

N-Channel 40V MOSFET

Product summary

V_{DS} (V)	$R_{DS(on),max}$ (m Ω)	I_D (A)
40	0.9 @ $V_{GS} = 10V$	300 ⁽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

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Package and ordering information

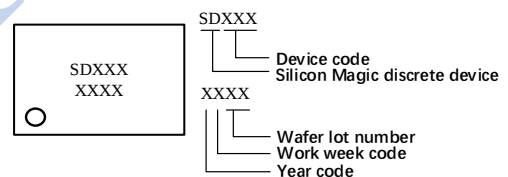
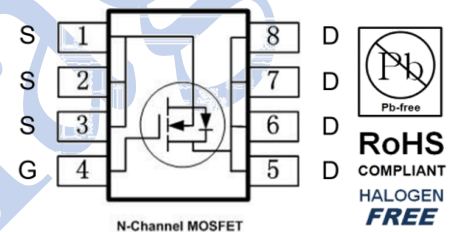
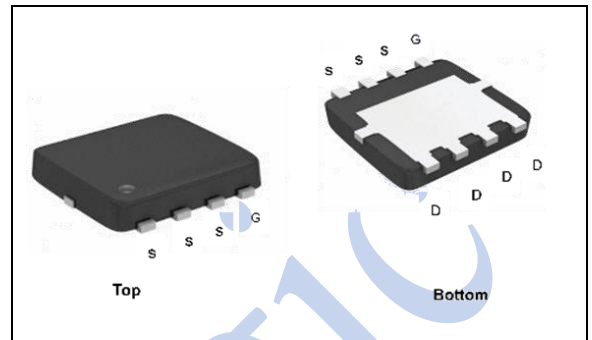
Ordering code	Package	Device code
SDH04L0P9C-AA	PDFN5*6-8L	AGT

1. Maximum ratings

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

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DS}	40	V
Gate-source voltage	V_{GS}	± 20	
Continuous drain current	$T_C = 25^\circ\text{C}$ ⁽¹⁾	300	A
	$T_C = 100^\circ\text{C}$	190	
	$T_A = 25^\circ\text{C}$ ⁽⁴⁾	42	
Pulsed drain current ⁽²⁾	$I_{D,pulse}$	1200	
Avalanche energy, single pulse ⁽³⁾	E_{AS}	701	mJ
Power dissipation	$T_C = 25^\circ\text{C}$	139	W
	$T_A = 25^\circ\text{C}$ ⁽⁴⁾	2.7	
Operating junction and storage temperature range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

DFN5*6-8L



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	$R_{\theta JA}$	45	

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	40			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.0	1.6	2.2	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} = 40 V, V _{GS} = 0 V			1	μA
Drain-source on-resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 90 A		0.8	0.9	mΩ
		V _{GS} = 4.5 V, I _D = 45 A		1.2	1.4	
Forward transconductance ⁽⁵⁾	g _{fs}	V _{DS} = 5 V, I _D = 90 A		430		S
Gate resistance	R _g	f = 1 MHz		3		Ω
Dynamic ⁽⁵⁾						
Total gate charge	Q _g	V _{DS} = 20 V, I _D = 45 A, V _{GS} = 4.5 V		42		nC
Total gate charge	Q _g	V _{DS} = 20 V, I _D = 90 A, V _{GS} = 10 V		86		
Gate-source charge	Q _{gs}			22		
Gate-drain charge	Q _{gd}			16		
Turn-on delay time	t _{d(on)}	V _{DS} = 20 V, I _D = 90 A, V _{GS} = 10 V, R _{GEN} = 4.7 Ω		33		ns
Rise time	t _r			41		
Turn-off delay time	t _{d(off)}			118		
Fall time	t _f			41		
Input capacitance	C _{iss}	V _{DS} = 20 V, V _{GS} = 0 V, f = 1 MHz		5870		pF
Output capacitance	C _{oss}			2320		
Reverse transfer capacitance	C _{rss}			95		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V _{SD}	V _{GS} = 0 V, I _F = 90 A		0.8	1.1	V
Reverse recovery time	t _{rr}	V _{DS} = 20 V, I _F = 90 A, di/dt = 100 A/μs		66		ns
Reverse recovery charge	Q _{rr}			55		nC

Notes

- (1) Limited by maximum junction temperature.
- (2) Pulse width limited by maximum junction temperature.
- (3) $V_{DS} = 20\text{ V}, V_{GS} = 10\text{ V}, L = 0.3\text{ mH}$.
- (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

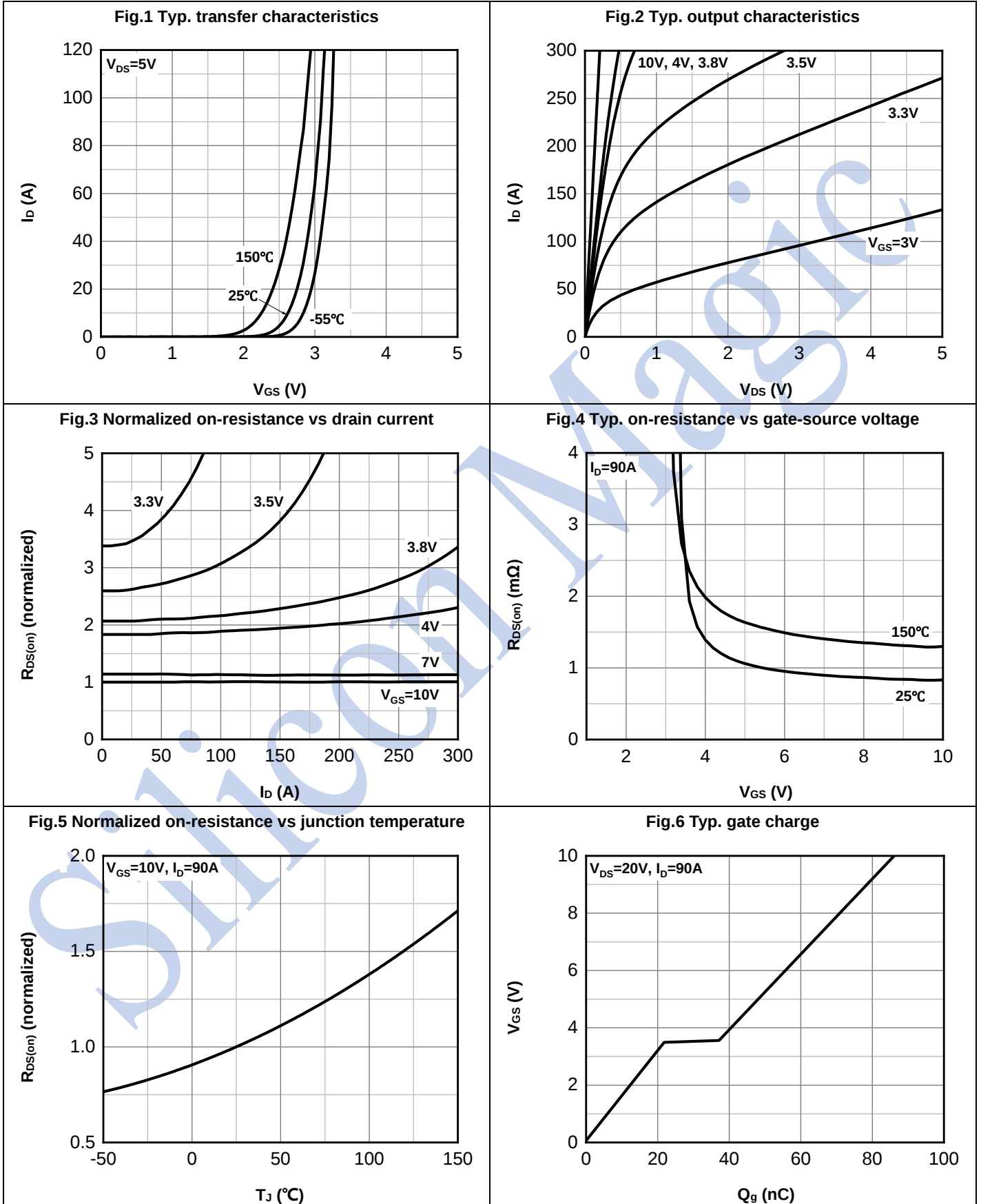


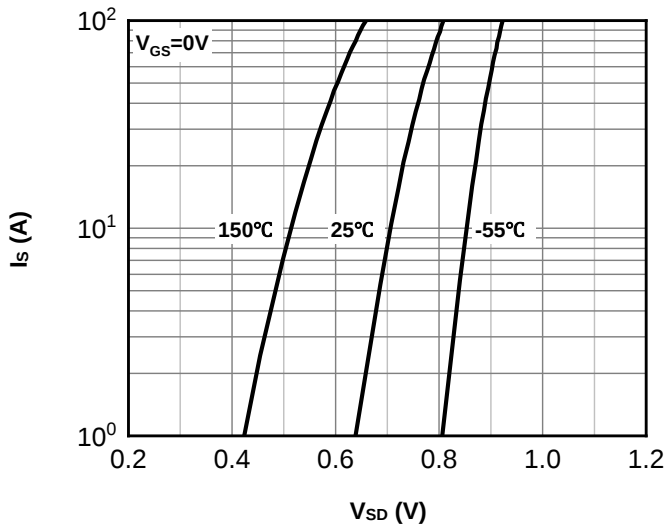
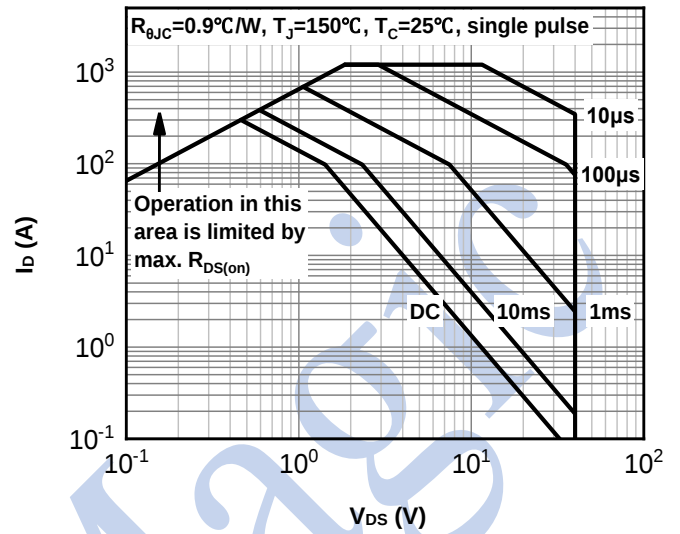
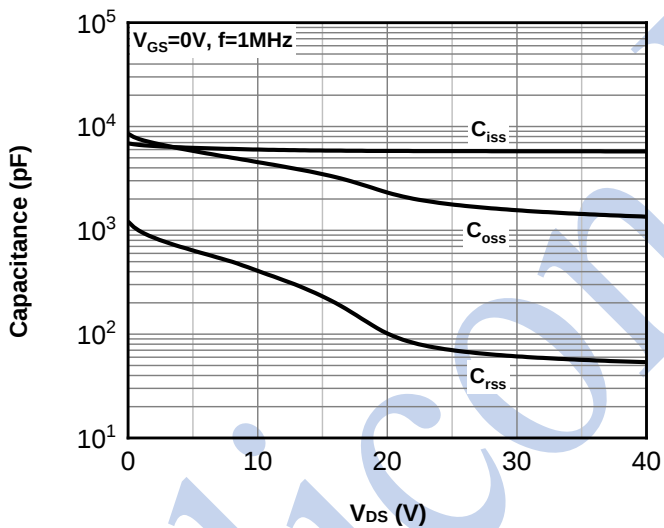
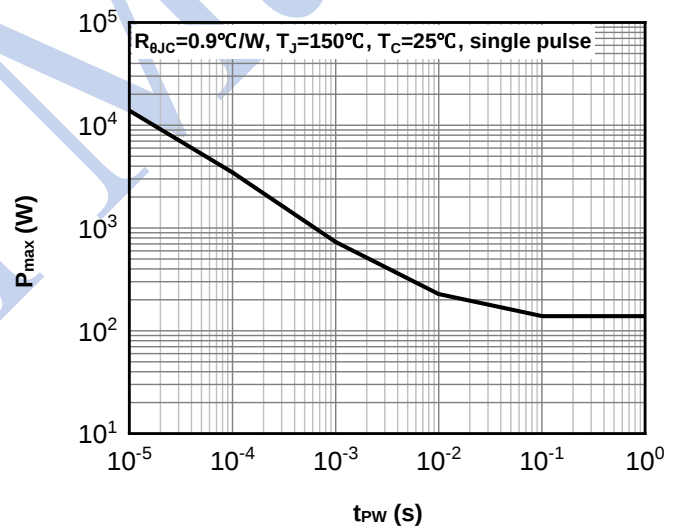
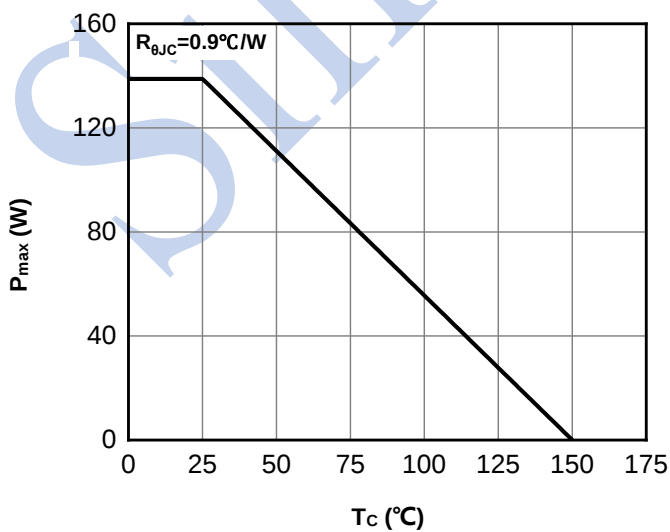
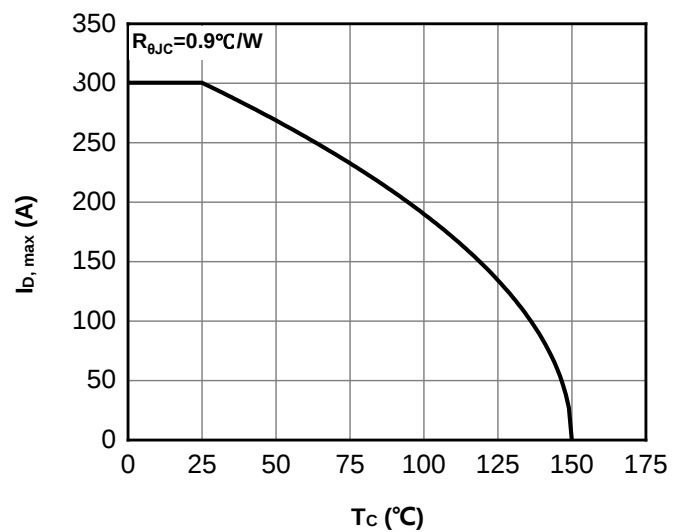
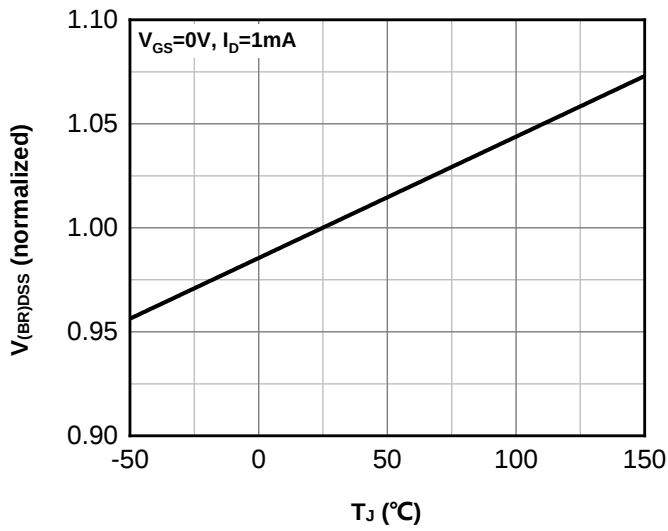
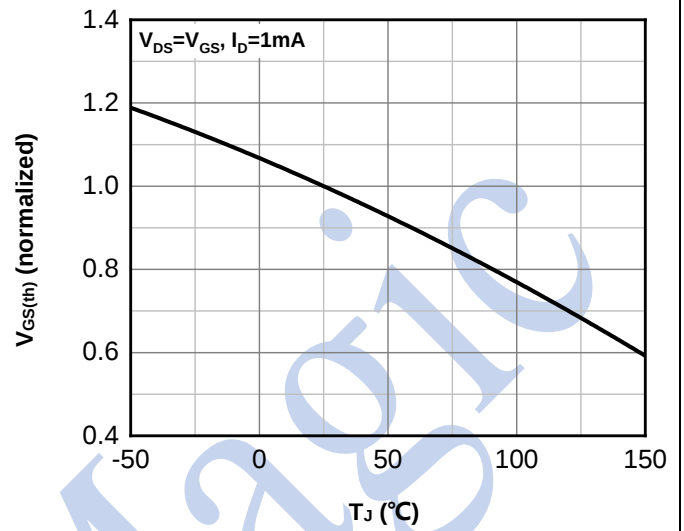
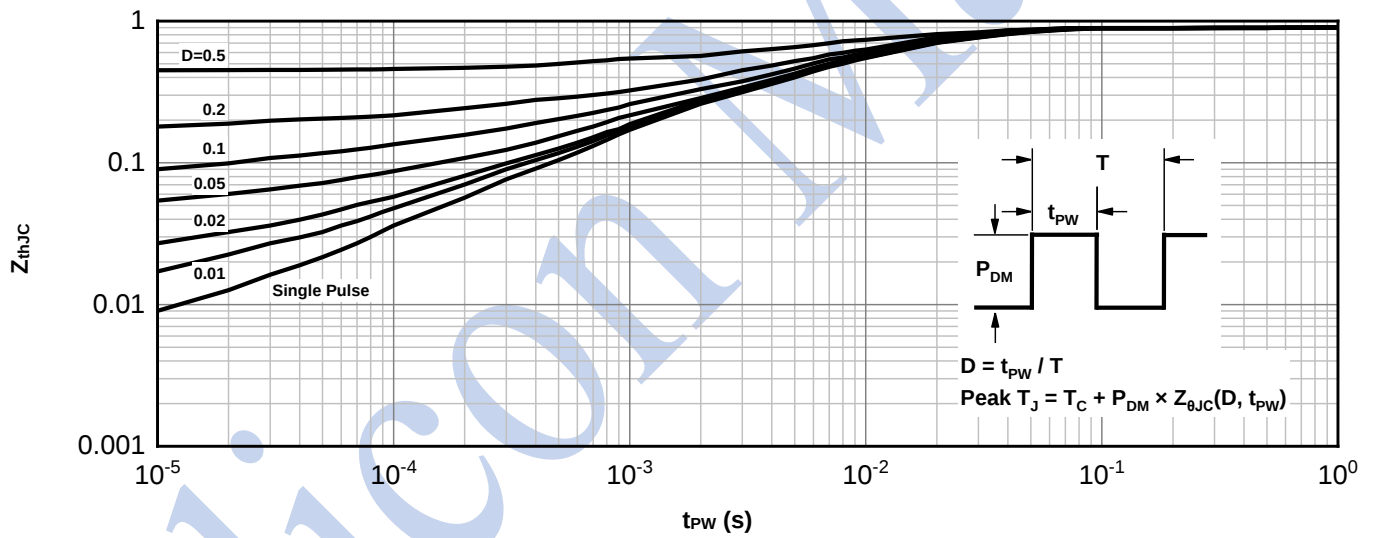
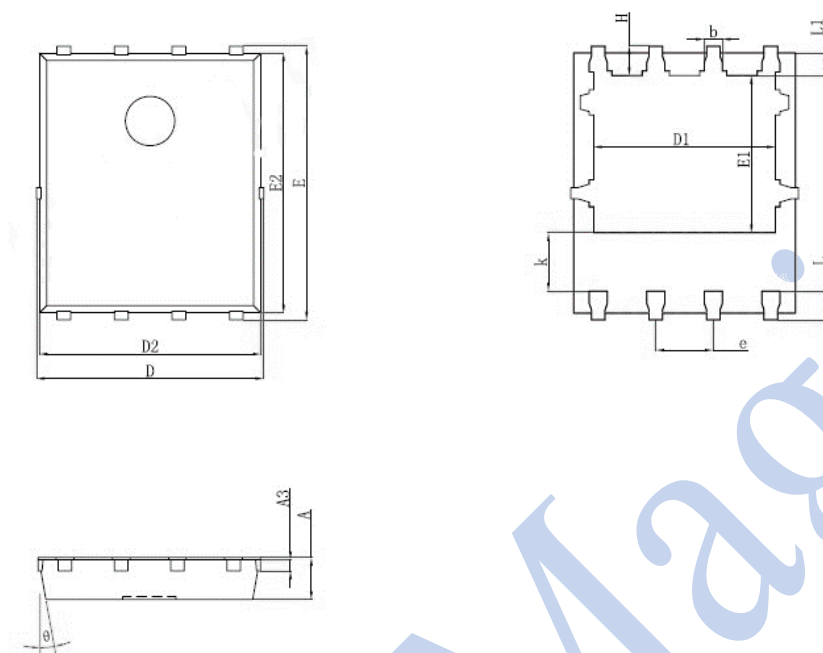
Fig.7 Typ. forward characteristics of body diode

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 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	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°

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