

N-Channel 100V MOSFET

Product summary

V_{DS} (V)	$R_{DS(on),max}$ (m Ω)	I_D (A)
100	20 @ $V_{GS} = 10V$	23 ⁽¹⁾

Features

- Low FOM
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Applications

- DC/DC conversion
- Power switch
- Motor drives

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Package and ordering information

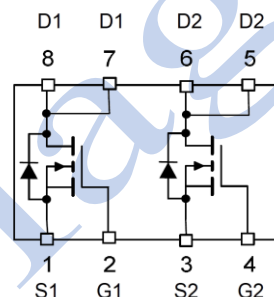
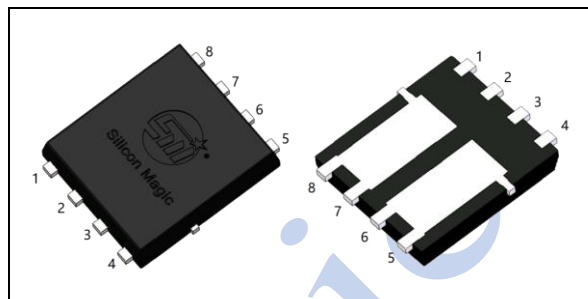
Ordering code	Package	Device code
SDH10K020N-AA	PDFN5*6-D	AGP

1. Maximum ratings

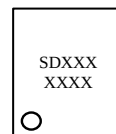
Absolute maximum ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{DS}	100	V
Gate-source voltage		V_{GS}	±20	
Continuous drain current	$T_C=25^{\circ}\text{C}$ ⁽¹⁾	I_D	23	A
	$T_C=100^{\circ}\text{C}$		18	
	$T_A=25^{\circ}\text{C}$ ⁽⁴⁾		6.8	
Pulsed drain current ⁽²⁾		$I_{D,pulse}$	92	
Avalanche energy, single pulse ⁽³⁾		E_{AS}	17	mJ
Power dissipation	$T_C=25^{\circ}\text{C}$	P_D	30	W
	$T_A=25^{\circ}\text{C}$ ⁽⁴⁾		2.1	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 175	°C

PDFN5*6-D



RoHS
COMPLIANT
HALOGEN
FREE



SDXXX
Device code
Silicon Magic discrete device

XXXX
Wafer lot number
Work week code
Year code

2. Thermal resistance ratings

Thermal resistance ratings				
Parameter		Symbol	Max.	Unit
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	5	°C/W
Thermal resistance, junction-to-ambient ⁽⁴⁾	Steady state	$R_{\theta JA}$	70	

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 = 1 mA	100			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.2	1.9	2.6	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} = 100 V, V _{GS} = 0 V			1	μA
Drain-source on-resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		17.5	20	mΩ
		V _{GS} = 5 V, I _D = 10 A		22	27	
Forward transconductance ⁽⁵⁾	g _{fs}	V _{DS} = 5 V, I _D = 20 A		29		S
Gate resistance	R _g	f = 1 MHz		1.8		Ω
Dynamic ⁽⁵⁾						
Total gate charge	Q _g	V _{DS} = 50 V, I _D = 20 A, V _{GS} = 5 V		13		nC
Total gate charge	Q _g	V _{DS} = 50 V, I _D = 20 A, V _{GS} = 10 V		22.5		
Gate-source charge	Q _{gs}			4.8		
Gate-drain charge	Q _{gd}			5.3		
Turn-on delay time	t _{d(on)}	V _{DS} = 50 V, I _D = 10 A, V _{GS} = 10 V, R _{GEN} = 10 Ω		20		ns
Rise time	t _r			43		
Turn-off delay time	t _{d(off)}			67		
Fall time	t _f			14		
Input capacitance	C _{iss}	V _{DS} = 50 V, V _{GS} = 0 V, f = 1 MHz		1250		pF
Output capacitance	C _{oss}			157		
Reverse transfer capacitance	C _{rss}			14		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V _{SD}	V _{GS} = 0 V, I _F = 20 A		0.98	1.2	V
Reverse recovery time	t _{rr}	V _{DS} = 50 V, I _F = 10 A, di/dt = 100 A/μs		33		ns
Reverse recovery charge	Q _{rr}			24		nC

Notes

- (1) Package Limited.
- (2) Pulse width limited by maximum junction temperature.
- (3) $V_{DS} = 50\text{ V}, V_{GS} = 10\text{ V}, L = 0.1\text{ mH}$.
- (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

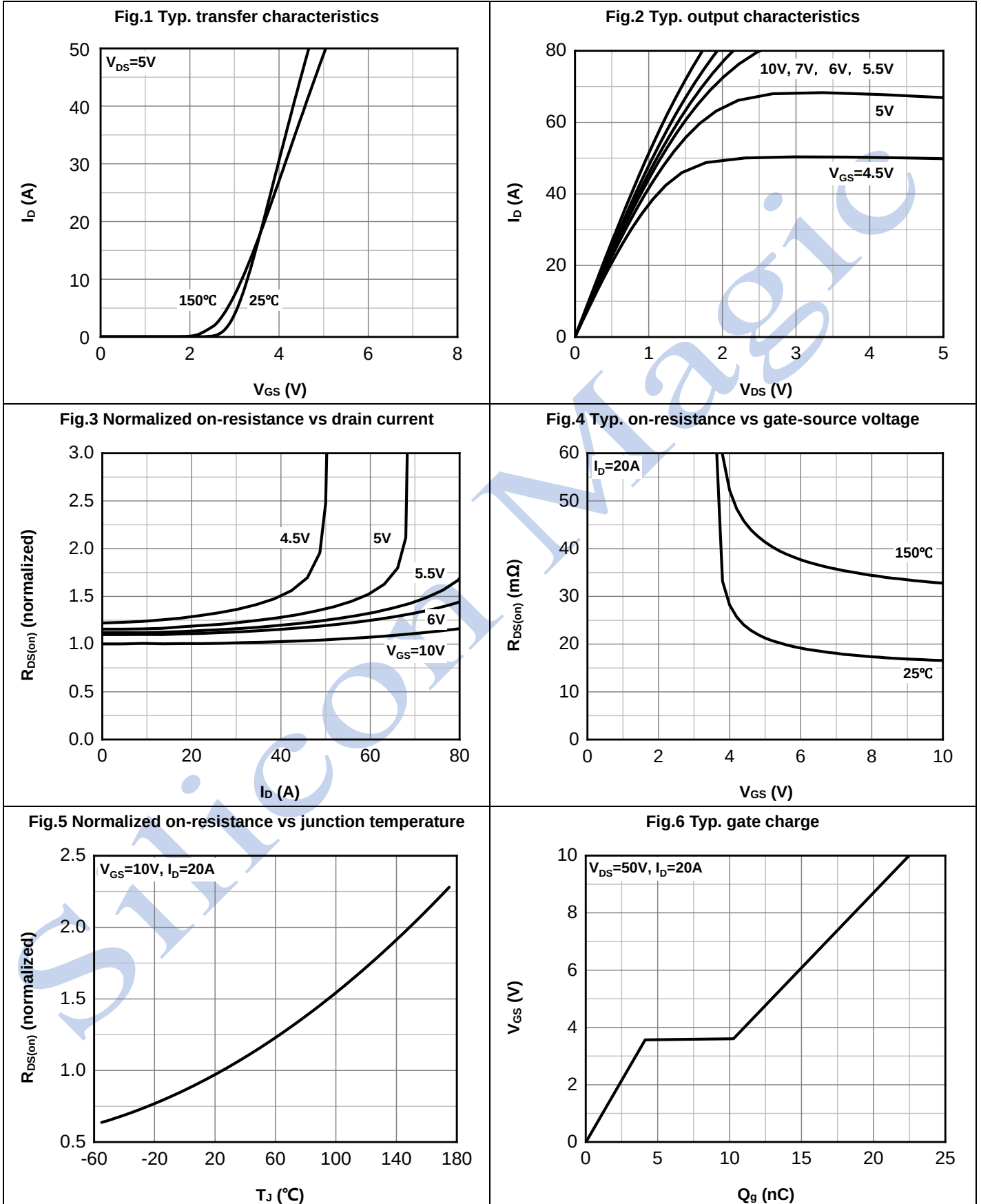


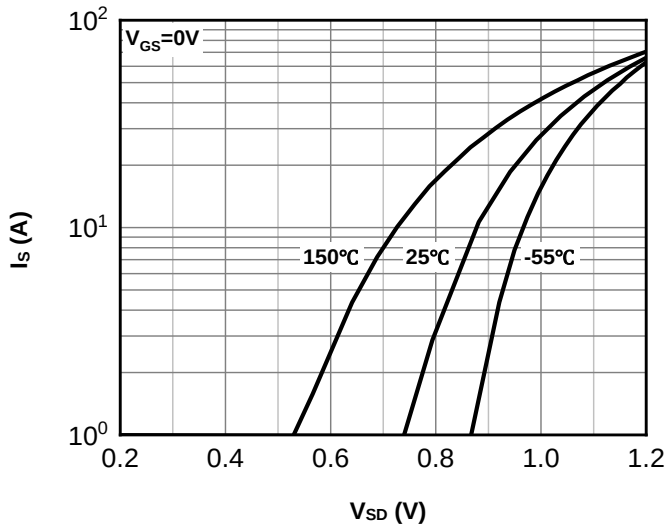
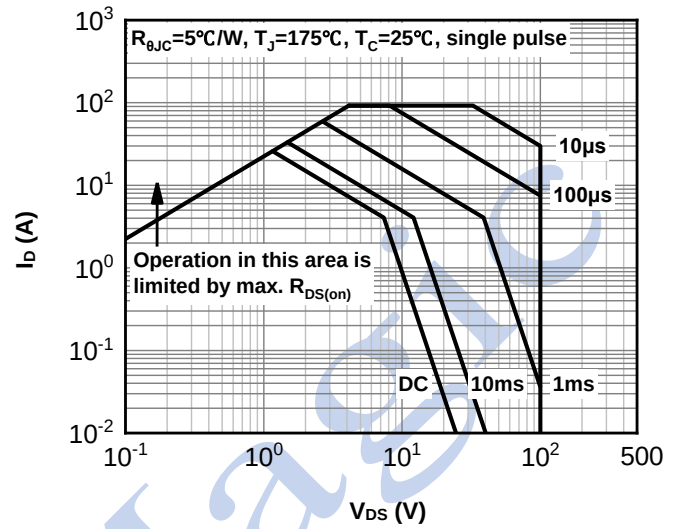
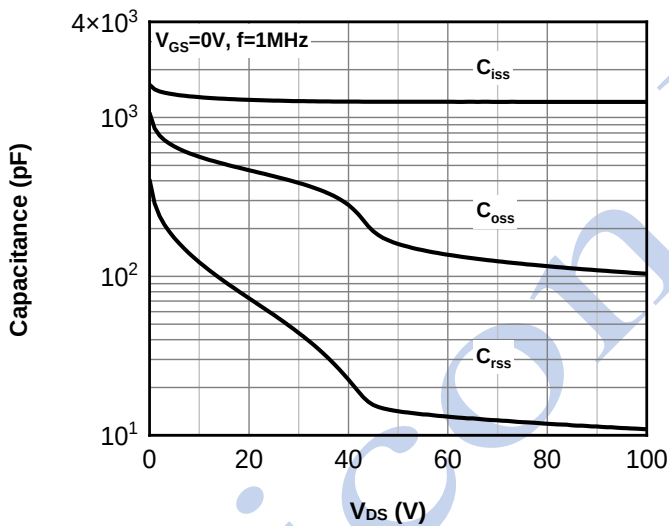
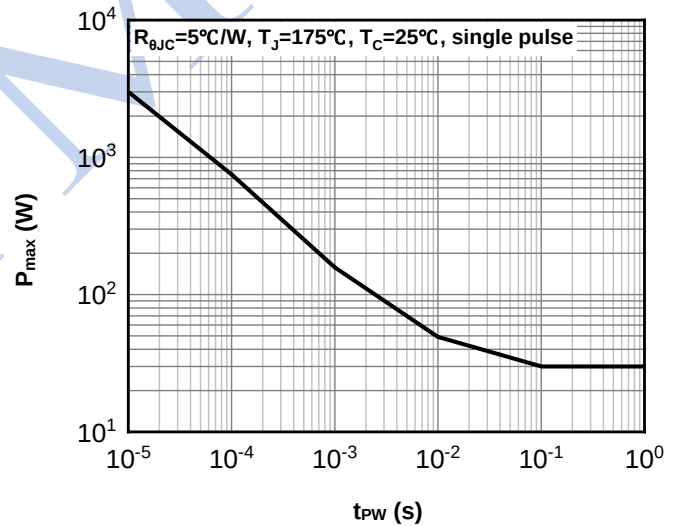
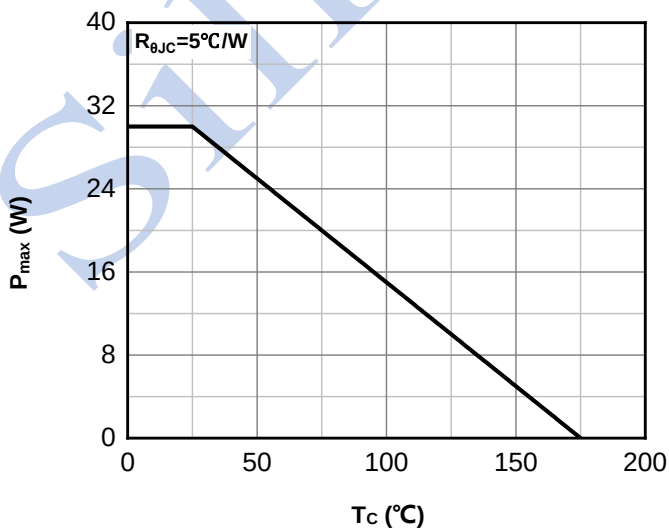
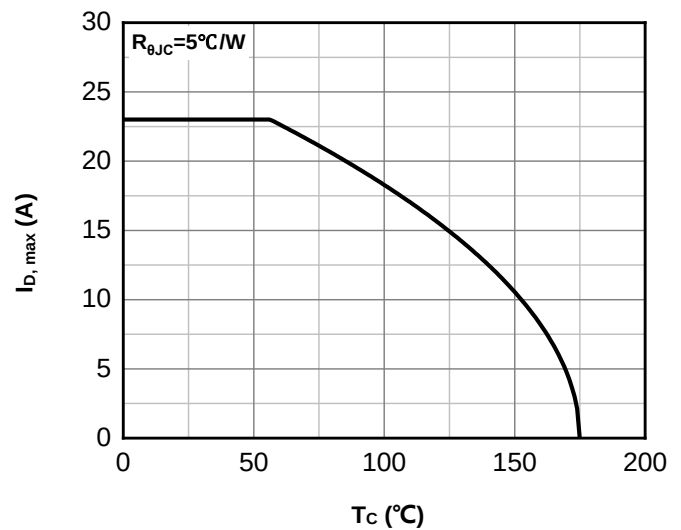
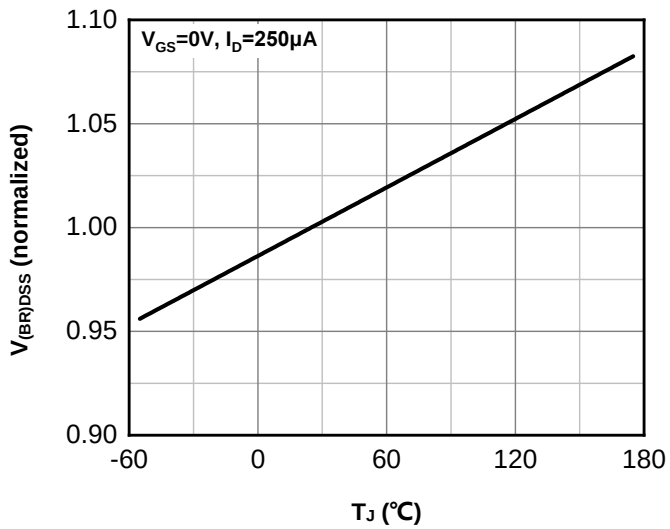
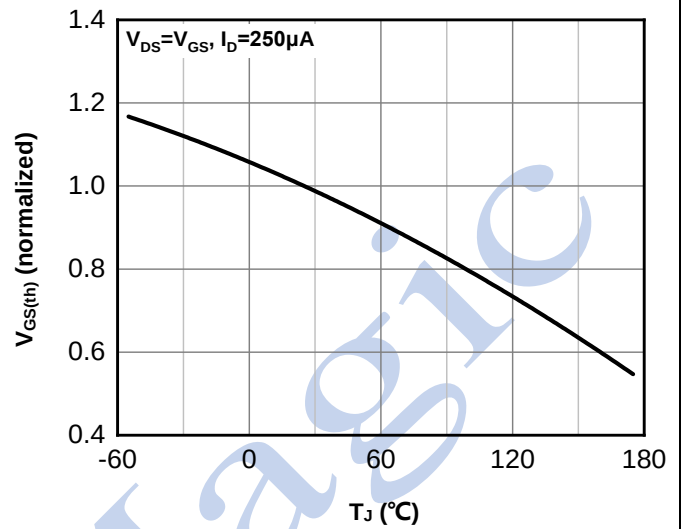
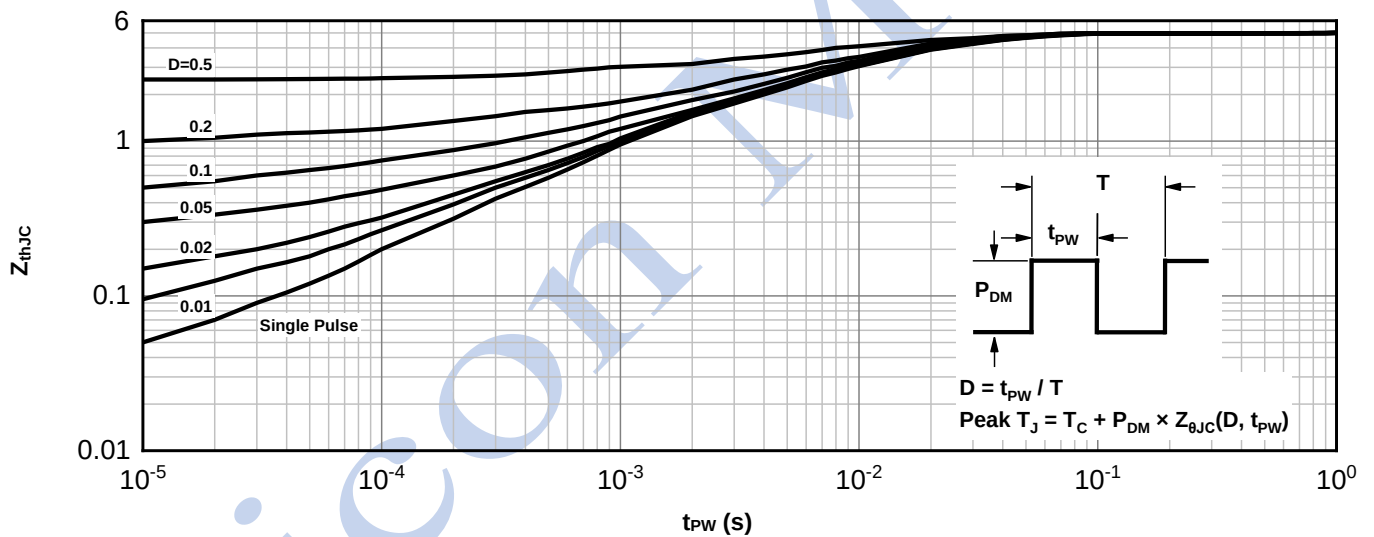
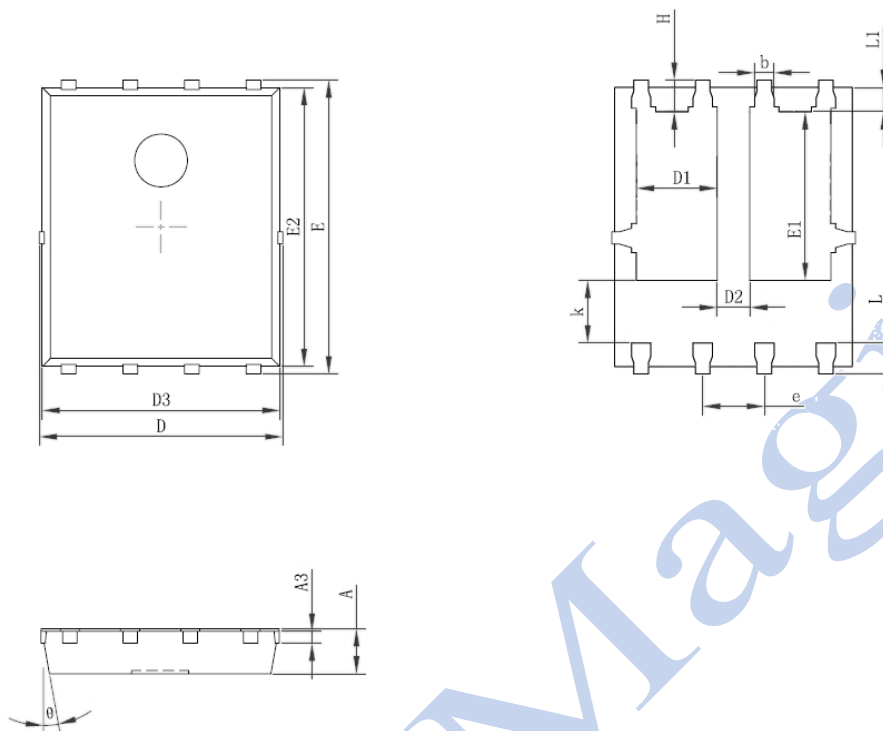
Fig.7 Typ. forward characteristics of body diode

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 Transient thermal impedance from junction to case


5. Package outline dimensions



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	1.470	-	1.870
D2	0.470	-	0.870
E1	3.375	-	3.575
D3	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°

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