

N-Channel 120 V MOSFET

Product summary

V_{DS} (V)	$R_{DS(on), Typ}$ (m Ω)	I_D (A)
120	2.1 @ $V_{GS} = 10V$	280 ⁽¹⁾

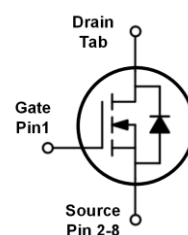
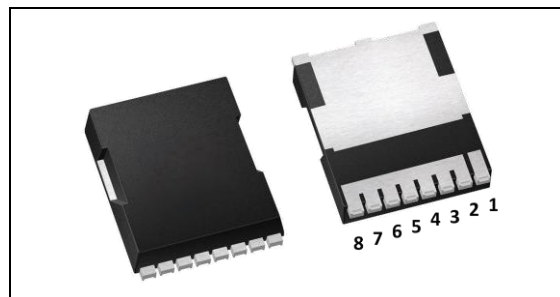
Features

- 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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1. Maximum ratings

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

Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{DS}	120	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current	$T_C = 25^\circ\text{C}$ ⁽¹⁾	I_D	280	A
	$T_C = 100^\circ\text{C}$		196	
	$T_A = 25^\circ\text{C}$ ⁽⁴⁾		33	
Pulsed drain current ⁽²⁾		$I_{D,pulse}$	840	
Avalanche energy, single pulse ⁽³⁾		E_{AS}	540	mJ
Power dissipation	$T_C = 25^\circ\text{C}$	P_D	431	W
	$T_A = 25^\circ\text{C}$ ⁽⁴⁾		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	$R_{\theta JC}$	0.29	°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	120			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.0		4.0	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} = 120 V, V _{GS} = 0 V			1	μA
Drain-source on-resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 100 A		2.1	2.3	mΩ
Forward transconductance ⁽⁵⁾	g _{fs}	V _{DS} = 5 V, I _D = 100 A		260		S
Gate resistance	R _g	f = 1 MHz		1		Ω
Dynamic ⁽⁵⁾						
Total gate charge	Q _g	V _{DS} = 50 V, I _D = 100 A, V _{GS} = 10 V		260		nC
Gate-source charge	Q _{gs}			75		
Gate-drain charge	Q _{gd}			76		
Turn-on delay time	t _{d(on)}	V _{DS} = 50 V, I _D = 100 A, V _{GS} = 10 V, R _{GEN} = 6 Ω		81		ns
Rise time	t _r			178		
Turn-off delay time	t _{d(off)}			167		
Fall time	t _f			68		
Input capacitance	C _{iss}	V _{DS} = 50 V, V _{GS} = 0 V, f = 1 MHz		15800		pF
Output capacitance	C _{oss}			1930		
Reverse transfer capacitance	C _{rss}			75		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V _{SD}	V _{GS} = 0 V, I _F = 100 A		0.85	1.1	V
Reverse recovery time	t _{rr}	V _{DS} = 50 V, I _F = 100 A, di/dt = 100 A/μs		92		ns
Reverse recovery charge	Q _{rr}			200		nC

Notes

- (1) Package limited.
- (2) Pulse width limited by maximum junction temperature.
- (3) $V_{DS} = 75\text{ V}, V_{GS} = 10\text{ V}, L = 0.3\text{ mH}$.
- (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

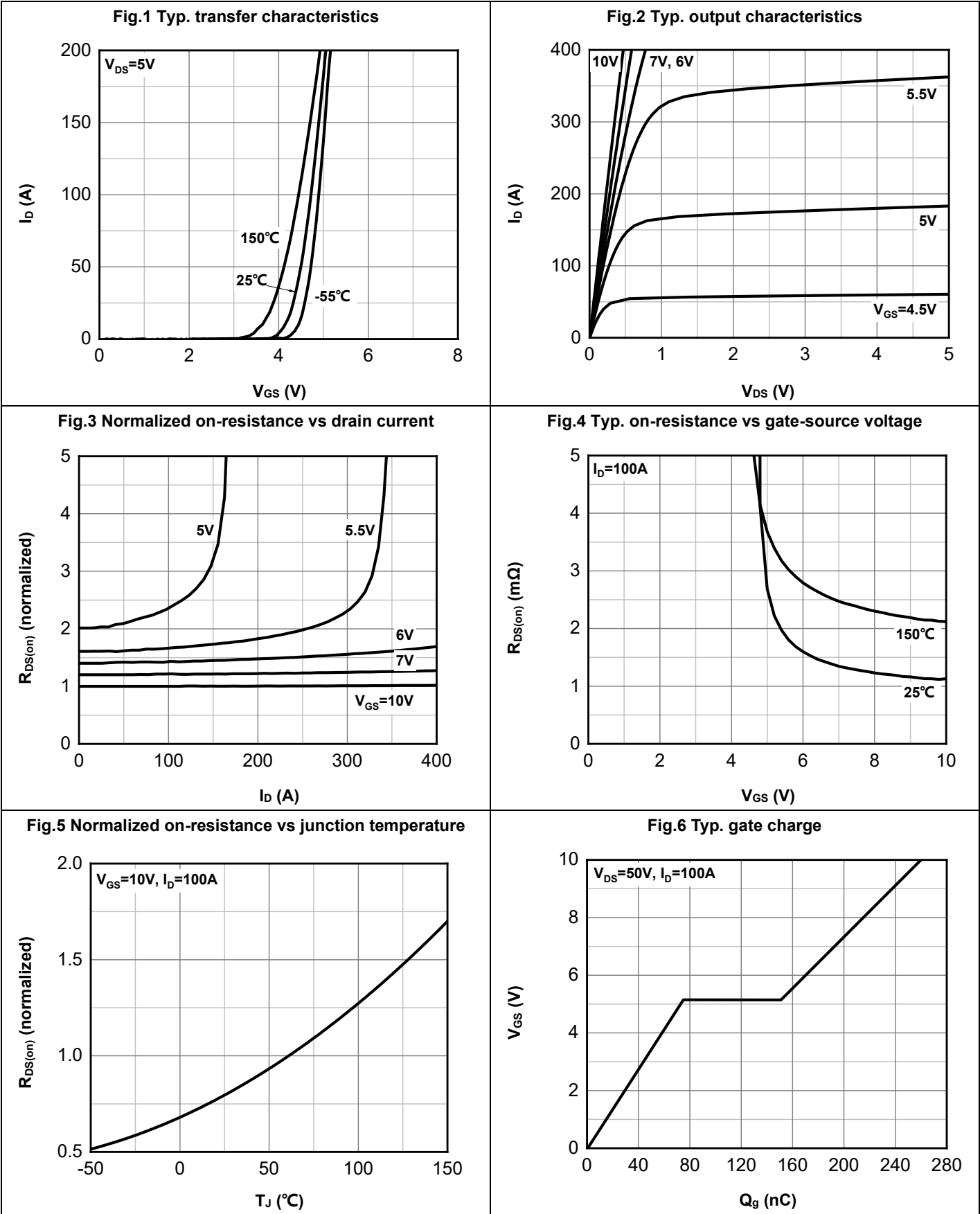


Fig.7 Typ. forward characteristics of body diode

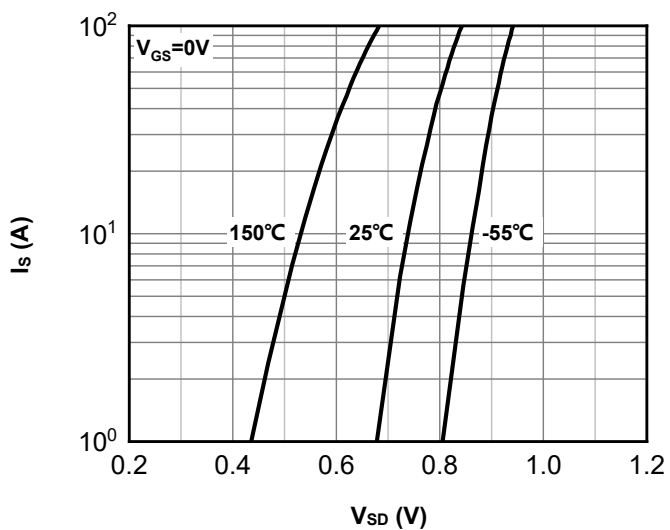


Fig.8 Safe operating area

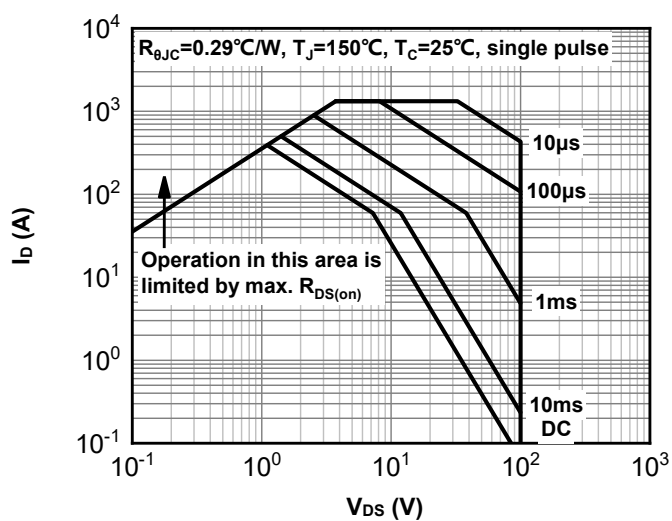


Fig.9 Typ. Capacitance

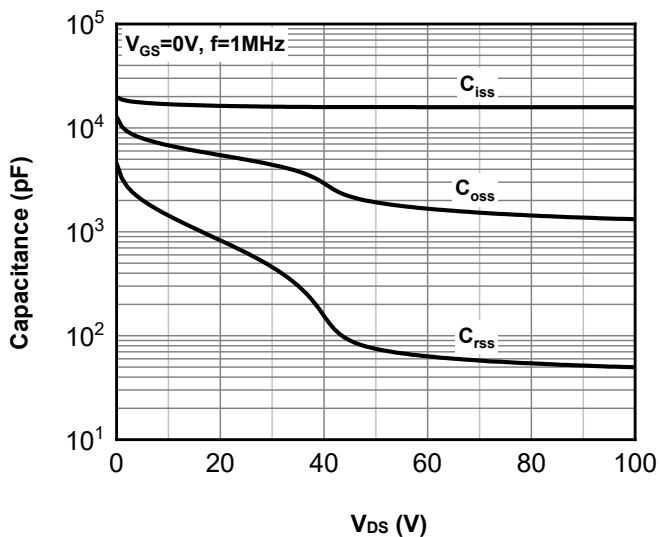


Fig.10 Single pulse maximum power dissipation

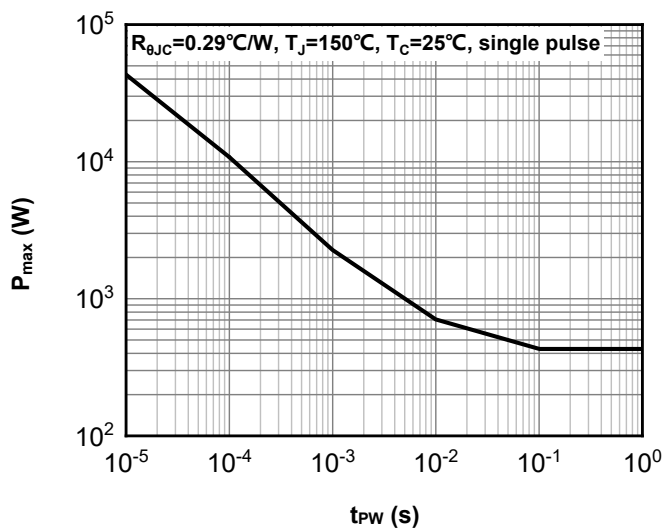


Fig.11 Max. power dissipation vs case temperature

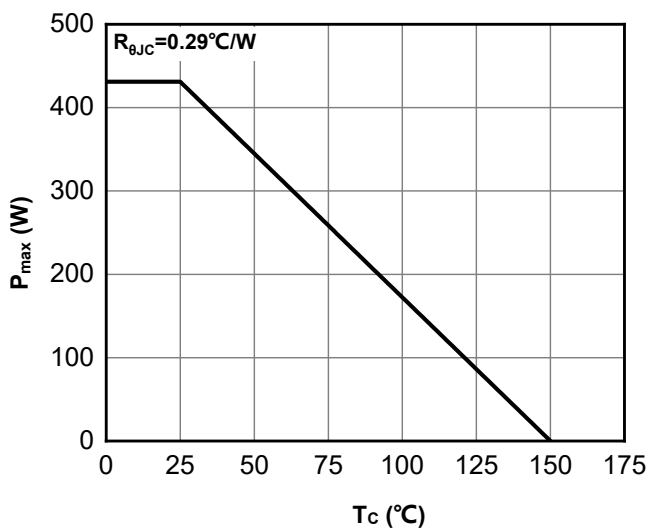


Fig.12 Max. continuous drain current vs case temperature

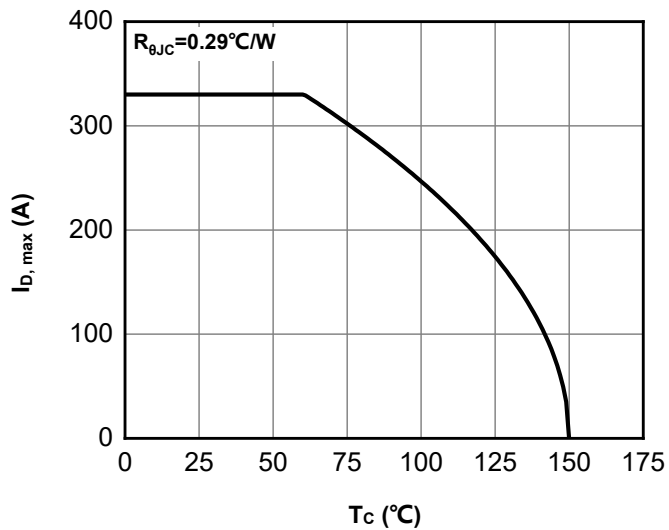


Fig.13 Normalized $V_{(BR)DSS}$ vs junction temperature

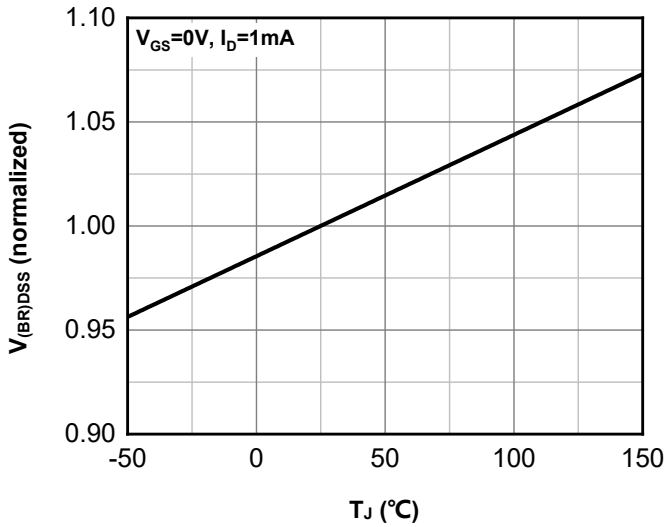


Fig.14 Normalized $V_{GS(th)}$ vs junction temperature

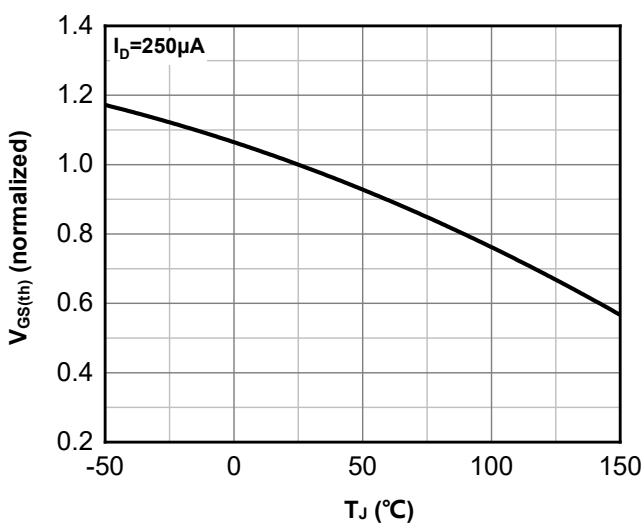
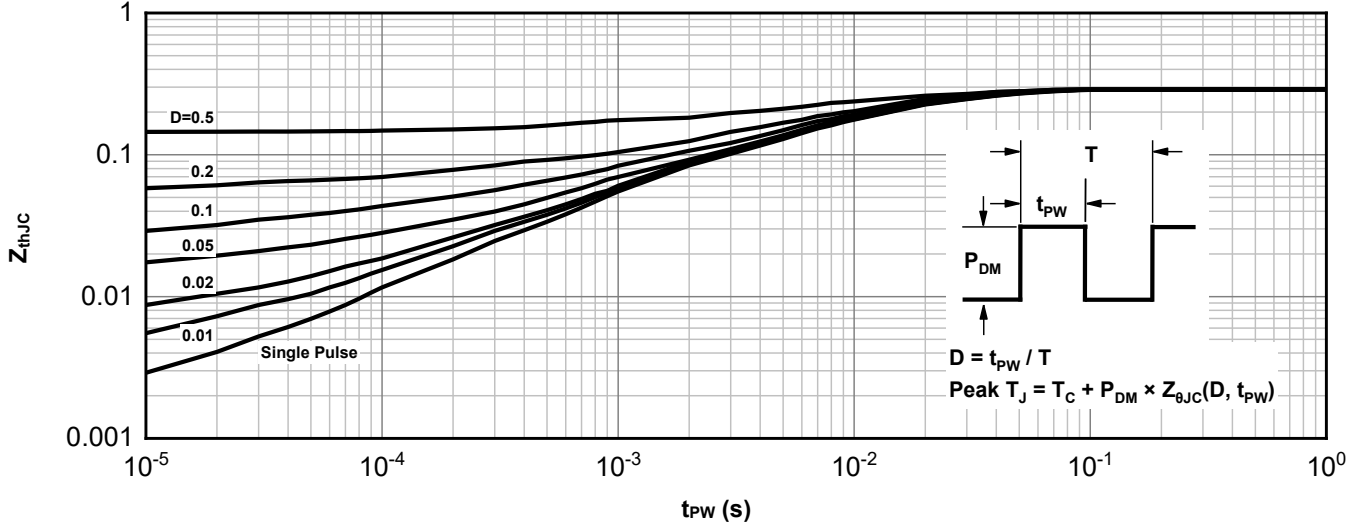
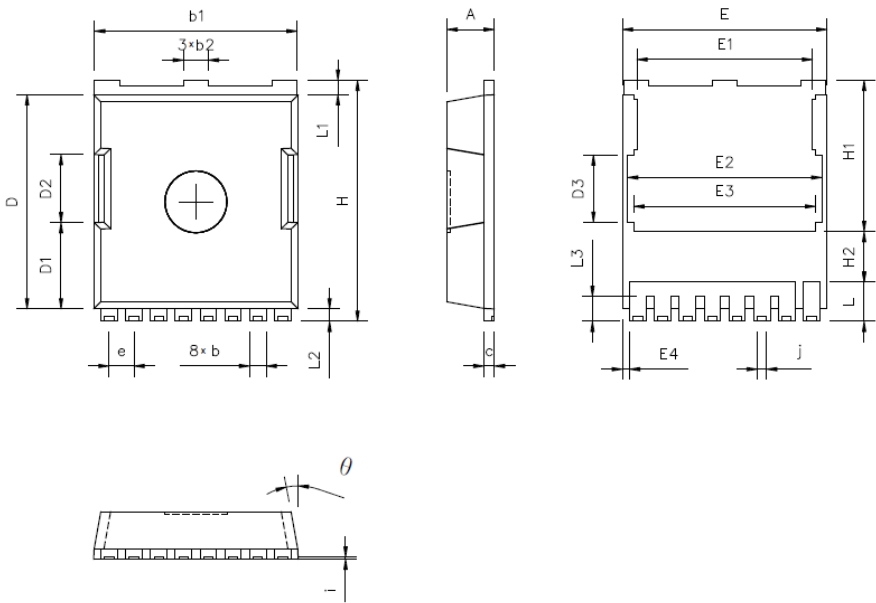


Fig.15 Transient thermal impedance from junction to case



5. Package outline dimensions



Dim	Millimeters		
	Min	Nom	Max
A	2.20	-	2.40
b	0.70	-	0.90
b1	9.70	-	9.90
b2	1.20 REF		
c	0.40	-	0.60
D	10.28	-	10.48
D1	4.08	-	4.28
D2	3.20	-	3.40
D3	3.16	-	3.36
E	9.80	-	10.00
E1	8.40	-	8.60
E2	9.30	-	9.50
E3	8.80 REF		
E4	0.25	-	0.45
e	1.20 BASIC		
H	11.58	-	11.78
H1	7.23	-	7.43
H2	2.45 REF		
i	0.10	-	-
j	0.45 REF		
L	1.60	-	2.10
L1	0.60	-	0.80
L2	0.50	-	0.70
L3	1.05	-	1.30
θ	10° REF		