AT2030

20V N+P Channel MOSFET

Features

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

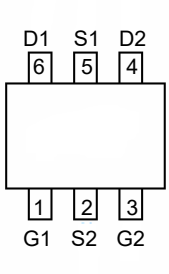
Product Summary

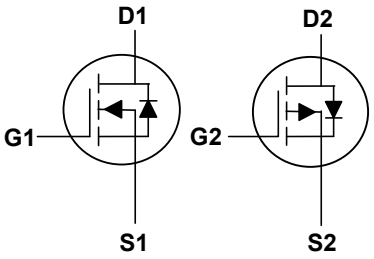
	N-Ch	P-Ch	
V_{DS}	20	-20	V
I_D	5	-4	A
$R_{DS(ON)}$ (at V_{GS}=±4.5V)	35	85	mΩ
$R_{DS(ON)}$ (at V_{GS}=±2.5V)	40	110	mΩ

Applications

- High Frequency Point-of-Load,Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch,Power management

SOT23-6L Top View





Absolute Maximum Ratings(T_A=25℃, unless otherwise noted)

Parameter	Symbol	N-Ch	P-Ch	Units
Drain-Source Voltage	V_{DS}	20	-20	V
Gate-Source Voltage	V_{GS}	±12	±12	V
Continuous Drain Current	I_D	5	-4	A
Pulsed Drain Current[2]	I_{DM}	16	-15	A
Total Power Dissipation[3]	P_D@T_A=25℃	1.25	1.25	W
Total Power Dissipation[3]	P_D@T_A=70℃	1	1	W
Storage Temperature Range	T_{STG}	-55 to 150		℃
Operating Junction Temperature Range	T_J	-55 to 150		℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient[1]	$R_{\theta JA}$	---	125	℃/W

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=250uA	20	---	---	V
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	V_{GS}=4.5V , I_D=4.5A	---	20	35	mΩ
		V_{GS}=2.5V , I_D=4A	---	25	40	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	0.5	0.7	1.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=20V , V_{GS}=0V , T_J=25℃	---	---	1	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA
Forward Transconductance	gfs	V_{DS}=10V , I_D=4.5A	---	8	---	S
Total Gate Charge	Q_g	V_{DS}=10V , V_{GS}=4.5V , I_D=4.2A	---	10	---	nC
Gate-Source Charge	Q_{gs}		---	2.3	---	
Gate-Drain Charge	Q_{gd}		---	2.9	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=10V , V_{GS}=4.5V , R_G=6Ω, I_D=3.6A,R_L=2.8Ω	---	7	---	ns
Rise Time	T_r		---	55	---	
Turn-Off Delay Time	$T_{d(off)}$		---	16	---	
Fall Time	T_f		---	10	---	
Input Capacitance	C_{iss}	V_{DS}=10V , V_{GS}=0V , f=1MHz	---	500	---	pF
Output Capacitance	C_{oss}		---	250	---	
Reverse Transfer Capacitance	C_{rss}		---	90	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V , I_S=1.3A , T_J=25℃	---	---	1.2	V

Note:

1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The power dissipation is limited by 150℃ junction temperature

Typical Characteristics

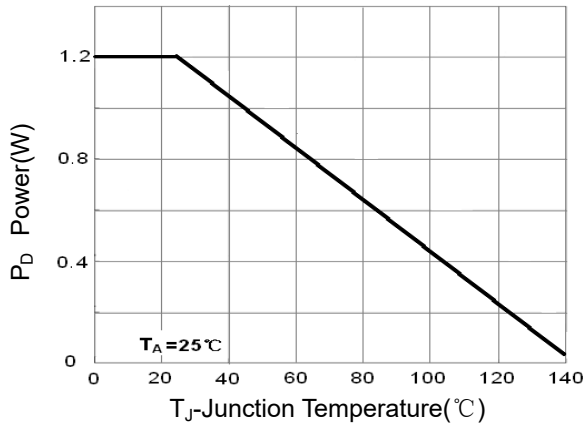


Figure 1 Power Dissipation

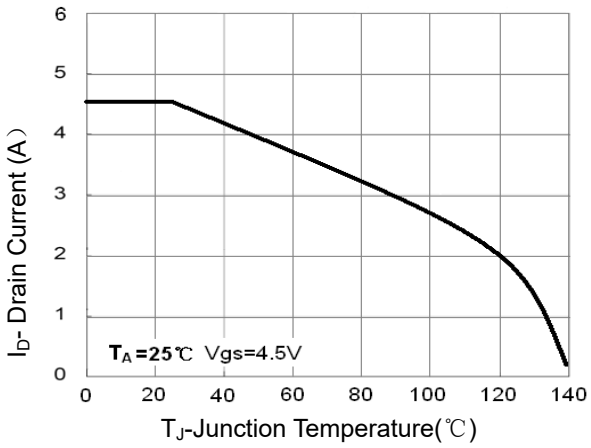


Figure 2 Drain Current

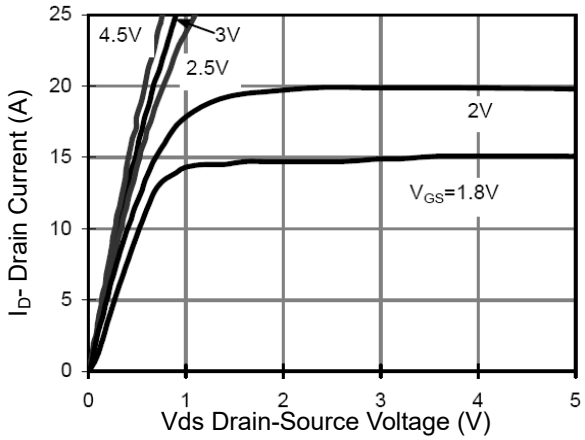


Figure 3 Output CHARACTERISTICS

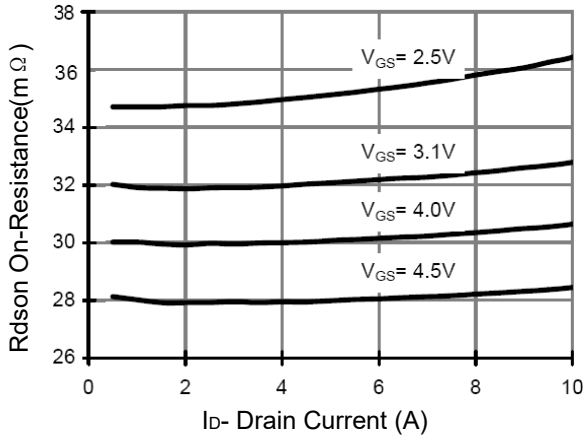


Figure 4 Drain-Source On-Resistance

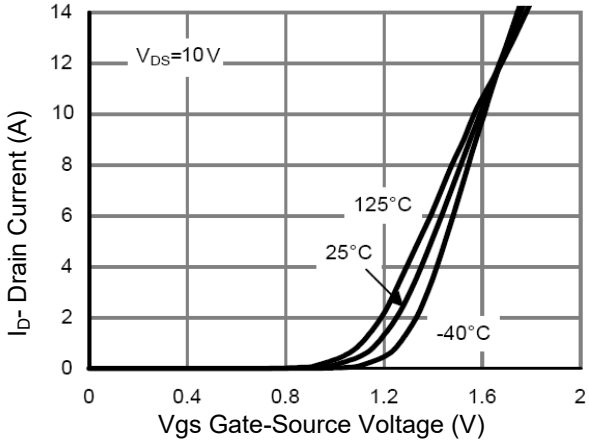


Figure 5 Transfer Characteristics

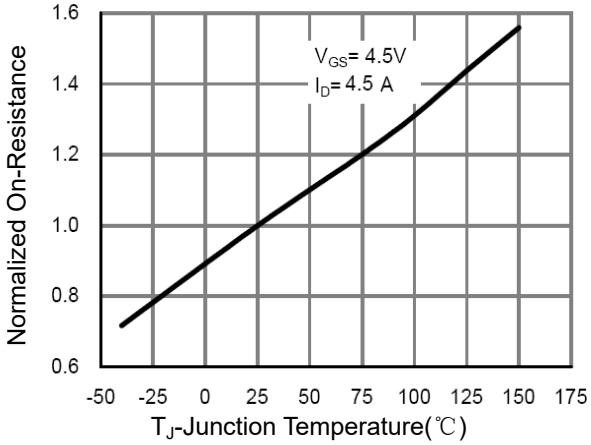


Figure 6 Drain-Source On-Resistance

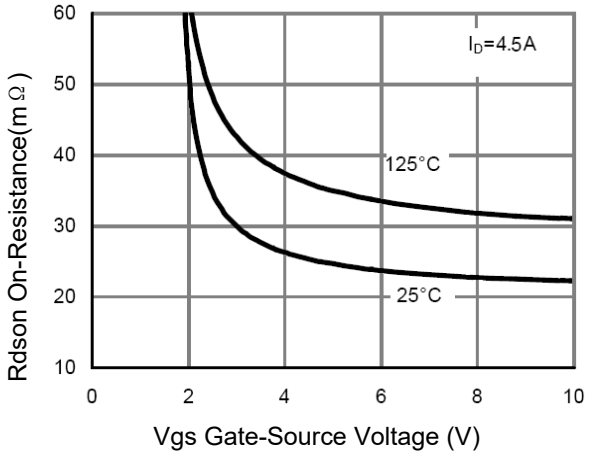


Figure 7 Rdson vs Vgs

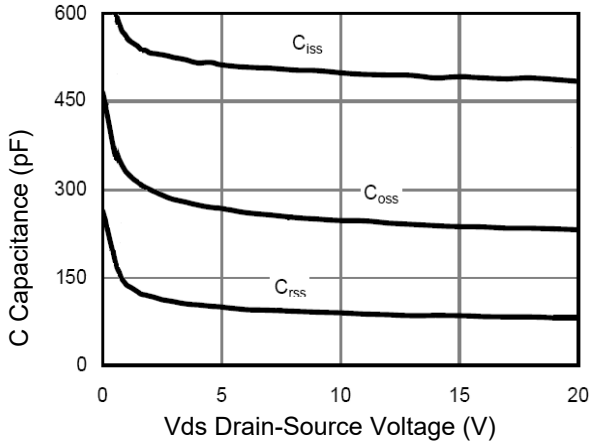


Figure 8 Capacitance vs Vds

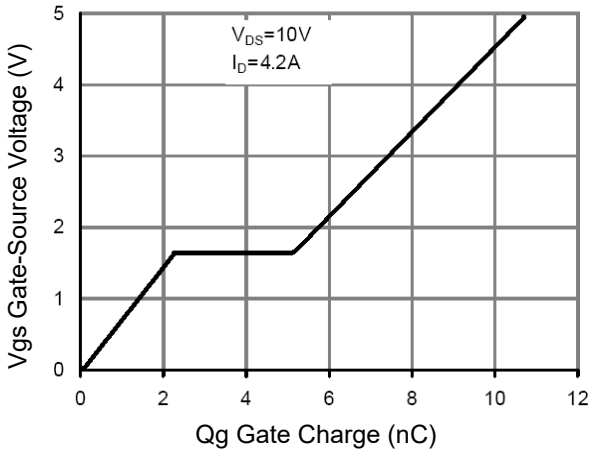


Figure 9 Gate Charge

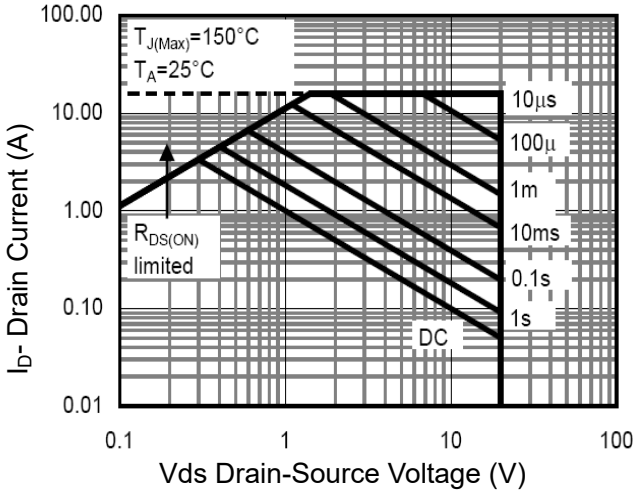


Figure 10 Safe Operation Area

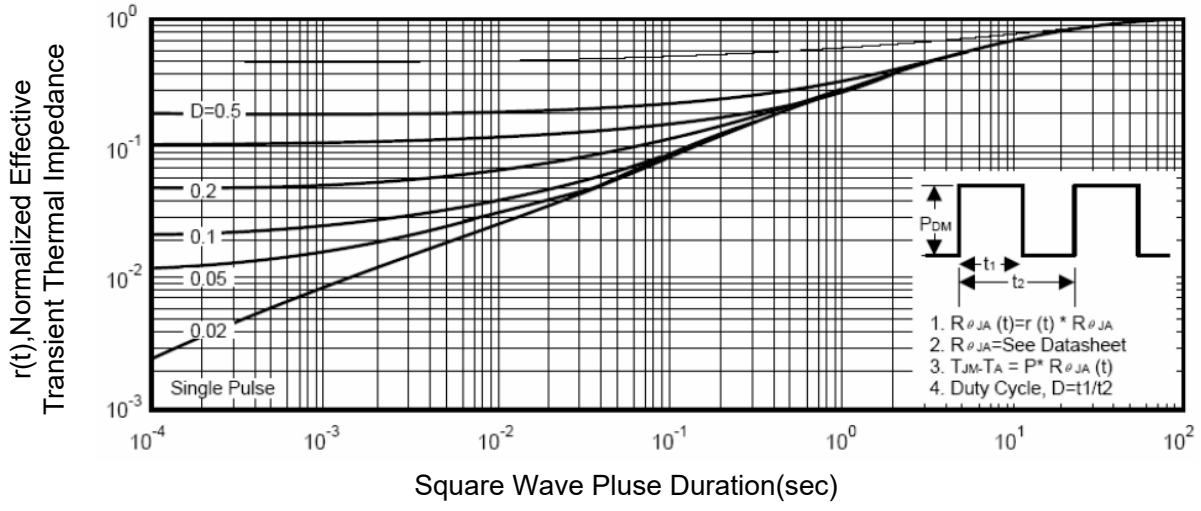


Figure 11 Normalized Maximum Transient Thermal Impedance

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=-250uA	-20	---	---	V
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	V_{GS}=-4.5V , I_D=-3A	---	60	85	mΩ
		V_{GS}=-2.5V , I_D=-2A	---	90	110	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =-250uA	-0.5	---	-1	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-20V , V_{GS}=0V , T_J=25℃	---	---	1	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA
Forward Transconductance	gfs	V_{DS}=-5V , I_D=-4A	---	7	---	S
Total Gate Charge	Q_g	V_{DS}=-10V , V_{GS}=-4.5V , I_D=-4A	---	9.6	---	nC
Gate-Source Charge	Q_{gs}		---	1.5	---	
Gate-Drain Charge	Q_{gd}		---	2.4	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=-10V , V_{GS}=-4.5V , R_G=6Ω, I_D=-1A	---	9.7	---	ns
Rise Time	T_r		---	18	---	
Turn-Off Delay Time	$T_{d(off)}$		---	25	---	
Fall Time	T_f		---	31	---	
Input Capacitance	C_{iss}	V_{DS}=-10V , V_{GS}=0V , f=1MHz	---	490	---	pF
Output Capacitance	C_{oss}		---	75	---	
Reverse Transfer Capacitance	C_{rss}		---	60	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V

Note:

1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The power dissipation is limited by 150℃ junction temperature

Typical Characteristics

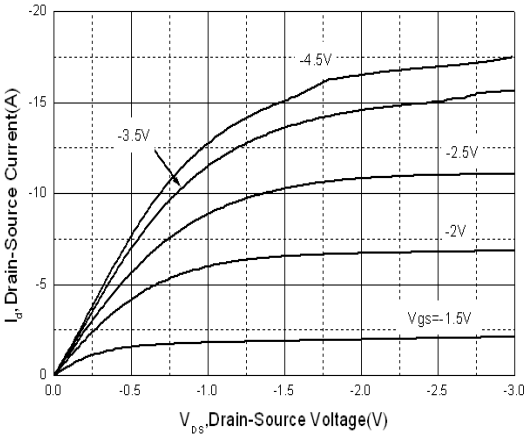


Figure 1: Typical Output Characteristics

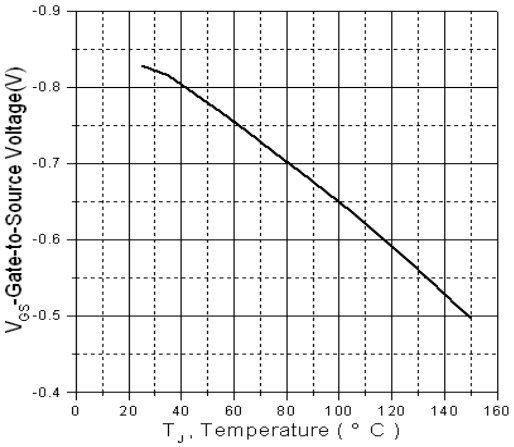


Figure 2. Gate to source cut-off voltage

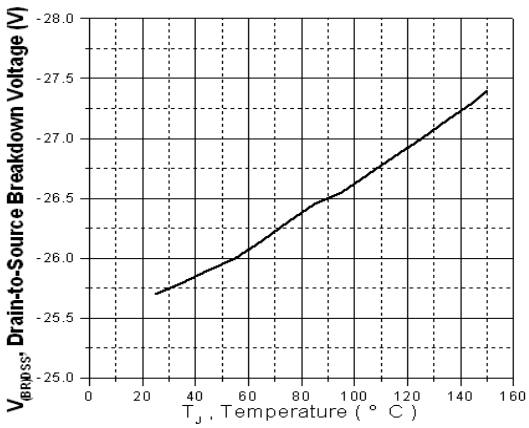


Figure 3. Drain-to-Source Breakdown Voltage Vs. Case Temperature

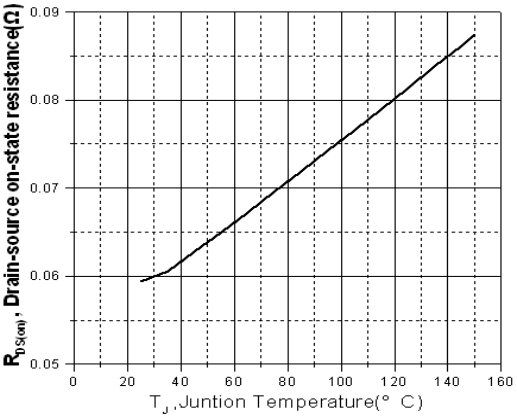


Figure 4: Normalized On-Resistance Vs. Case Temperature

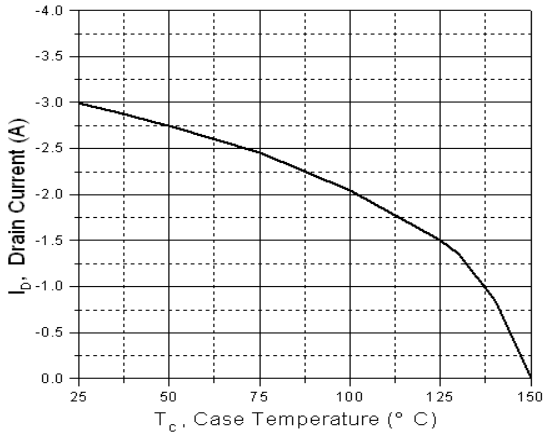


Figure 5. Maximum Drain Current Vs. Case Temperature

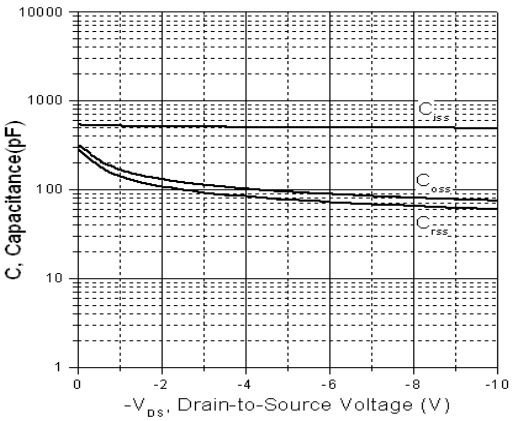


Figure 6 .Typical Capacitance Vs. Drain-to-Source Voltage

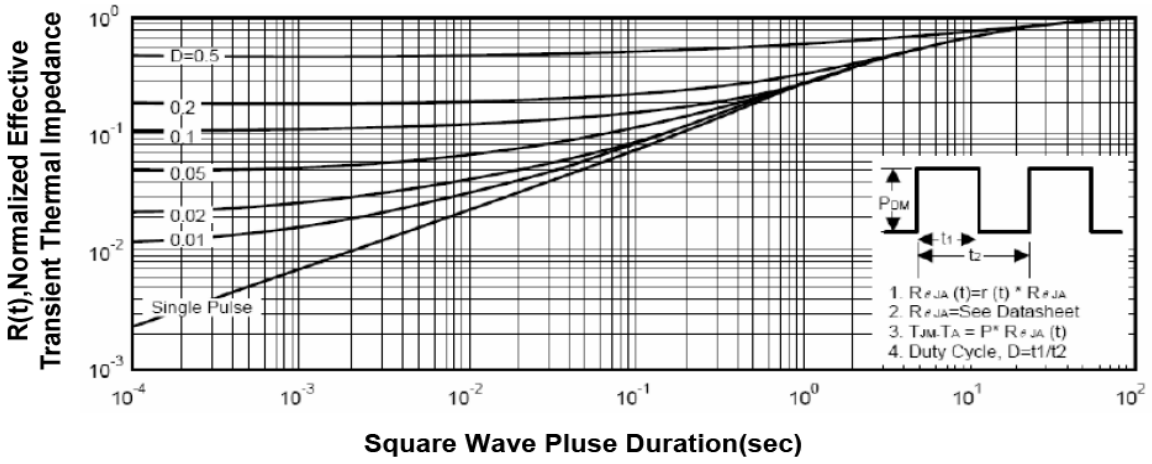
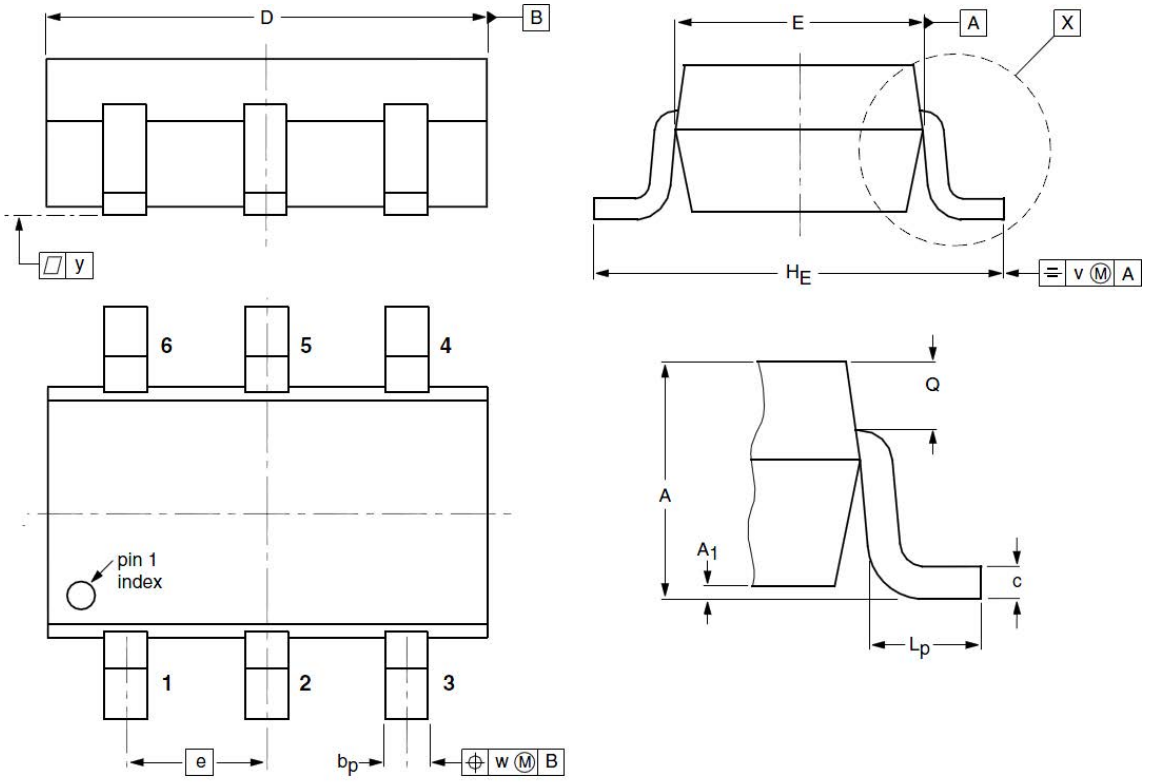


Figure7. Maximum Effective Transient Thermal Impedance Junction-to-Case

SOT23-6L Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	0.90	1.07	1.45	**A_1**	0.01	0.05	0.15
b_p	0.30	0.40	0.50	**c**	0.10	0.15	0.22
D	2.70	2.92	3.10	**E**	1.35	1.55	1.75
e	--	0.95	--	**H_E**	2.50	2.80	3.00
L_P	0.30	0.45	0.60	**Q**	0.23	0.29	0.33
v	--	0.20	--	**W**	--	0.20	--
y	--	0.10	--				