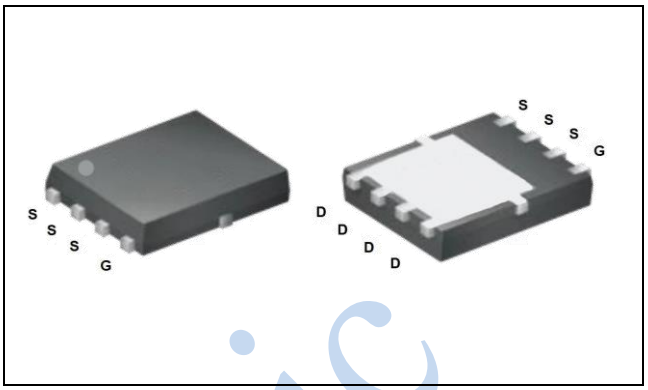
N-Channel 60V MOSFET

Product summary

V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
60	1.3 @ V_{GS} = 10V 1.7 @ V_{GS} = 4.5V	280 (1)

PDFN5X6-8L

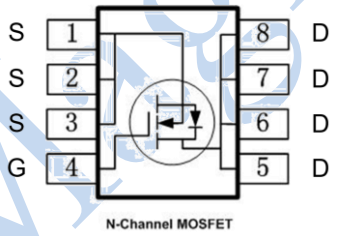


Features

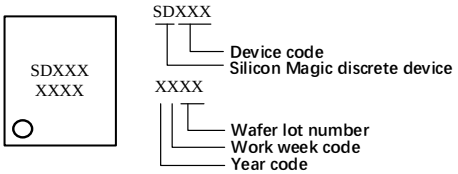
- Low $R_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Applications

- DC/DC conversion
- Power switch
- Motor drives



Pb-free
RoHS
COMPLIANT
HALOGEN
FREE



Package and ordering information

Ordering code	Package	Device code
SDN06L1P3S4C	PDFN5X6-8L	ACX

1. Maximum ratings

Absolute maximum ratings (T_A = 25℃ unless otherwise noted)				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-source voltage		V_{DS}	60	V
Gate-source voltage		V_{GS}	±20	
Continuous drain current	T_C=25℃(1)	I_D	280	A
	T_C=100℃		177	
	T_A=25℃ (4)		34	
Pulsed drain current(2)		$I_{D,pulse}$	1120	
Avalanche energy, single pulse(3)		E_{AS}	900	mJ
Power dissipation	T_C=25℃	P_D	178	W
	T_A=25℃ (4)		2.7	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 150	℃

2. Thermal resistance ratings

Thermal resistance ratings				
Parameter		**Symbol**	**Max.**	**Unit**
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	0.7	℃/W
Thermal resistance, junction-to-ambient (4)	Steady state	$R_{\theta JA}$	45	

3. Electrical Characteristics

Electrical characteristics (T_J = 25℃ unless otherwise noted)						
Parameter	**Symbol**	**Test conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static parameter						
Drain to source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0, I_D = 250 μA	60			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} = 60 V, V_{GS} = 0 V			1	μA
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 50 A		0.9	1.3	mΩ
		V_{GS} = 4.5 V, I_D = 50 A		1.4	1.7	
Forward transconductance (5)	g_{fs}	V_{DS} = 5 V, I_D = 50 A		230		S
Gate resistance	R_g	f = 1 MHz		1	2	Ω
Dynamic(5)						
Total gate charge	Q_g	V_{DS} = 30 V, I_D = 50 A, V_{GS} = 4.5 V		75		nC
Total gate charge	Q_g	V_{DS} = 30 V, I_D = 50 A, V_{GS} = 10 V		136		
Gate-source charge	Q_{gs}			20		
Gate-drain charge	Q_{gd}			39		
Turn-on delay time	$t_{d(on)}$	V_{DS} = 30 V, I_D = 50 A, V_{GS} = 10 V, R_{GEN} = 1.6 Ω		23		ns
Rise time	t_r			33		
Turn-off delay time	$t_{d(off)}$			87		
Fall time	t_f			31		
Input capacitance	C_{iss}	V_{DS} = 30 V, V_{GS} = 0 V, f = 1 MHz		6620		pF
Output capacitance	C_{oss}			1730		
Reverse transfer capacitance	C_{rss}			95		
Reverse Diode Characteristics (5)						
Diode forward voltage	V_{SD}	V_{GS} = 0 V, I_F = 50 A		0.8	1.1	V
Reverse recovery time	t_{rr}	V_{DS} = 30 V, I_F = 50 A, di/dt = 100 A/μs		65		ns
Reverse recovery charge	Q_{rr}			85		nC

Notes

(1) Limited by maximum junction temperature.

(2) Pulse width limited by maximum junction temperature.

(3) V_{DS} = 30 V, V_{GS} = 10 V, L = 0.3 mH.

(4) $R_{\theta JA}$ is determined with the device mounted on a 1 in^2 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.1 Typ. transfer characteristics

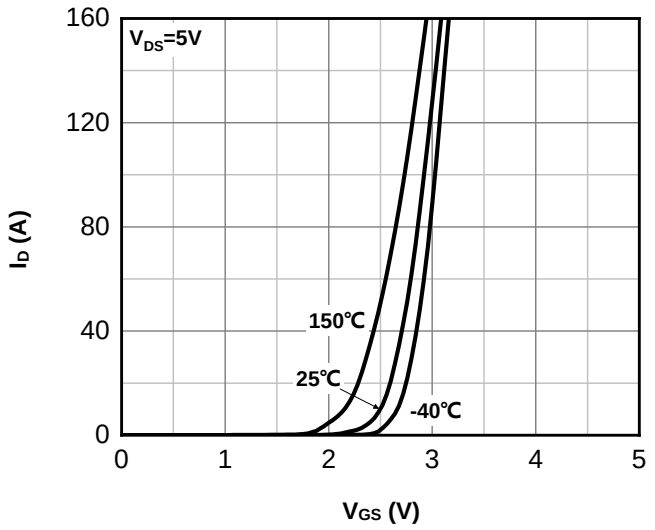


Fig.2 Typ. output characteristics

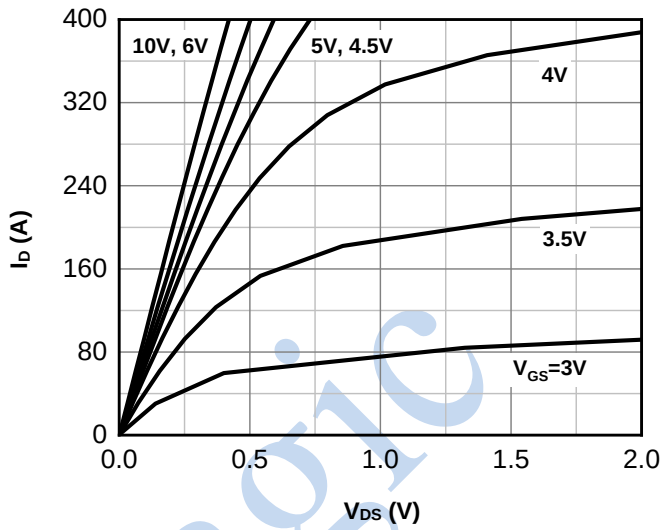


Fig.3 Normalized on-resistance vs drain current

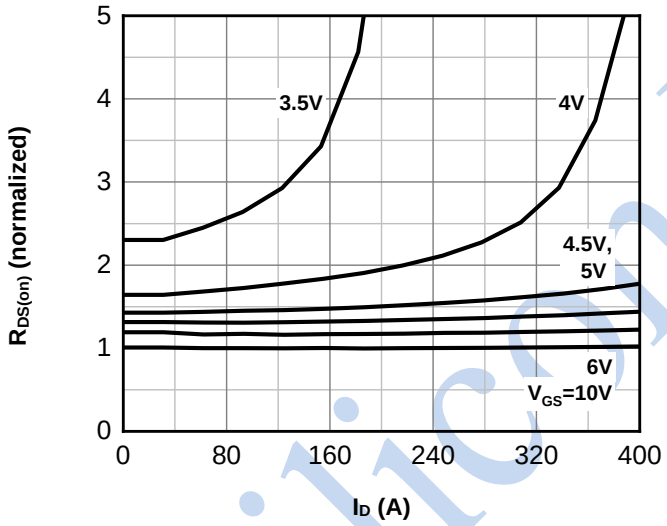


Fig.4 Typ. on-resistance vs gate-source voltage

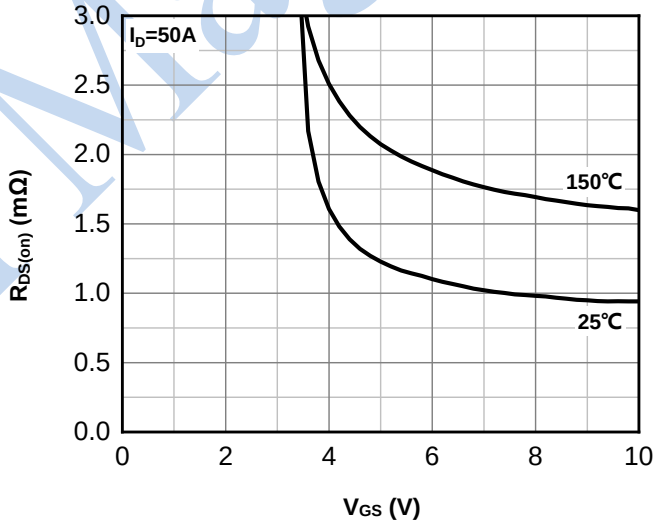


Fig.5 Normalized on-resistance vs junction temperature

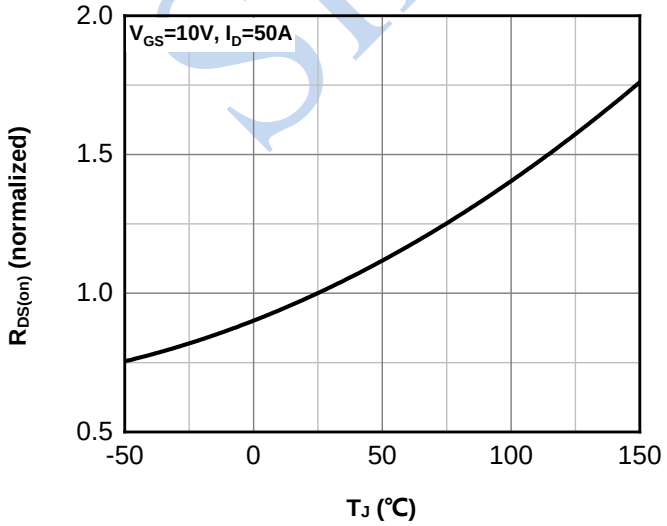


Fig.6 Typ. gate charge

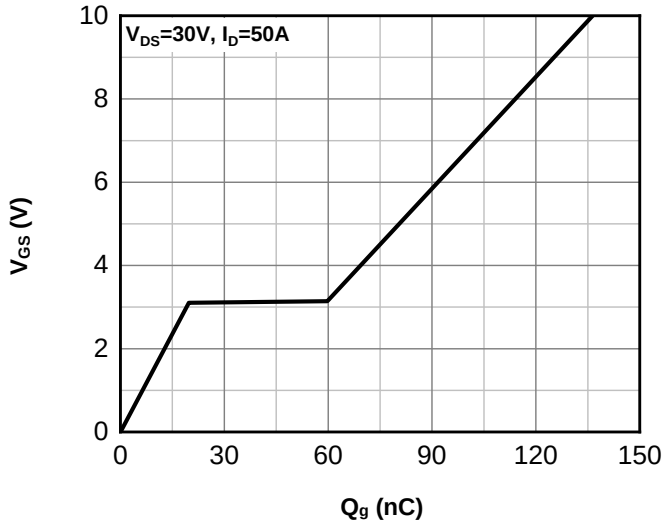


Fig.7 Typ. forward characteristics of body diode

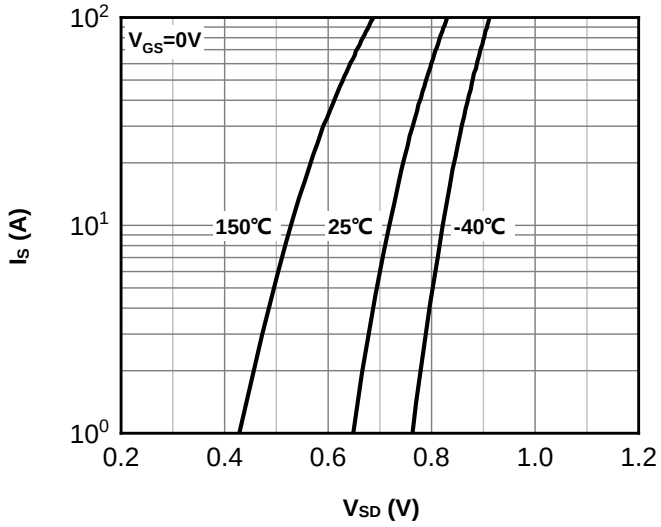


Fig.8 Safe operating area

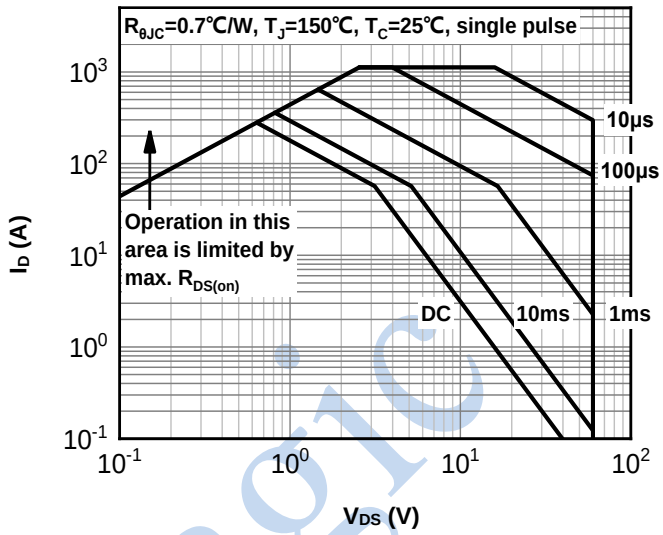


Fig.9 Typ. Capacitance

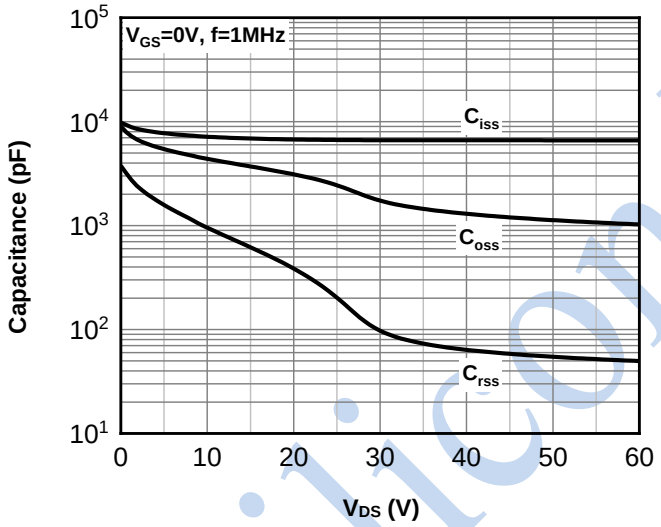


Fig.10 Single pulse maximum power dissipation

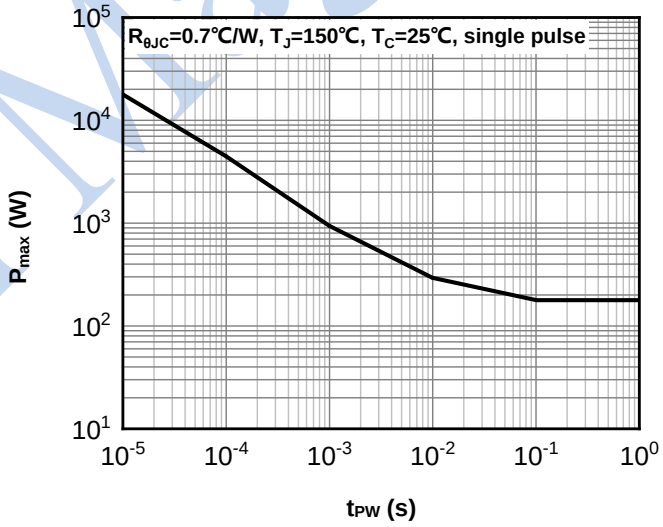


Fig.11 Max. power dissipation vs case temperature

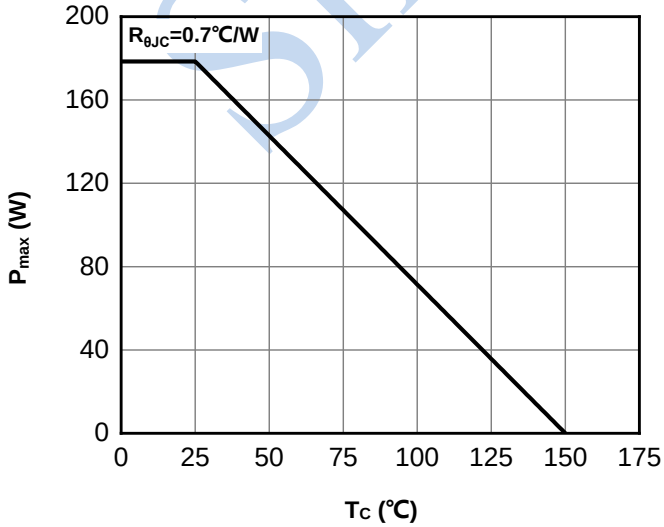


Fig.12 Max. continuous drain current vs case temperature

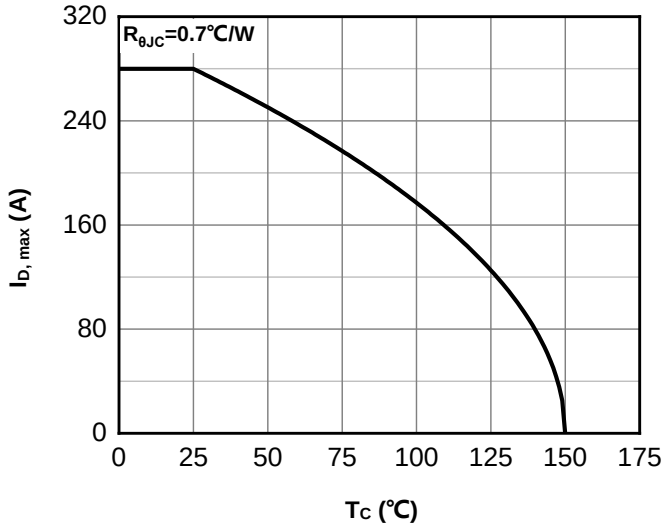


Fig.13 Normalized $V_{(BR)DSS}$ vs junction temperature

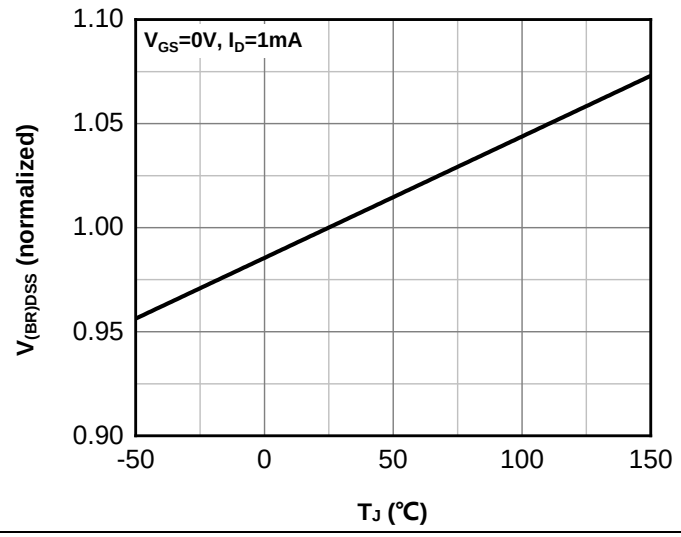


Fig.14 Normalized $V_{GS(th)}$ vs junction temperature

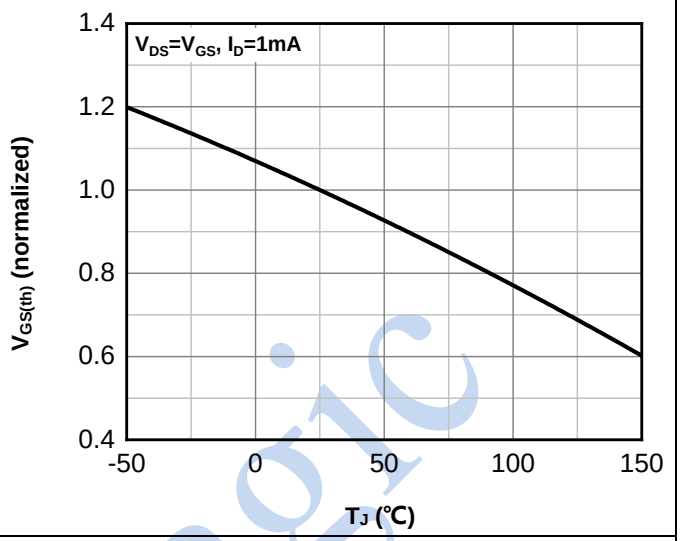
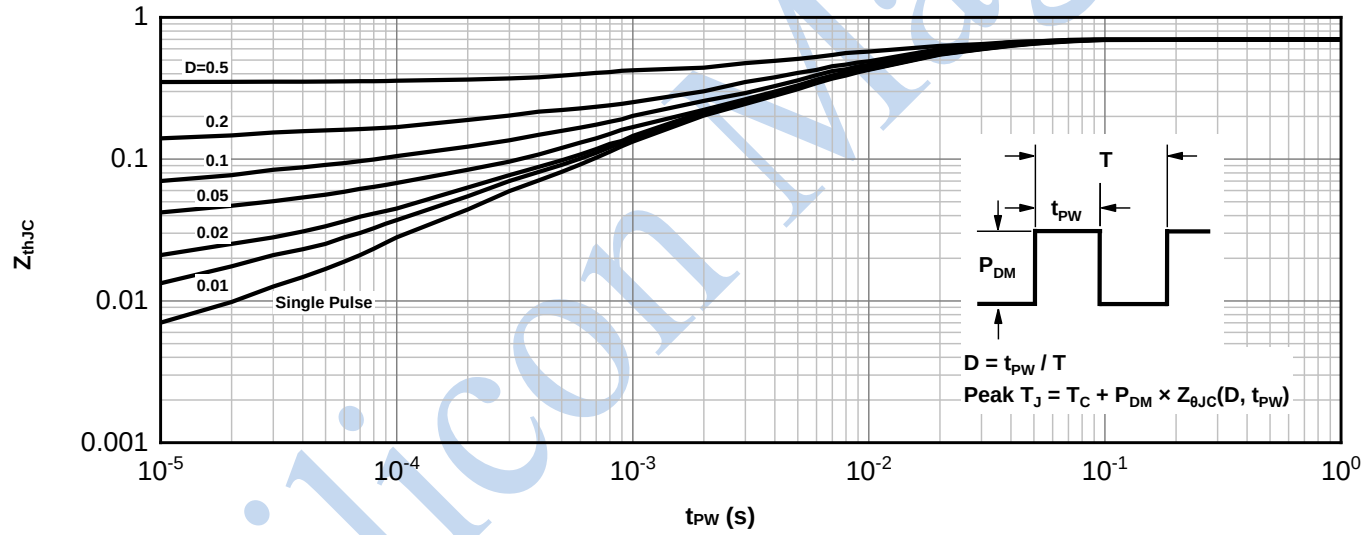
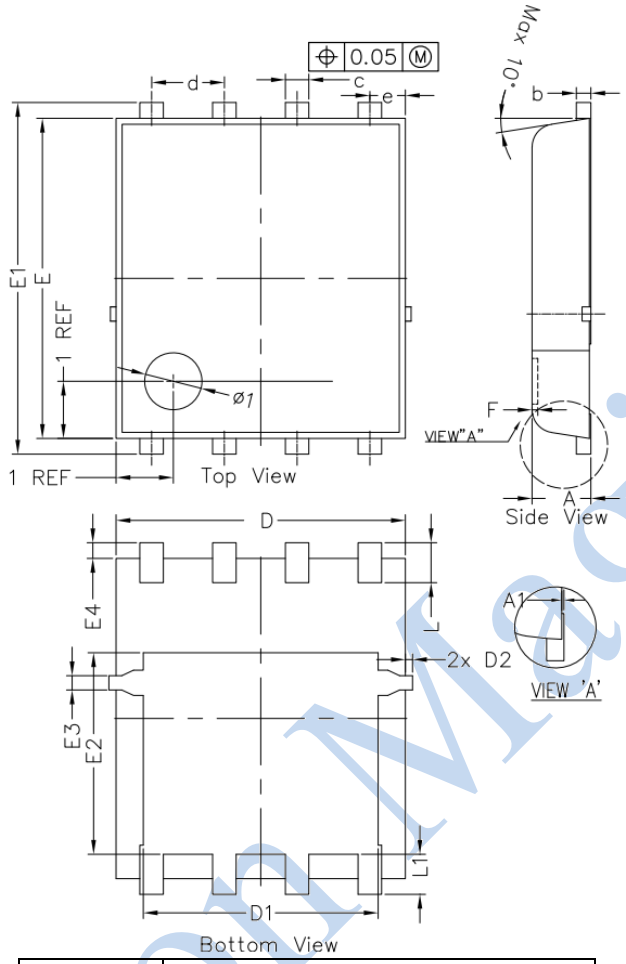


Fig.15 Transient thermal impedance from junction to case



5. Package outline dimensions



Dim	Millimeters		
	Min	Nom	Max
A	0.900	1.000	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

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