

General Description

The ZMD68605N combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

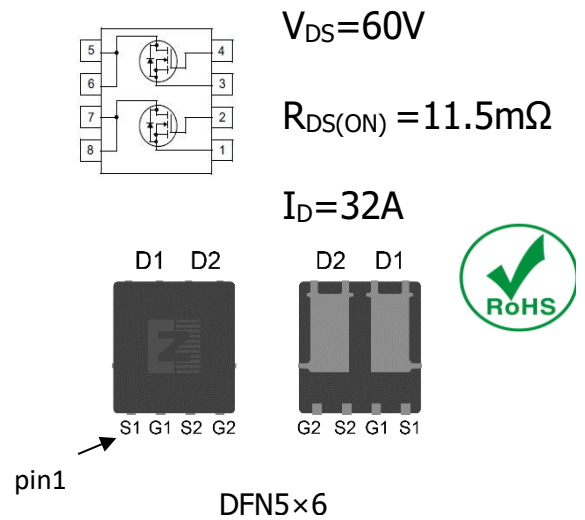
Features

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

Application

- Synchronous Rectification in DC/DC and AC/DC Converters
- Industrial and Motor Drive applications

Product Summary



Ordering Information:

Part NO.	ZMD68605N
Marking	ZMD68605
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

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 ^②	$I_D@T_C=25^\circ C$	32	A
	$I_D@T_C=75^\circ C$	24	A
	$I_D@T_C=100^\circ C$	20	A
Pulsed Drain Current ^①	I_{DM}	96	A
Total Power Dissipation ^②	$P_D@T_C=25^\circ C$	73	W
Total Power Dissipation	$P_D@T_A=25^\circ C$	3.6	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}	60	mJ

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case ^②	R_{thJC}	-	-	1.7	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	50	° C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	° C

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60			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}	$V_{DS}=60V, V_{GS}=0V$			1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$		11.5	14	m Ω
		$V_{GS}=4.5V, I_D=8A$		14	18	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=25V, I_D=10A$		15		s
Source-drain voltage	V_{SD}	$I_S=10A$			1.28	V

•Dynamic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Resistance	R_g	$f = 1MHz$		2		Ω
Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V$ $f = 1MHz$	-	2520	-	pF
Output capacitance	C_{oss}		-	149	-	
Reverse transfer capacitance	C_{rss}		-	106	-	
Total gate charge	Q_g	$V_{DD}=30V$ $I_D=10A$ $V_{GS}=10V$	-	30	-	nC
Gate - Source charge	Q_{gs}		-	9	-	
Gate - Drain charge	Q_{gd}		-	6	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=15V$ $R_G=3.3\Omega,$ $I_D=20A$		12		ns
Turn-ON Rise time	t_r			44		ns
Turn-Off Delay time	$t_{D(off)}$			53		ns
Turn-Off Fall time	t_f			13		ns

Diode Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Reverse Recovery Time	t_{RR}	$V_{DD} = 20\text{ V}$, dI_S/dt $=100\text{ A/s}$, $I_S = 30\text{ A}$		36		ns
Reverse Recovery Charge	Q_{RR}			40		nC

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;

Fig.1 Gate-Charge Characteristics

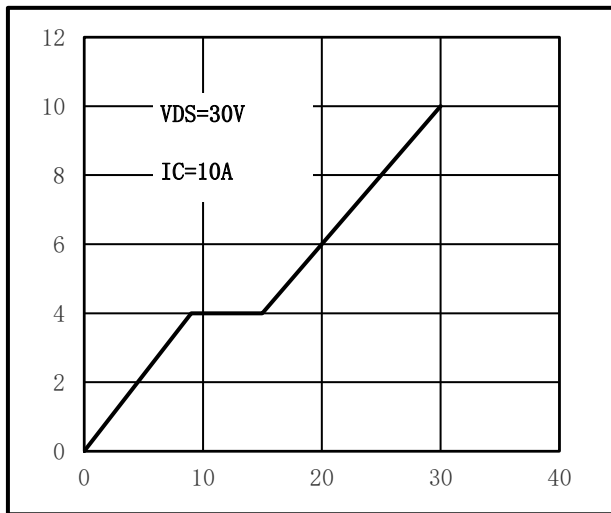


Fig.2 Capacitance Characteristics

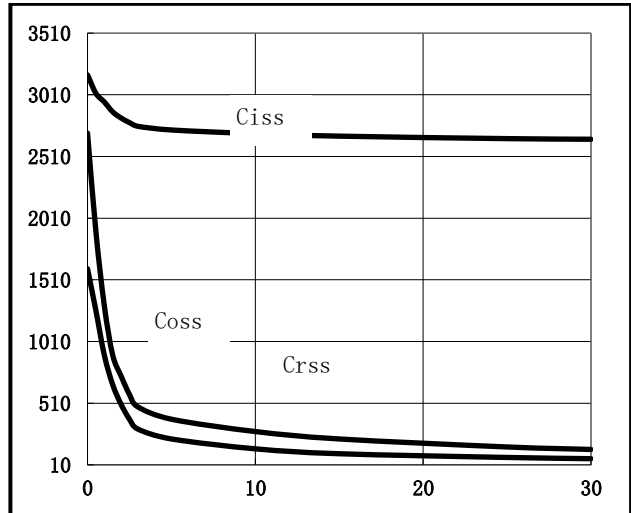


Fig.3 Power Dissipation

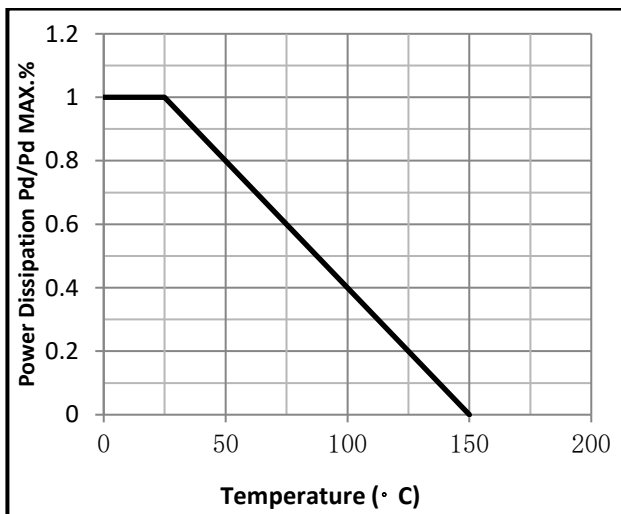


Fig.4 Typical output Characteristics

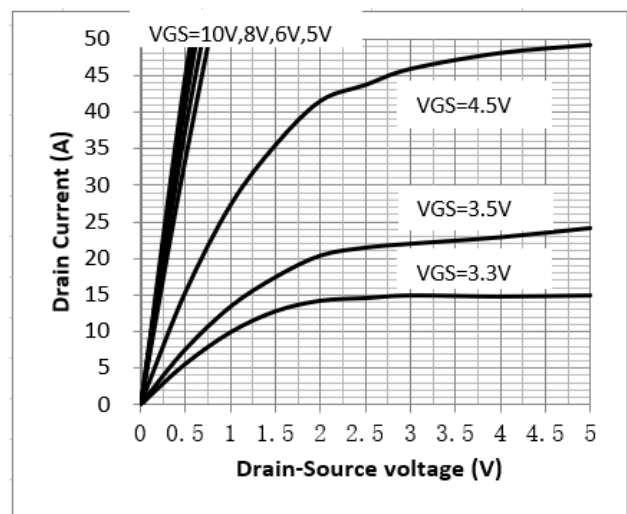


Fig.5 Threshold Voltage V.S Junction Temperature Fig.6 Resistance V.S Drain Current

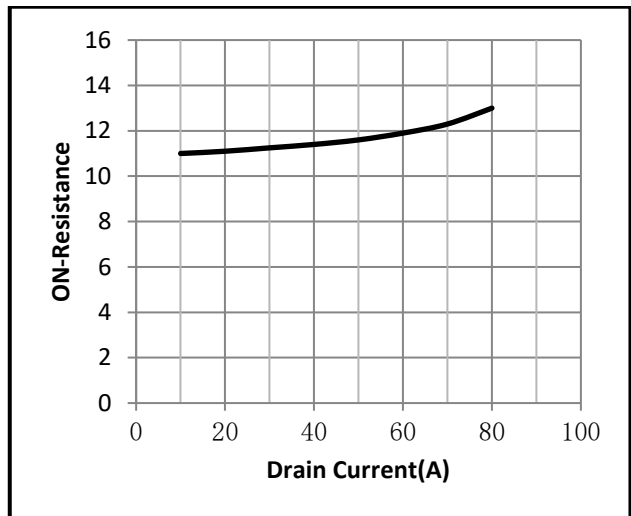
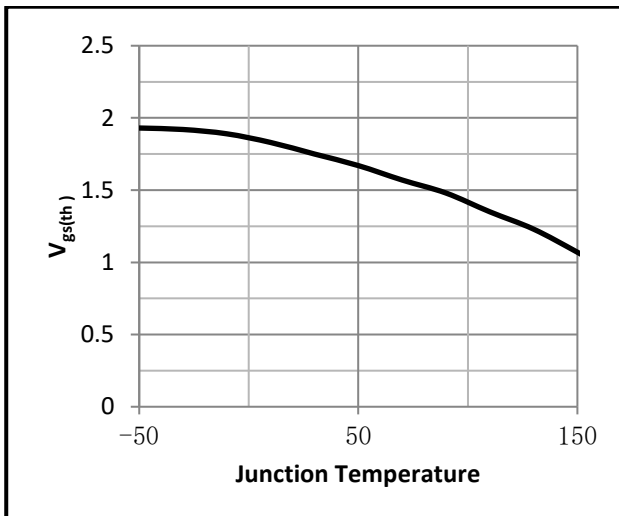


Fig.7 On-Resistance VS Gate Source Voltage

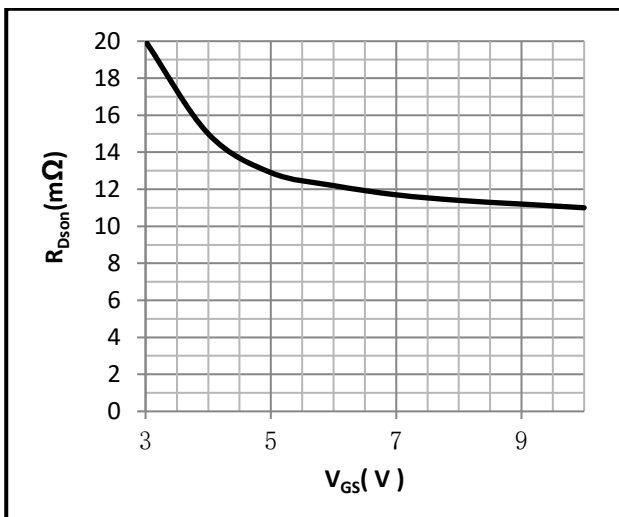


Fig.8 On-Resistance V.S Junction Temperature

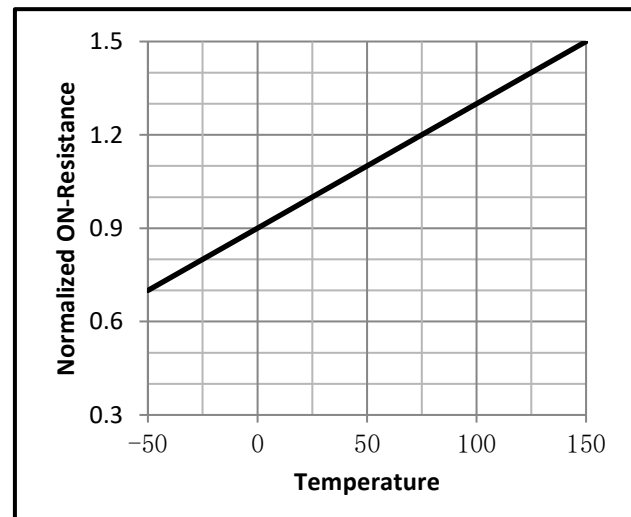


Fig.9 SOA Maximum Safe Operating Area

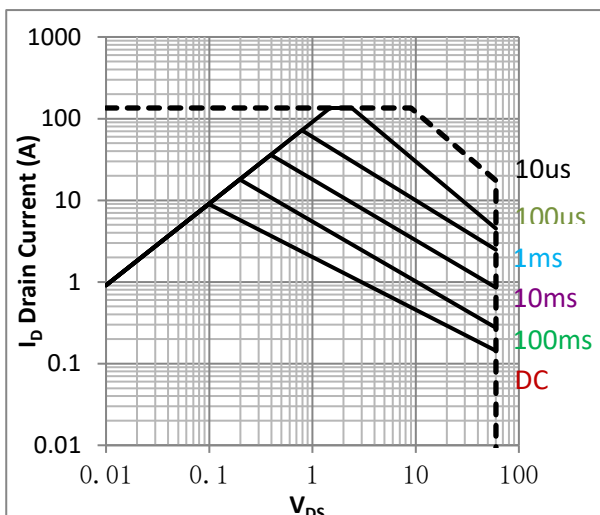


Fig.10 I_D -Junction Temperature

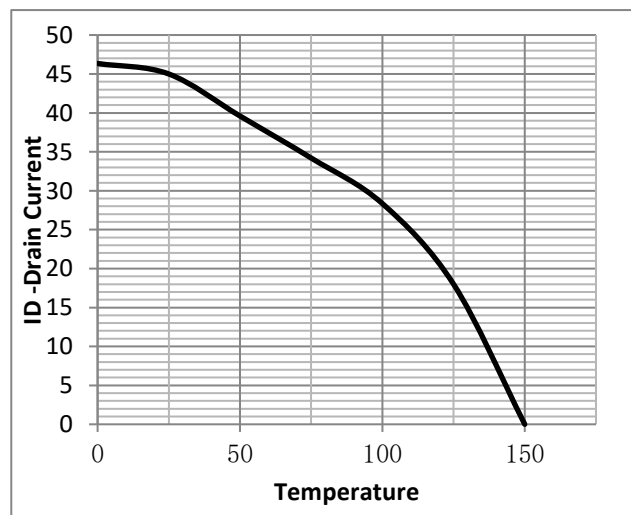


Figure 11. Diode Forward Voltage vs. Current

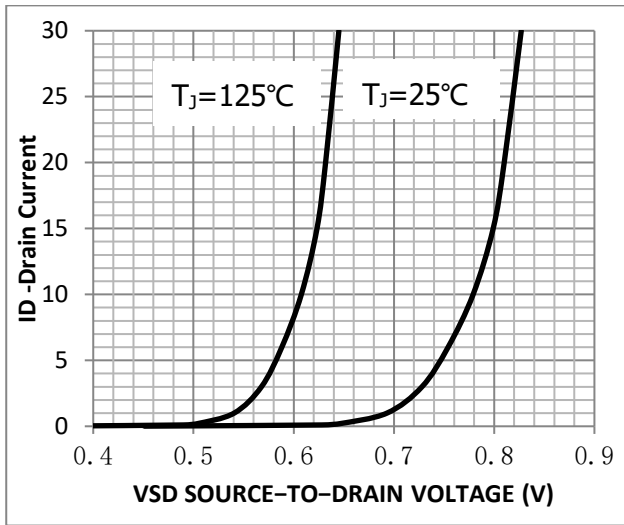


Figure 12. Transfer Characteristics

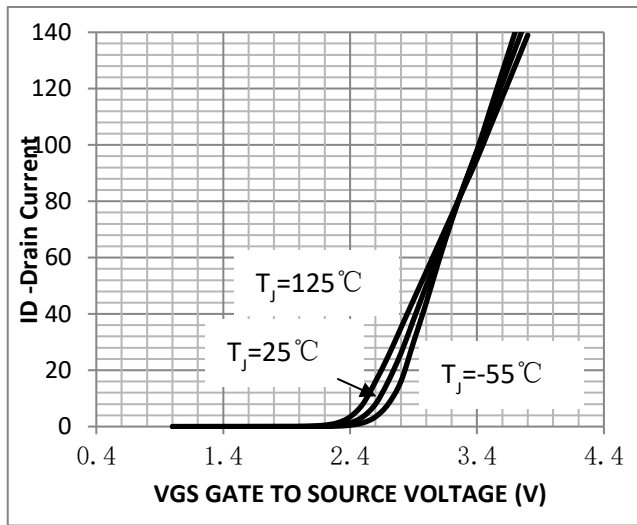


Fig.13 Gate Charge Measurement Circuit

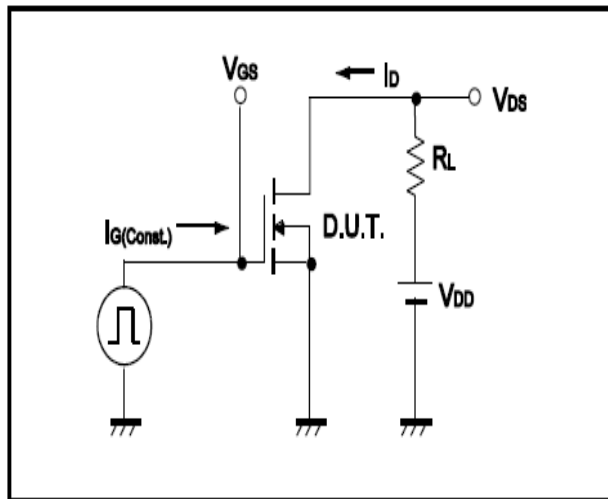


Fig.14 Gate Charge Waveform

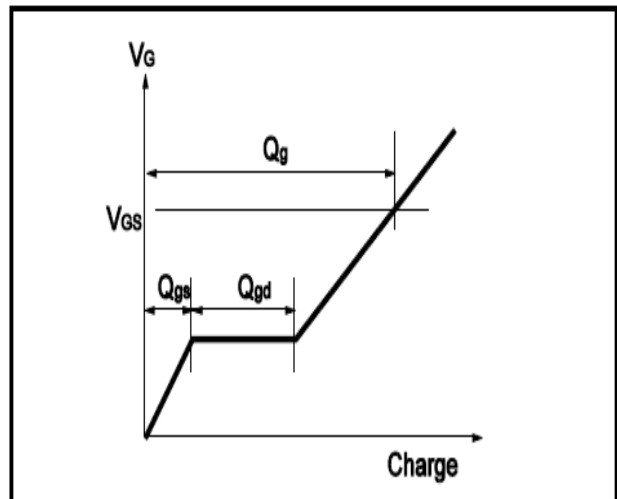


Fig.15 Switching Time Measurement Circuit

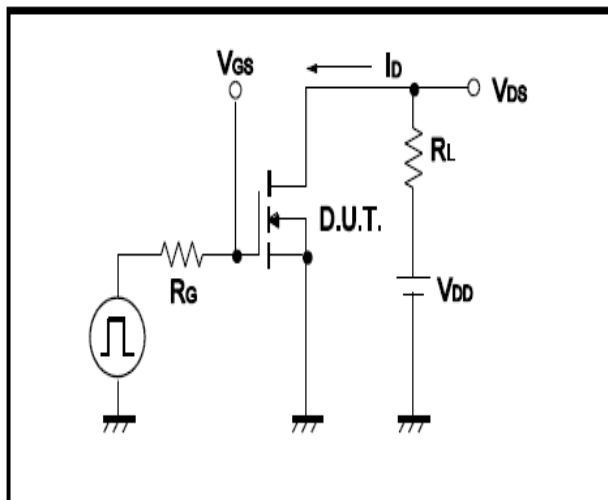


Fig.16 Switching Time Waveform

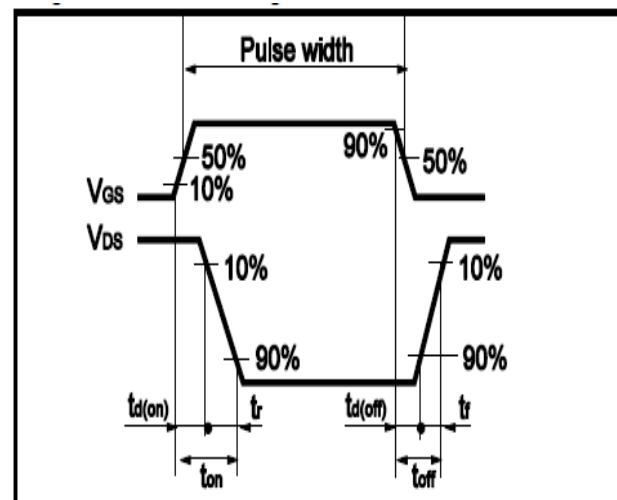


Fig.17 Avalanche Measurement Circuit

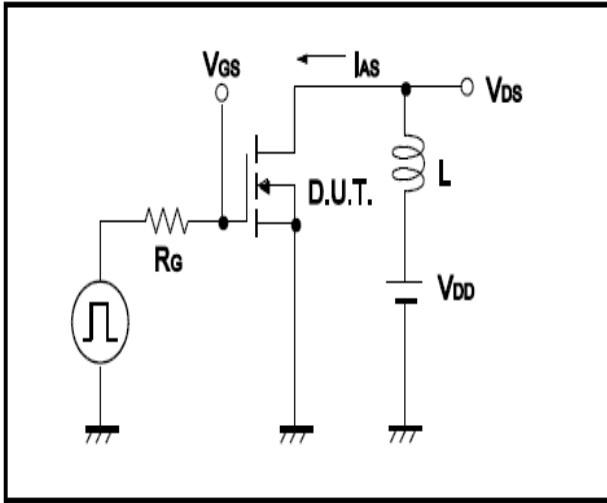
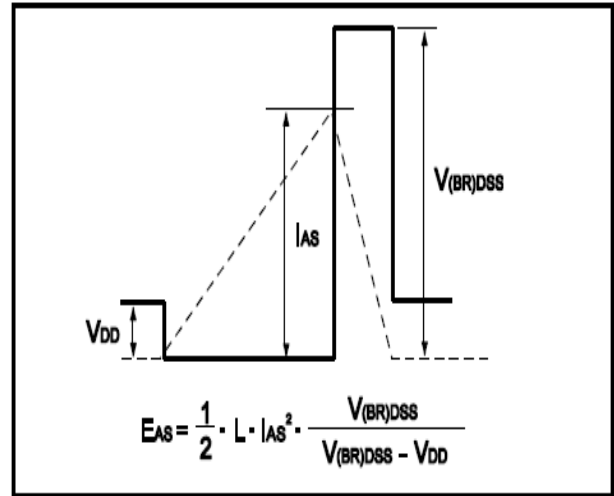
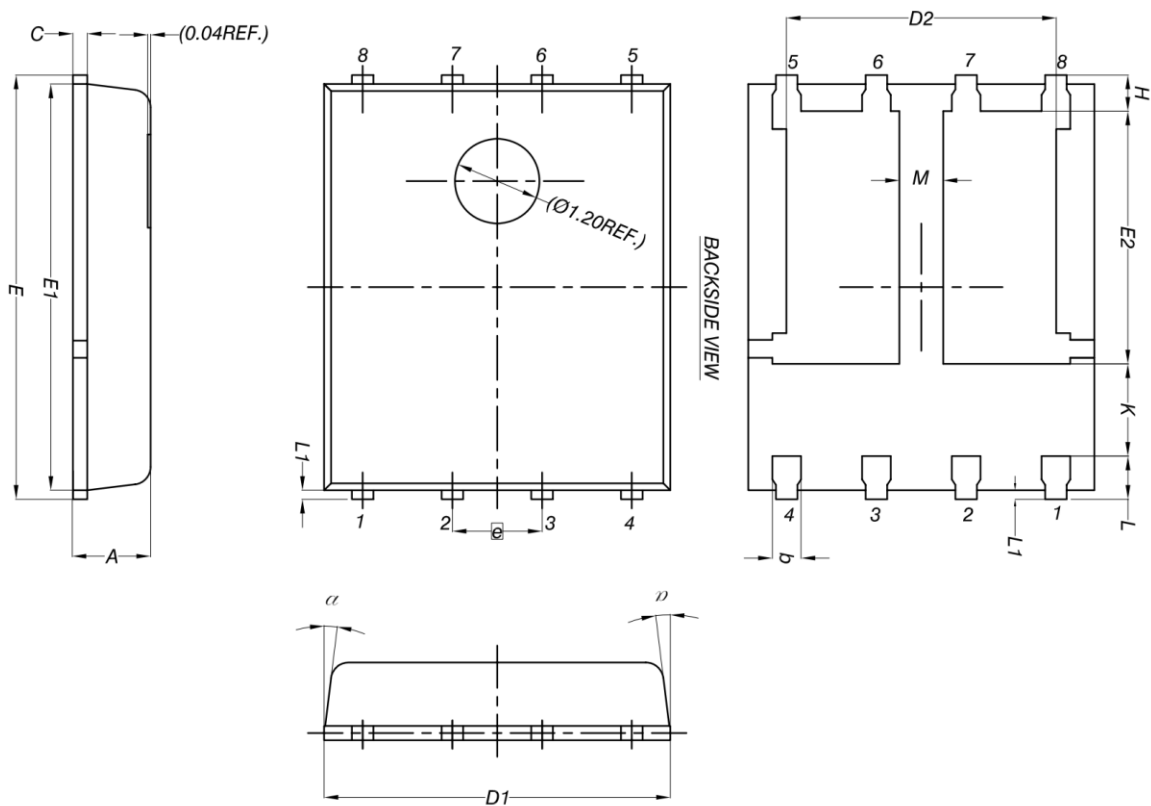


Fig.18 Avalanche Waveform



•Dimensions (DFN5×6)

Unit: mm



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
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
e	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
M	0.50	-	-
α	0°	-	12°

Land Pattern
(Only for Reference)

