N-Channel Enhancement Mode Power MOSFET

Description

The G250N03IEA uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

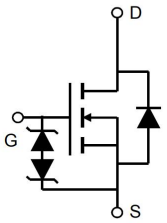
AEC-Q101 Qualified

General Features

- V_{DS} 30V
- I_D (at V_{GS} = 10V) 5.3A
- $R_{DS(ON)}$ (at V_{GS} = 10V) < 25mΩ
- $R_{DS(ON)}$ (at V_{GS} = 4.5V) < 30mΩ
- $R_{DS(ON)}$ (at V_{GS} = 2.5V) < 50mΩ
- 100% Avalanche Tested
- RoHS Compliant
- ESD (HBM): 3.5KV

Application

- Power switch
- DC/DC converters



Schematic diagram



SOT-23

Ordering Information

Device	Package	Marking	Packaging
G250N03IEA	SOT-23	G250N03	3000pcs/Reel

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Continuous Drain Current	T_C = 25ºC	I_D	5.3	A
	T_C = 100ºC		3.4	
Pulsed Drain Current (note1)		I_{DM}	21.2	A
Gate-Source Voltage		V_{GS}	±10	V
Power Dissipation		P_D	1.4	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 To 150	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	89	ºC/W

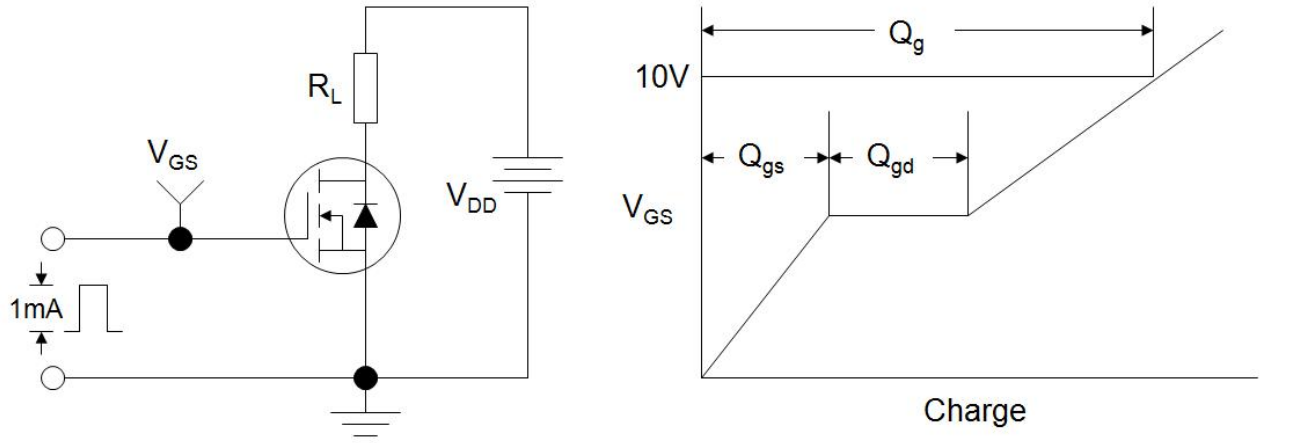
Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	30	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V	--	--	1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±10V	--	--	±10	uA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	0.5	1	1.3	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 4A	--	21	25	mΩ
		V_{GS} = 4.5V, I_D =4A	--	24	30	
		V_{GS} = 2.5V, I_D =2A	--	37	50	
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 4A	--	10	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1.0MHz	--	573	--	pF
Output Capacitance	C_{oss}		--	66	--	
Reverse Transfer Capacitance	C_{rss}		--	56	--	
Total Gate Charge	Q_g	V_{DD} = 15V, I_D = 4A, V_{GS} = 10V	--	14	--	nC
Gate-Source Charge	Q_{gs}		--	1	--	
Gate-Drain Charge	Q_{gd}		--	2.5	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 15V, I_D = 4A, R_G = 3Ω	--	3	--	ns
Turn-on Rise Time	t_r		--	2.8	--	
Turn-off Delay Time	$t_{d(off)}$		--	25	--	
Turn-off Fall Time	t_f		--	4	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	5.3	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 4A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Qrr	I_F = 4A, V_{GS} = 0V di/dt=100A/us	--	2	--	nC
Reverse Recovery Time	Trr		--	6	--	ns

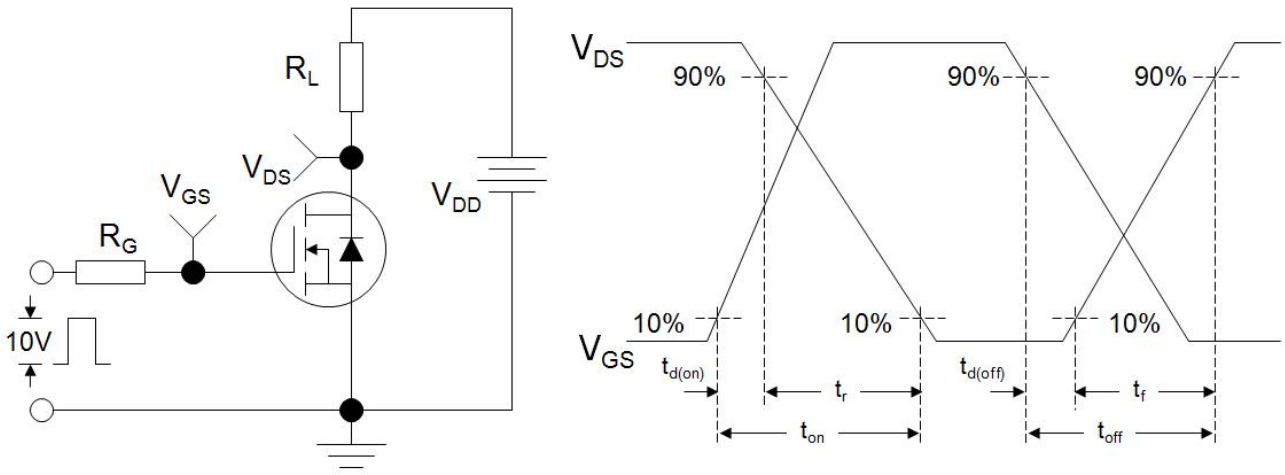
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical R_G

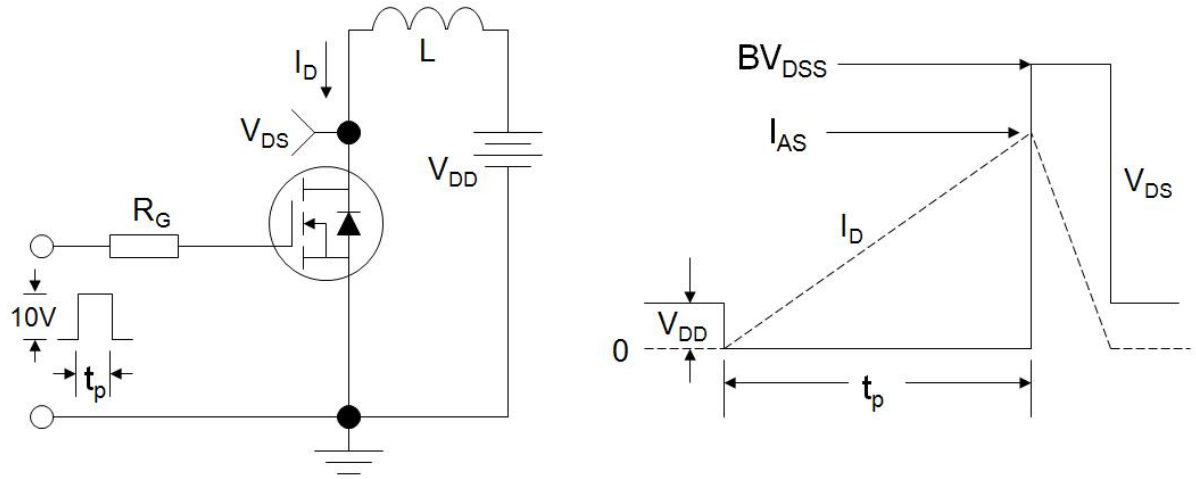
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

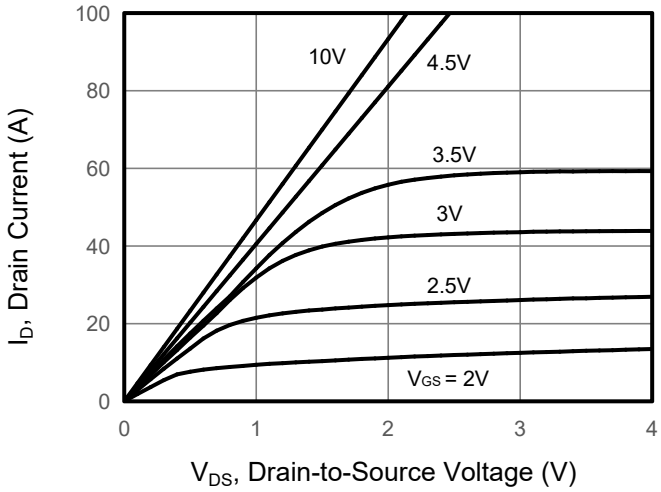


Figure 2. Transfer Characteristics

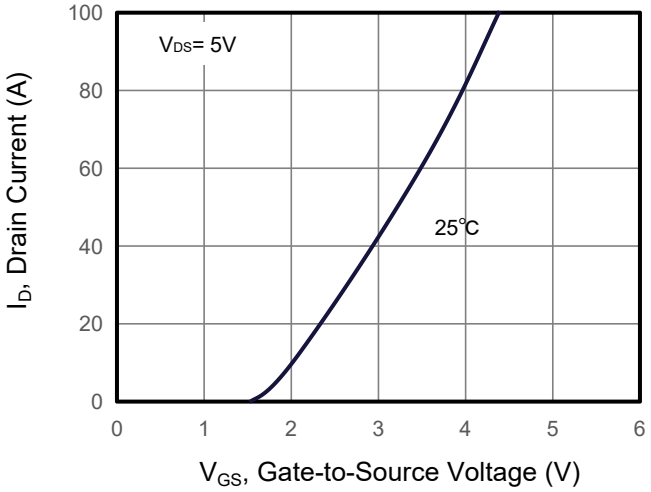


Figure 3. Drain Source On Resistance

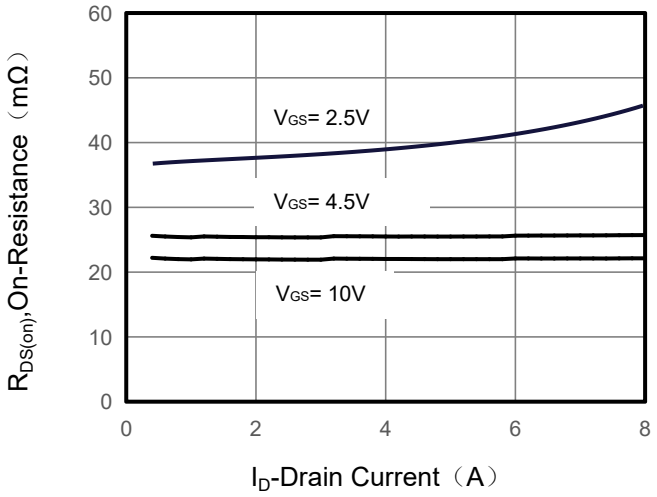


Figure 4. Gate Charge

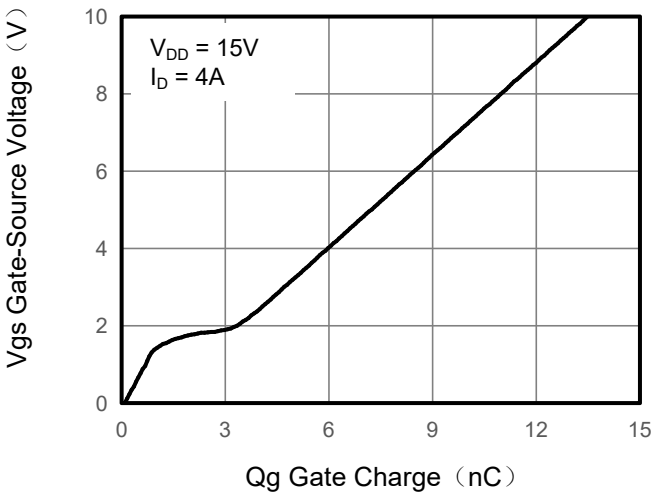


Figure 5. Capacitance

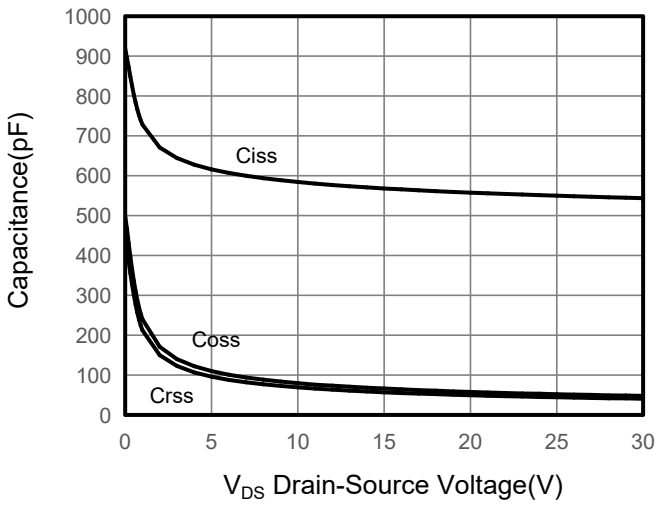
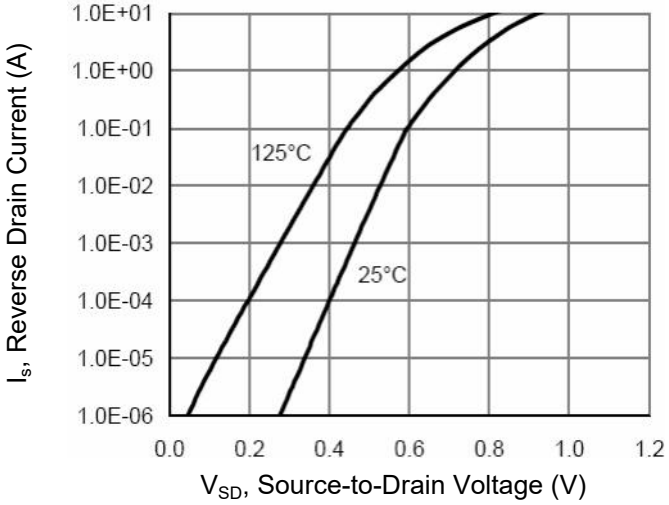


Figure 6. Source-Drain Diode Forward



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

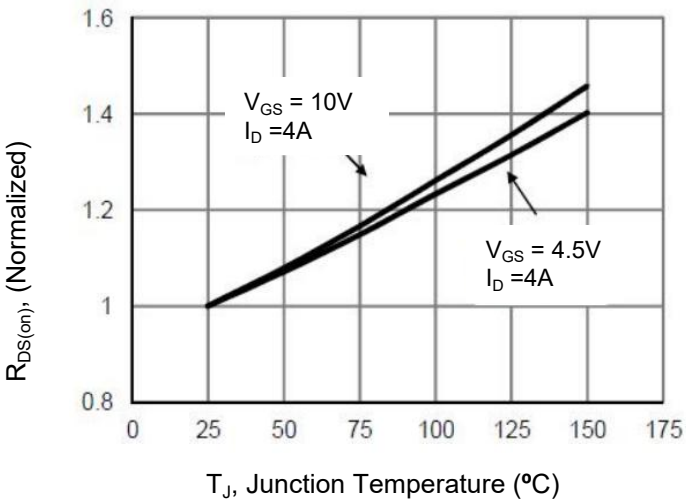


Figure 8. Safe Operation Area

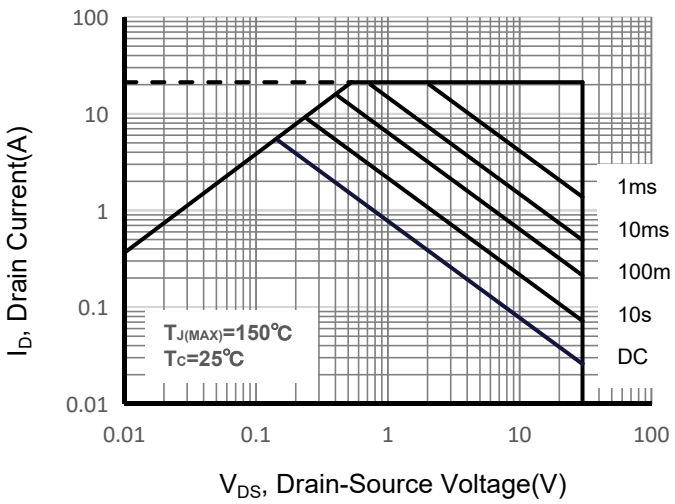


Figure 9. Maximum Continuous Drain Current vs Case Temperature

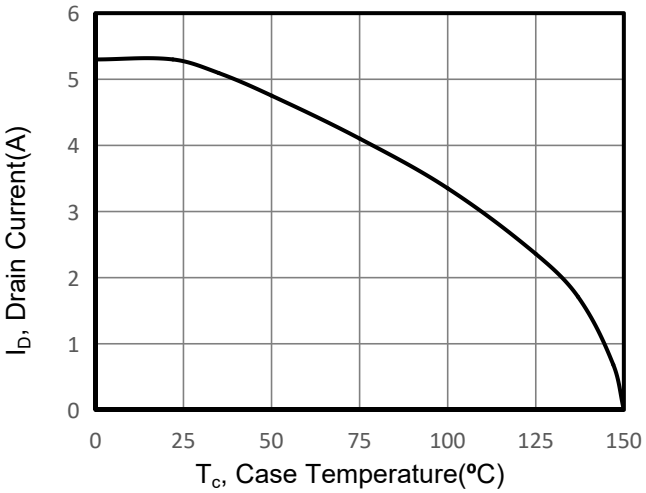
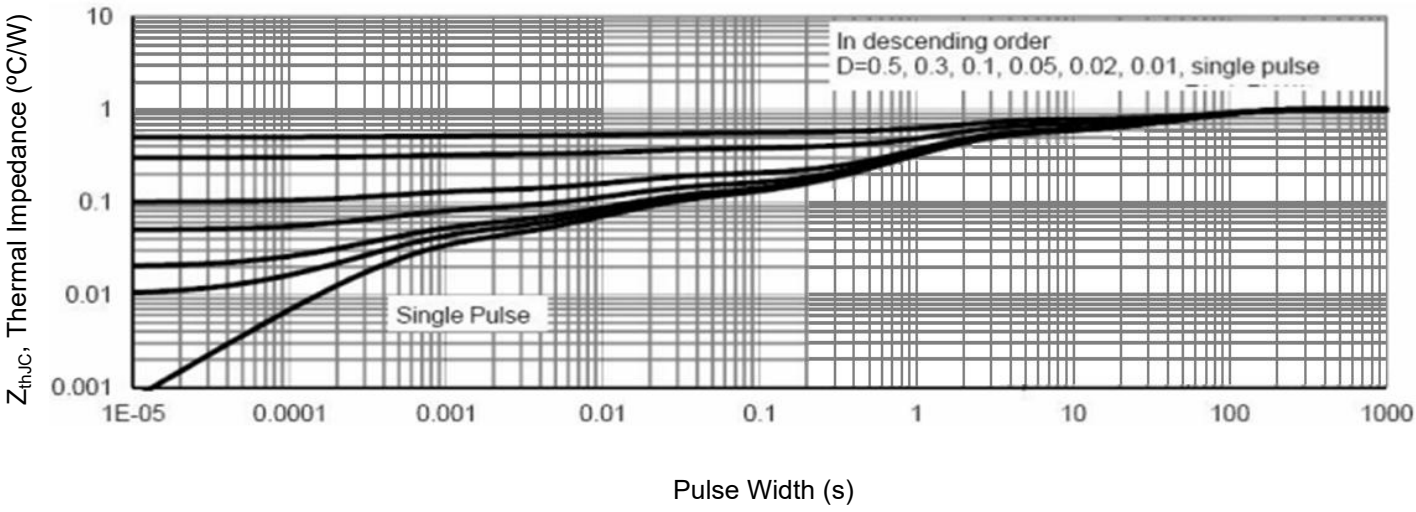
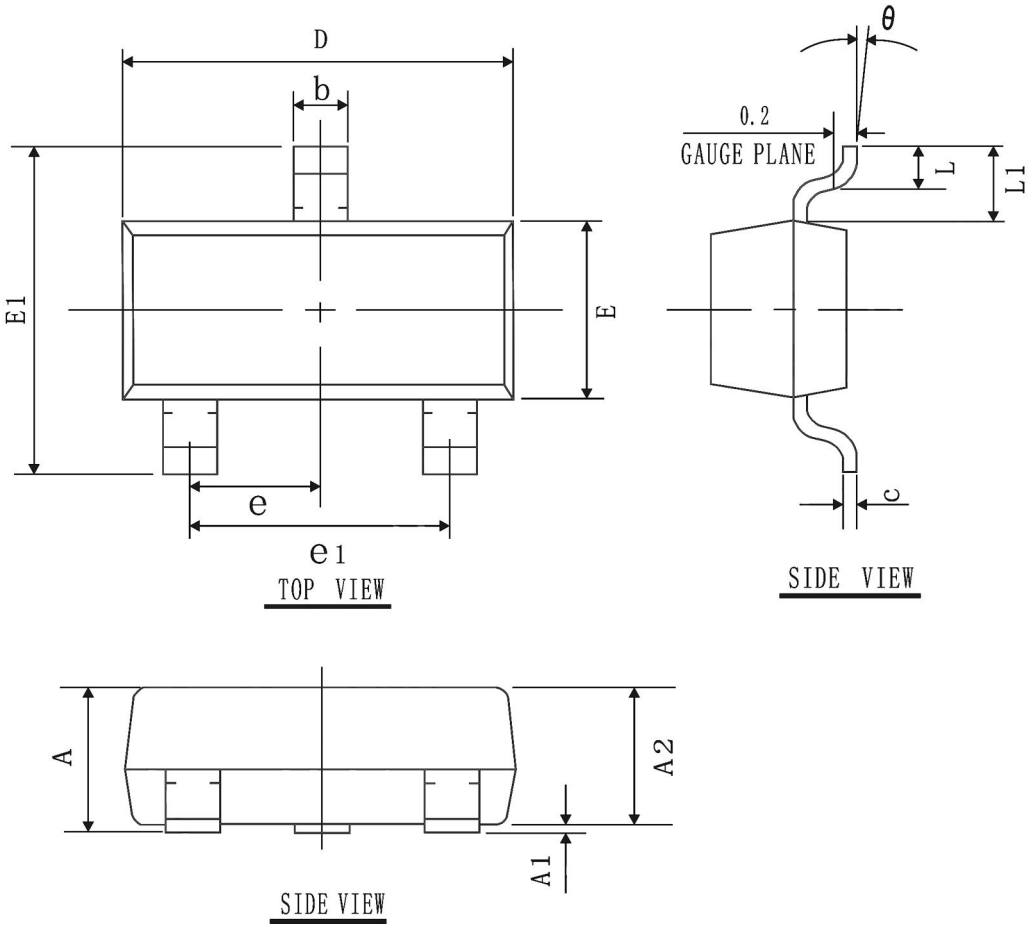


Figure 10. Normalized Maximum Transient Thermal Impedance



SOT-23 Package Information



COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	0.90	1.05	1.20
A1	0.00	0.05	0.10
A2	0.90	1.00	1.10
b	0.30	0.40	0.50
c	0.08	0.10	0.15
D	2.80	2.90	3.00
E	1.20	1.30	1.40
E1	2.30	2.40	2.50
L	0.30	0.40	0.50
θ	0°	5°	10°
L1	0.55 REF		
e	0.95 BSC		
e1	1.90 REF		