N-Ch 130V Fast Switching MOSFETs

- ★ Super Low Gate Charge
- ★ Green Device Available
- ★ Excellent Cdv/dt effect decline
- ★ Advanced high cell density Trench technology

Product Summary

Green

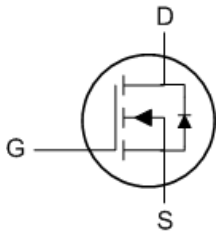
BVDSS	RDSON	ID
130V	165mΩ	2A

Description

The XR2N13 is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The XR2N13 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

SOT23 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	130	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25℃	Continuous Drain Current	2	A
I_D@T_A=70℃	Continuous Drain Current	---	A
I_{DM}	Pulsed Drain Current[2]	8	A
P_D@T_A=25℃	Total Power Dissipation[3]	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	---	83.3	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	---	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	130	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	---	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=1.5A	---	165	200	mΩ
		V_{GS}=4.5V , I_D=1A	---	185	220	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.5	2	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=130V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=130V, V_{GS}=0V , T_J=100℃	---	---	---	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=70V , I_D=2A	---	---	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	---	---	Ω
Q_g	Total Gate Charge	V_{DS}=70V , V_{GS}=10V , I_D=2A	---	2.66	---	nC
Q_{gs}	Gate-Source Charge		---	0.63	---	
Q_{gd}	Gate-Drain Charge		---	0.57	---	
$T_{d(on)}$	Turn-On Delay Time	VGS=10V, VDD=70V, RG=3Ω, ID=2A	---	4	---	ns
T_r	Rise Time		---	6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	11	---	
T_f	Fall Time		---	3	---	
C_{iss}	Input Capacitance	V_{DS}=70V , V_{GS}=0V , f=1MHz	---	126	---	pF
C_{oss}	Output Capacitance		---	17.8	---	
C_{rss}	Reverse Transfer Capacitance		---	26	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	2	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25C	---	---	1.2	V
t_{rr}	Reverse Recovery Time	IF=2A , di/dt=100A/μs , T_J=25C	---	24	---	nS
Q_{rr}	Reverse Recovery Charge		---	100	---	nC

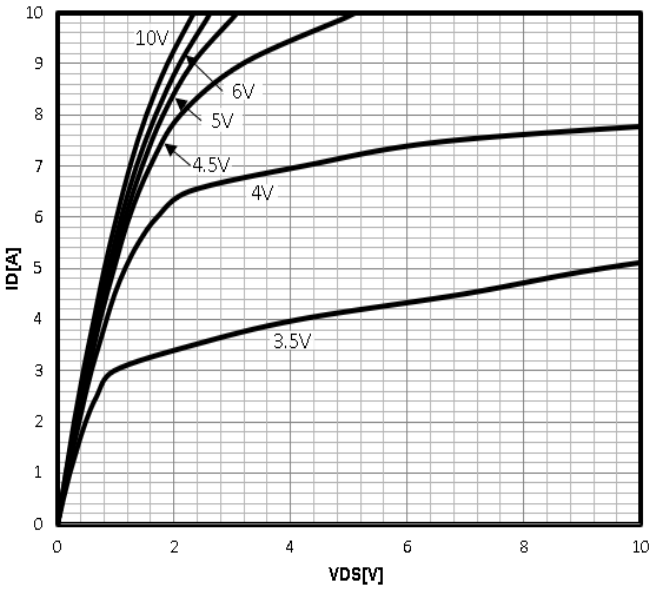
Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width≤300μs, duty cycle≤2%.
4. This value is guaranteed by design hence it is not included in the production test.

Characteristics Curve:

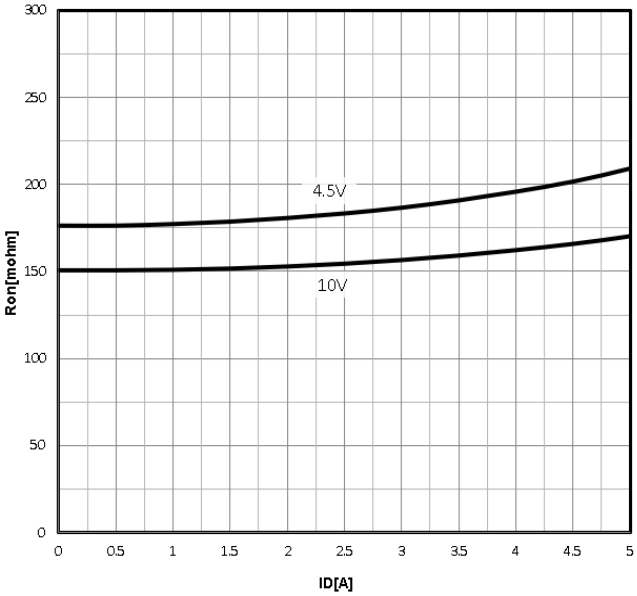
Typ. output characteristics

$I_D=f(V_{DS})$



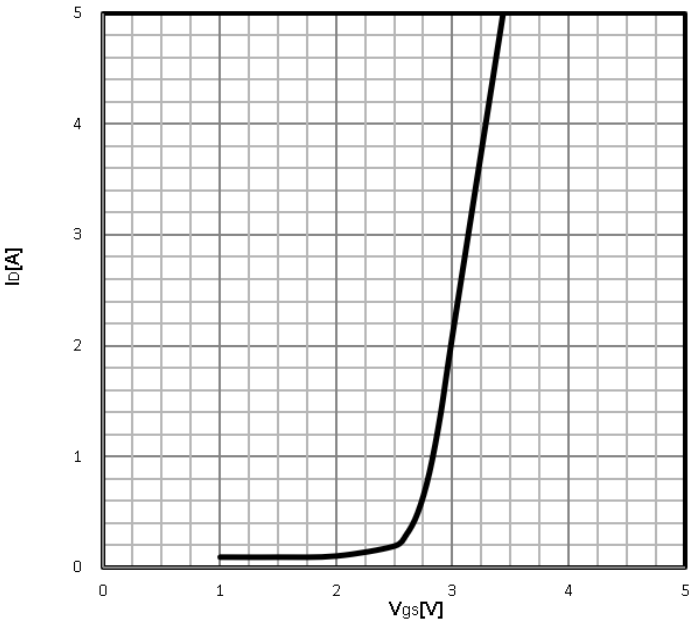
Typ. drain-source on resistance

$R_{DS(on)}=f(I_D)$



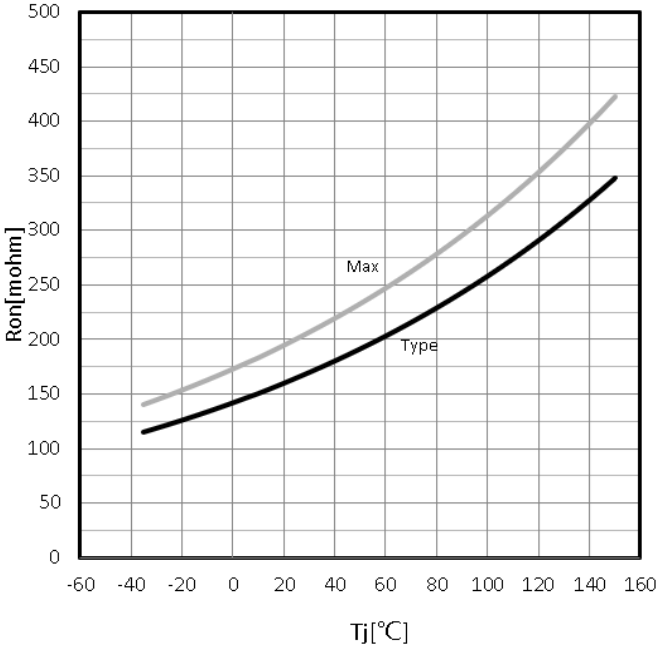
Typ. transfer characteristics

$I_D=f(V_{GS})$

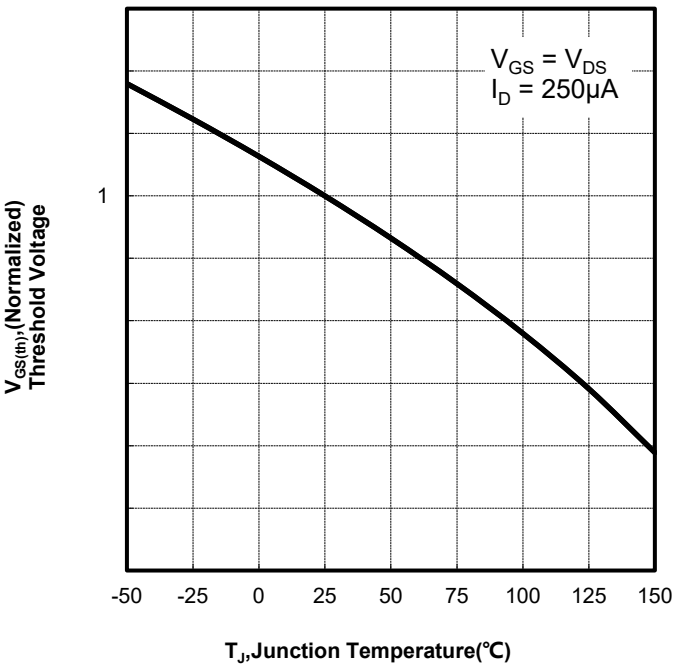


Drain-source on-state resistance

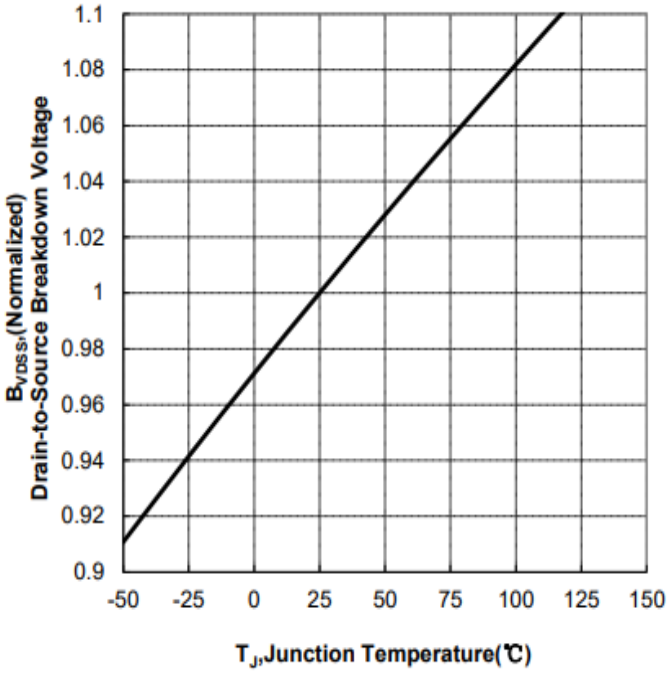
$R_{DS(on)}=f(T_j);I_D=2A;\ V_{GS}=10V$



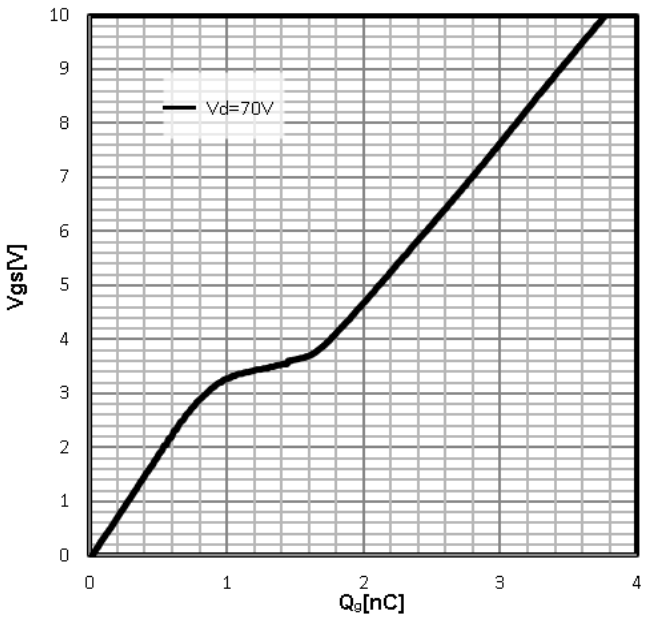
Gate Threshold Voltage
$V_{TH}=f(T_j)$; I_D=250uA



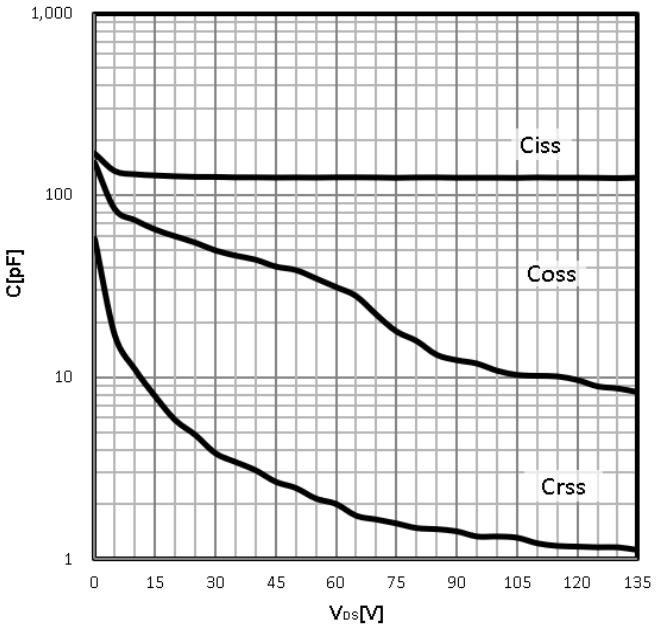
Drain-source breakdown voltage
$V_{BR(DSS)}=f(T_j)$; I_D=250uA



Typ. gate charge
$V_{GS}=f(Q_g)$; I_D=2A

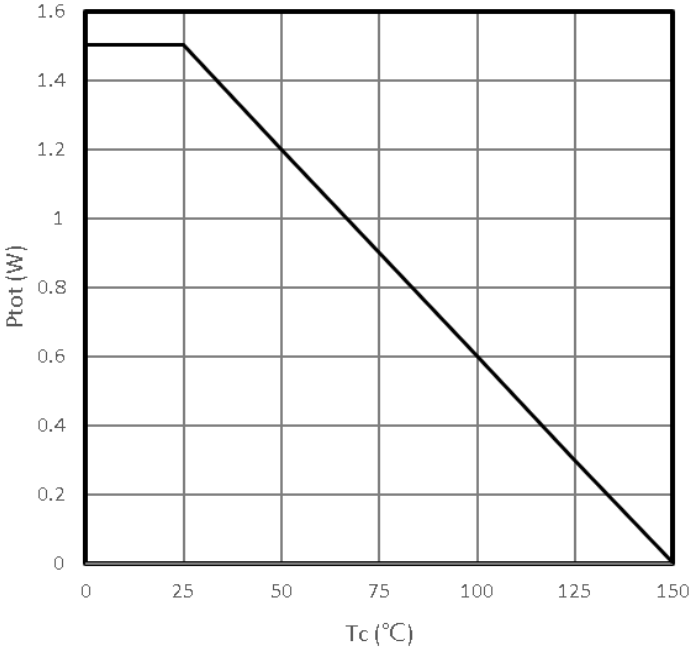


Typ. capacitances
C =f(V_{DS}); V_{GS}=0V; f =1MHz



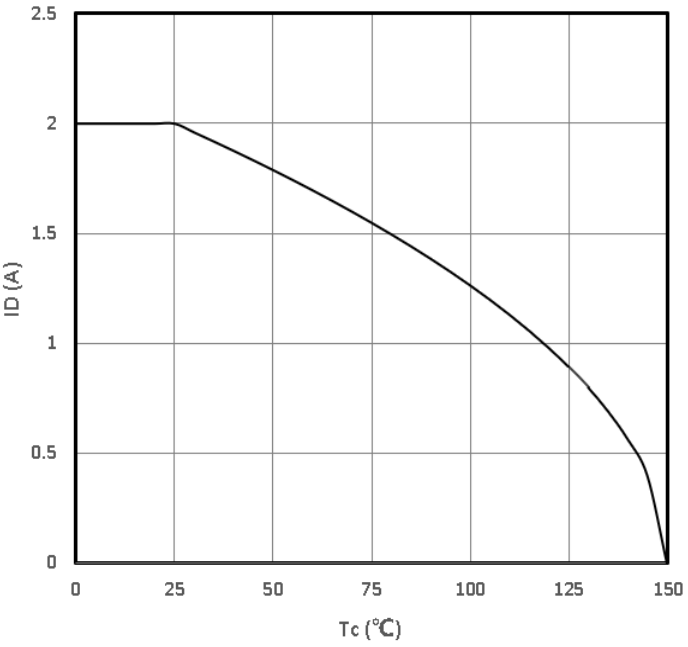
Power Dissipation

$P_{tot}=f(T_C)$



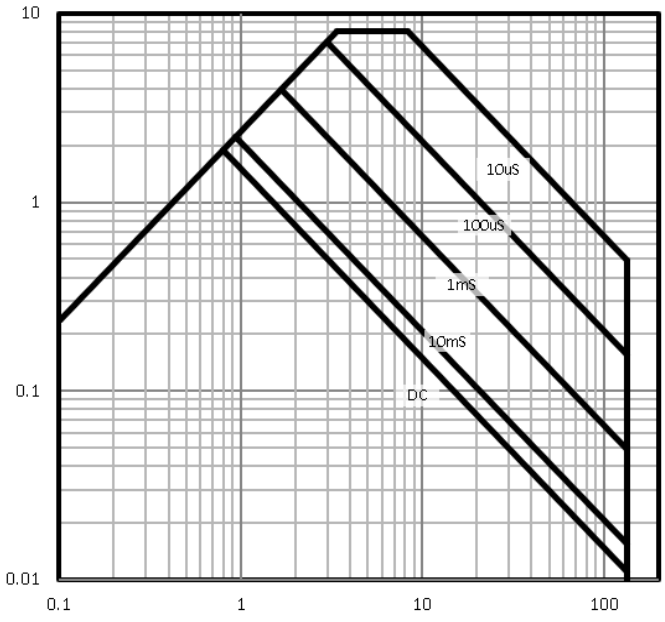
Maximum Drain Current

$I_D=f(T_C)$



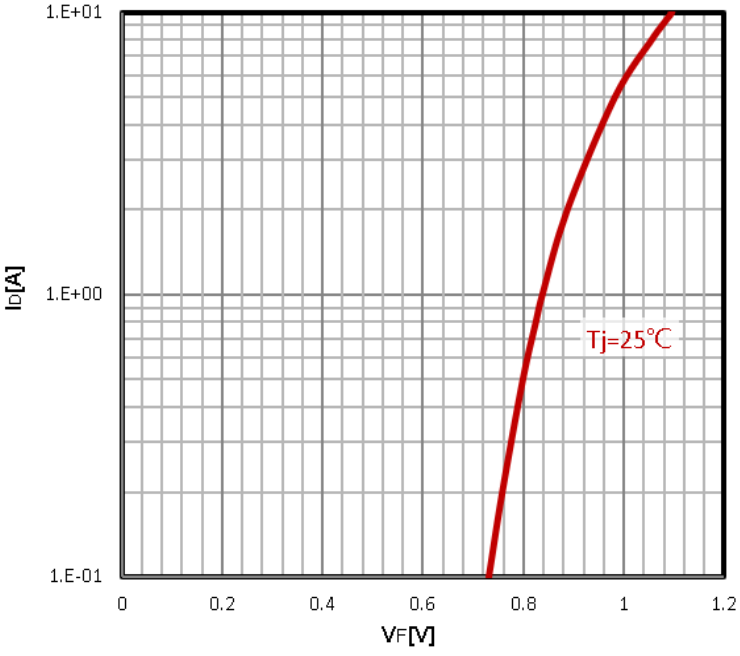
Safe operating area

$I_D=f(V_{DS})$



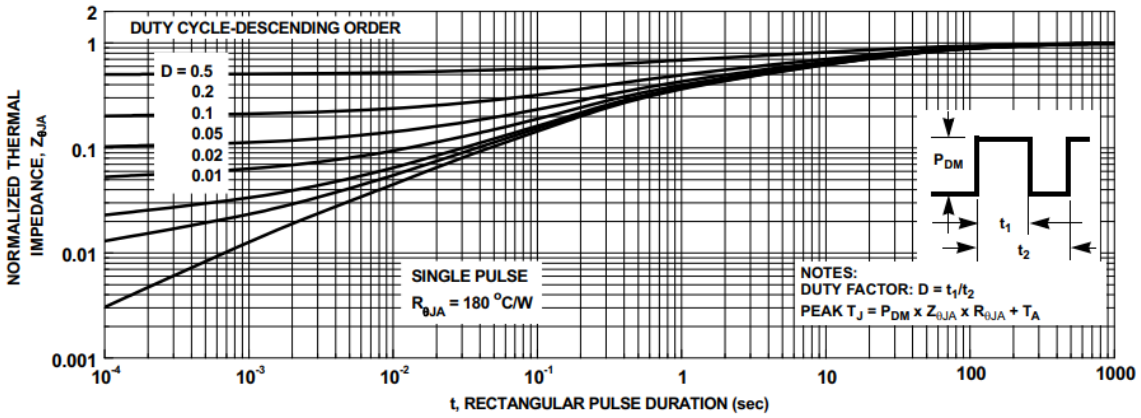
Body Diode Forward Voltage Variation

$I_F=f(V_{GS})$

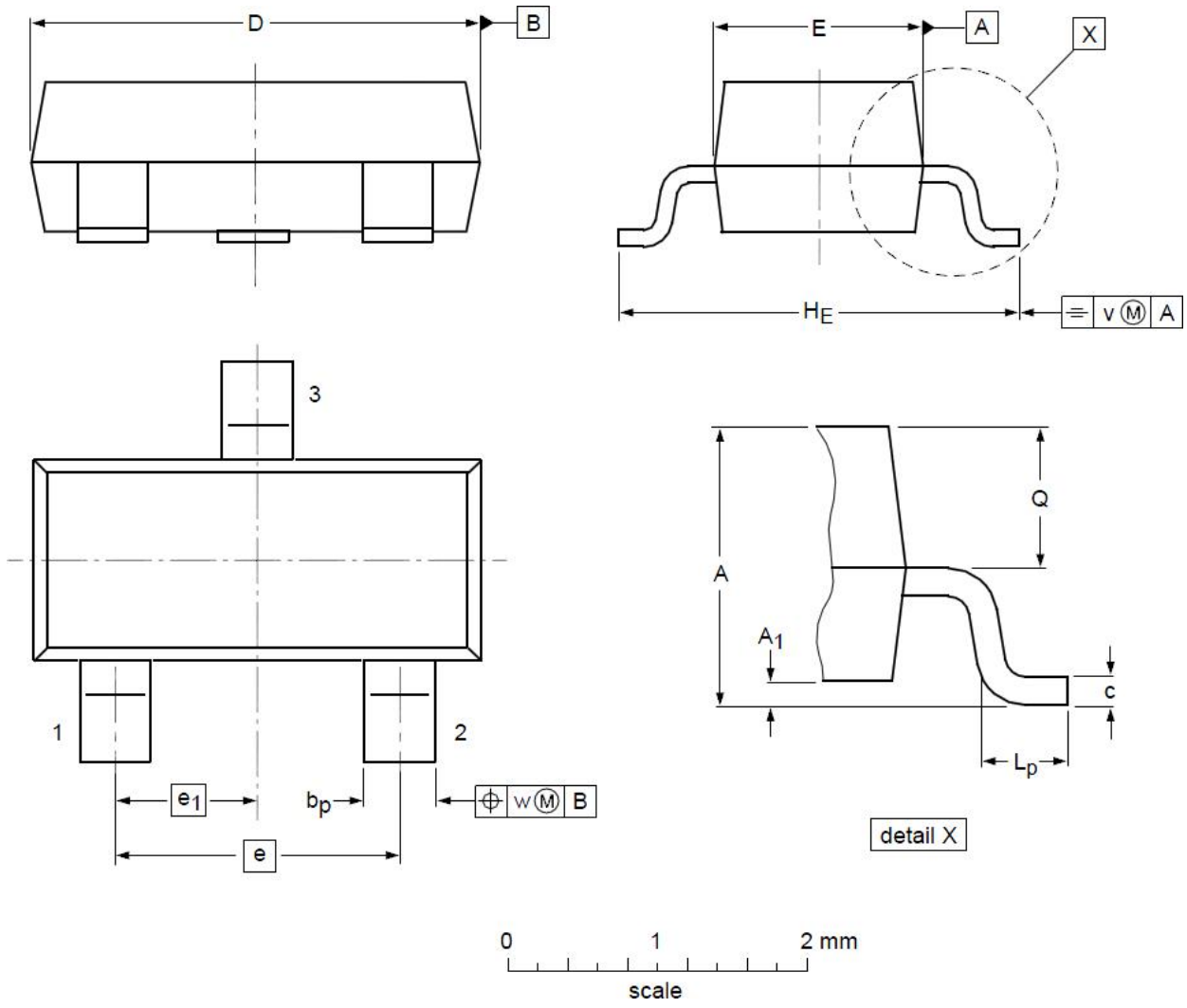


Max. transient thermal impedance

$Z_{thJC}=f(t_p)$



SOT23 Mechanical Data



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.01	1.15	**A_1**	0.01	0.05	0.10
b_p	0.30	0.42	0.50	**c**	0.08	0.13	0.15
D	2.80	2.92	3.00	**E**	1.20	1.33	1.40
e	--	1.90	--	**e_1**	--	0.95	--
H_E	2.25	2.40	2.55	**L_p**	0.30	0.42	0.50
Q	0.45	0.49	0.55	**v**	--	0.20	--
w	--	0.10	--				