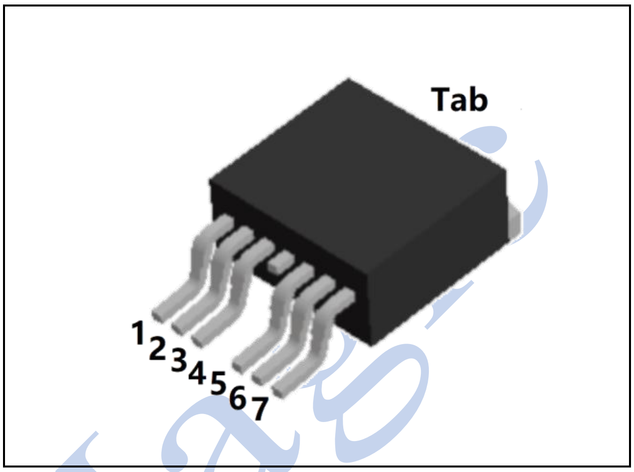
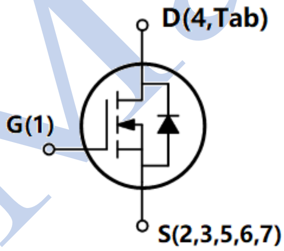
N-Channel 40V MOSFET

Product summary

V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
40	0.9 @ V_{GS} = 10V	240 (1)

TO263-7L





RoHS COMPLIANT
HALOGEN FREE

Features

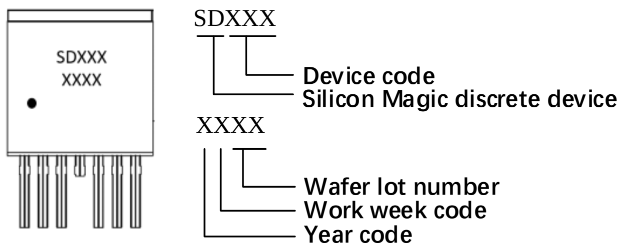
- For automotive applications and AEC-Q101 qualified
- Great FOM (figure of merit) with low RDS(on) trench technology
- Fast switching speed
- 100% avalanche tested. High avalanche ruggedness.

Applications

- DC/DC conversion
- Power switch
- Motor drives

Package and ordering information

Ordering code	Package	Device code
SDA04N0P6F-AA	TO263-7L	ADU



1. Maximum ratings

Absolute maximum ratings (T_A = 25℃ 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℃(1)	I_D	240	A
	T_C=100℃(1)		240	
	T_A=25℃ (4)		50	
Pulsed drain current(2)		$I_{D,pulse}$	960	
Avalanche energy, single pulse(3)		E_{AS}	1900	mJ
Power dissipation	T_C=25℃	P_D	416	W
	T_A=25℃ (4)		3.7	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 175	℃

2. Thermal resistance ratings

Thermal resistance ratings				
Parameter		**Symbol**	**Max.**	**Unit**
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	0.36	℃/W
Thermal resistance, junction-to-ambient (4)	Steady state	$R_{\theta JA}$	40	

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	40			V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	2.6	3.4	4.2	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		0.75	0.9	mΩ
Forward transconductance (5)	g_{fs}	V_{DS} = 5 V, I_D = 90 A		300		S
Gate resistance	R_g	f = 1 MHz		1		Ω
Dynamic(5)						
Total gate charge	Q_g	V_{DS} = 20 V, I_D = 180 A, V_{GS} = 10 V		238		nC
Gate-source charge	Q_{gs}			71		
Gate-drain charge	Q_{gd}			82		
Turn-on delay time	$t_{d(on)}$	V_{DS} = 20 V, I_D = 90 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		40		ns
Rise time	t_r			67		
Turn-off delay time	$t_{d(off)}$			102		
Fall time	t_f			36		
Input capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz		14030		pF
Output capacitance	C_{oss}			4300		
Reverse transfer capacitance	C_{rss}			405		
Reverse Diode Characteristics (5)						
Diode forward voltage	V_{SD}	V_{GS} = 0 V, I_F = 90 A		0.9	1.1	V
Reverse recovery time	t_{rr}	V_{DS} = 20 V, I_F = 180 A, di/dt = 100 A/μs		110		ns
Reverse recovery charge	Q_{rr}			340		nC

Notes

(1) Package limited.

(2) Pulse width limited by maximum junction temperature.

(3) V_{DS} = 20 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

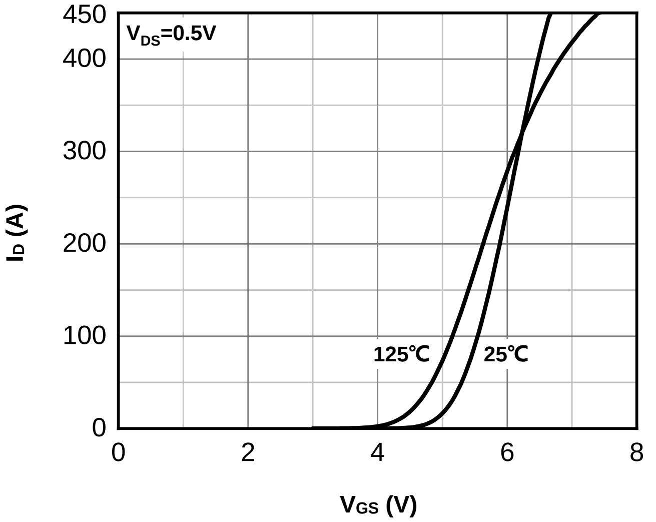


Fig.2 Typ. output characteristics

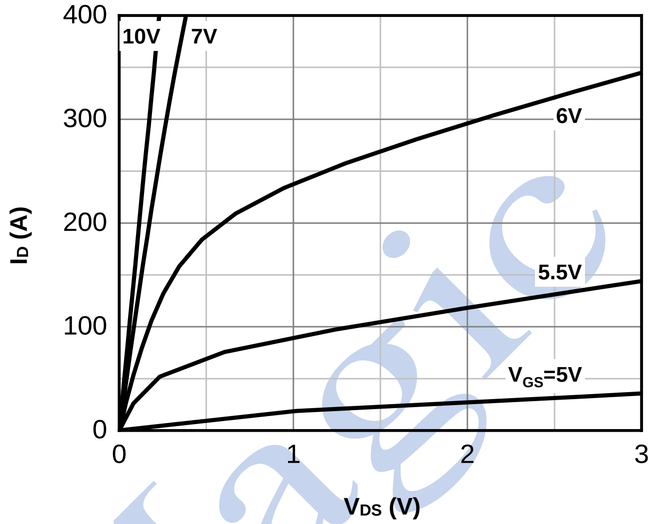


Fig.3 Normalized on-resistance vs drain current

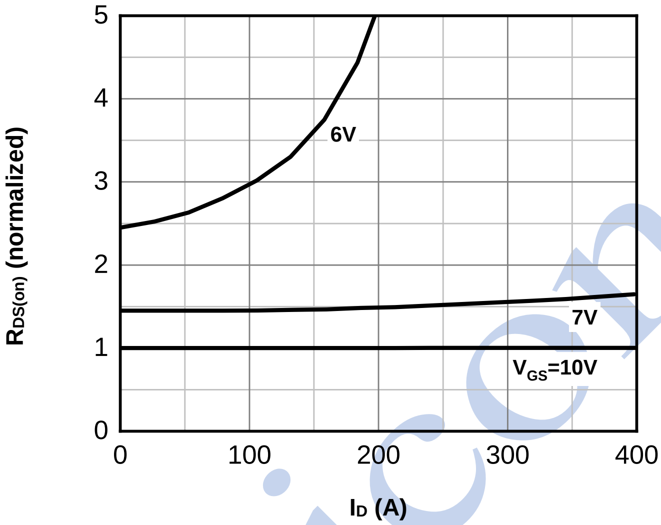


Fig.4 Typ. on-resistance vs gate-source voltage

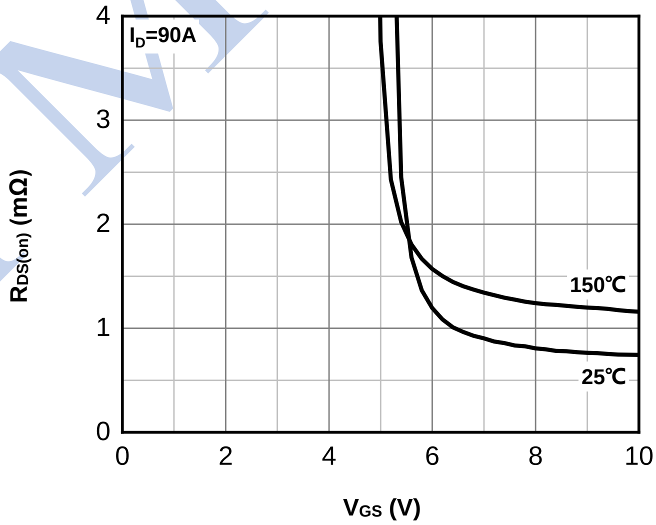


Fig.5 Normalized on-resistance vs junction temperature

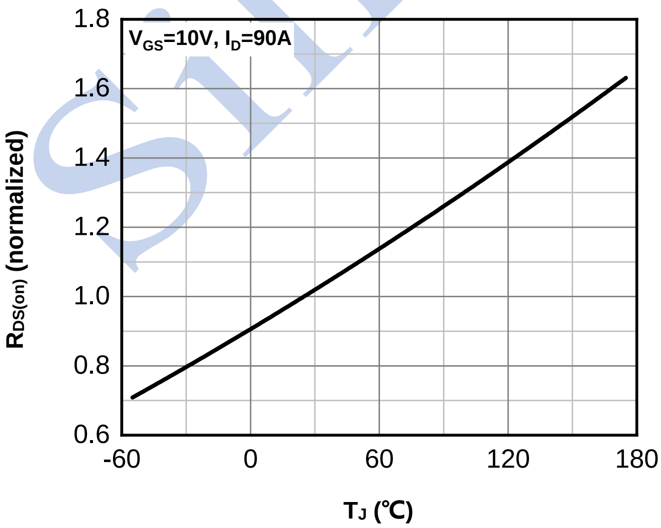


Fig.6 Typ. gate charge

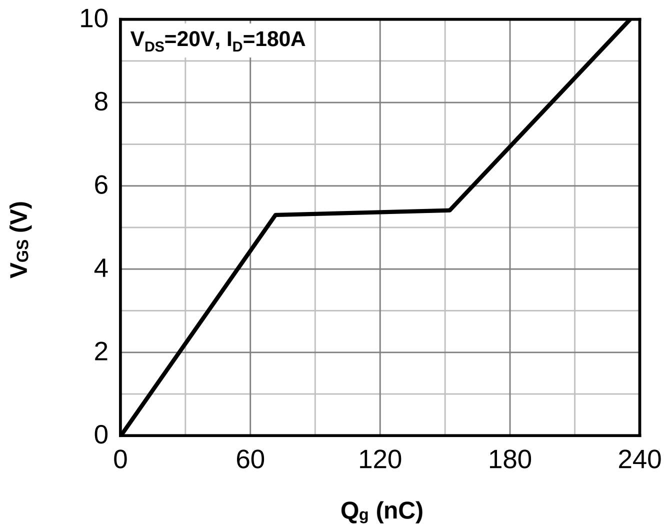


Fig.7 Typ. forward characteristics of body diode

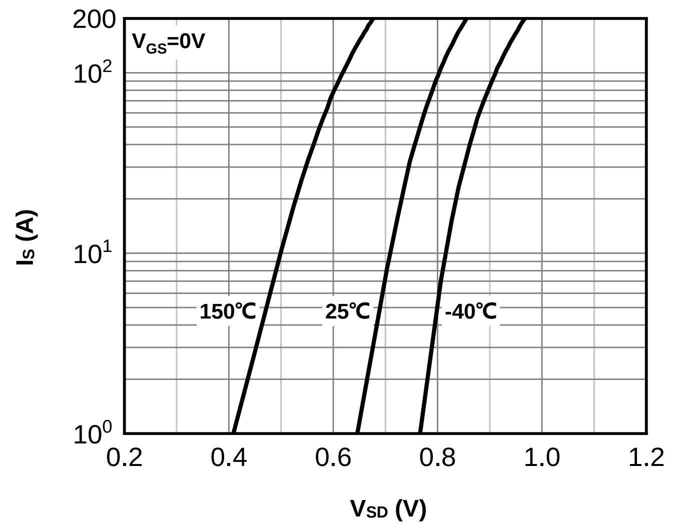


Fig.8 Safe operating area

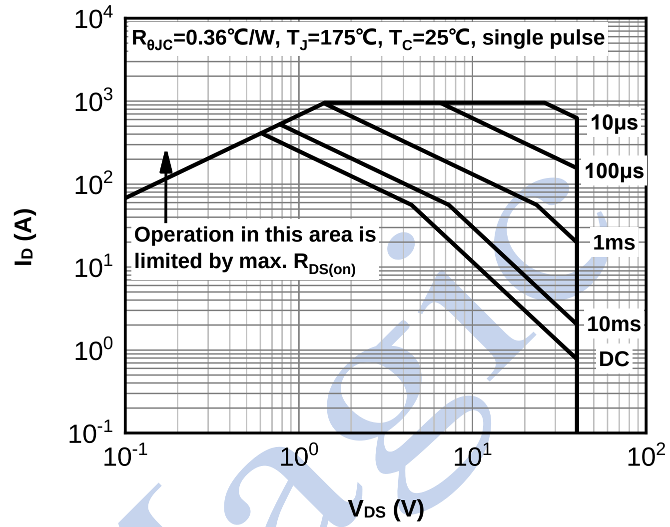


Fig.9 Typ. Capacitance

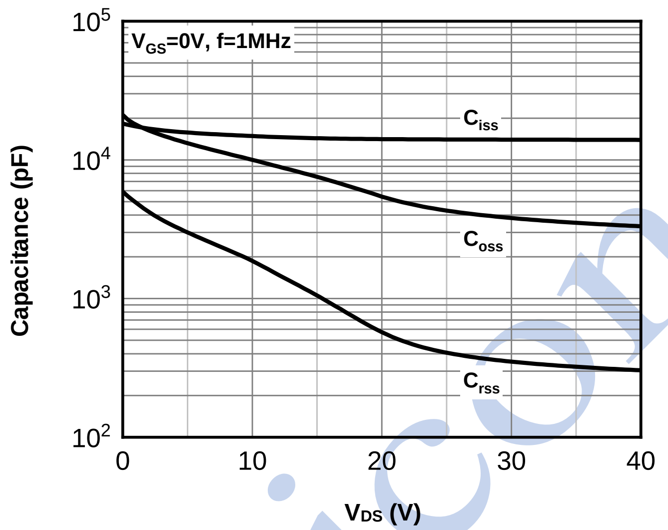


Fig.10 Single pulse maximum power dissipation

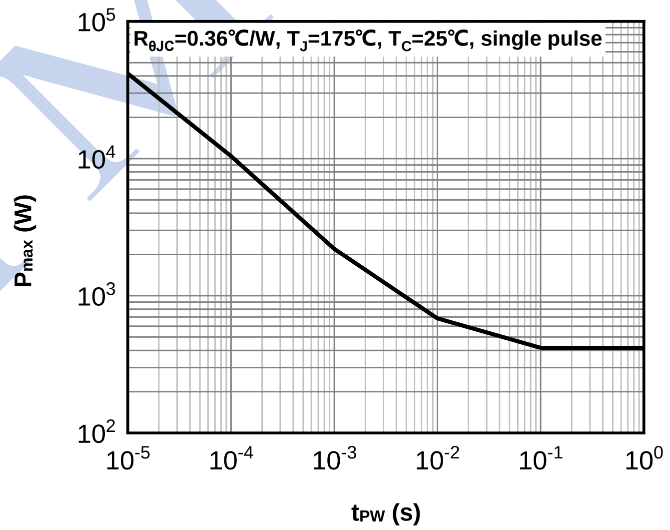


Fig.11 Max. power dissipation vs case temperature

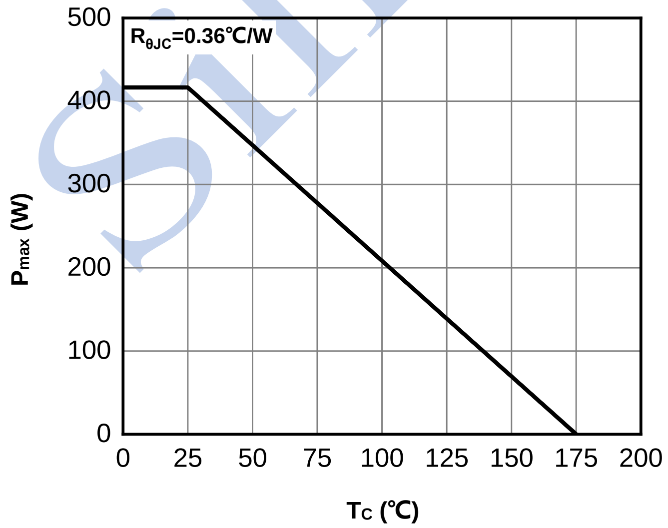


Fig.12 Max. continuous drain current vs case temperature

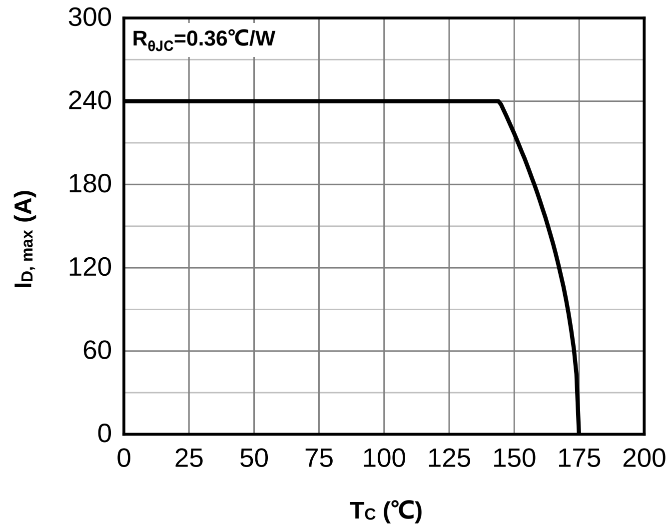


Fig.13 Normalized $V_{(BR)DSS}$ vs junction temperature

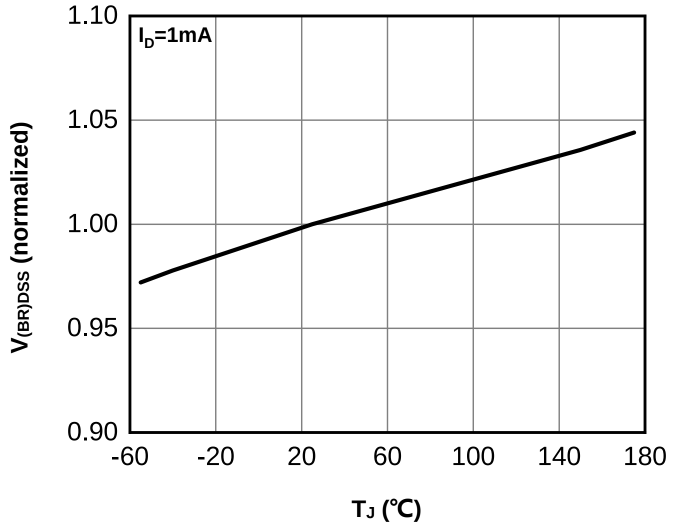


Fig.14 Normalized $V_{GS(th)}$ vs junction temperature

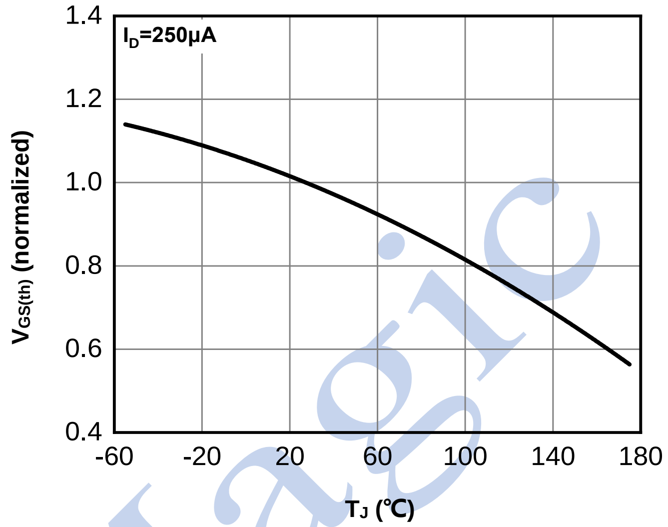
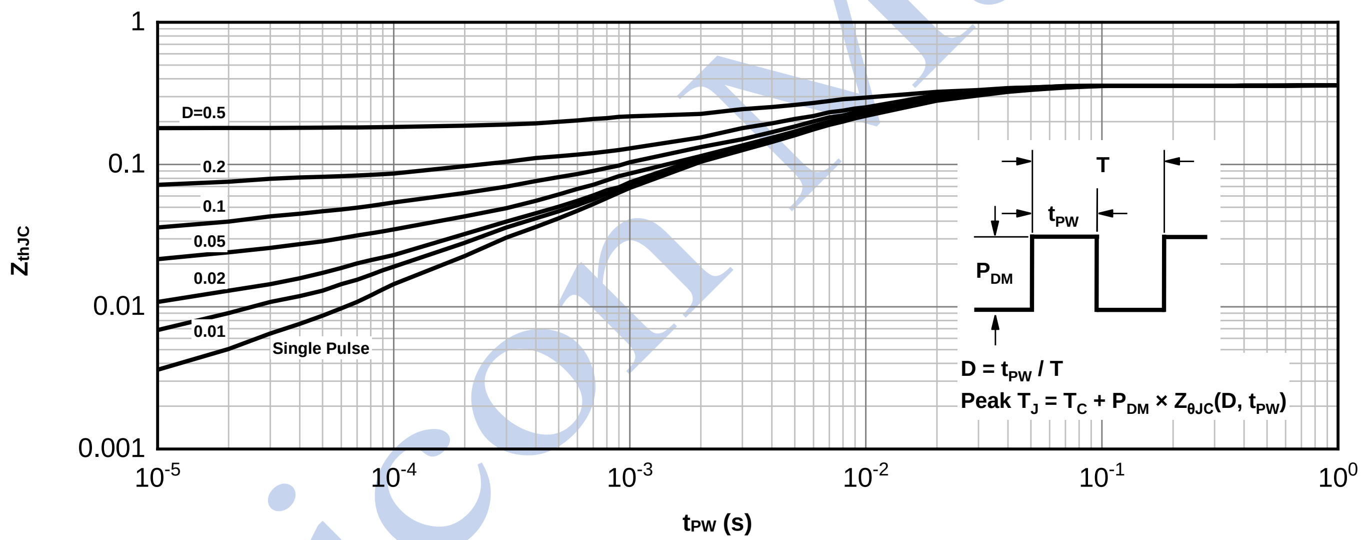
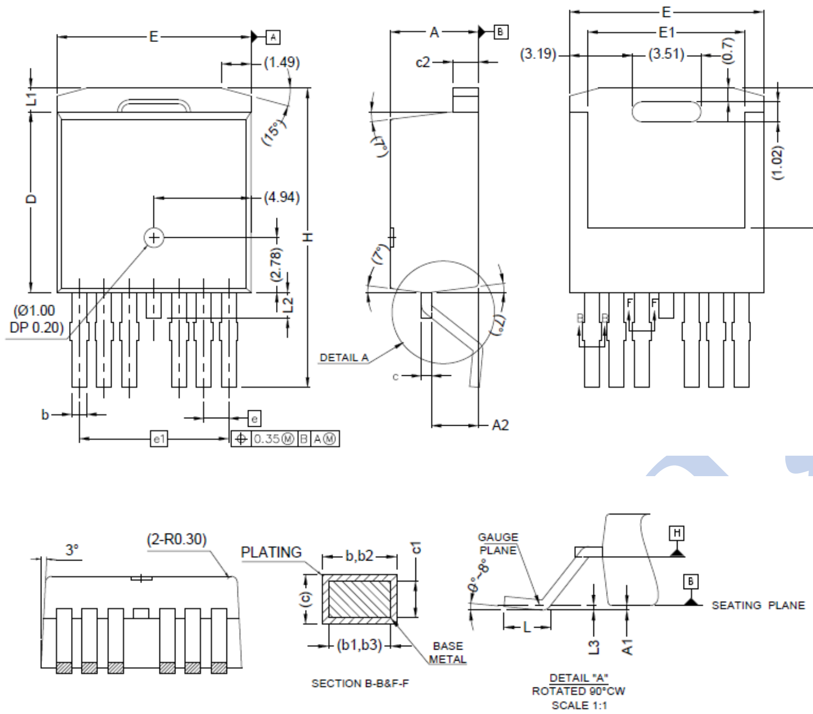


Fig.15 Transient thermal impedance from junction to case



5. Package outline dimensions



SYMBOLS	DIMENSIONS IN MILLMETERS		
	MIN	NOM	MAX.
A	4.30	-	4.70
A1	-	-	0.25
A2	2.20	-	2.60
b	0.65	-	0.85
b1	0.65	-	0.80
b2	0.80	-	1.00
b3	0.80	-	0.95
c	0.45	-	0.60
c1	0.45	-	0.55
c2	1.25	-	1.40
D	9.00	-	9.40
D1	6.86	-	7.42
E	9.68	-	10.08
E1	7.70	-	8.30
e	1.27 BSC		
e1	7.62 BSC		
L	1.78	-	2.79
L1	-	-	1.60
L2	-	-	1.78
L3	0.25 BSC		
H	14.61	-	15.88

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