

Preliminary Specification: Subject to Change without Notice

N-Channel 80 V MOSFET

Product summary

V_{DS} (V)	$R_{DS(on),max}$ (m Ω)	I_D (A)
80	2.09 @ $V_{GS} = 10V$	180 ⁽¹⁾

Features

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

Applications

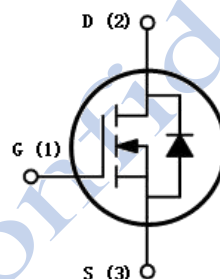
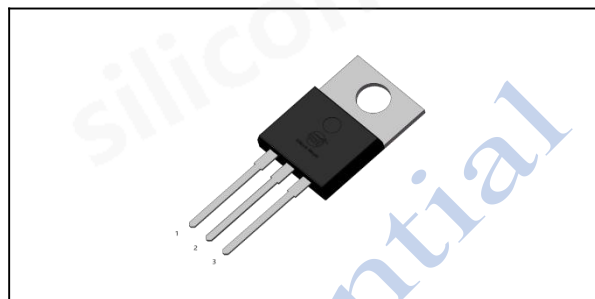
- DC/DC conversion
- Power switch
- Motor drives

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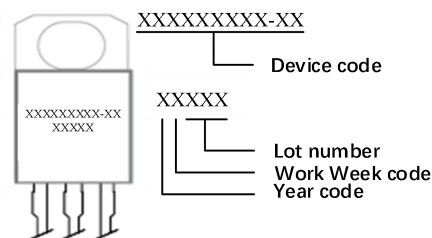
Package and ordering information

Ordering code	Package	Device code
SDH08N002AF-BA	TO220-3L	H08N002AF-BA

TO220-3L



RoHS
COMPLIANT
HALOGEN
FREE



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	180	A
	$T_C = 100^\circ\text{C}$		145	
	$T_A = 25^\circ\text{C}$ ⁽⁴⁾		28.9	
Pulsed drain current ⁽²⁾		$I_{D,pulse}$	720	
Avalanche energy, single pulse ⁽³⁾		E_{AS}	600	mJ
Power dissipation	$T_C = 25^\circ\text{C}$	P_D	187.5	W
	$T_A = 25^\circ\text{C}$ ⁽⁴⁾		3.7	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

2. Thermal resistance ratings

Thermal resistance ratings				
Parameter		Symbol	Max.	Unit
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	0.8	°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 = 250 μA	80			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.2	3	3.8	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} = 80 V, V _{GS} = 0 V			1	μA
Drain-source on-resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		1.85	2.09	mΩ
Forward transconductance ⁽⁵⁾	g _{fs}	V _{DS} = 5 V, I _D = 20 A		87		S
Gate resistance	R _g	f = 1 MHz		1.3		Ω
Dynamic ⁽⁵⁾						
Total gate charge	Q _g	V _{DS} = 40 V, I _D = 50 A, V _{GS} = 10 V		69.9		nC
Gate-source charge	Q _{gs}			21.9		
Gate-drain charge	Q _{gd}			14.3		
Turn-on delay time	t _{d(on)}	V _{DS} = 40 V, I _D = 20 A, V _{GS} = 10 V, R _{GEN} = 1.6 Ω		17.8		ns
Rise time	t _r			16.9		
Turn-off delay time	t _{d(off)}			16.9		
Fall time	t _f			11.5		
Input capacitance	C _{iss}	V _{DS} = 40 V, V _{GS} = 0 V, f = 1 MHz		5038		pF
Output capacitance	C _{oss}			1565		
Reverse transfer capacitance	C _{rss}			42		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V _{SD}	V _{GS} = 0 V, I _F = 20 A		0.8	1.1	V
Reverse recovery time	t _{rr}	V _{DS} = 40 V, I _F = 20 A, di/dt = 1000 A/μs		30		ns
Reverse recovery charge	Q _{rr}			240		nC

Notes

- (1) Package limited.
- (2) Pulse width limited by maximum junction temperature.
- (3) $V_{DS} = 40\text{ V}, V_{GS} = 10\text{ V}, L = 1\text{ mH}$.
- (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

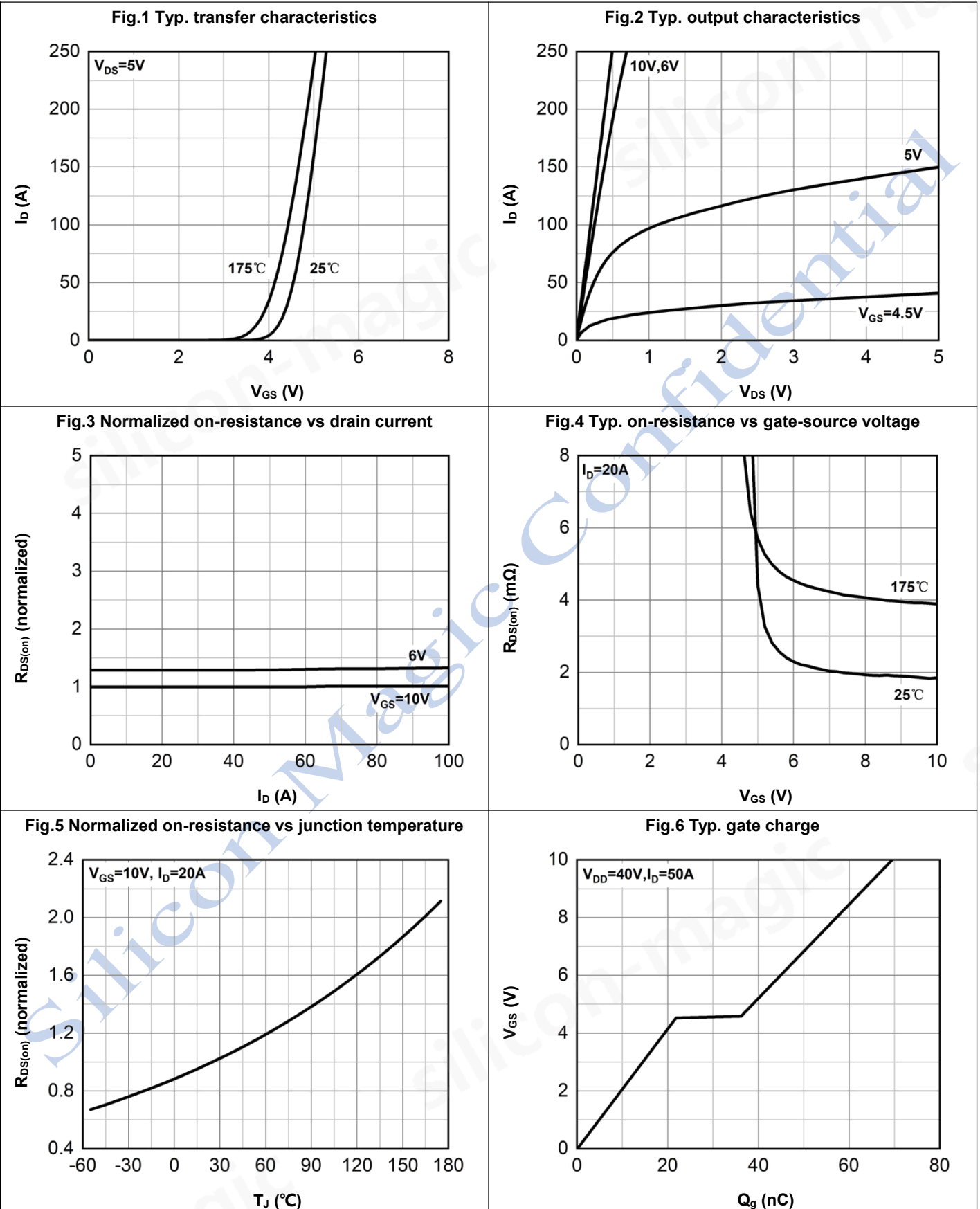


Fig.7 Typ. forward characteristics of body diode

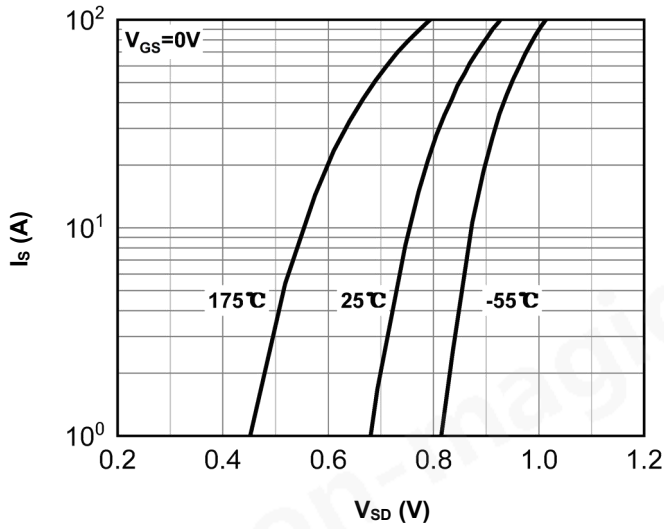


Fig.8 Safe operating area

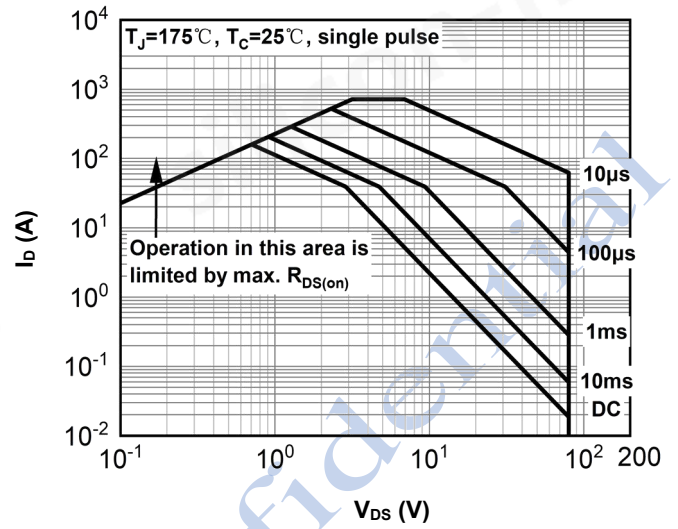


Fig.9 Typ. Capacitance

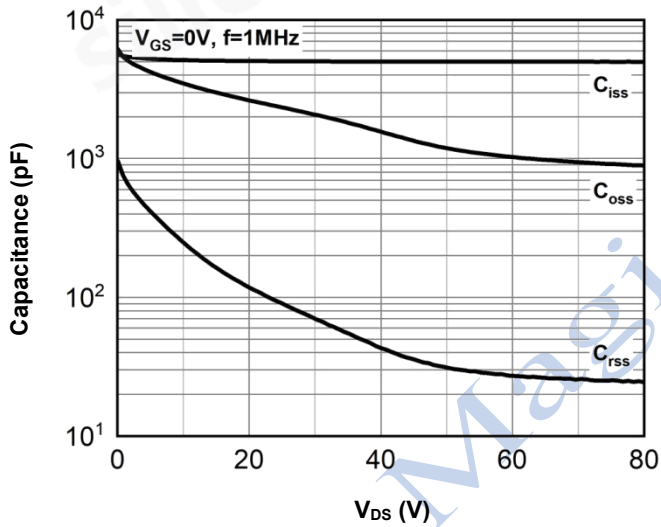


Fig.10 Single pulse maximum power dissipation

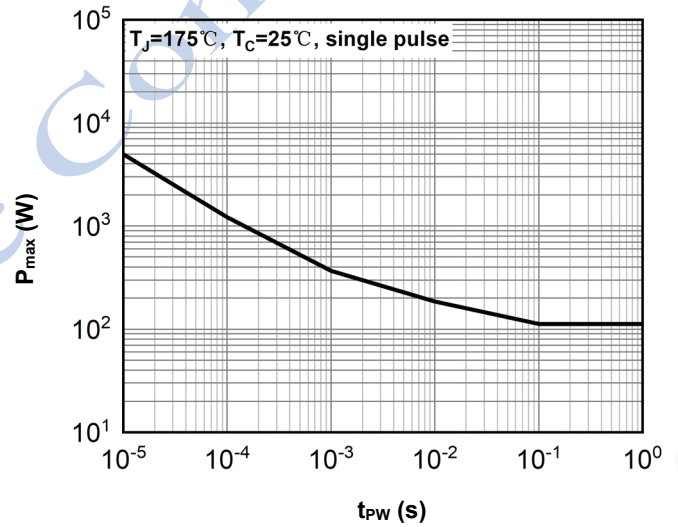


Fig.11 Max. power dissipation vs case temperature

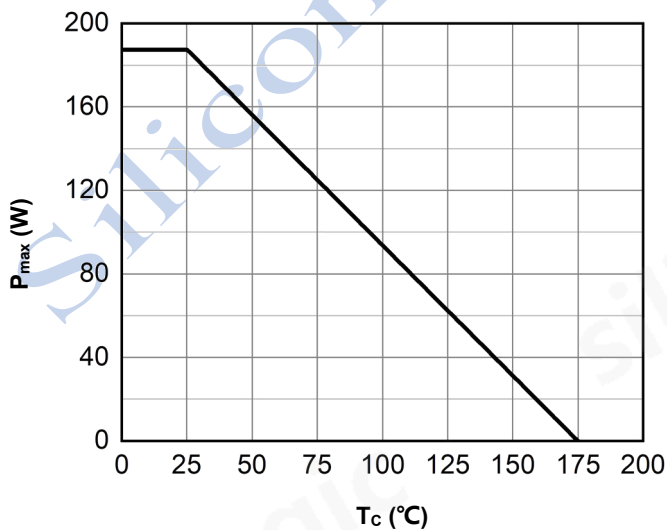


Fig.12 Max. continuous drain current vs case temperature

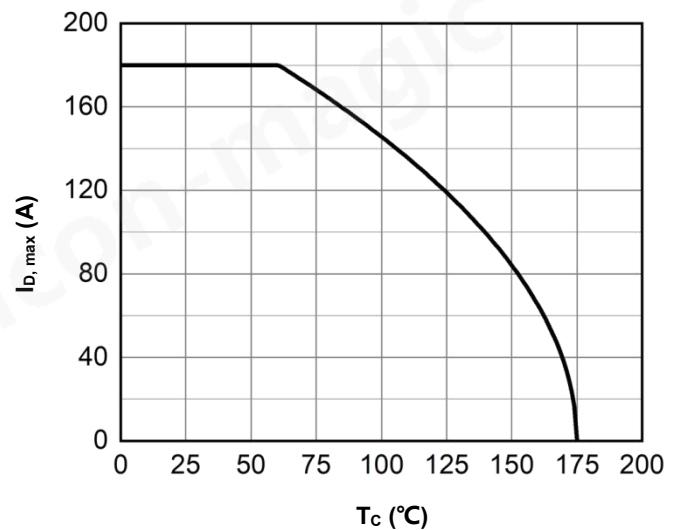


Fig.13 Normalized $V_{(BR)DSS}$ vs junction temperature

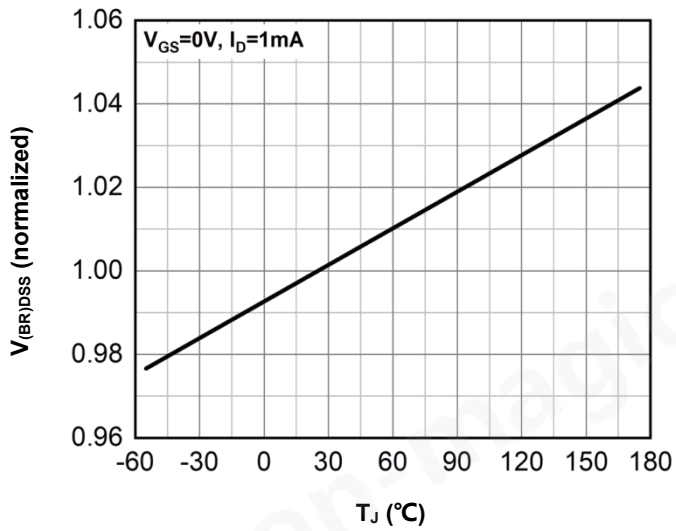


Fig.14 Normalized $V_{GS(th)}$ vs junction temperature

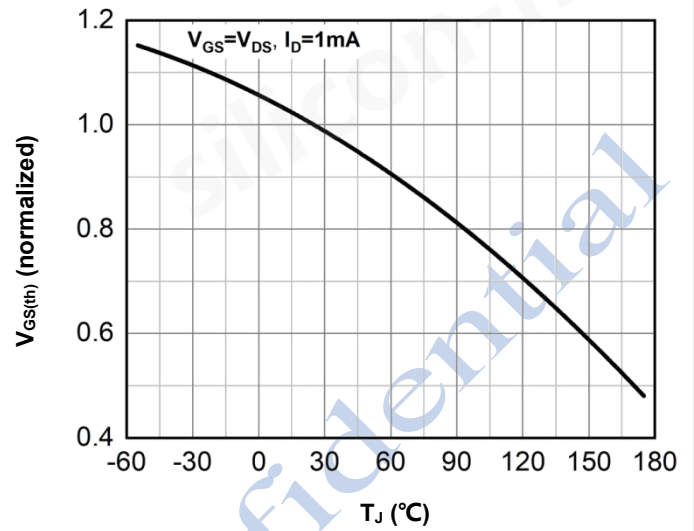
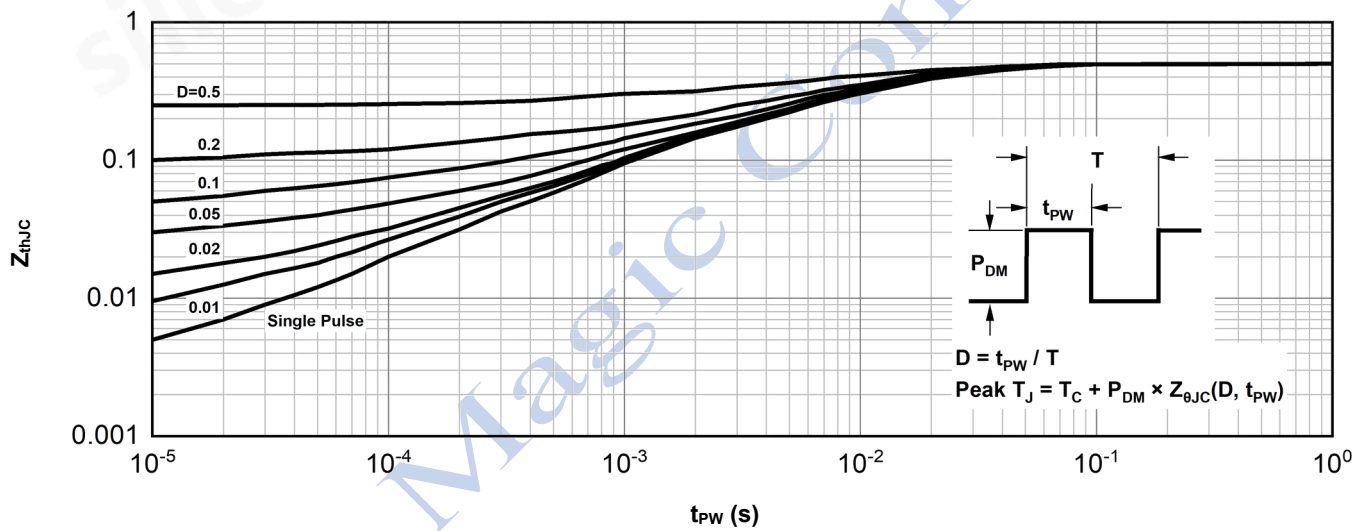
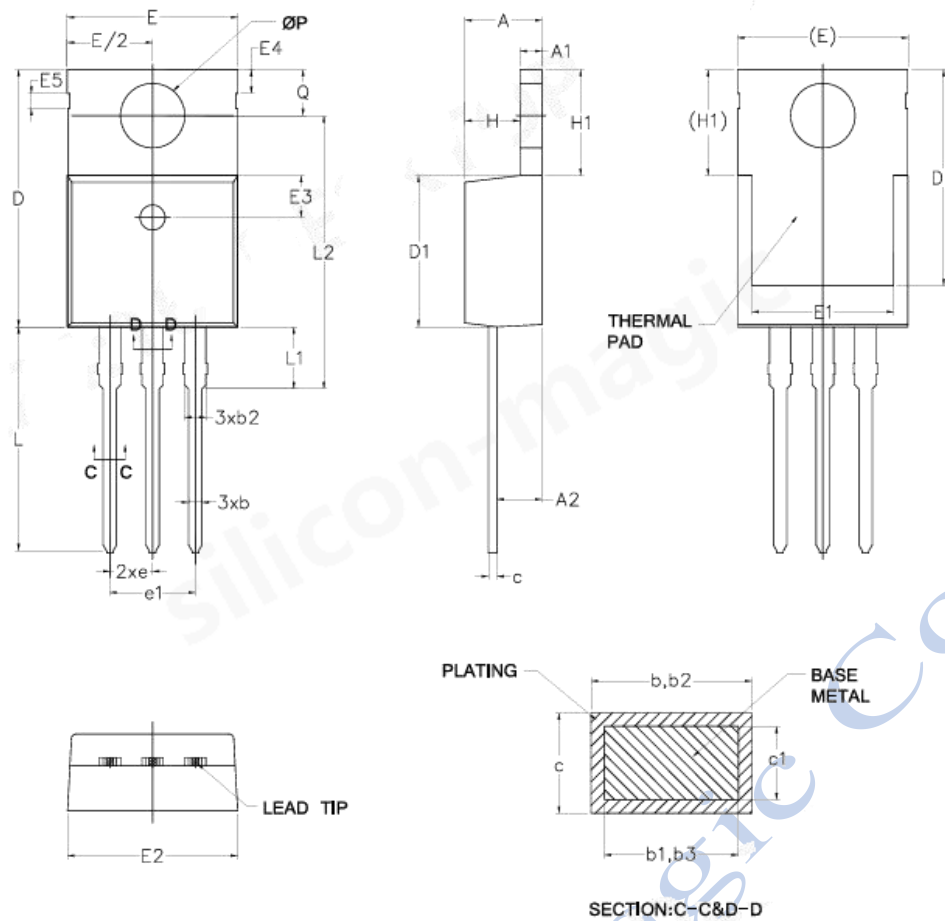


Fig.15 Transient thermal impedance from junction to case



5. Package outline dimensions



Dim	Millimeters		
	Min	Nom	Max
A	4.47	4.57	4.67
A1	1.20	1.30	1.40
A2	2.35	2.67	2.90
b	0.71	0.80	0.91
b1	0.71	0.80	0.86
b2	1.22	1.27	1.36
b3	1.22	1.27	1.31
c	0.47	0.50	0.60
c1	0.47	0.50	0.55
D	14.70	15.30	15.80
D1	8.90	9.00	9.47
D2	11.75	—	13.60
E	9.70	—	10.37
E1	7.00	8.44	8.89
E2	9.80	10.11	10.20
E3	2.40	2.50	2.60
E4	1.27	1.42	1.57
E5	0.90TYP		
e	2.54BSC		
e1	5.08BSC		
H	3.00	3.27	3.40
H1	6.15	6.30	6.45
L	12.90	13.45	14.80
L1	2.54	3.69	3.84
L2	12.13	16.25	16.50
P	3.60	3.84	3.90
Q	2.65	2.74	2.95

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