

N-Channel 80V MOSFET

Product summary

V_{DS} (V)	$R_{DS(on),max}$ (m Ω)	I_D (A)
80	3.0 @ $V_{GS} = 10V$	176 ⁽¹⁾

Features

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

Applications

- DC/DC conversion
- Power switch
- Motor drives

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

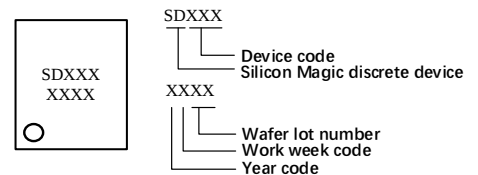
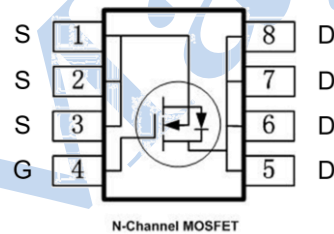
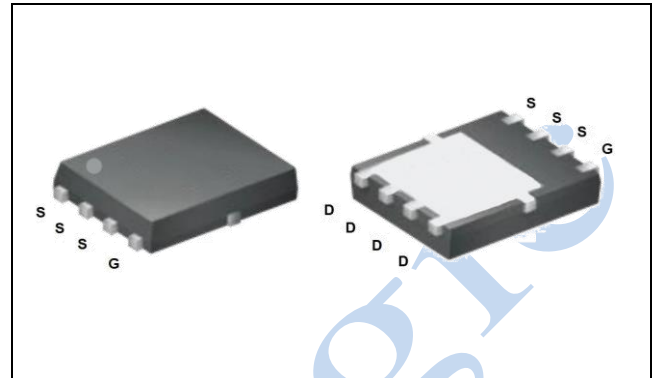
Package and ordering information

Ordering code	Package	Device code
SDN08N003S2C	PDFN5X6-8L	ADP

1. Maximum ratings

Absolute maximum ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)				
Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{DS}	80	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current	$T_C = 25^\circ\text{C}$ ⁽¹⁾	I_D	176	A
	$T_C = 100^\circ\text{C}$		111	
	$T_A = 25^\circ\text{C}$ ⁽⁴⁾		22	
Pulsed drain current ⁽²⁾		$I_{D,pulse}$	705	
Avalanche energy, single pulse ⁽³⁾		E_{AS}	467	mJ
Power dissipation	$T_C = 25^\circ\text{C}$	P_D	166	W
	$T_A = 25^\circ\text{C}$ ⁽⁴⁾		2.7	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

PDFN5X6-8L



2. Thermal resistance ratings

Thermal resistance ratings						
Parameter		Symbol	Max.	Unit		
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	0.75			$^{\circ}\text{C/W}$
Thermal resistance, junction-to-ambient ⁽⁴⁾	Steady state	$R_{\theta JA}$	45			

3. Electrical Characteristics

Electrical characteristics						
Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Static parameter						
Drain to source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0, I_D = 250 \mu A$	80			V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	2.2	3.0	3.8	V
Gate-body leakage	I_{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 80 \text{ V}, V_{GS} = 0 \text{ V}$			1	μA
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10 \text{ V}, I_D = 50 \text{ A}$		2.4	3.0	m Ω
Forward transconductance ⁽⁵⁾	g_{fs}	$V_{DS} = 5 \text{ V}, I_D = 50 \text{ A}$		118		S
Gate resistance	R_g	$f = 1\text{MHz}$, open drain		1		Ω
Dynamic ⁽⁵⁾						
Total gate charge	Q_g	$V_{DS} = 40 \text{ V}, I_D = 50 \text{ A}, V_{GS} = 10 \text{ V}$		67		nC
Gate-source charge	Q_{gs}			18		
Gate-drain charge	Q_{gd}			19		
Turn-on delay time	$t_{d(on)}$	$V_{DS} = 40 \text{ V}, I_D = 50 \text{ A}, V_{GS} = 10 \text{ V},$ $R_{GEN} = 3 \Omega$		25		ns
Rise time	t_r			20		
Turn-off delay time	$t_{d(off)}$			51		
Fall time	t_f			17		
Input capacitance	C_{iss}	$V_{DS} = 40 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		4170		pF
Output capacitance	C_{oss}			817		
Reverse transfer capacitance	C_{rss}			36		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V_{SD}	$V_{GS} = 0 \text{ V}, I_F = 50 \text{ A}$		0.8	1.1	V
Reverse recovery time	t_{rr}	$V_{DS} = 40 \text{ V}, I_F = 50 \text{ A}, di/dt = 100 \text{ A}/\mu s$		60		ns
Reverse recovery charge	Q_{rr}			72		nC

Notes

- (1) Package limited.
- (2) Pulse width limited by maximum junction temperature.
- (3) $V_{DS} = 40 \text{ V}, V_{GS} = 10 \text{ V}, L = 0.3 \text{ mH}$.
- (4) $R_{\theta JA}$ is determined with the device mounted on a 1 in² 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

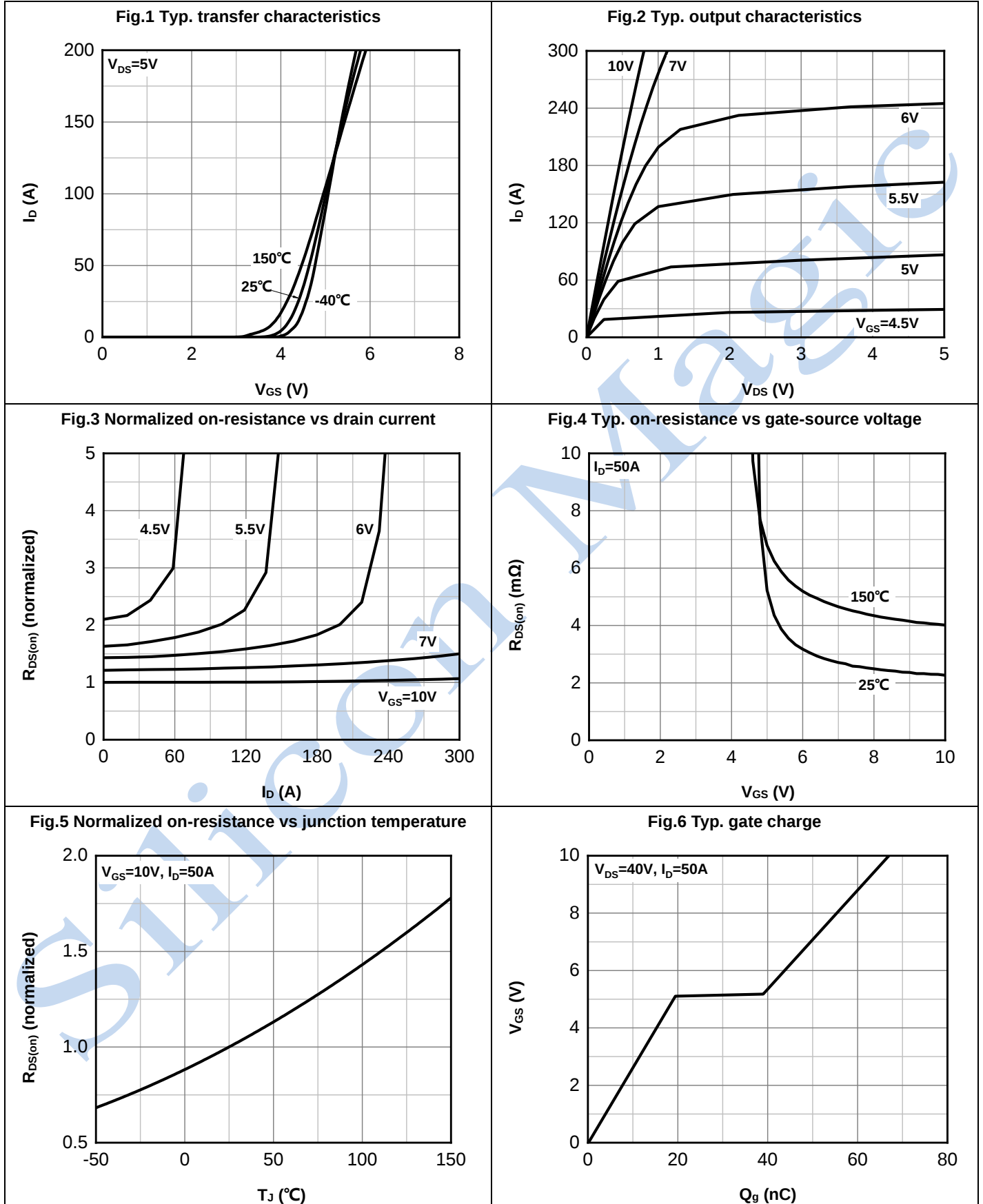


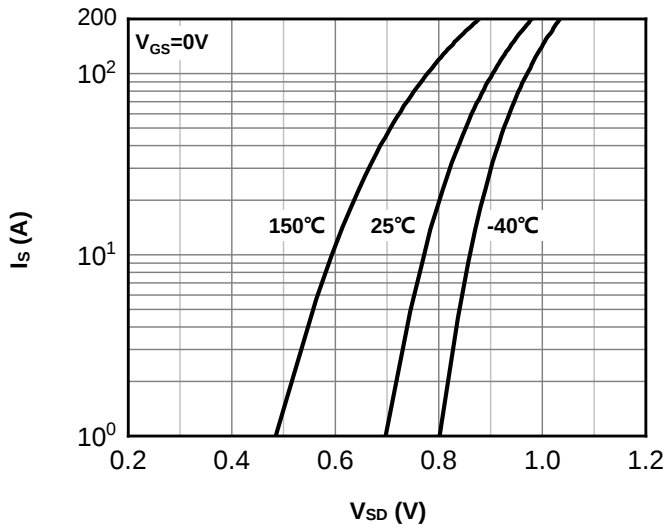
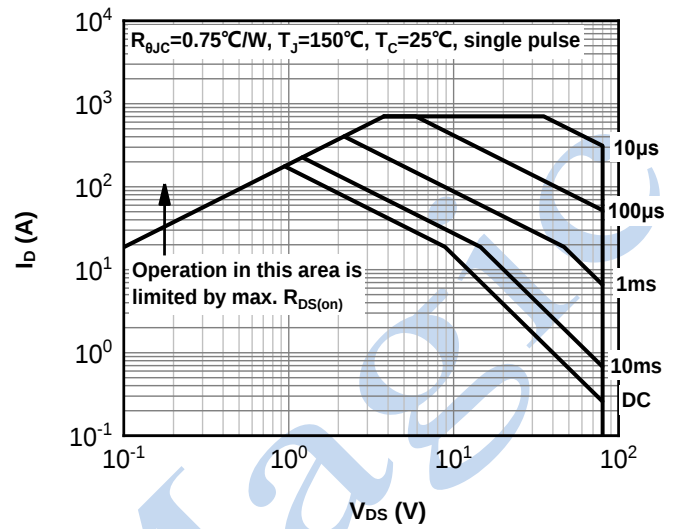
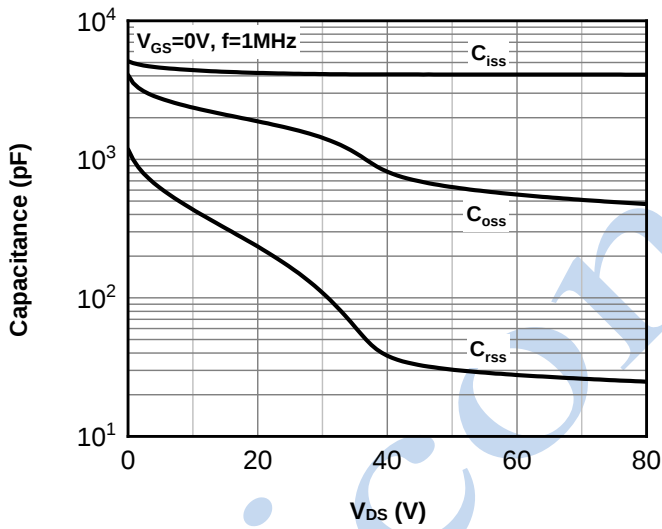
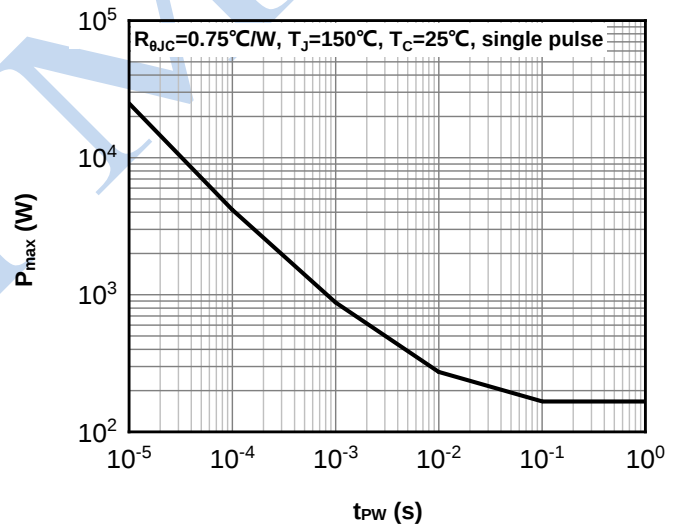
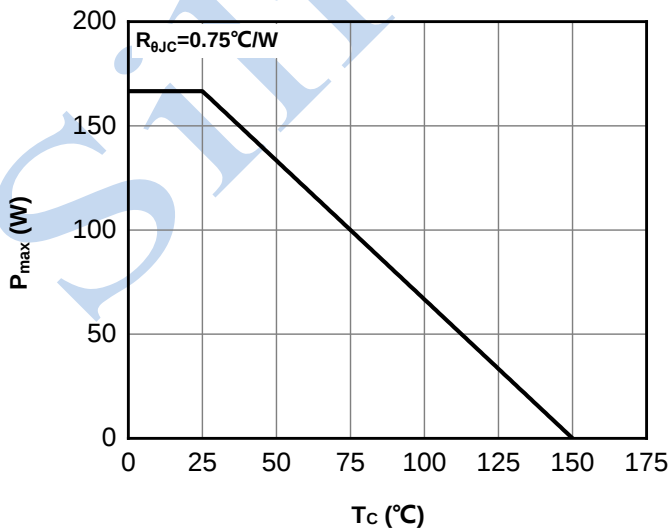
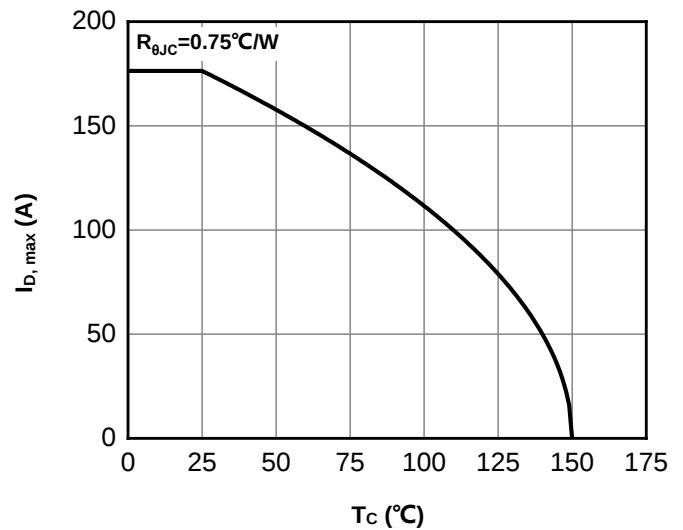
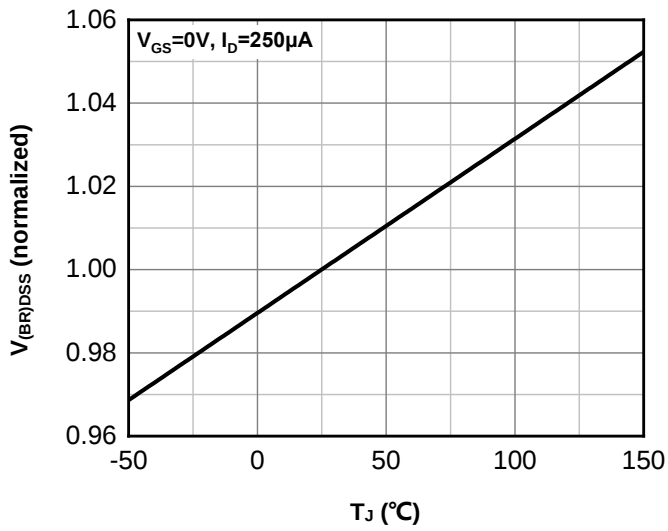
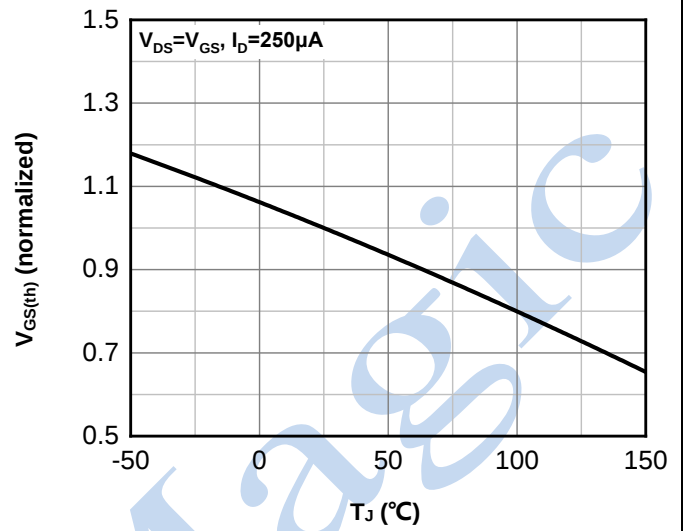
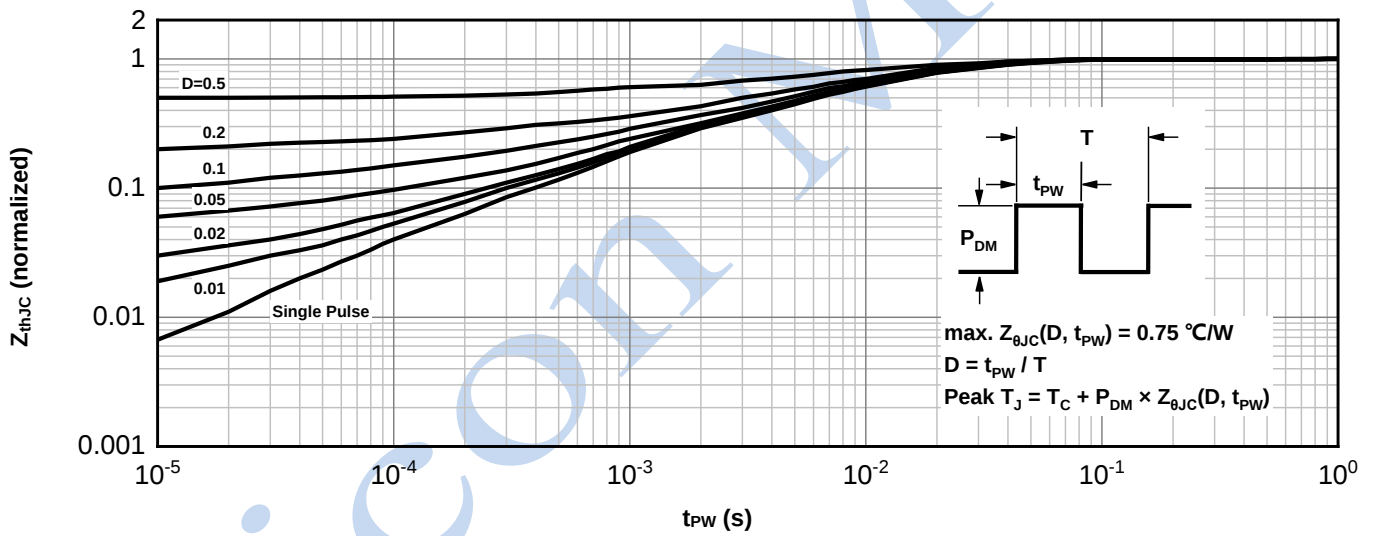
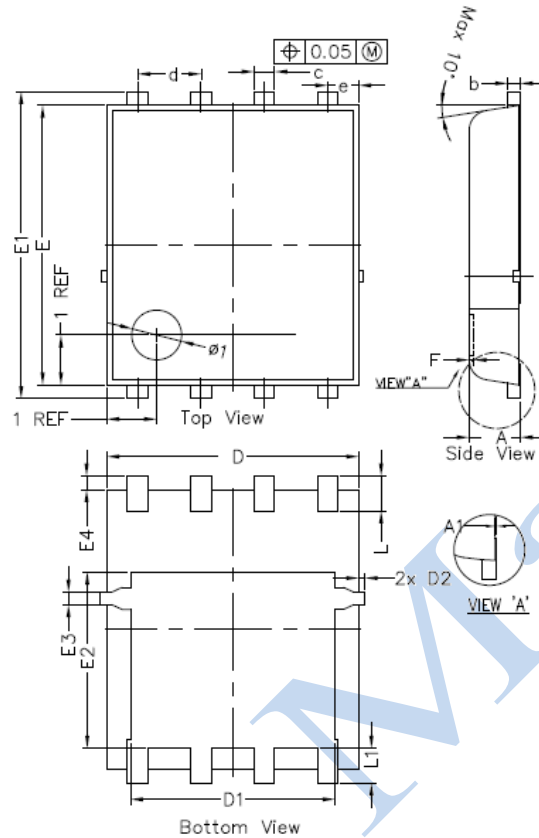
Fig.7 Typ. forward characteristics of body diode

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 Normalized transient thermal impedance from junction to case


5. Package outline dimensions



Dim	Millimeters		
	Min	Nom	Max
A	0.900	1.000	1.100
A1	0.000	---	0.050
b	0.246	0.254	0.312
c	0.310	0.410	0.510
d	1.27BSC		
D	4.950	5.050	5.150
D1	4.000	4.100	4.200
D2	---	---	0.125
e	0.62BSC		
E	5.500	5.600	5.700
E1	6.050	6.150	6.250
E2	3.425	3.525	3.625
E3	0.150	0.250	0.350
E4	0.175	0.275	0.375
F	---	---	0.100
L	0.500	0.600	0.700
L1	0.600	0.700	0.800

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.