

• General Description

The ZMS070N10D combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

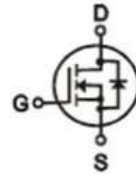
• Features

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

• Application

- SMPS 2nd Synchronous Rectifier
- Load switch
- BLDC Motor driver

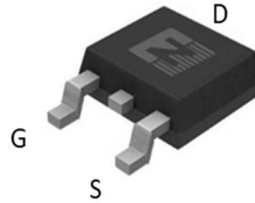
• Product Summary



$$V_{DS} = 100V$$

$$R_{DS(ON)} = 7m\Omega$$

$$I_D = 75A$$



TO-252

• Ordering Information:

Part NO.	ZMS070N10D
Marking	ZMS070N10
Packing Information	REEL TAPE
Basic ordering unit (pcs)	2500

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

Parameter	Symbol	Conditions	Rating	Unit
Drain-Source Voltage	V_{DS}	$25^\circ C \leq T_J \leq 175^\circ C$	100	V
Gate-Source Voltage	V_{GS}	Pulsed ^①	+20/-20	V
Continuous Drain Current	I_D	$T_C = 25^\circ C$	75	A
	I_D	$T_C = 75^\circ C$	54	A
	I_D	$T_C = 100^\circ C$	38	A
Pulsed Drain Current	I_{DM}	pulsed; $t_p \leq 10 \mu s$; $T_{mb} = 25^\circ C$;	225	A
Total Power Dissipation	P_D	$T_C = 25^\circ C$	71	W
Total Power Dissipation	P_D	$T_A = 25^\circ C$	3.0	W
Operating Junction Temperature	T_J		-55 to 175	$^\circ C$
Storage Temperature	T_{STG}		-55 to 175	$^\circ C$
Single Pulse Avalanche Energy	E_{AS}	$L = 0.1mH$, $V_{GS} = 10V$, $R_g = 25\Omega$, $T_J = 25^\circ C$	120	mJ
ESD Level (HBM)			Class 1C	

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	2.1	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	50	° 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	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 30A$		7	9	m Ω
		$V_{GS} = 4.5V, I_D = 20A^{\circ}$		9	11	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = 25V, I_D = 10A$		16		S
Diode Forward Voltage	V_{FSD}	$I_S = 30A$			1.2	V

•Dynamic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	$f = 1MHz,$ $V_{DS} = 25V$	-	2190	-	pF
Output capacitance	C_{oss}		-	1130	-	
Reverse transfer capacitance	C_{rss}		-	138	-	
Gate Resistance	R_g	$f = 1MHz$		1.6		Ω
Total gate charge	Q_g	$V_{DD} = 15V$ $I_D = 5A$ $V_{GS} = 10V$	-	33	-	nC
	$Q_g(4.5v)$			16		
Gate - Source charge	Q_{gs}		-	6.8	-	
Gate - Drain charge	Q_{gd}		-	5.8	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{GS} = 10V,$ $V_{DS} = 15V$ $R_G = 6\Omega, I_D = 15A$		14		ns
Turn-ON Rise time	t_r			21		ns
Turn-Off Delay time	$t_{D(off)}$			28		ns
Turn-Off Fall time	t_f			7		ns
Reverse Recovery Time	t_{RR}	$V_{DD} = 20V,$ $dI_S/dt = 100$ $A/s, I_S = 30A$		56		ns
Reverse Recovery Charge	Q_{RR}			67		nC

Fig.1 Gate-Charge Characteristics

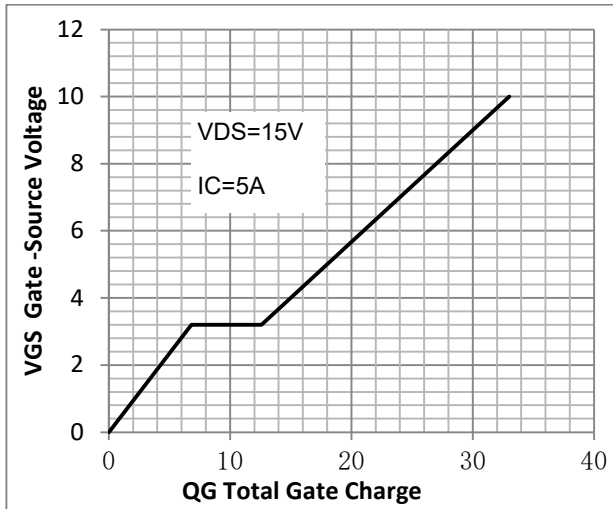


Fig.2 Capacitance Characteristics

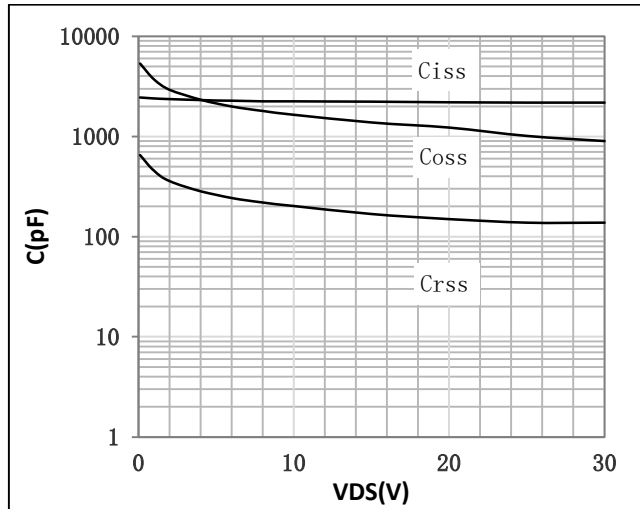


Fig.3 Power Dissipation

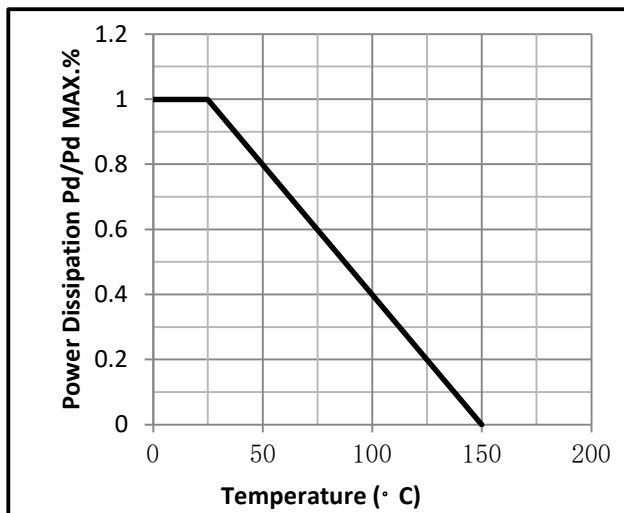


Fig.4 Typical output Characteristics

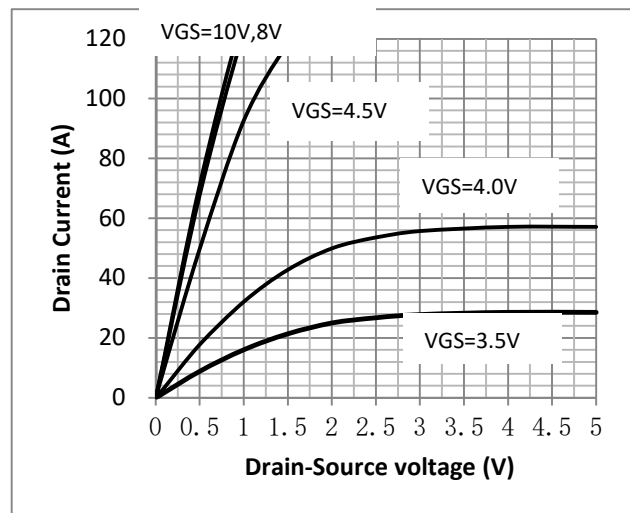


Fig.5 Threshold Voltage V.S Junction Temperature

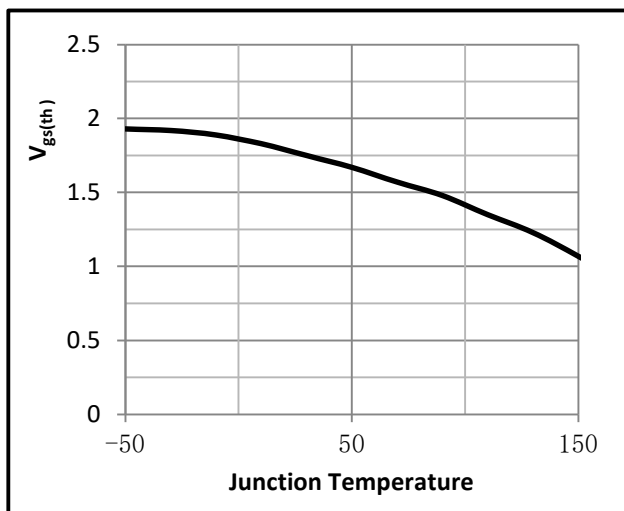


Fig.6 Resistance V.S Drain Current

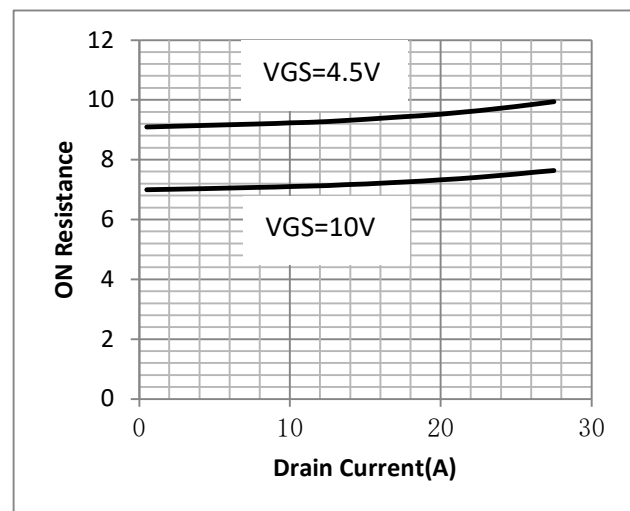


Fig.7 On-Resistance VS Gate Source Voltage

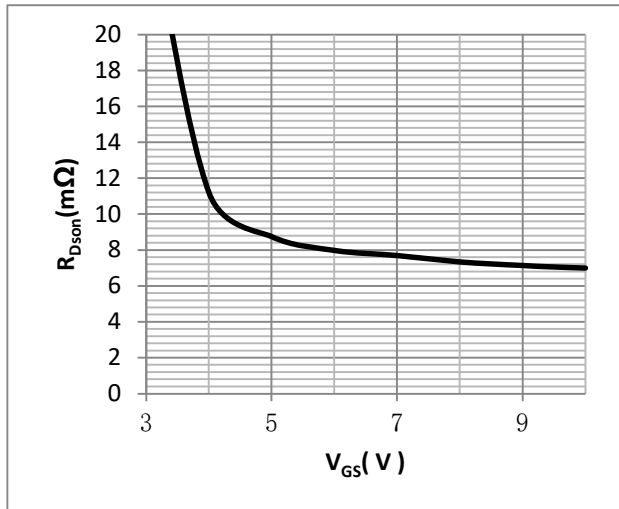


Fig.8 On-Resistance V.S Junction Temperature

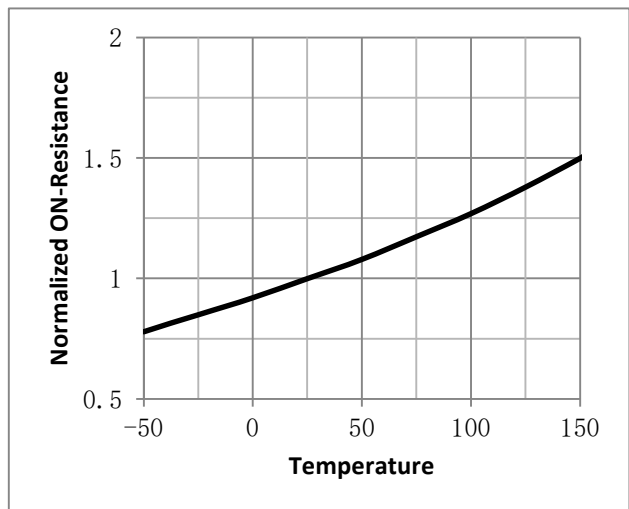


Fig.9 Diode Forward Voltage vs. Current

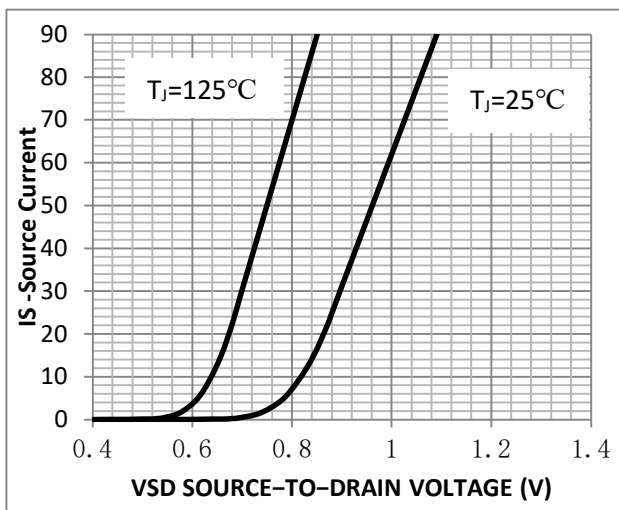


Figure.10 Transfer Characteristics

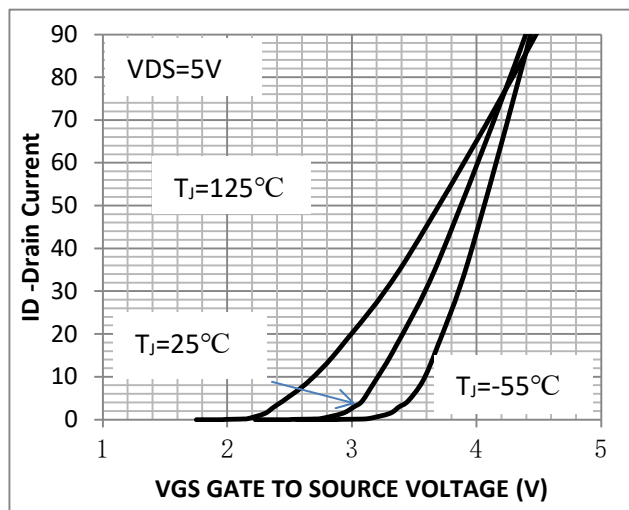


Fig.11 SOA Maximum Safe Operating Area

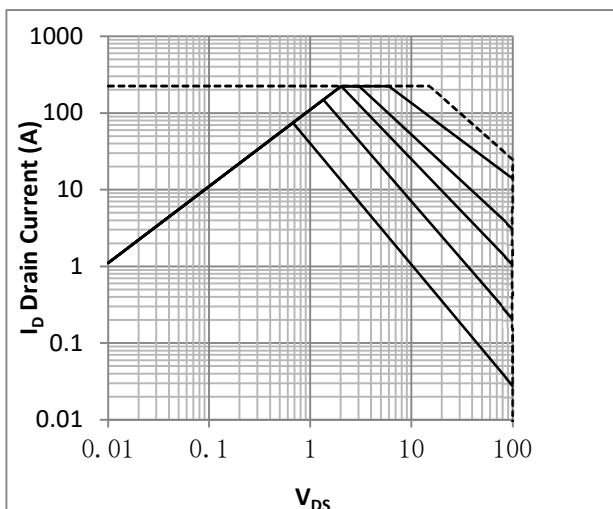


Fig.12 ID-Junction Temperature

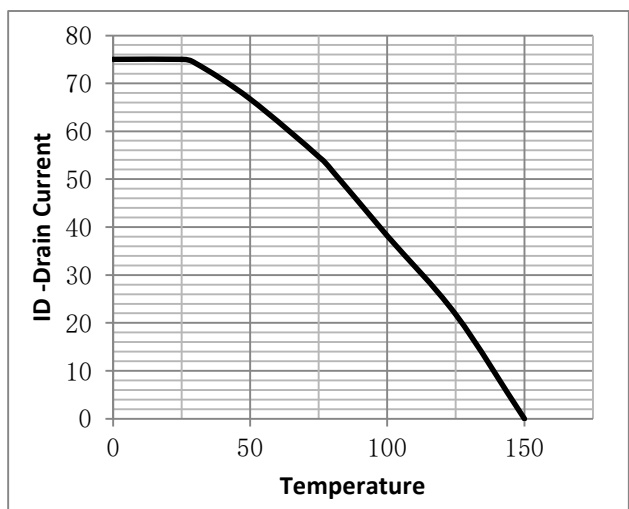


Fig.13 Gate Charge Measurement Circuit

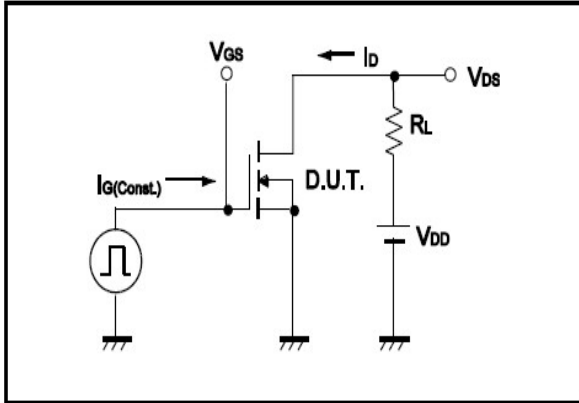


Fig.14 Gate Charge Waveform

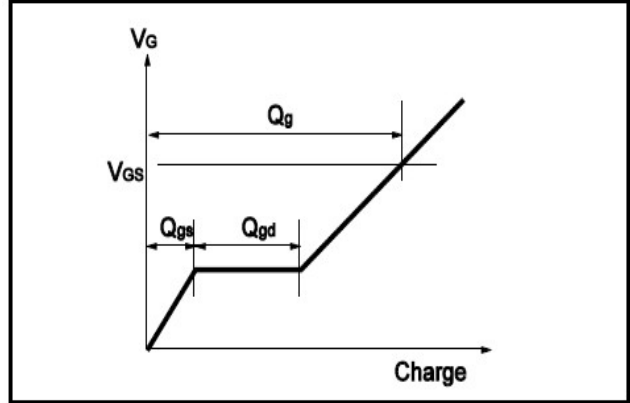


Fig.15 Switching Time Measurement Circuit

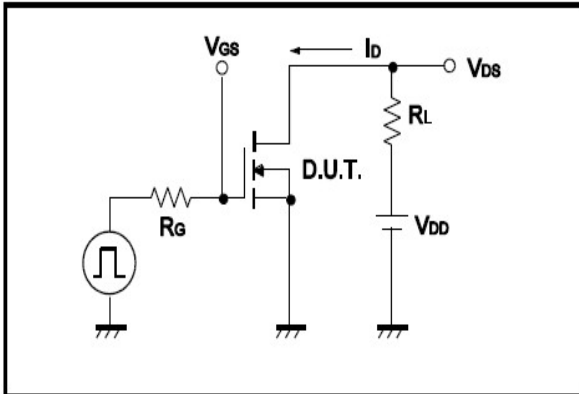


Fig.16 Switching Time Waveform

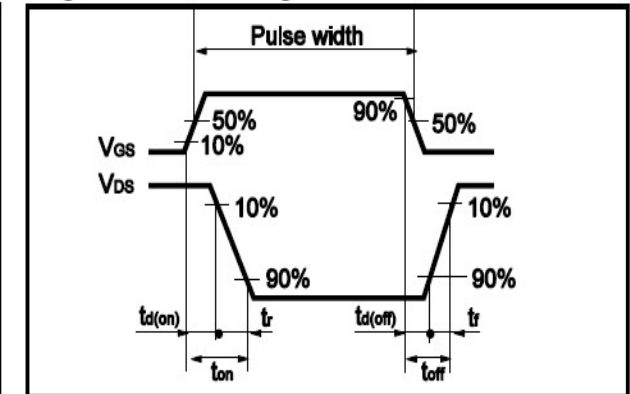


Fig.17 Avalanche Measurement Circuit

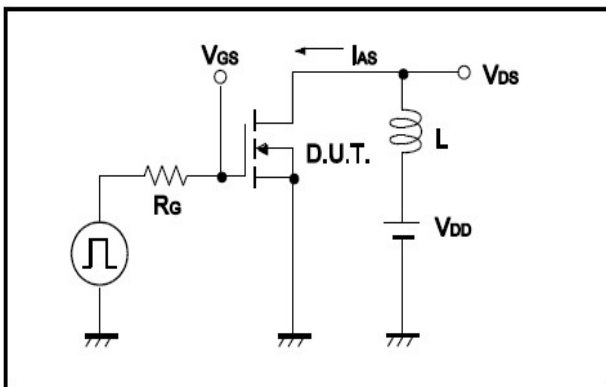
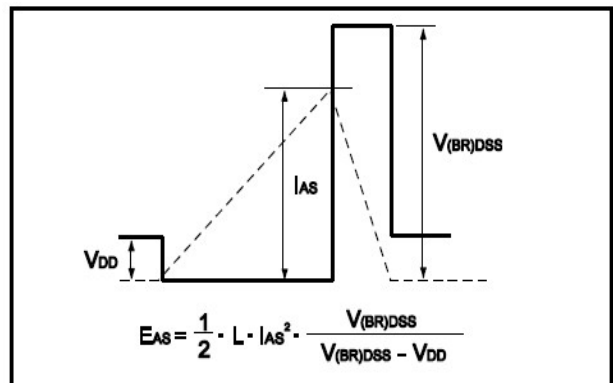
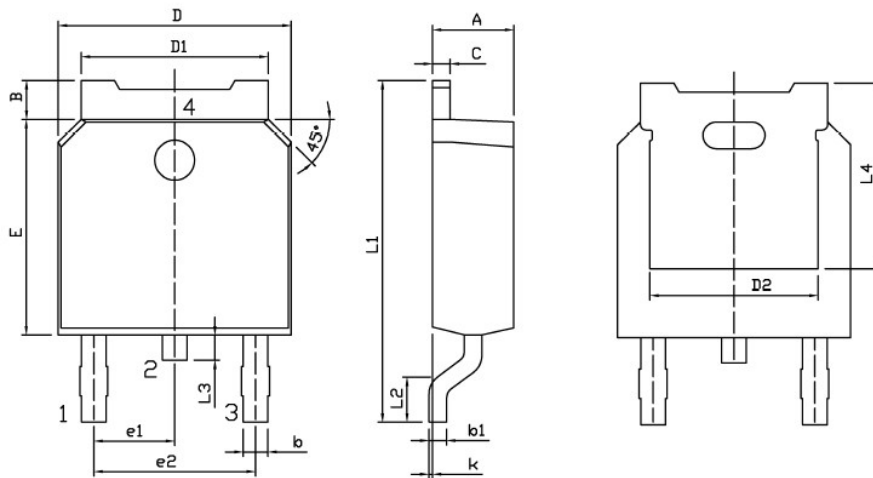


Fig.18 Avalanche Waveform



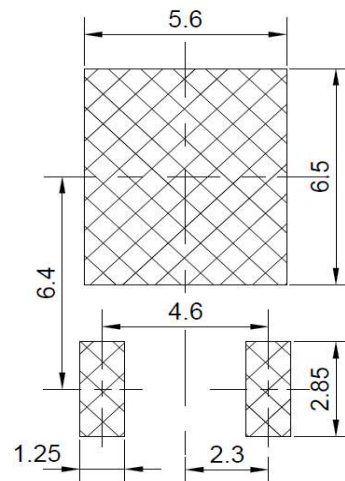


• Dimensions (TO-252)



Land Pattern
(Only for Reference)

Dimensions In Millimeters					
Symbol	MIN	MAX	Symbol	MIN	MAX
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.70	0.90	e2	4.43	4.73
b1	0.45	0.55	L1	9.85	10.35
C	0.45	0.55	L2	1.70	2.00
D	6.45	6.75	L3	0.60	0.90
D1	5.10	5.50	L4	5.05	
D2	4.85		k	0.00	0.10



Note:

- ① Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$, Accumulation time ≤ 50 hours; For DC , the following test conditions can be passed: $V_{GS}=+15V/-5V$, $T_j=175^\circ\text{C}$, $t=1000$ hours;
- ② Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;
- ③ $V_{gs}\geq 4.5V$ is required for practical application.

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