

• 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.

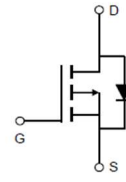
• Features

- AEC-Q101 Qualified
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

• Application

- SMPS 2nd Synchronous Rectifier
- BLDC Motor driver
- DC/DC

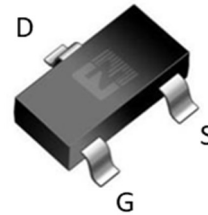
• Product Summary



$$V_{DS} = -100V$$

$$R_{DS(ON)} = 400m\Omega$$

$$I_D = -1.8A$$



SOT23-3



• Ordering Information:

Part NO.	ZMA036KP10T
Marking	36KP10
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

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

Parameter	Symbol	Conditions	Rating	Unit
Drain-Source Voltage	V_{DS}	$25^\circ C \leq T_J \leq 150^\circ C$	-100	V
Gate-Source Voltage	V_{GS}	Pulsed ^①	+20/-20	V
Continuous Drain Current	I_D	$T_C = 25^\circ C$	-1.8	A
	I_D	$T_C = 75^\circ C$	-1.4	A
	I_D	$T_C = 100^\circ C$	-1.1	A
Pulsed Drain Current	I_{DM}	pulsed; $t_p \leq 10 \mu s$; $T_{mb} = 25^\circ C$;	-5.4	A
Total Power Dissipation	P_D	$T_C = 25^\circ C$	9.6	W
Total Power Dissipation	P_D	$T_A = 25^\circ C$	0.7	W
Operating Junction Temperature	T_J		-55 to 150	$^\circ C$
Storage Temperature	T_{STG}		-55 to 150	$^\circ C$
Single Pulse Avalanche Energy	E_{AS}	$L = 0.1mH$, $V_{GS} = 10V$, $R_g = 25\Omega$, $T_J = 25^\circ C$	6	mJ
ESD Level (HBM)			Class 1C	

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	13	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	180	° C/W
Soldering temperature	T_{sold}	-	-	260	° C

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = -250\mu A$	-100			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}	$V_{DS} = -100V, V_{GS} = 0V$			1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS} = -10V, I_D = -1.8A$		360	430	m Ω
		$V_{GS} = -6V, I_D = -1.6A$		450	600	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = -10V, I_D = -1.0 A$		5		S
Source-drain voltage	V_{SD}	$I_S = -1.8A$			-1.28	V

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	$V_{DS} = -25V$ $f = 1MHz$	-	818	-	pF
Output capacitance	C_{oss}		-	22	-	
Reverse transfer capacitance	C_{rss}		-	15	-	
Gate Resistance	R_g	$f = 1MHz$	-	8.3	-	Ω

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

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	$V_{DD} = -25V$ $I_D = -1.8A$ $V_{GS} = -10V$	-	12	-	nC
Gate - Source charge	Q_{gs}		-	2.6	-	
Gate - Drain charge	Q_{gd}		-	2	-	

Fig.1 Power Dissipation Derating Curve

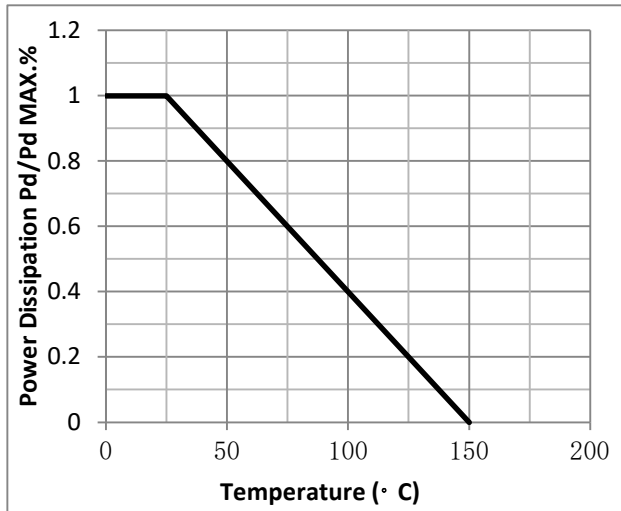


Fig.2 Typical output Characteristics

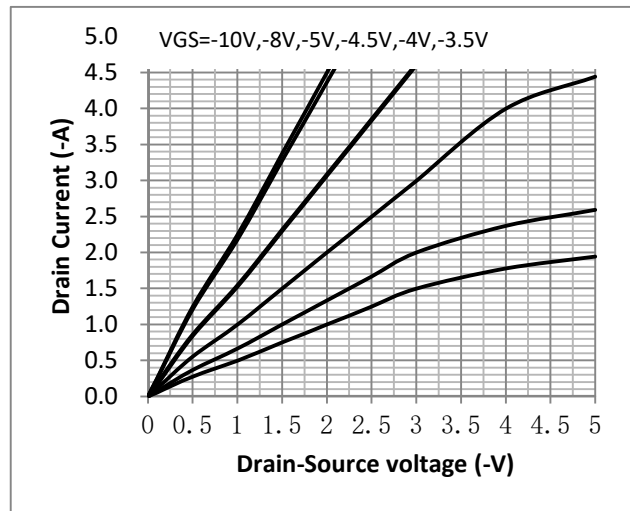


Fig.3 Threshold Voltage V.S Junction Temperature

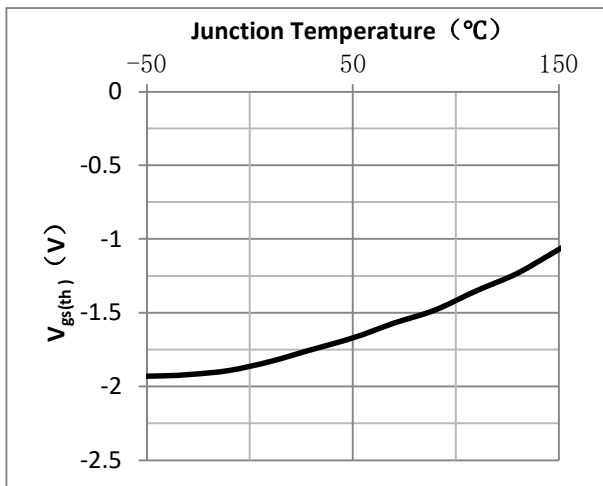


Fig.4 Resistance V.S Drain Current

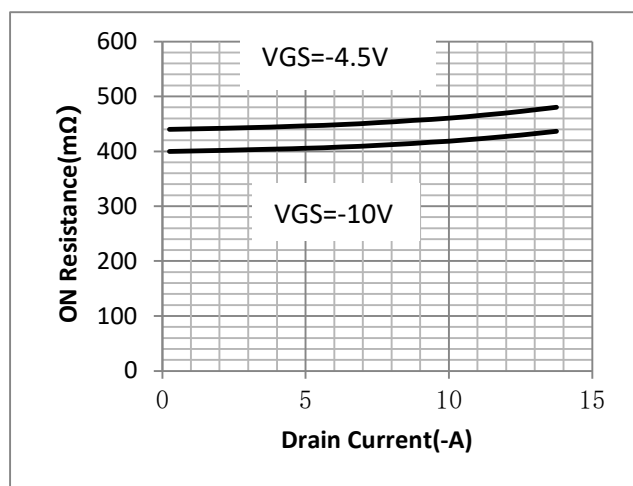


Fig.5 On-Resistance VS Gate Source Voltage

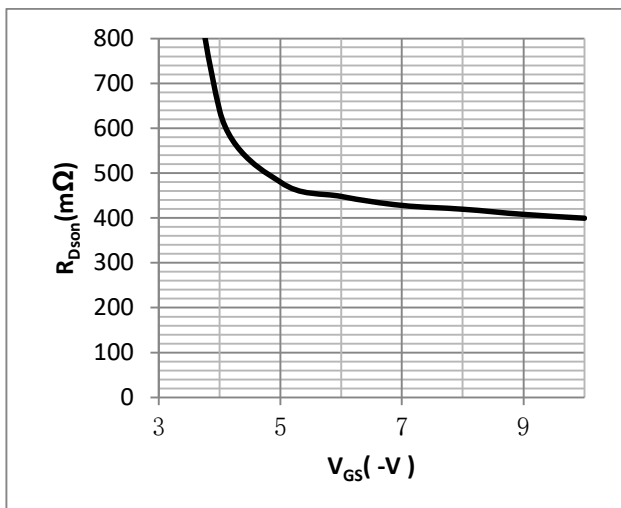


Fig.6 On-Resistance V.S Junction Temperature

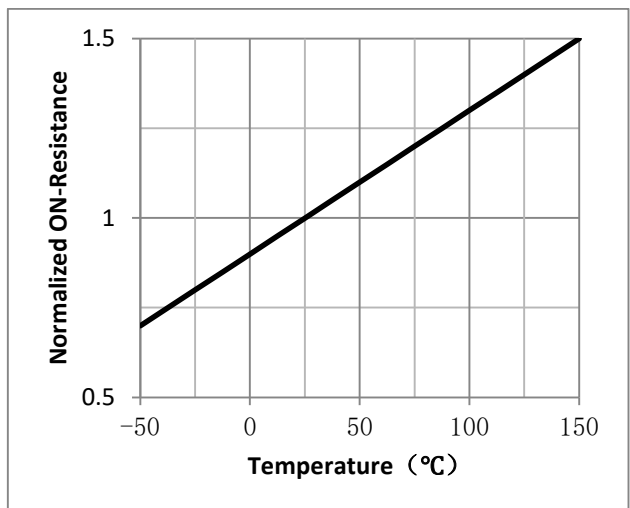


Fig.7 Gate-Charge Characteristics

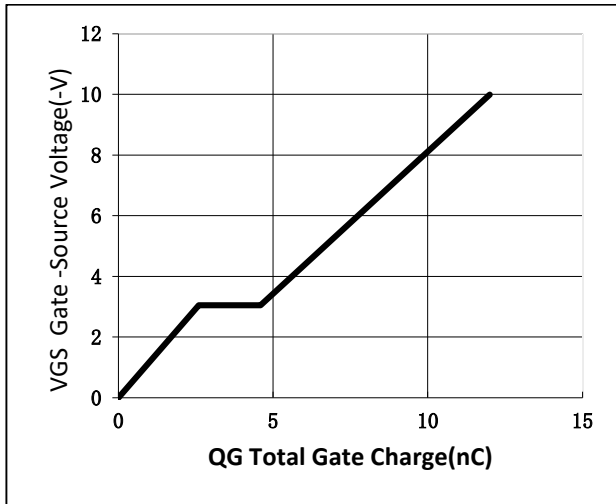


Fig.8 Capacitance Characteristics

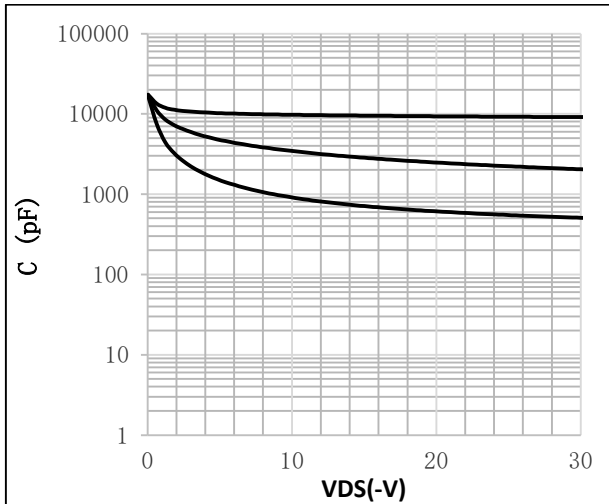


Fig.9 Maximum Forward Biased Safe Operating Area Fig.10 ID-Junction Temperature

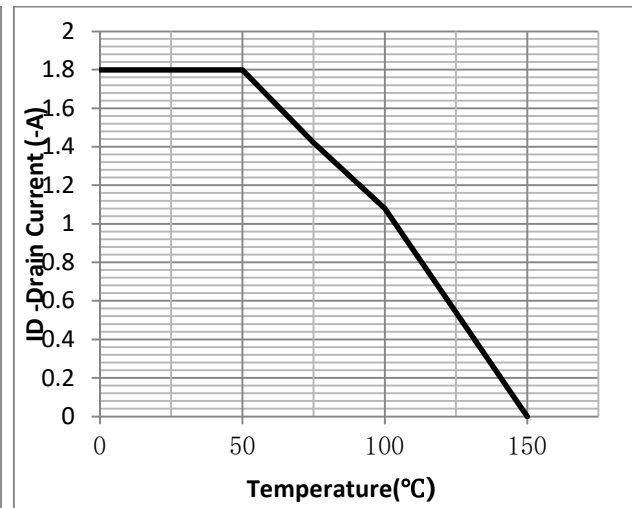
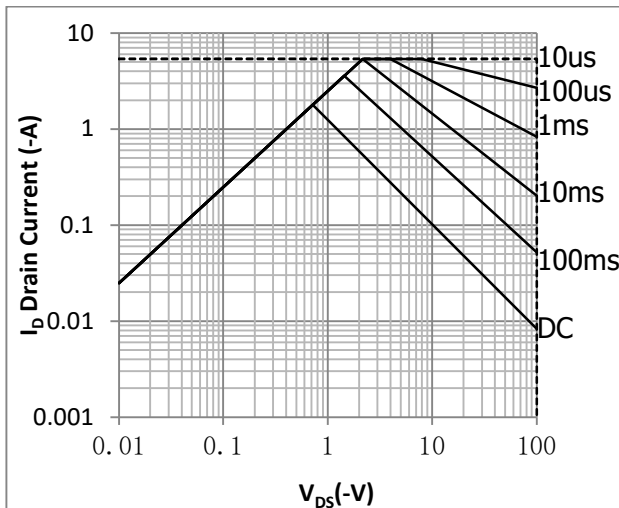


Figure 11. Diode Forward Voltage vs. Current

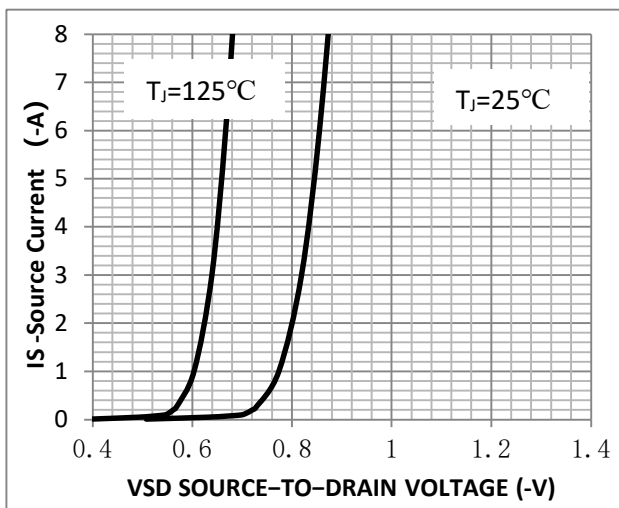


Figure 12. Transfer Characteristics

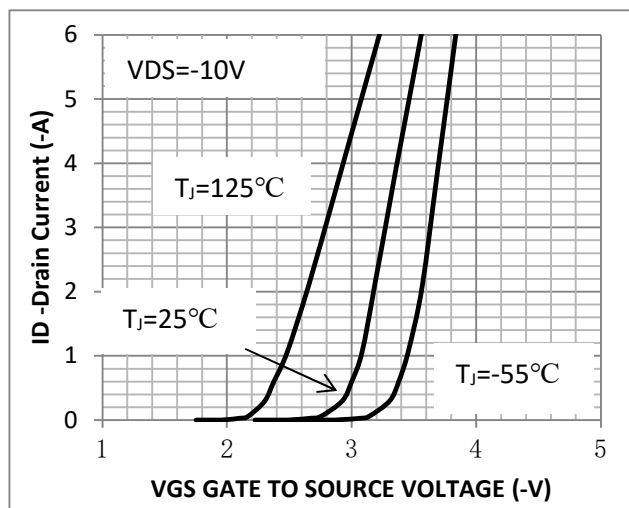


Fig.7 Gate Charge Measurement Circuit

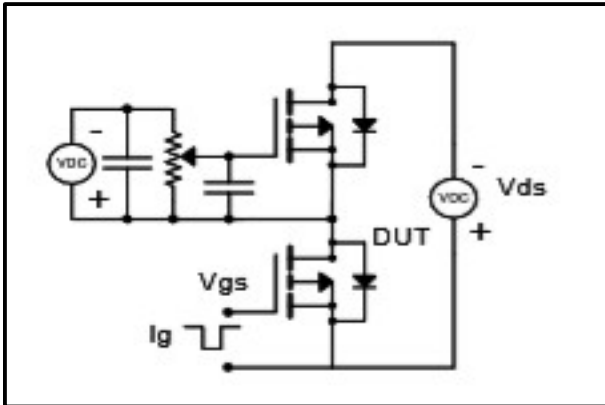


Fig.8 Gate Charge Waveform

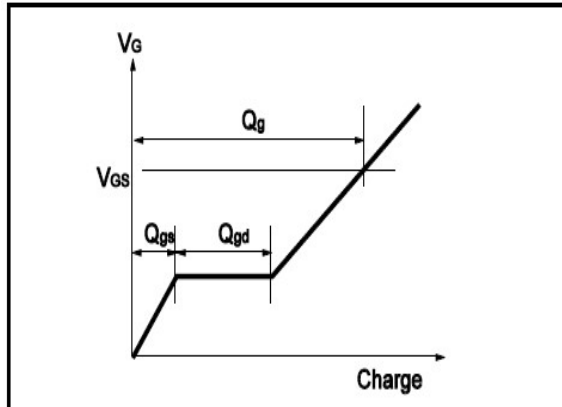


Fig.9 Switching Time Measurement Circuit

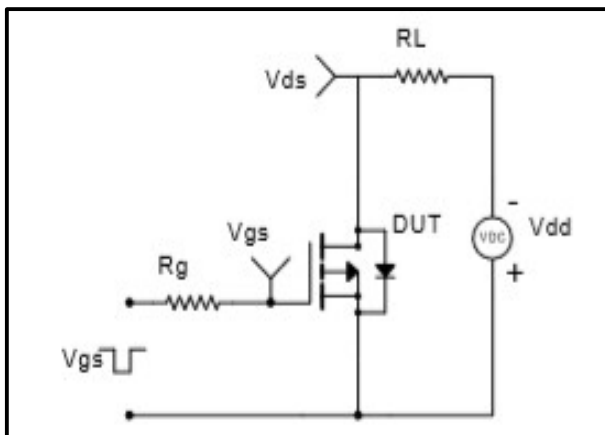


Fig.10 Switching Time Waveform

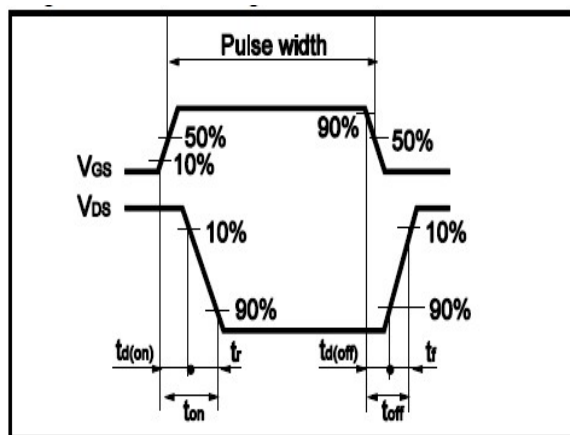


Fig.11 Avalanche Measurement Circuit

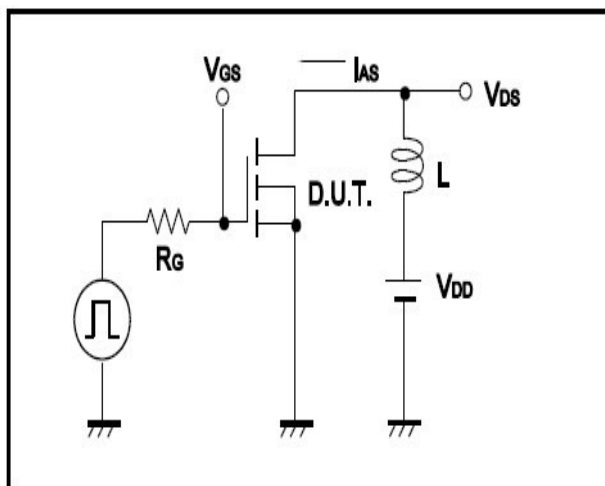
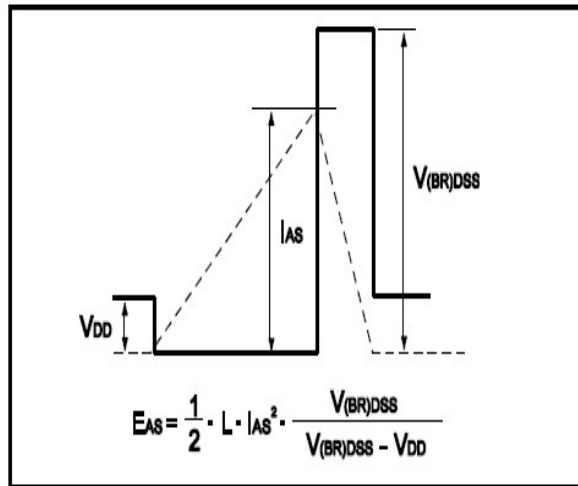
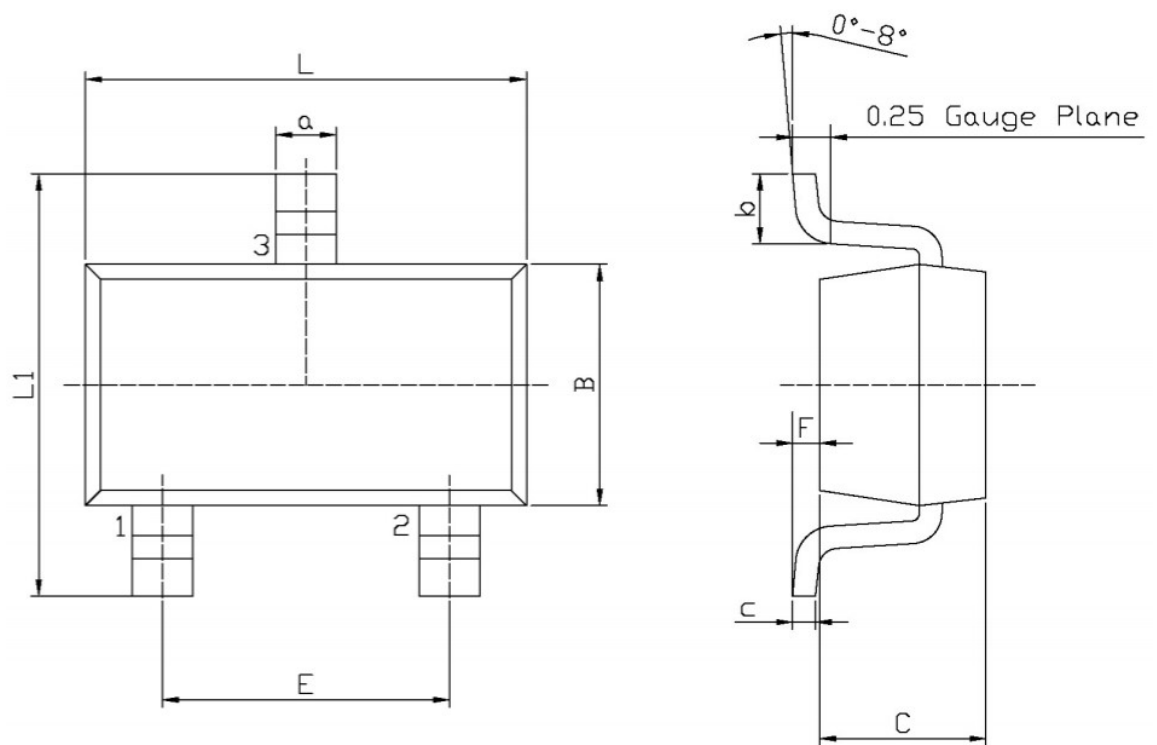


Fig.12 Avalanche Waveform



•Dimensions(SOT23-3)

Unit: mm



Unit: mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
L	2.82	3.02	a	0.35	0.50
B	1.50	1.70	c	0.10	0.20
C	0.90	1.30	b	0.35	0.55
L1	2.60	3.00	F	0	0.15
E	1.80	2.00			



Note: ① Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$, Accumulation time ≤ 50 hours;

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

③ $V_{gs} < -4.5\text{V}$ is required for practical application.

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