

• General Description

The ZMD68403S 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
- Dual DIE in one package

• Application

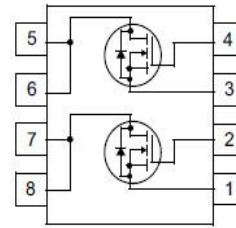
- Power Management in Notebook Computer,
- Portable Equipment and Battery Powered Systems

• Ordering Information:

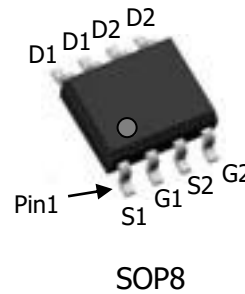
Part NO.	ZMD68403S
Marking	ZMD68403
Packing Information	REEL TAPE
Basic ordering unit (pcs)	4000

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D @ T_C = 25^\circ\text{C}$	10	A
	$I_D @ T_C = 75^\circ\text{C}$	7.6	A
	$I_D @ T_C = 100^\circ\text{C}$	6.3	A
Pulsed Drain Current ^①	I_{DM}	30	A
Total Power Dissipation	$P_D @ T_C = 25^\circ\text{C}$	3.6	W
Total Power Dissipation	$P_D @ T_A = 25^\circ\text{C}$	0.69	W
Operating Junction Temperature	T_J	-55 to 175	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 to 175	$^\circ\text{C}$
Single Pulse Avalanche Energy ($L=0.5\text{mH}, V_{GS}=10\text{V}, R_g=25\Omega, T_J=25^\circ\text{C}$)	E_{AS}	85	mJ

• Product Summary


$V_{DS1} = 40\text{V}$
 $V_{DS2} = 40\text{V}$
 $R_{DS(ON)1} = 14\text{m}\Omega$
 $R_{DS(ON)2} = 14\text{m}\Omega$
 $I_{D1} = 10\text{A}$
 $I_{D2} = 10\text{A}$



Single Pulse Avalanche Energy ($L=0.1\text{mH}, V_{GS}=10\text{V}, R_g=25\Omega, T_J=25^\circ\text{C}$)	E_{AS}	34	mJ
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•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	2.5	$^\circ\text{C/W}$
Thermal resistance, junction - ambient	R_{thJA}	-	-	70	$^\circ\text{C/W}$
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	$^\circ\text{C}$

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	40			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu\text{A}$	1.2		2.5	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=40\text{V}, V_{GS}=0\text{V}$			1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=10\text{A}$		14	18	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=8\text{A}$		18	23	$\text{m}\Omega$
Forward Transconductance	g_{FS}	$V_{DS}=25\text{V}, I_D=4\text{A}$		6		S

•Dynamic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	$f = 1\text{MHz}$ $V_{DS}=25\text{V}$	-	1490	-	pF
Output capacitance	C_{oss}		-	110	-	
Reverse transfer capacitance	C_{rss}		-	80	-	
Total gate charge	Q_g	$V_{DD}=25\text{V}$ $I_D=20\text{A}$ $V_{GS}=10\text{V}$	-	21	-	nC
Gate - Source charge	Q_{gs}		-	3.8	-	
Gate - Drain charge	Q_{gd}		-	4.2	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{GS}=10\text{V}, V_{DS}=15\text{V}$ $R_G=3.3\Omega,$ $I_D=20\text{A}$		6		ns
Turn-ON Rise time	t_r			2.0		ns
Turn-Off Delay time	$t_{D(off)}$			34		ns
Turn-Off Fall time	t_f			5.5		ns

Diode Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Reverse Recovery Time	t_{RR}	$V_{DD} = 20\text{ V}, dI_S/dt = 100\text{ A/s}, I_S = 30\text{ A}$		8		ns
Reverse Recovery Charge	Q_{RR}			17		ns

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

Fig.1 Power Dissipation

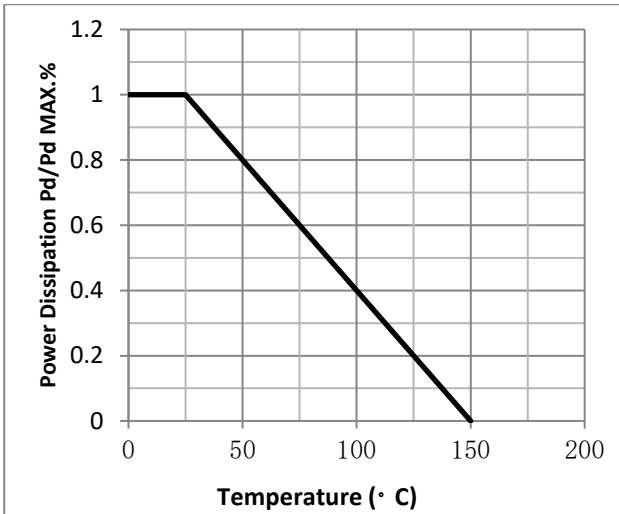


Fig.2 Typical output Characteristics

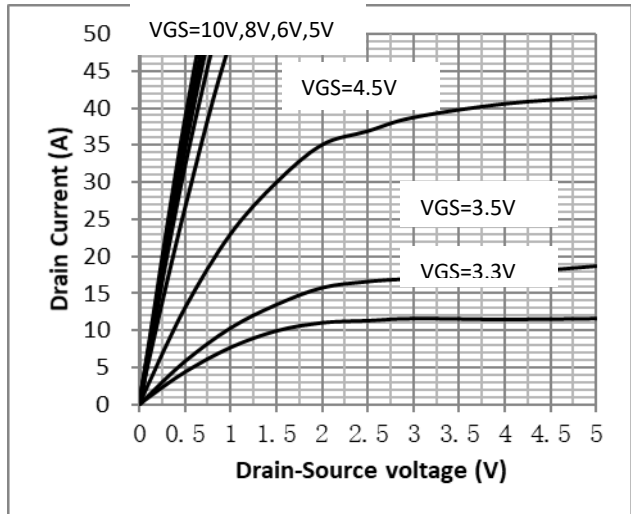


Fig.3 Threshold Voltage V.S Junction Temperature

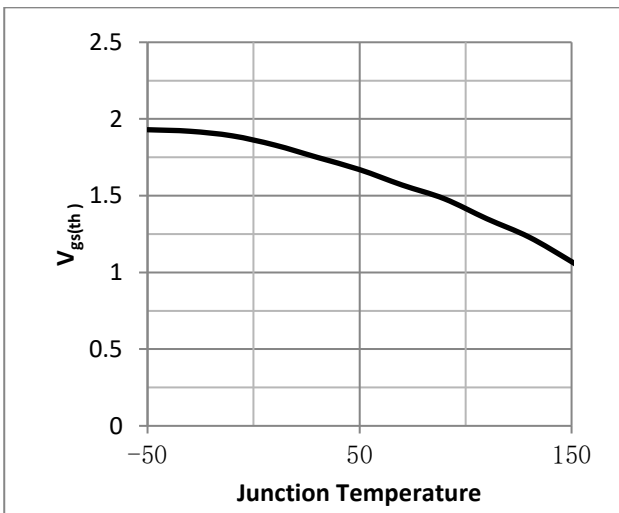


Fig.4 Resistance V.S Drain Current

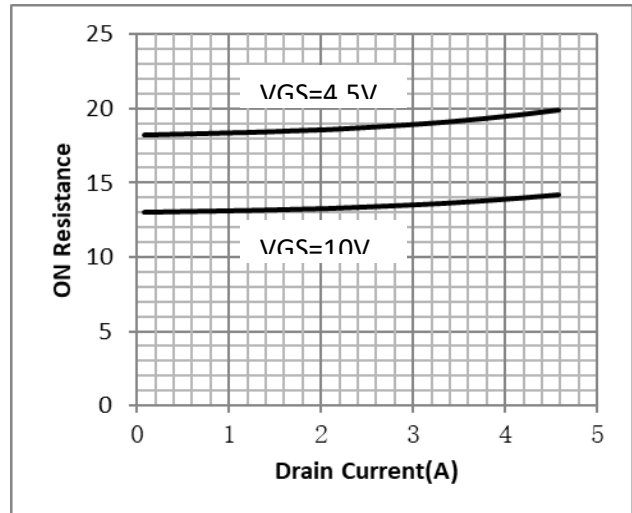


Fig.5 On-Resistance VS Gate Source Voltage

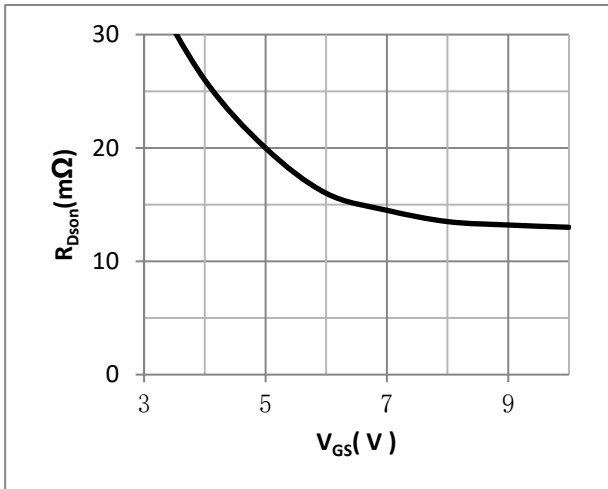


Fig.6 On-Resistance V.S Junction Temperature

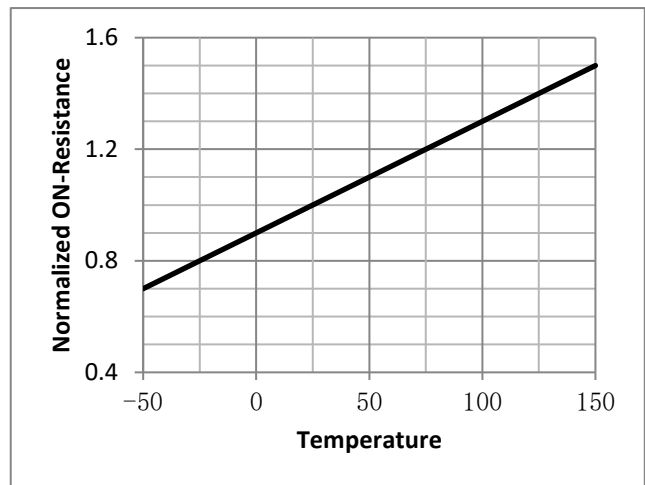


Figure 7. Diode Forward Voltage vs. Current

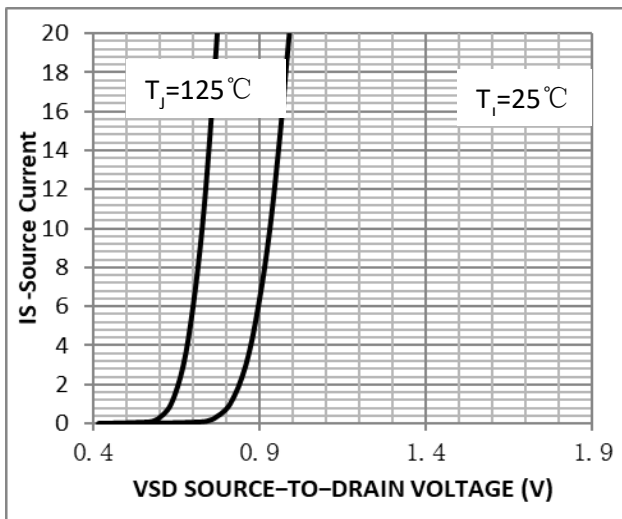


Figure 8. Transfer Characteristics

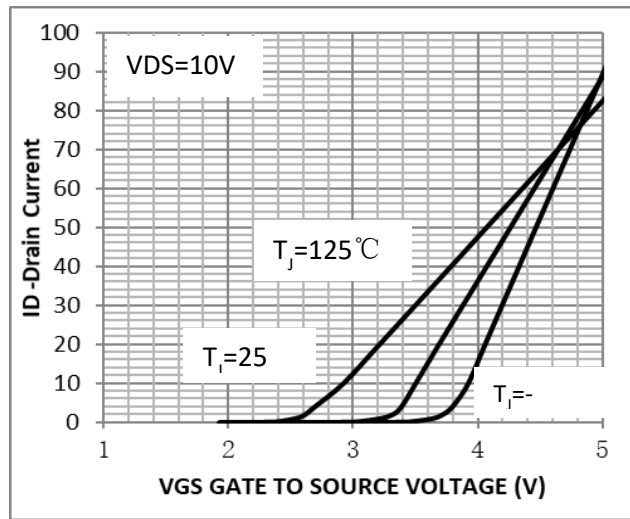


Fig.9 SOA Maximum Safe Operating Area

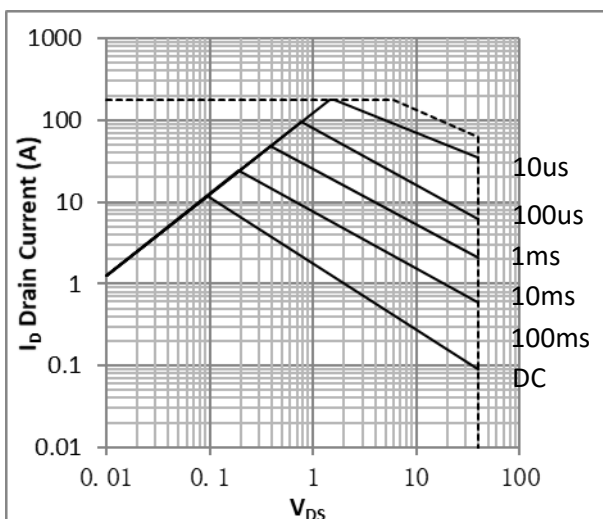


Fig.10 ID-Junction Temperature

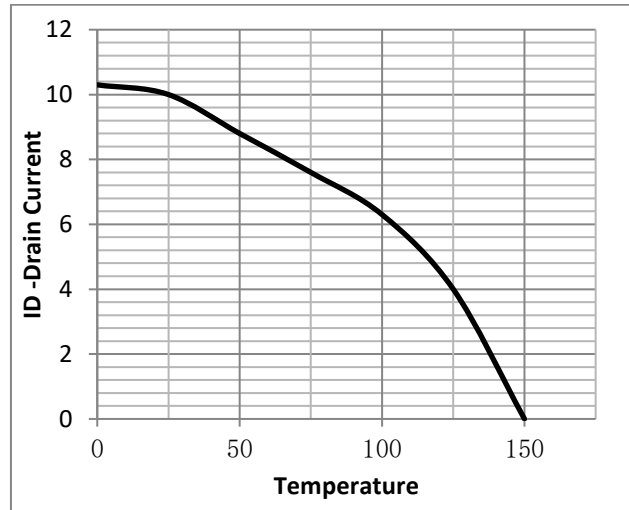


Figure 11. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

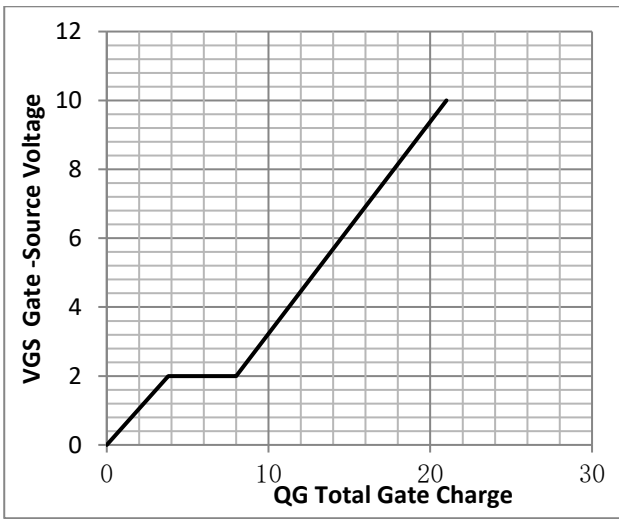


Fig.12 Capacitance Variation

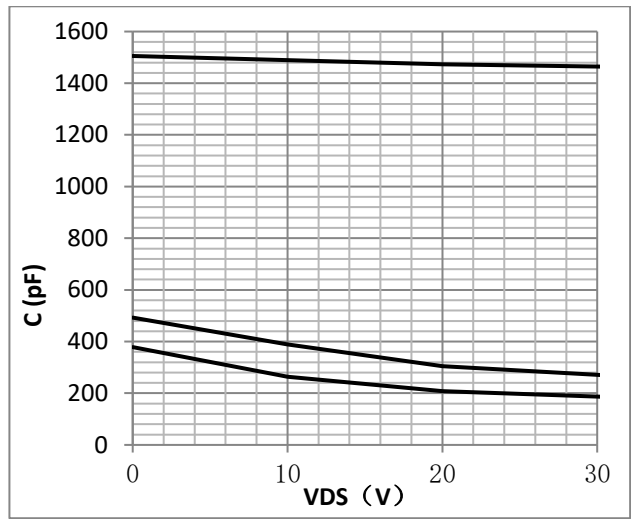


Fig.13 Switching Time Measurement Circuit

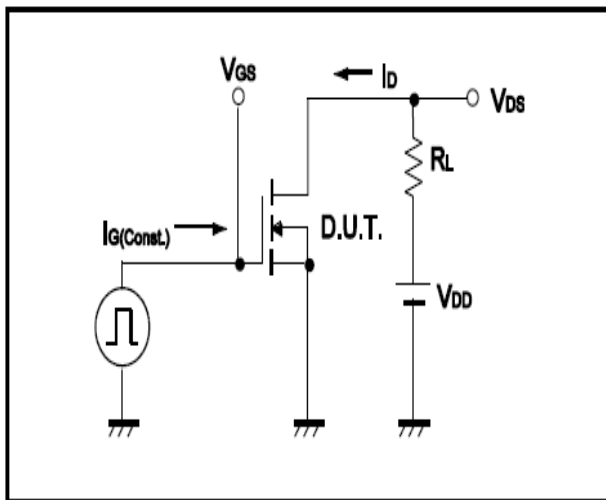


Fig.14 Gate Charge Waveform

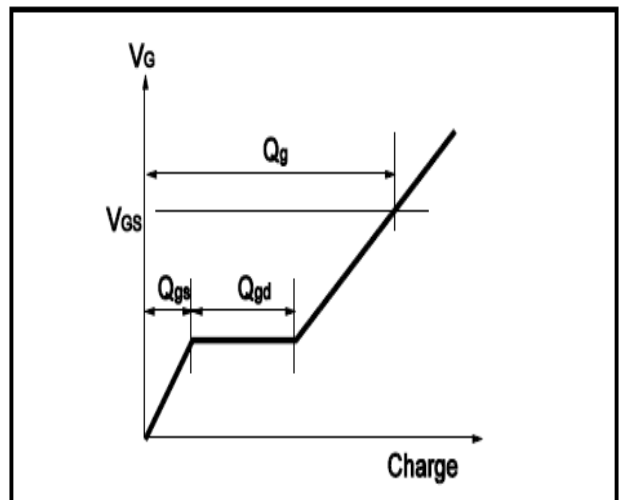


Fig.15 Switching Time Measurement Circuit

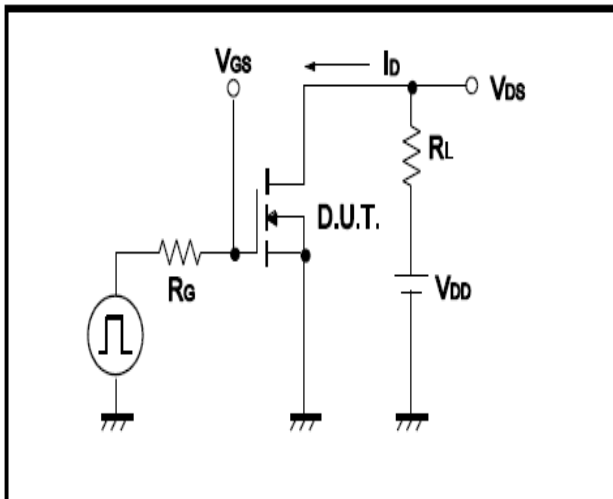


Fig.16 Gate Charge Waveform

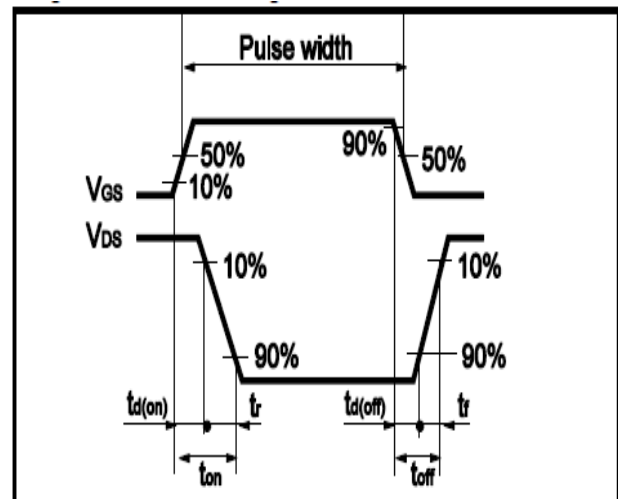


Fig.17 Avalanche Measurement Circuit

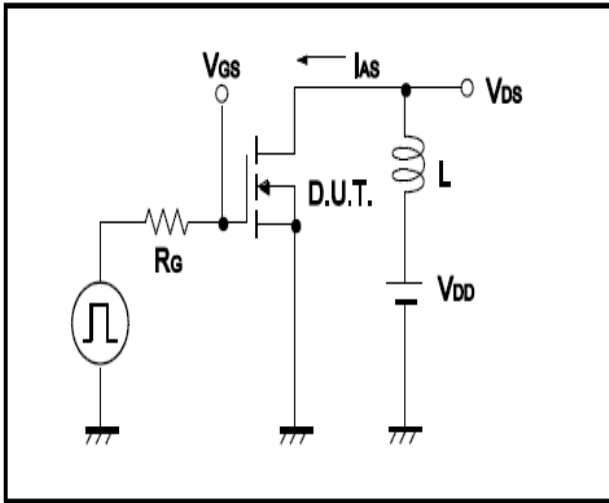
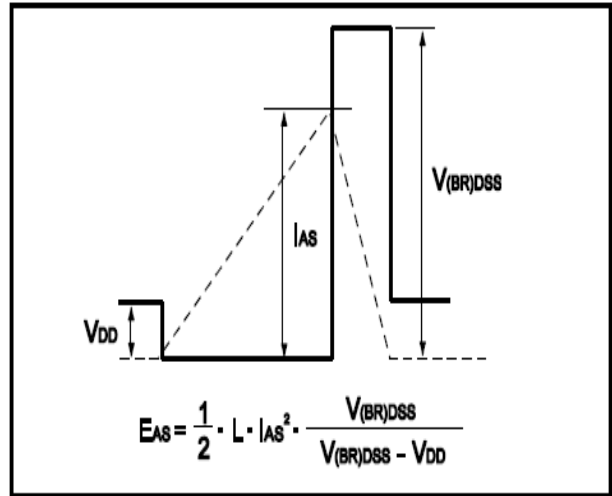


Fig.18 Avalanche Waveform



●Dimensions(SOP8)

Unit: mm

SYMBOL	min	TYP	max	SYMBOL	min		max
A	4.80		5.25	C	1.30		1.75
A1	0.37		0.49	C1	0.55		0.75
A2		1.27		C2	0.55		0.65
A3		0.41		C3	0.05		0.20
B	5.80		6.20	C4	0.10	0.20	0.23
B1	3.80		4.10	D		1.05	
B2		5.00		D1	0.40		0.62

