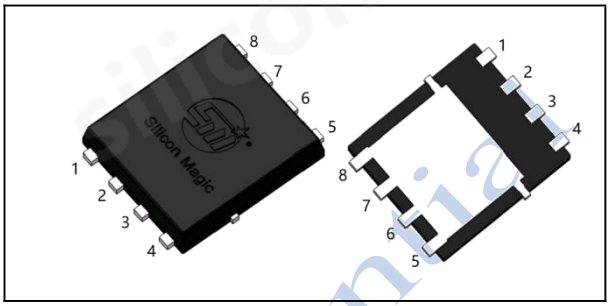
Preliminary Specification: Subject to Change without Notice

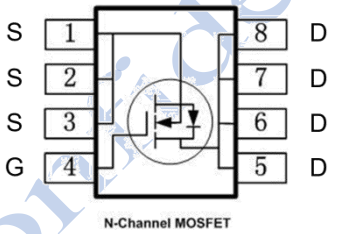
N-Channel 150 V MOSFET

Product summary

V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
150	11 @ V_{GS} = 10V	76 (1)

PDFN5*6-8L



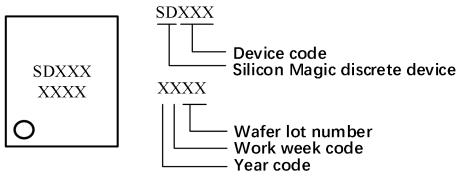


Features

- Low $R_{DS(on)}$ SGT technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Applications

- DC/DC conversion
- Power switch
- Motor drives



is the registered trademark of Silicon-Magic Semiconductor Technology (Hangzhou) Co., Ltd.

Package and ordering information

Ordering code	Package	Device code
SDH15N9P3C-AB	PDFN5*6-8L	AMC

1. Maximum ratings

Absolute maximum ratings (T_A = 25℃ unless otherwise noted)				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-source voltage		V_{DS}	150	V
Gate-source voltage		V_{GS}	±20	
Continuous drain current	T_C=25℃ (1)	I_D	76	A
	T_C=100℃		48	
	T_A=25℃ (4)		10.3	
Pulsed drain current(2)		$I_{D,pulse}$	307.2	
Avalanche energy, single pulse(3)		E_{AS}	100	mJ
Power dissipation	T_C=25℃	P_D	138.8	W
	T_A=25℃ (4)		2.5	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 150	℃

2. Thermal resistance ratings

Thermal resistance ratings				
Parameter		**Symbol**	**Max.**	**Unit**
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	0.9	°C/W
Thermal resistance, junction-to-ambient (4)	Steady state	$R_{\theta JA}$	50	

3. Electrical Characteristics

Electrical characteristics (T_J = 25°C unless otherwise noted)						
Parameter	**Symbol**	**Test conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static parameter						
Drain to source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 μA	150			V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	2.8	3.6	4.4	V
Gate-body leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} = 150 V, V_{GS} = 0 V			1	μA
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 20 A		9.2	11	mΩ
Forward transconductance(5)	g_{fs}	V_{DS} = 5 V, I_D = 20 A		43		S
Gate resistance	R_g	f = 1 MHz		2.3		Ω
Dynamic(5)						
Total gate charge	Q_g	V_{DS} = 75 V, I_D = 20 A, V_{GS} = 10 V		20		nC
Gate-source charge	Q_{gs}			8.2		
Gate-drain charge	Q_{gd}			7.0		
Turn-on delay time	$t_{d(on)}$	V_{DS} = 75 V, I_D = 20 A, V_{GS} = 10 V, R_{GEN} = 1.6 Ω		10.8		ns
Rise time	t_r			14.5		
Turn-off delay time	$t_{d(off)}$			3.1		
Fall time	t_f			5.2		
Input capacitance	C_{iss}	V_{DS} = 75 V, V_{GS} = 0 V, f = 1 MHz		1367		pF
Output capacitance	C_{oss}			462		
Reverse transfer capacitance	C_{rss}			20		
Reverse Diode Characteristics(5)						
Diode forward voltage	V_{SD}	V_{GS} = 0 V, I_F = 20 A		0.9	1.1	V
Reverse recovery time	t_{rr}	V_{DS} = 75 V, I_F = 20 A, di/dt = 100 A/μs		66		ns
Reverse recovery charge	Q_{rr}			100		nC

Notes

(1) limited by maximum junction temperature.

(2) Pulse width limited by maximum junction temperature.

(3) V_{DS} = 75 V, V_{GS} = 10 V, L = 1 mH.

(4) $R_{\theta JA}$ is determined with the device mounted on a 1 in^2 pad 2 oz copper pad on a 1.5x1.5 in. board of FR-4 material.

(5) Guaranteed by design, not subject to production testing.

4. Electrical characteristics diagrams

Fig.1 Typ. transfer characteristics

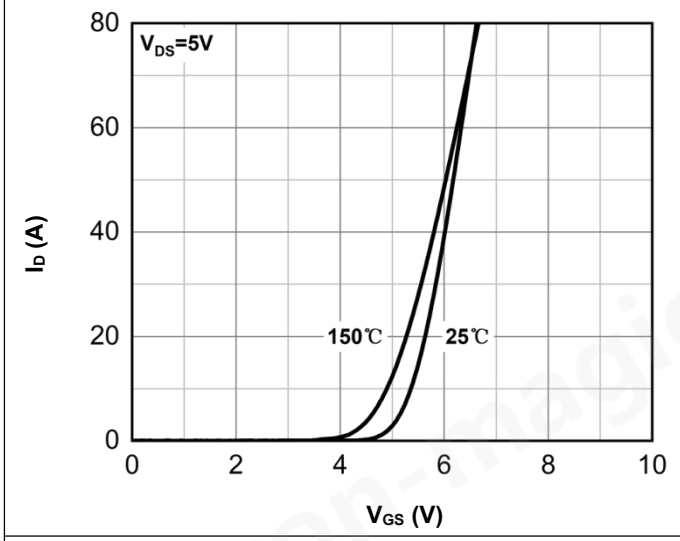


Fig.2 Typ. output characteristics

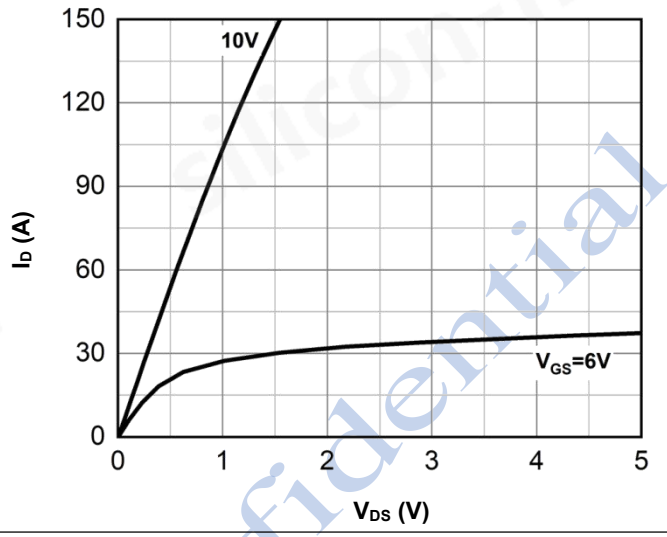


Fig.3 Normalized on-resistance vs drain current

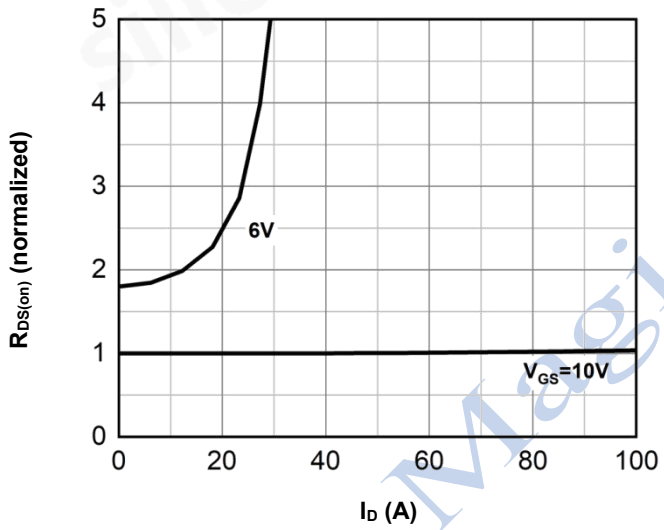


Fig.4 Typ. on-resistance vs gate-source voltage

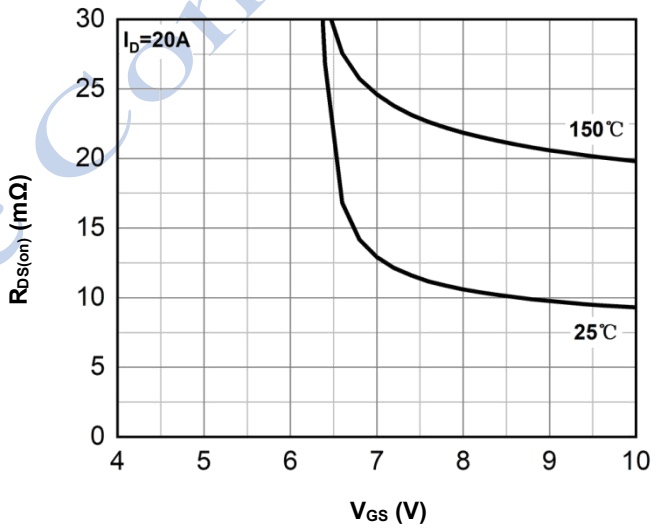


Fig.5 Normalized on-resistance vs junction temperature

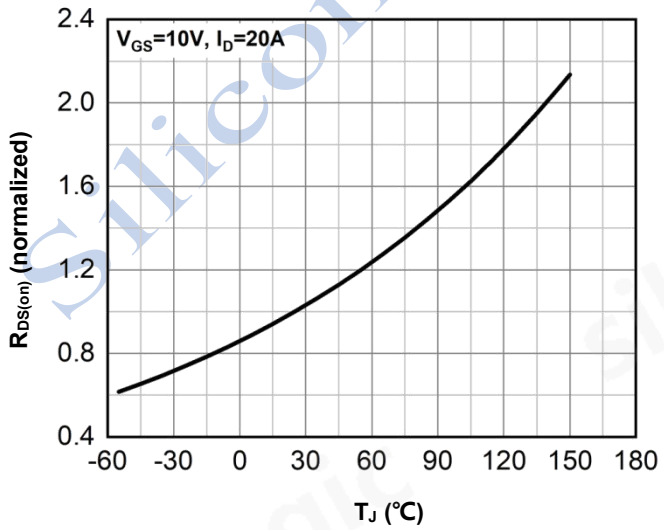


Fig.6 Typ. gate charge

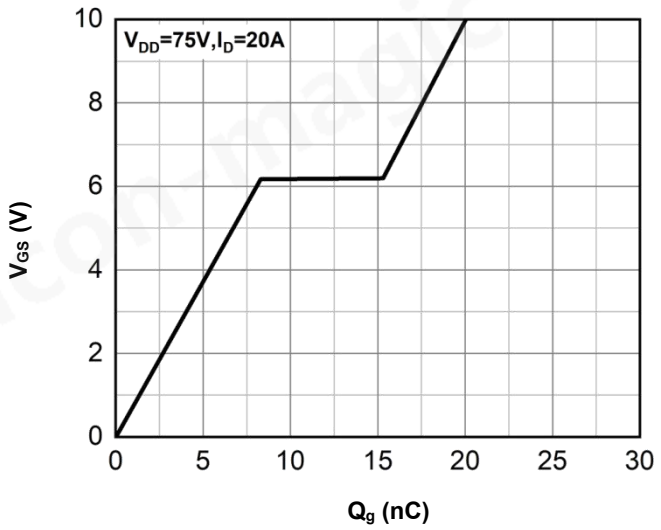


Fig.7 Typ. forward characteristics of body diode

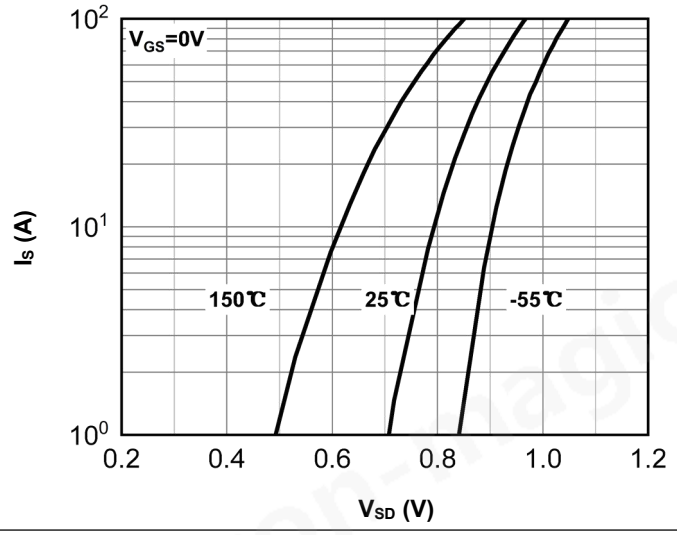


Fig.8 Safe operating area

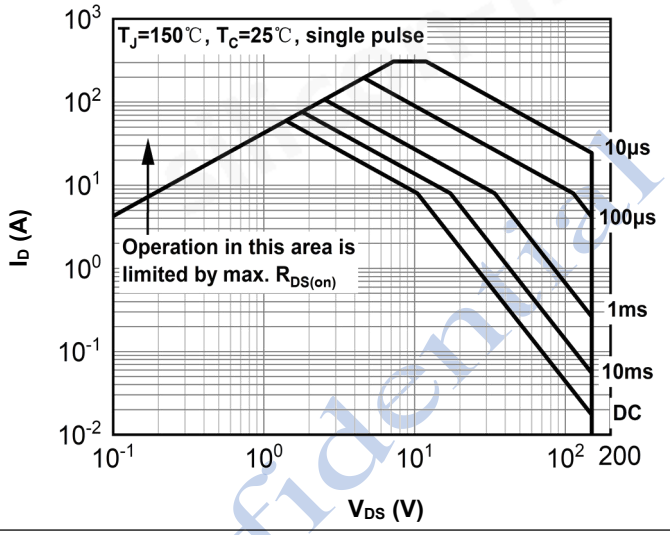


Fig.9 Typ. Capacitance

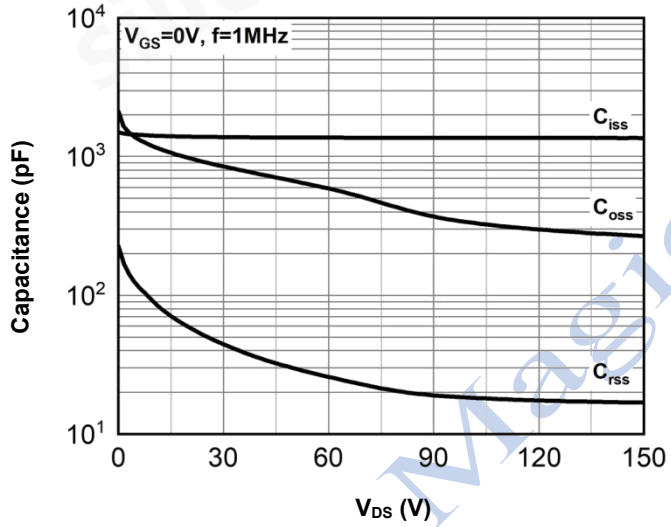


Fig.10 Single pulse maximum power dissipation

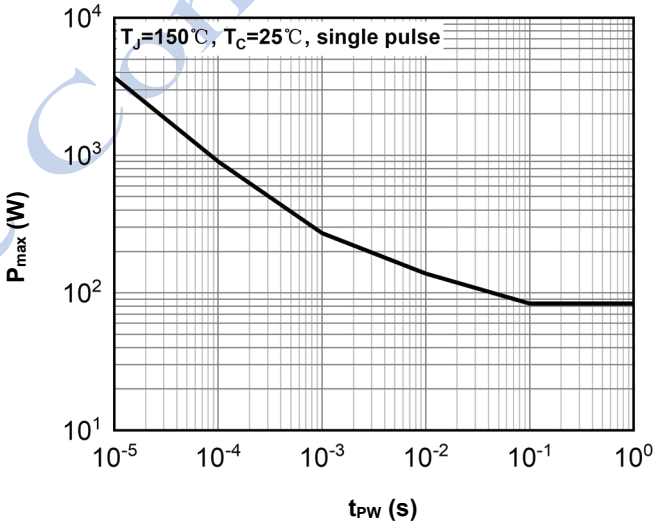


Fig.11 Max. power dissipation vs case temperature

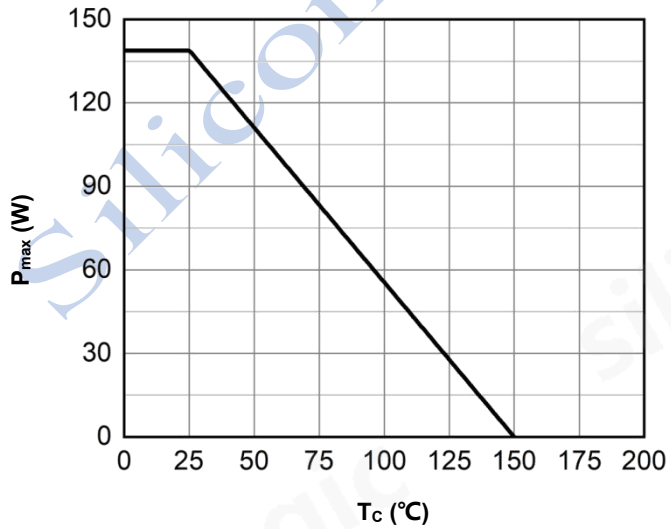


Fig.12 Max. continuous drain current vs case temperature

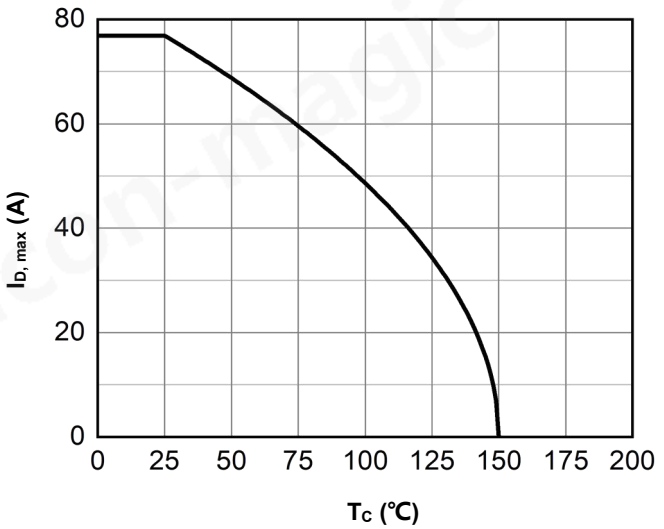


Fig.13 Normalized $V_{(BR)DSS}$ vs junction temperature

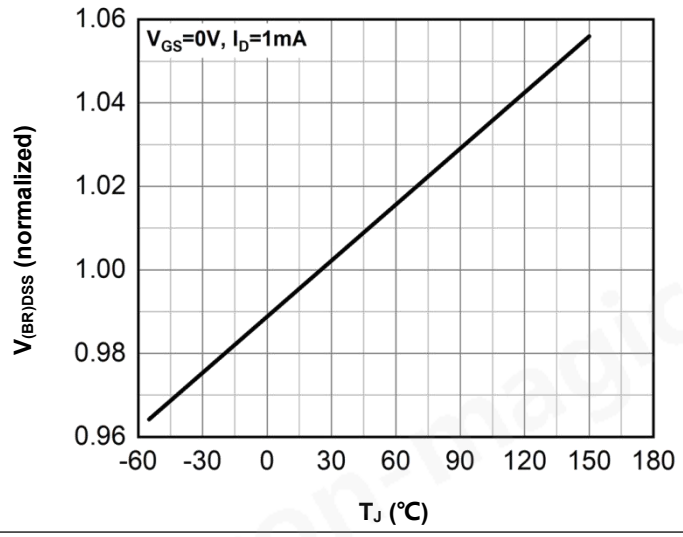


Fig.14 Normalized $V_{GS(th)}$ vs junction temperature

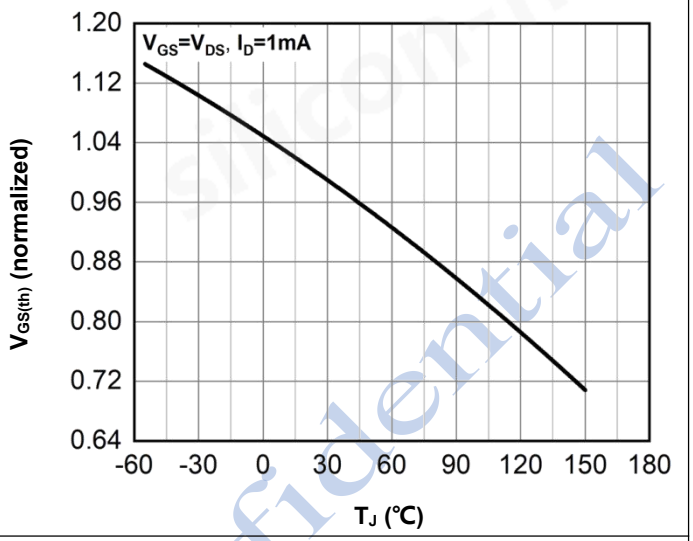
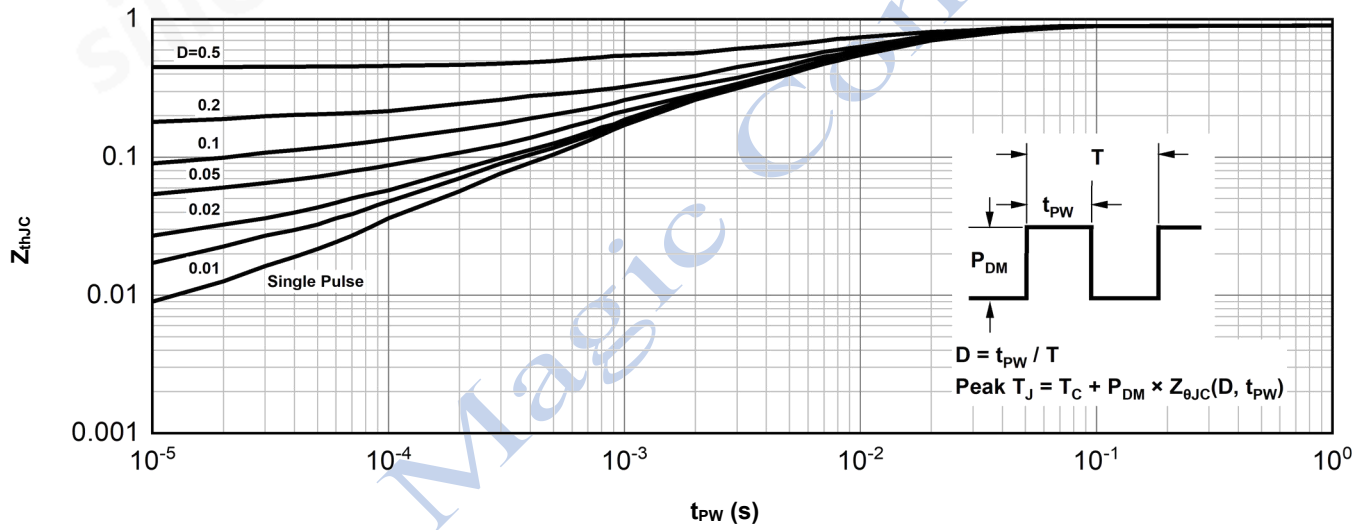
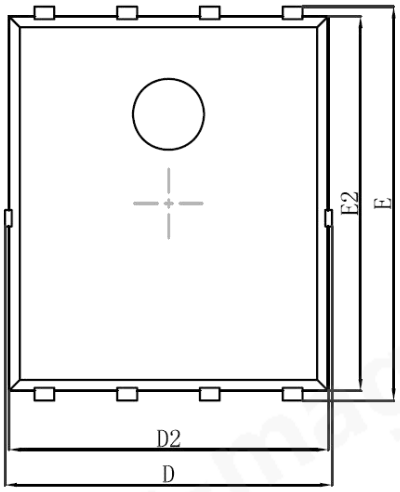


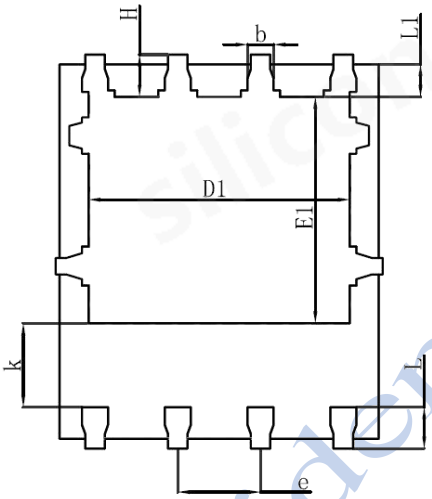
Fig.15 Transient thermal impedance from junction to case



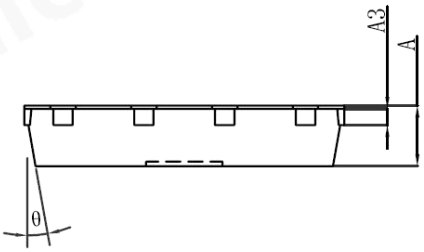
5. Package outline dimensions



Top View



Bottom View



Side View

Dim	Millimeters		
	Min	Nom	Max
A	0.900	—	1.000
A3		0.254 REF	
D	4.944	—	5.096
E	5.974	—	6.126
D1	3.910	—	4.110
E1	3.375	—	3.575
D2	4.824	—	4.976
E2	5.674	—	5.826
k	1.190	—	1.390
b	0.350	—	0.450
e		1.270 TYP	
L	0.559	—	0.711
L1	0.424	—	0.576
H	0.574	—	0.726
θ	10°	—	12°

Legal Disclaimer

The information given in this document shall be for illustrative purposes only and shall in no event be regarded as a guarantee of conditions or characteristics. Silicon Magic Technologies reserves the right to change any information herein. With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Silicon Magic Technologies or its affiliates hereby make no representation or warranty of any kind, expressed or implied, as to any information provided hereunder, including without limitation as to the accuracy, completeness or non-infringement of intellectual property rights of any third party, and they assume no liability for the consequences of use of such information. In addition, any information given in this document is subject to customer's compliance with its obligations stated herein and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Silicon Magic Technologies in customer's applications. The information contained herein is exclusively intended for technically trained staff. No license is granted by implication under any patent right, copyright, mask work right, or other intellectual property right. It is customer's sole responsibility to evaluate the suitability of the product for the intended application and the completeness of the product information given herein with respect to such application. In no event shall Silicon Magic Technologies or its affiliates be liable to any party for any direct, indirect, special, punitive, incidental or consequential damages of any nature whatsoever, including but not limited to loss of profits and loss of goodwill, whether or not such damages are based on tort or negligence, warranty, breach of contract or any other legal theory. In addition, any recipient of this document and the relevant products samples may not alter, decompile, disassemble, reverse engineer, or otherwise modify any information/samples received hereunder. Any intellectual property rights arising from the reverse engineering of Silicon Magic's products shall belong to Silicon Magic.