_{gd}$		-	31	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=15V$ $R_G = 3.3\Omega,$		12		ns
Turn-ON Rise time	$t_r$			7		ns



Turn-Off Delay time	$t_{D(off)}$	$I_D = 20A$		53		ns
Turn-Off Fall time	$t_f$			14		ns
Reverse Recovery Time	$t_{RR}$	$V_{DD} = 20 V,$ $dI_S/dt = 100 A/s,$ $I_S = 30 A$		19.3		ns
Charge Time	$t_a$			10.9		ns
Discharge Time	$t_b$			8.4		ns
Reverse Recovery Charge	$Q_{RR}$			9.5		ns

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

Fig.1 Power Dissipation

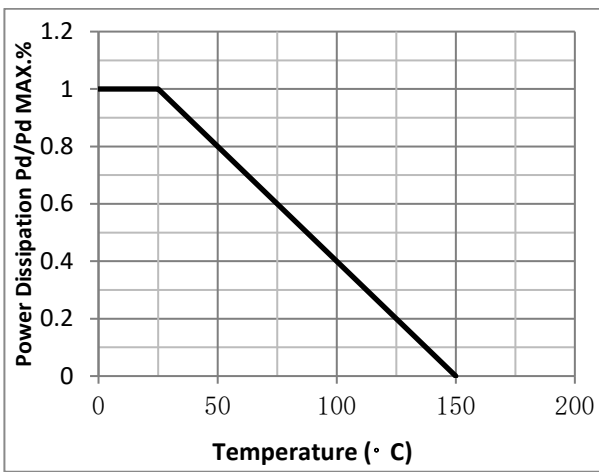


Fig.2 Typical output Characteristics

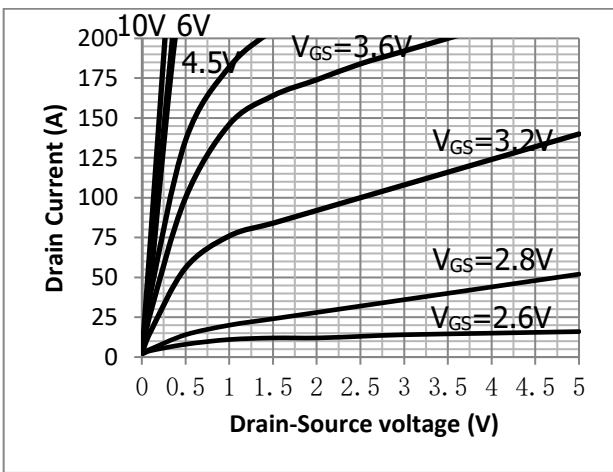


Fig.3 Threshold Voltage V.S Junction Temperature

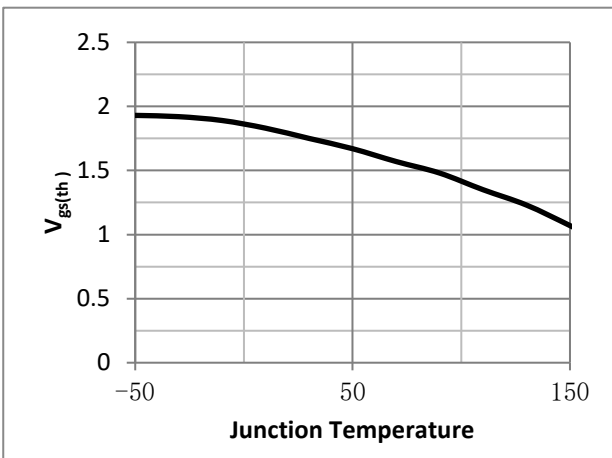


Fig.4 Resistance V.S Drain Current

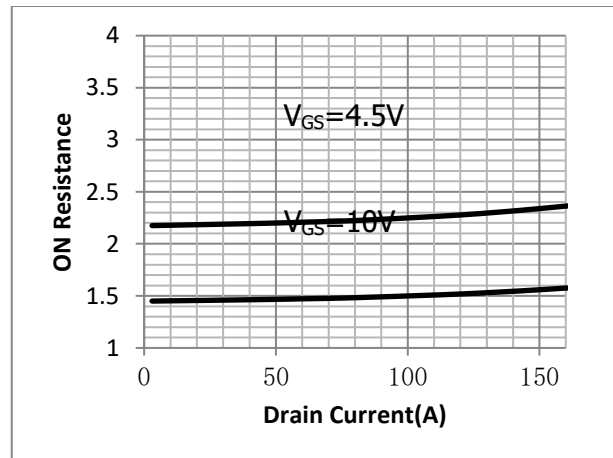


Fig.5 On-Resistance VS Gate Source Voltage

Fig.6 On-Resistance V.S Junction Temperature

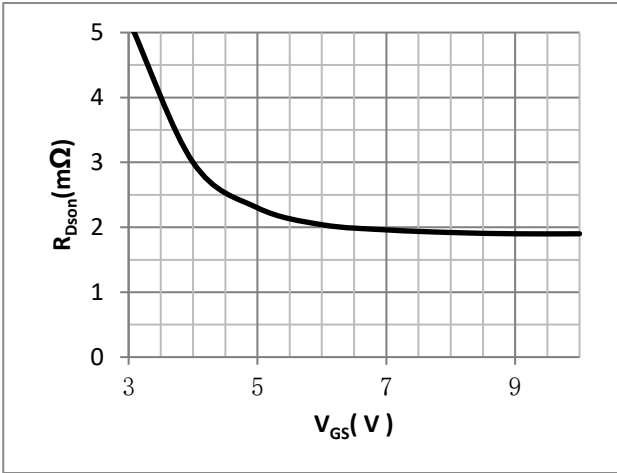


Fig.7 Safe Operating Area

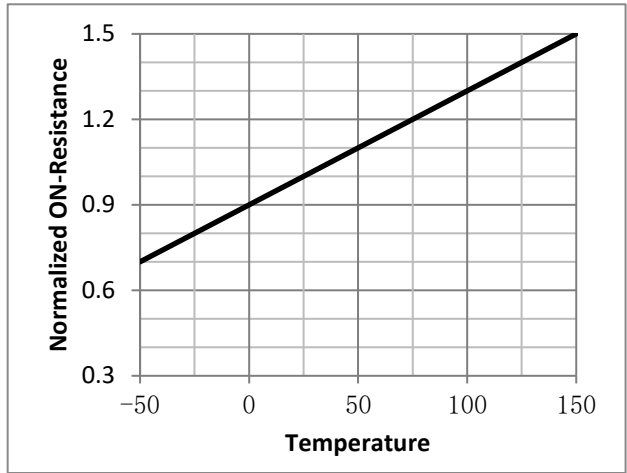


Fig.8 Drain Current V.S Junction Temperature

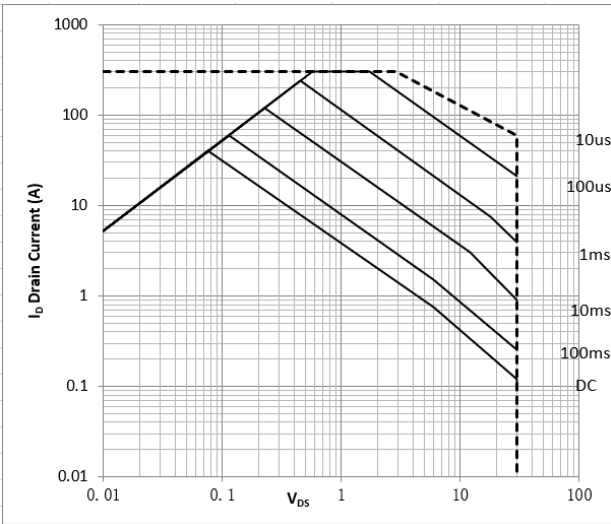


Fig.9 Diode Forward Voltage vs. Current

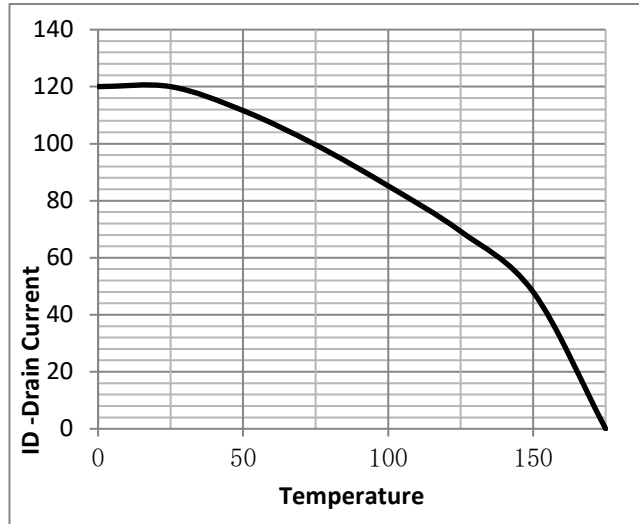


Fig.10 Capacitance Variation

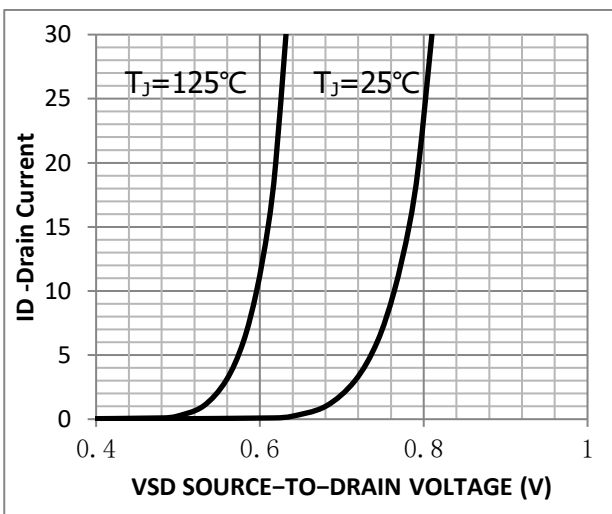


Figure 11. Gate-to-Source and

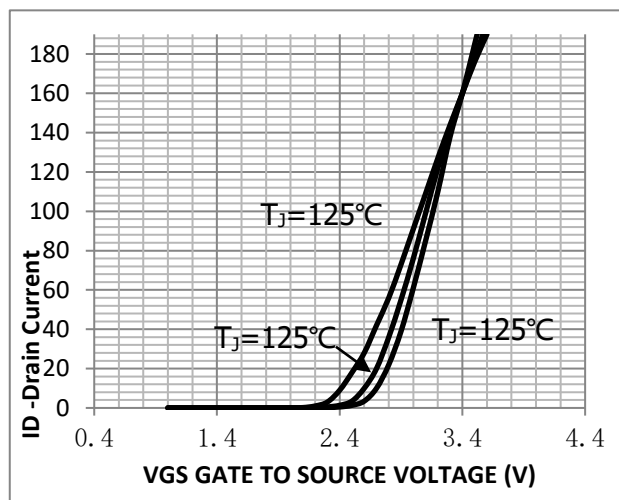


Fig.12 Capacitance Variation

Drain-to-Source Voltage vs. Total Charge

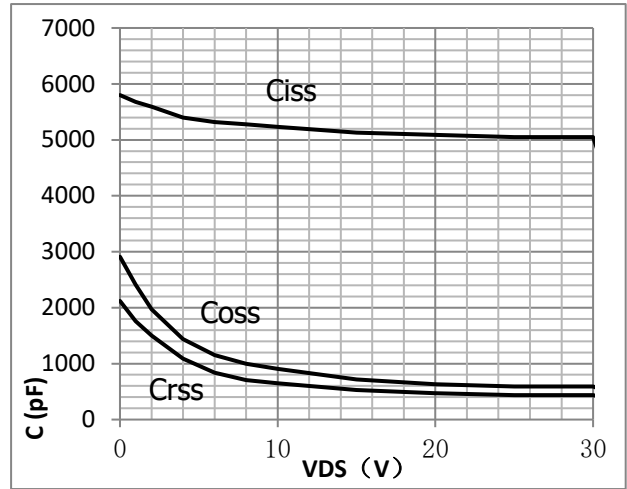
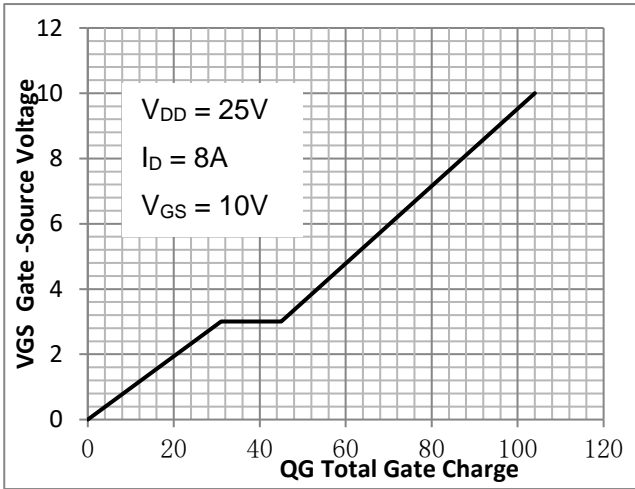


Fig.13 Switching Time Measurement Circuit

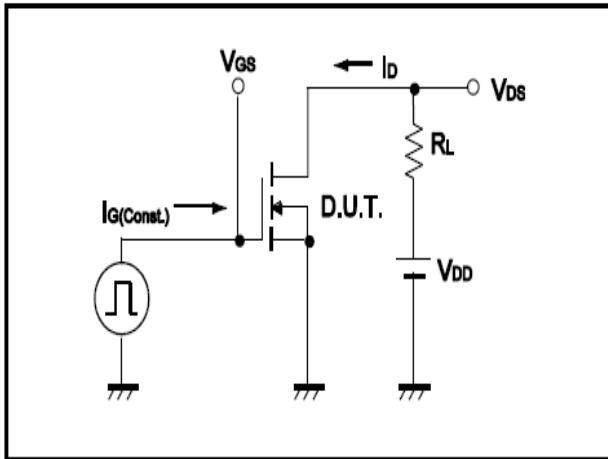


Fig.14 Gate Charge Waveform

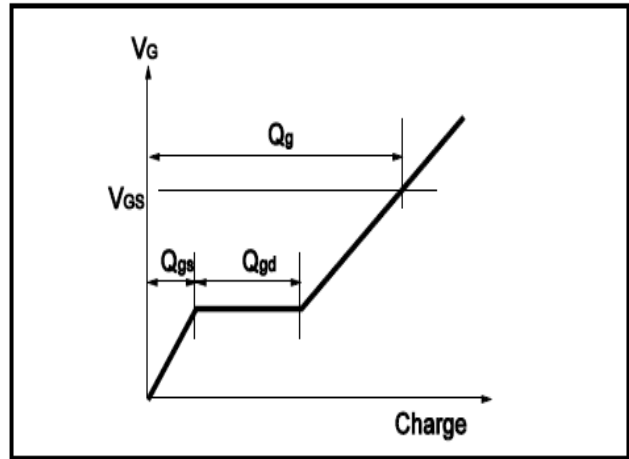


Fig.15 Switching Time Measurement Circuit

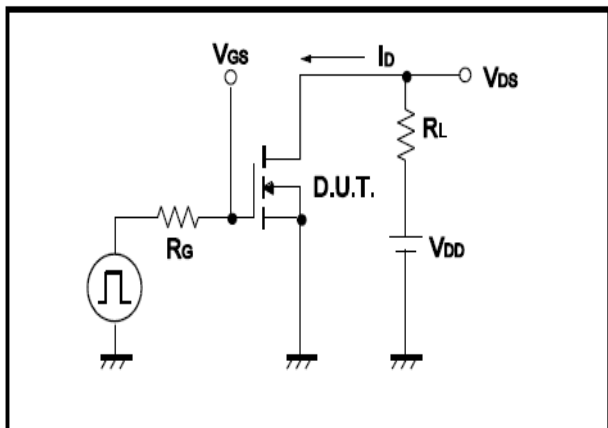


Fig.16 Gate Charge Waveform

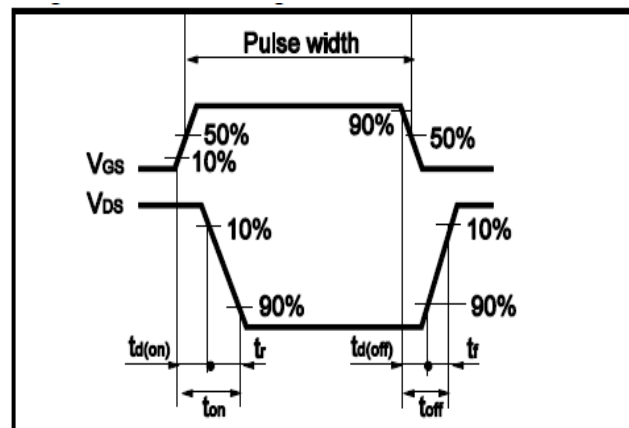




Fig.17 Avalanche Measurement Circuit

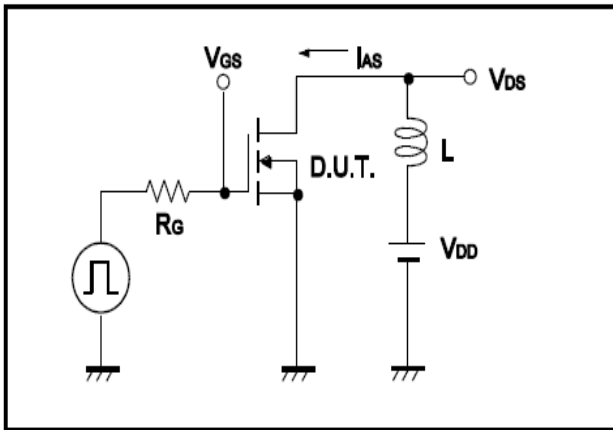
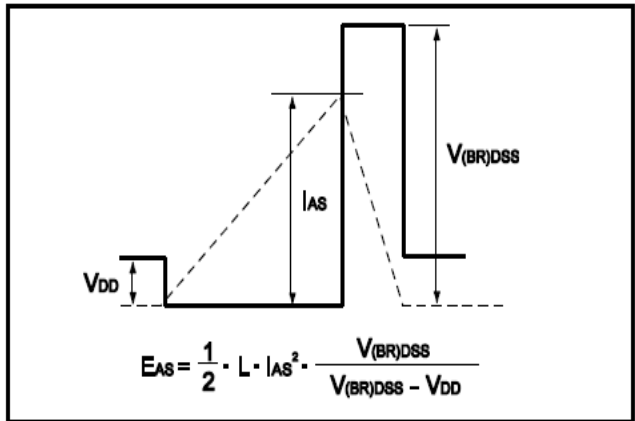
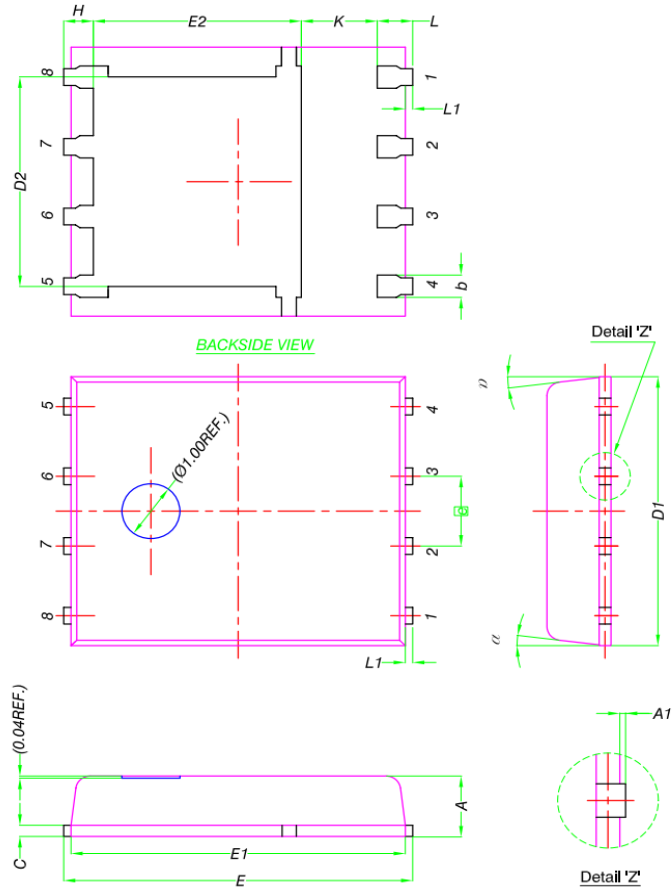


Fig.18 Avalanche Waveform



•Dimensions (DFN5x6)

Unit: mm



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
<span style="border: 1px solid black; padding: 2px;">e</span>	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
$\alpha$	0°	-	12°