

N-Channel 110V MOSFET

Product summary

V_{DS} (V)	$R_{DS(on),max}$ (m Ω)	I_D (A)
110	3.0 @ $V_{GS} = 10V$	175 ⁽¹⁾

Features

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

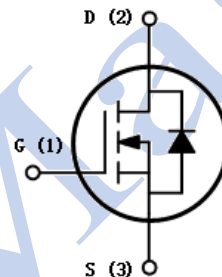
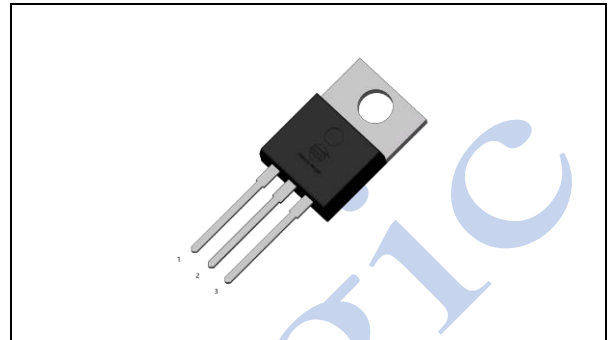
Applications

- DC/DC conversion
- Power switch
- Motor drives

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Package and ordering information

Ordering code	Package	Device code
SDN11N003A-AA	TO220-3L	ALD

TO220-3L


RoHS
COMPLIANT
HALOGEN
FREE



SDXXX
XXXX

Device code
Silicon Magic discrete device

XXXX
XXXX

Wafer lot number
Work week code
Year code

1. Maximum ratings

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

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DS}	110	V
Gate-source voltage	V_{GS}	± 20	
Continuous drain current	I_D	175	A
	I_D	136	
	I_D	24	
Pulsed drain current ⁽²⁾	$I_{D,pulse}$	700	
Avalanche energy, single pulse ⁽³⁾	E_{AS}	278	mJ
Power dissipation	P_D	250	W
	P_D	3.1	
Operating junction and storage temperature range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

2. Thermal resistance ratings

Thermal resistance ratings				
Parameter		Symbol	Max.	Unit
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	0.5	°C/W
Thermal resistance, junction-to-ambient ⁽⁴⁾	Steady state	$R_{\theta JA}$	40	

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	110			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.5	3.3	4.1	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} = 105 V, V _{GS} = 0 V			1	μA
Drain-source on-resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 100 A		2.3	3.0	mΩ
Forward transconductance ⁽⁵⁾	g _{fs}	V _{DS} = 5 V, I _D = 100 A		270		S
Gate resistance	R _g	f = 1 MHz		1.9		Ω
Dynamic ⁽⁵⁾						
Total gate charge	Q _g	V _{DS} = 50 V, I _D = 100 A, V _{GS} = 10 V		145		nC
Gate-source charge	Q _{gs}			49		
Gate-drain charge	Q _{gd}			45		
Turn-on delay time	t _{d(on)}	V _{DS} = 50 V, I _D = 100 A, V _{GS} = 10 V, R _{GEN} = 6 Ω		103		ns
Rise time	t _r			142		
Turn-off delay time	t _{d(off)}			65		
Fall time	t _f			74		
Input capacitance	C _{iss}	V _{DS} = 50 V, V _{GS} = 0 V, f = 1 MHz		8800		pF
Output capacitance	C _{oss}			2200		
Reverse transfer capacitance	C _{rss}			89		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V _{SD}	V _{GS} = 0 V, I _F = 100 A		0.9	1.2	V
Reverse recovery time	t _{rr}	V _{DS} = 50 V, I _F = 50 A, di/dt = 100 A/μs		88		ns
Reverse recovery charge	Q _{rr}			175		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

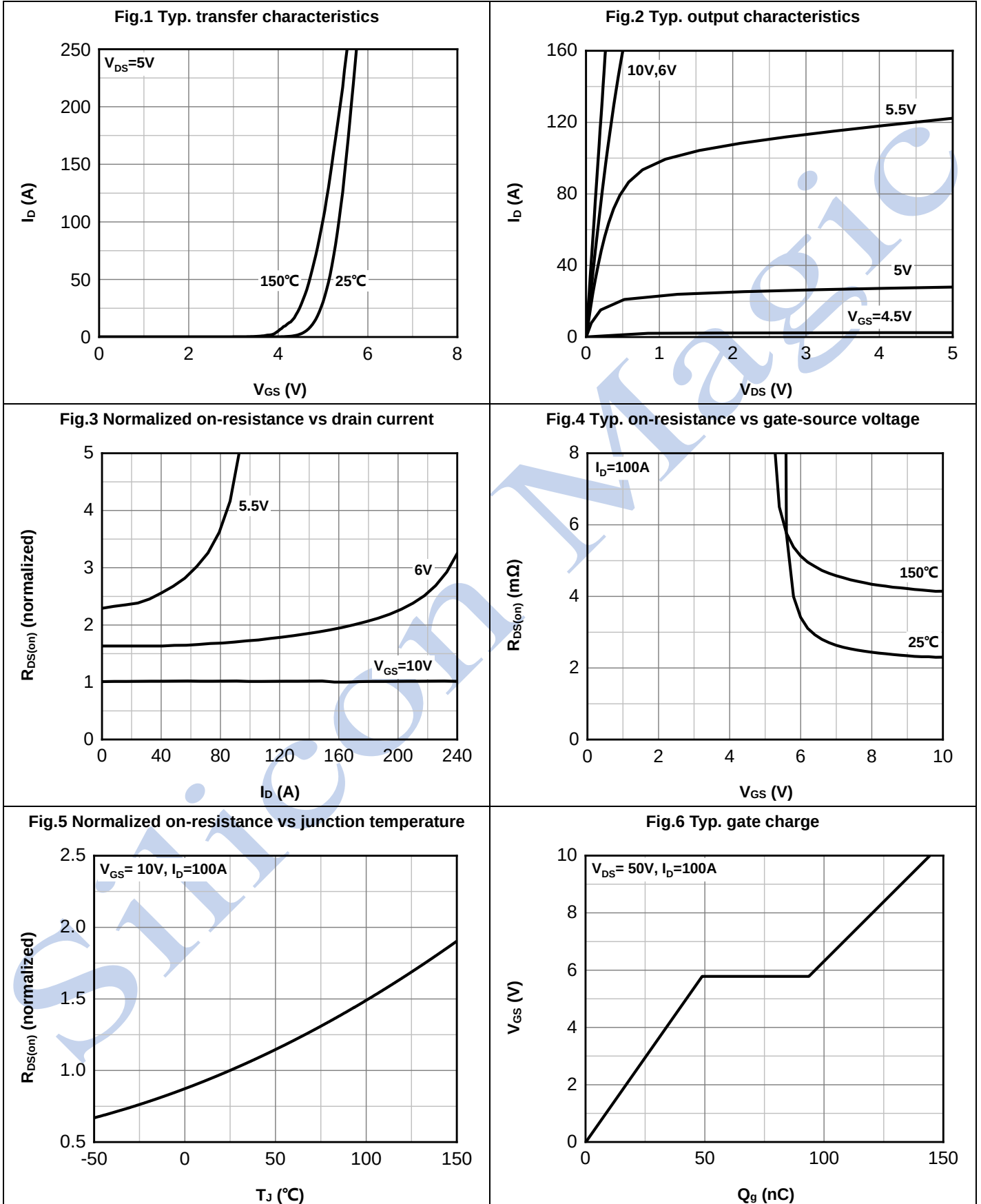


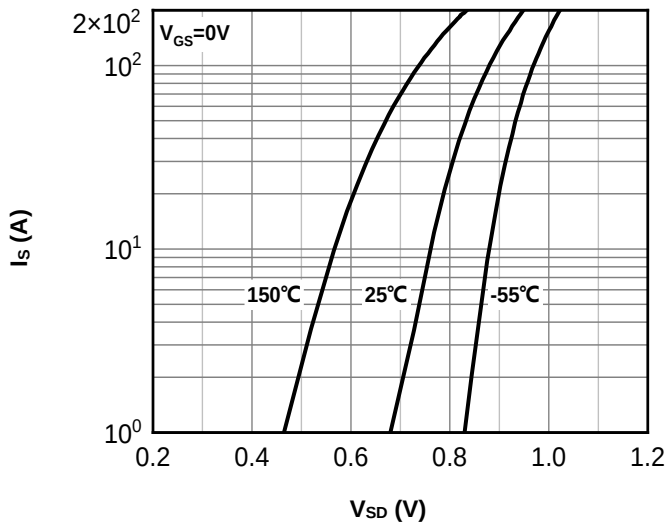
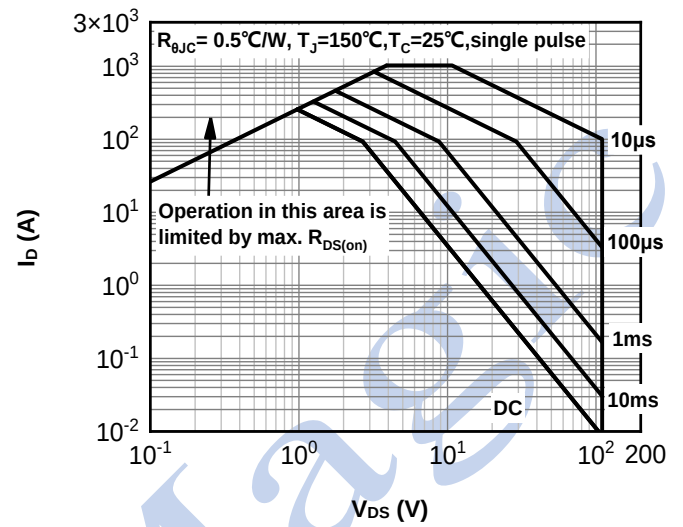
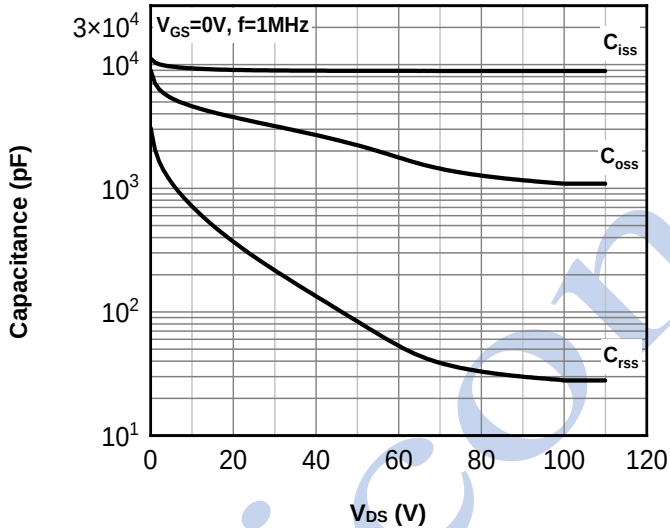
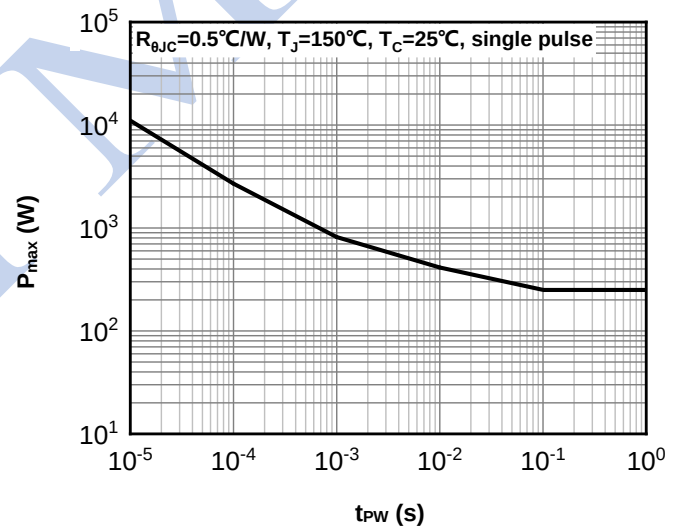
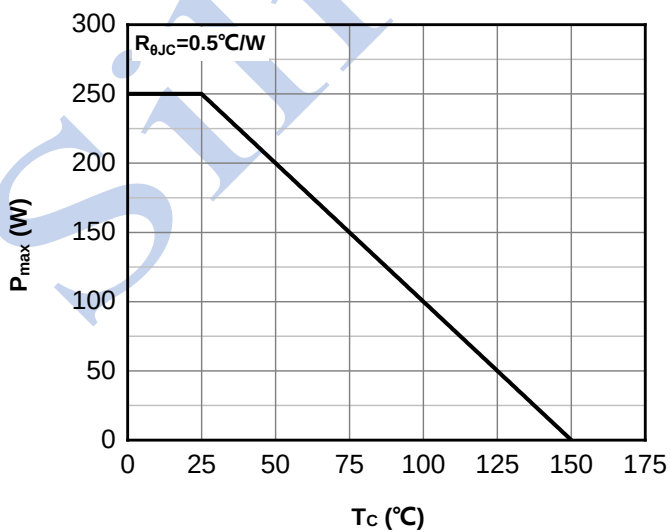
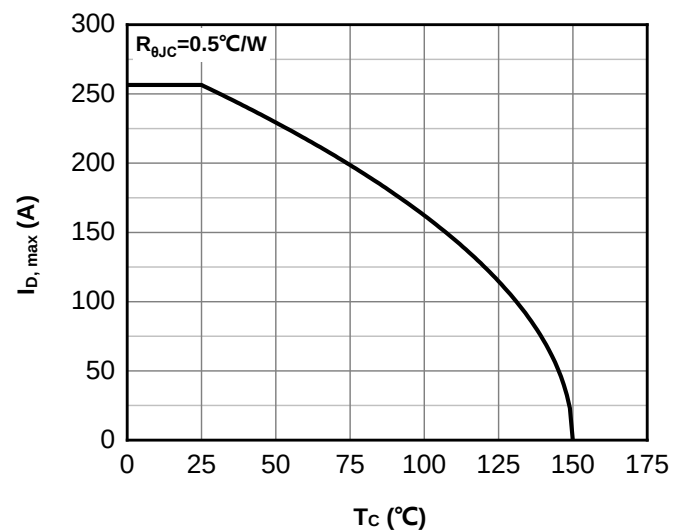
Fig.7 Typ. forward characteristics of body diode

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

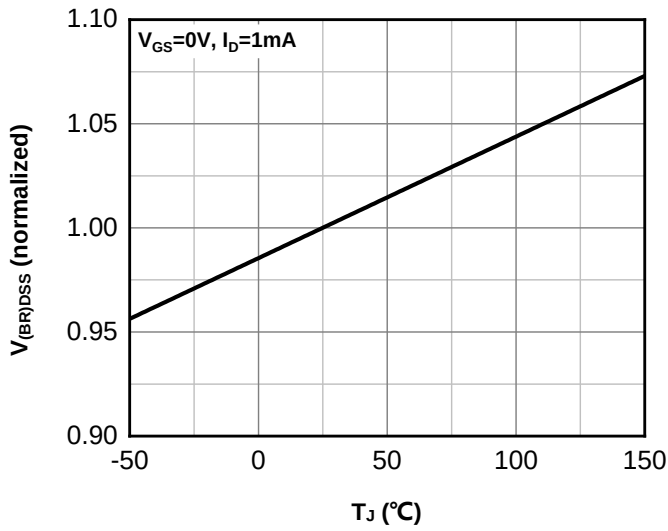


Fig.14 Normalized $V_{GS(th)}$ vs junction temperature

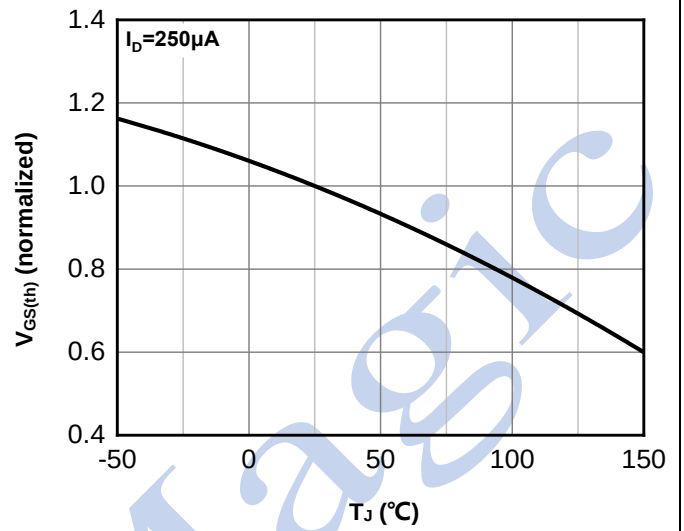
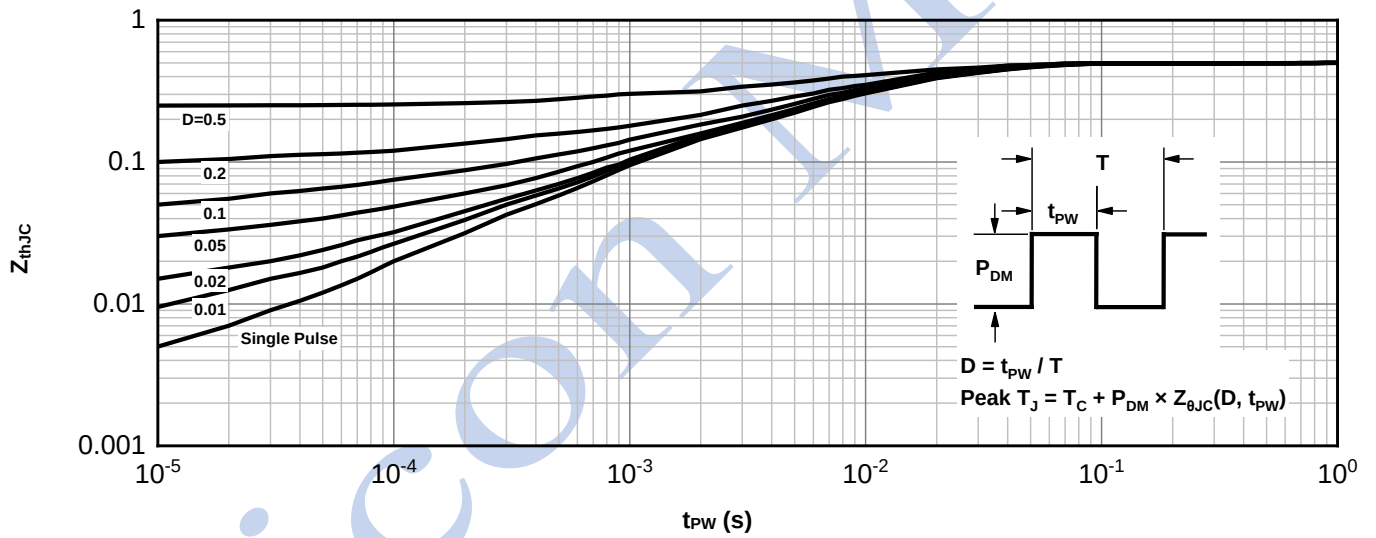
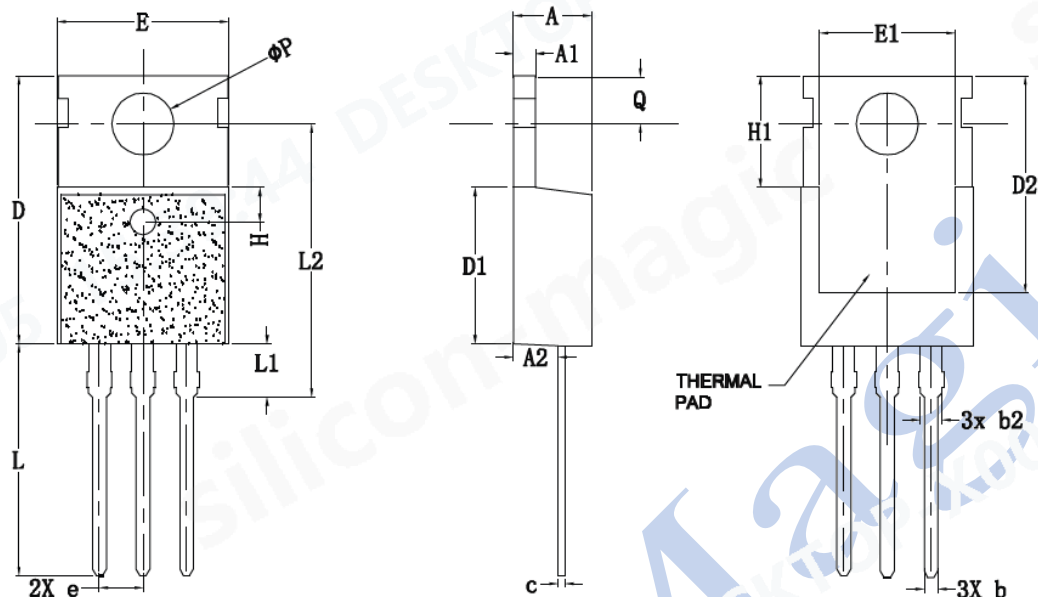


Fig.15 Transient thermal impedance from junction to case



5. Package outline dimensions



Dim	Millimeters		
	Min	Nom	Max
A	4.37	4.58	4.70
A1	1.25	1.30	1.40
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.17	1.27	1.37
c	0.45	0.50	0.60
D	15.10	15.60	16.10
D1	8.80	9.25	9.40
D2	12.00	—	13.50
e	2.54 BSC		
E	9.80	10.00	10.20
E1	7.00	—	8.46
H	1.60	2.00	2.40
H1	6.25	6.50	6.85
L	12.80	13.50	13.80
L1	2.75	3.10	3.40
L2	15.30	—	16.40
Q	2.60	2.80	3.00
P	3.50	3.60	3.80

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