

P-Channel Enhancement Mode Power MOSFET

Description

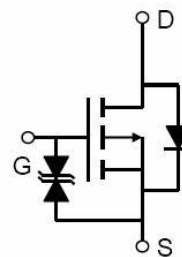
The G04P10HE uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

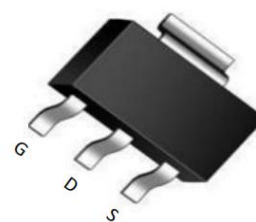
- V_{DS} -100V
- I_D (at $V_{GS} = -10V$) -4A
- $R_{DS(ON)}$ (at $V_{GS} = -10V$) < 200m Ω
- $R_{DS(ON)}$ (at $V_{GS} = -4.5V$) < 250m Ω
- 100% Avalanche Tested
- RoHS Compliant
- ESD (HBM) : 6KV

Application

- Power switch
- DC/DC converters



Schematic diagram



SOT-223

Ordering Information

Device	Package	Marking	Packaging
G04P10HE	SOT-223	G04P10	2500pcs/Reel

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-100	V
Continuous Drain Current	I_D	-4	A
		-2.5	
Pulsed Drain Current (note1)	I_{DM}	-16	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	1.2	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient, $t \leq 10s$	R_{thJA}	100	$^\circ\text{C/W}$

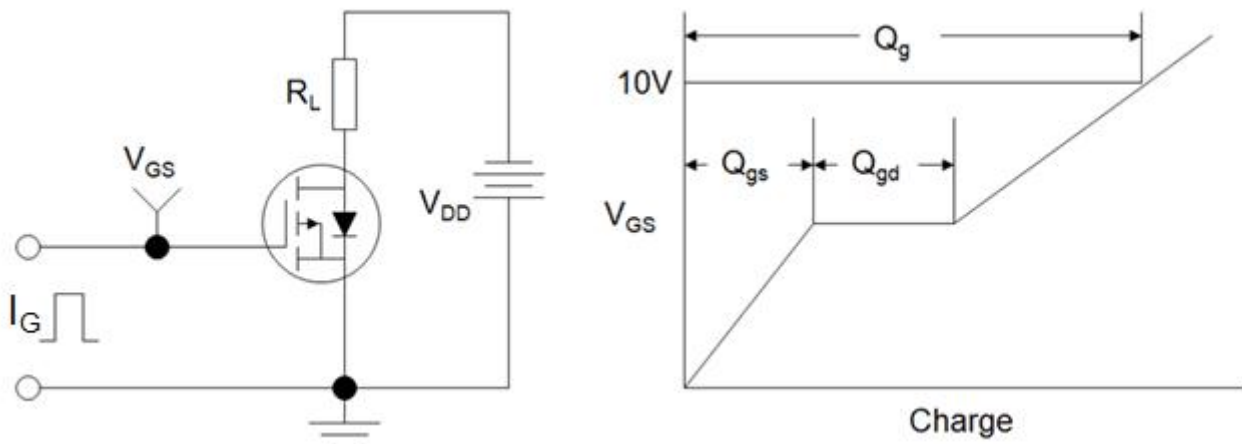
Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-100	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -100V, V _{GS} = 0V	--	--	-1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±20V	--	--	±10	uA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-1.2	-1.6	-2.8	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = -10V, I _D = -4A	--	180	200	mΩ
		V _{GS} = -4.5V, I _D = -3A	--	190	250	
Forward Transconductance	g _{FS}	V _{DS} = -5V, I _b = -4A	--	10	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = -50V, f = 1.0MHz	--	1700	--	pF
Output Capacitance	C _{oss}		--	50	--	
Reverse Transfer Capacitance	C _{rss}		--	45	--	
Total Gate Charge	Q _g	V _{DD} = -50V, I _D = -4A, V _{GS} = -10V	--	32	--	nC
Gate-Source Charge	Q _{gs}		--	5	--	
Gate-Drain Charge	Q _{gd}		--	7	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = -50V, I _D = -4A, R _G = 9Ω	--	52	--	ns
Turn-on Rise Time	t _r		--	12	--	
Turn-off Delay Time	t _{d(off)}		--	38	--	
Turn-off Fall Time	t _f		--	28	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	-4	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = -4A, V _{GS} = 0V	--	--	-1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = -4A, V _{GS} = 0V di/dt=-100A/us	--	35	--	nC
Reverse Recovery Time	T _{rr}		--	46	--	ns

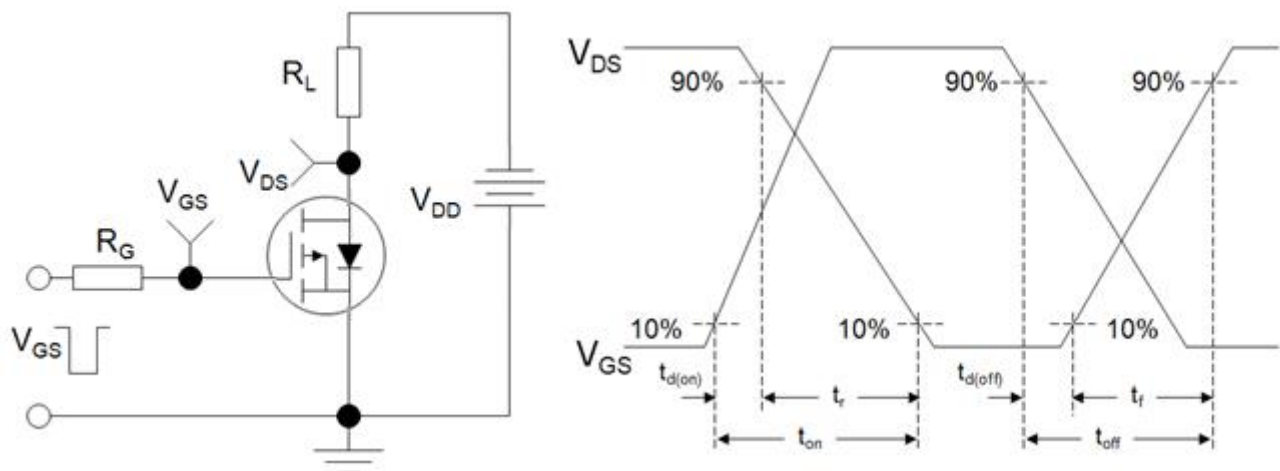
Notes

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

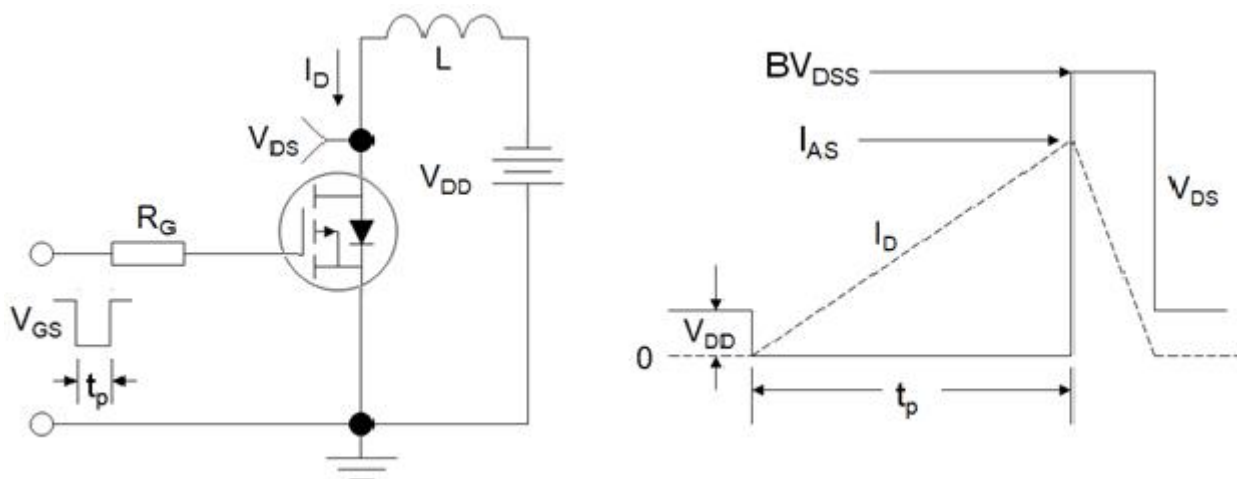
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

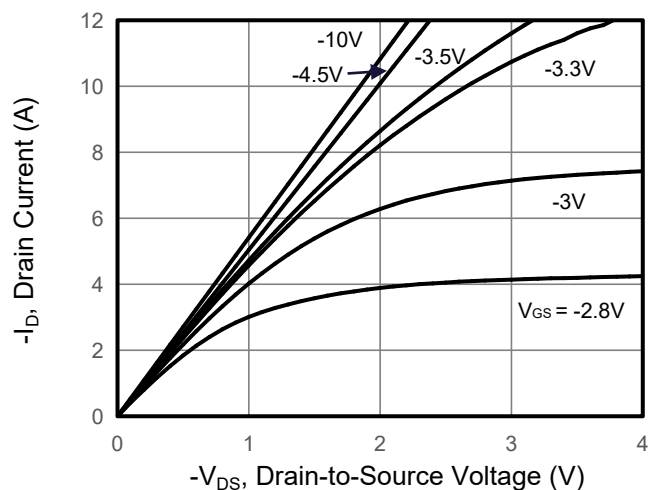


Figure 2. Transfer Characteristics

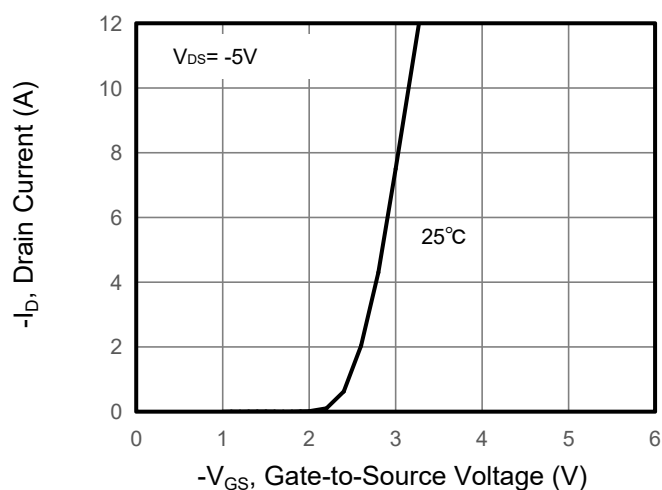


Figure 3. Drain Source On Resistance

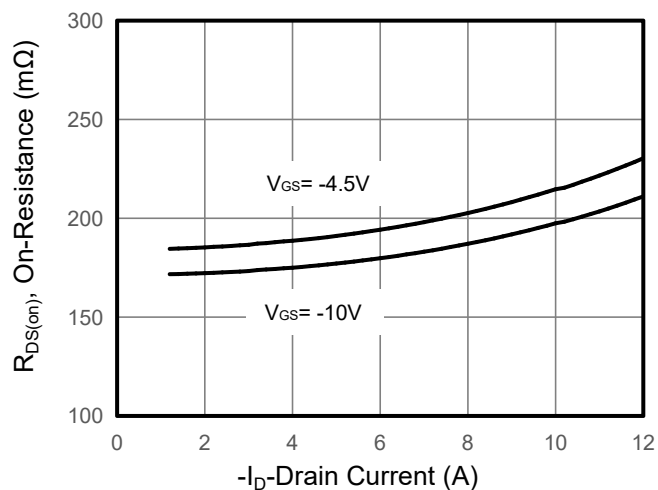


Figure 4. Gate Charge

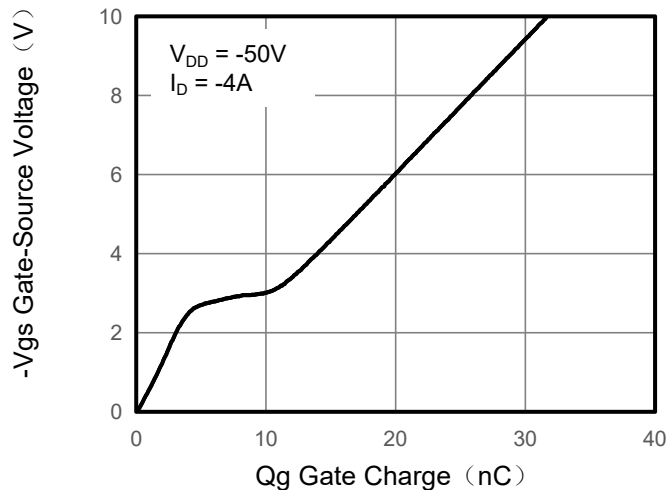


Figure 5. Capacitance

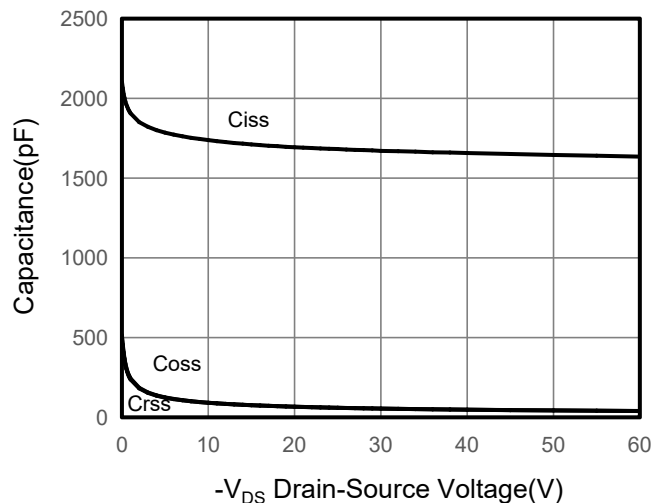
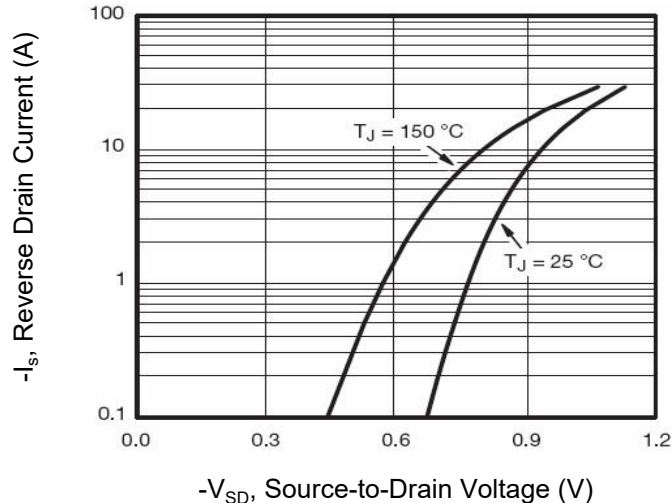


Figure 6. Source-Drain Diode Forward



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

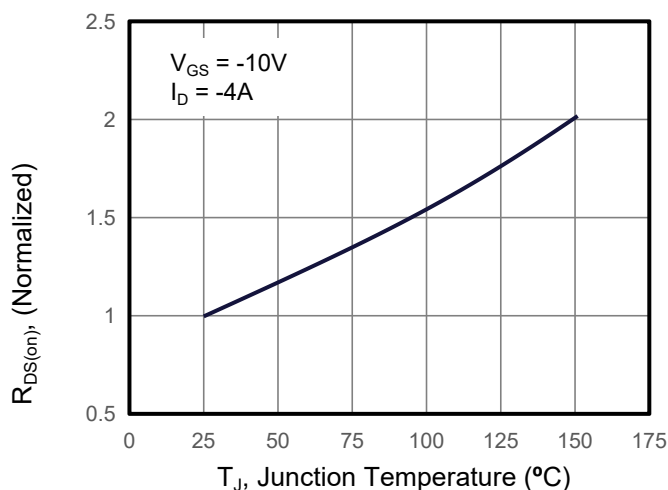


Figure 8. Safe Operation Area

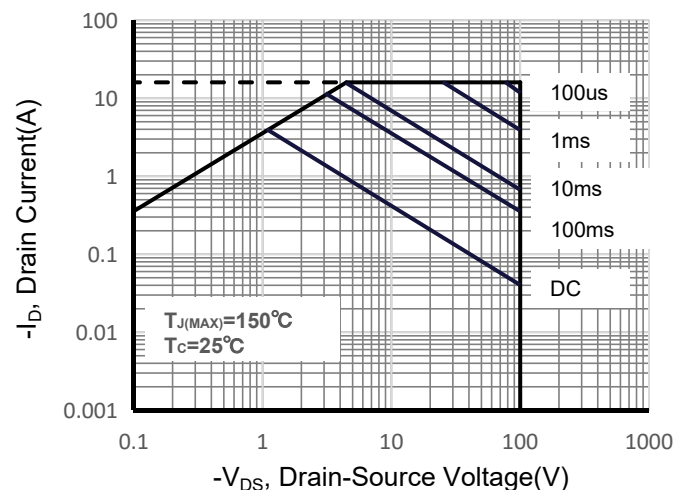


Figure 9. Maximum Continuous Drain Current vs Case Temperature

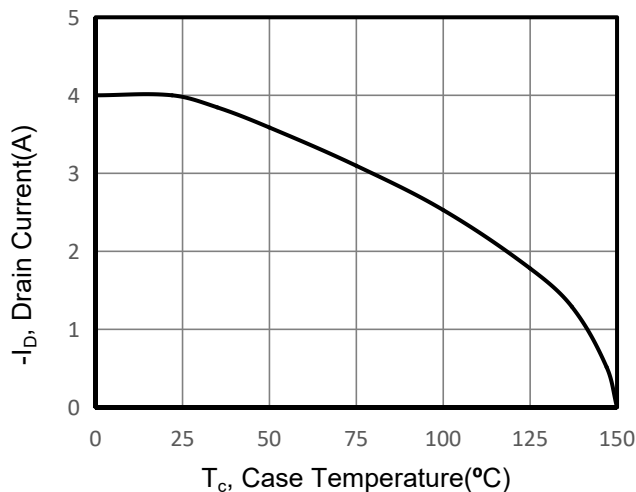
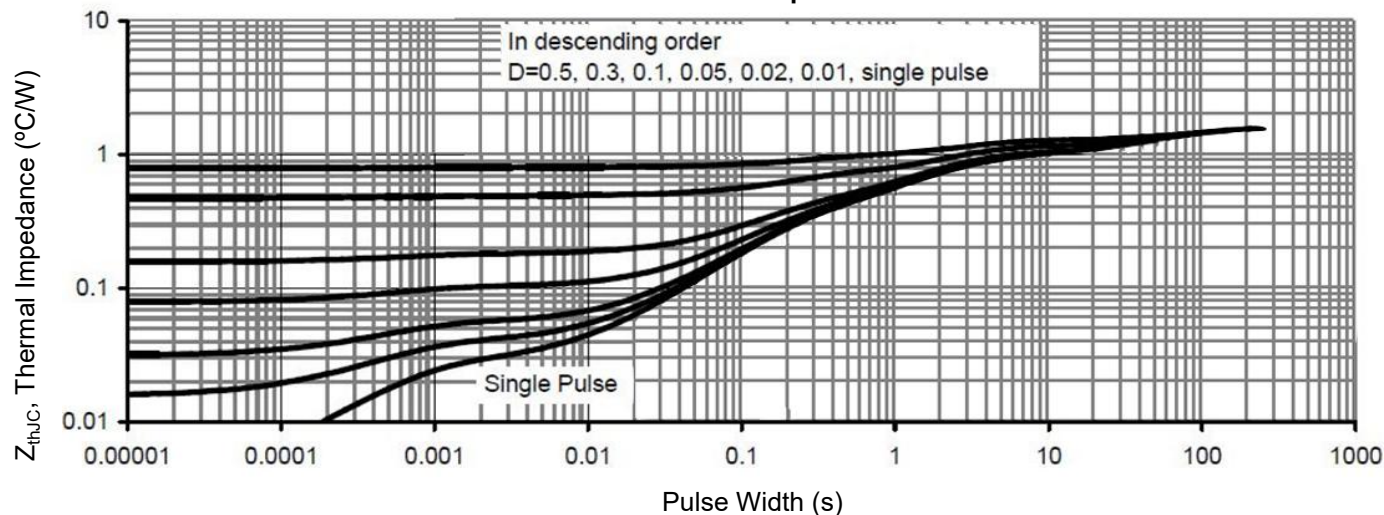
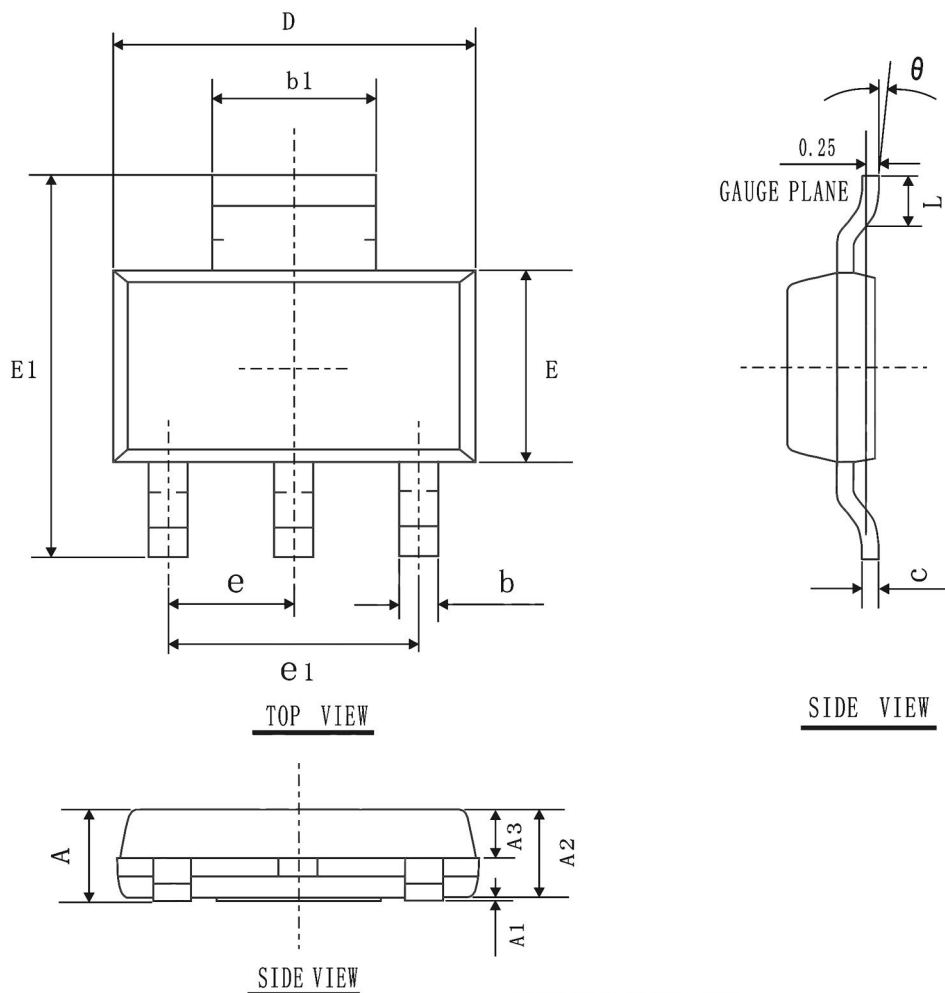


Figure 10. Normalized Maximum Transient Thermal Impedance



SOT-223 Package Mechanical Data



COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	—	—	1.80
A1	0.00	0.05	0.10
A2	1.50	1.60	1.70
A3	0.85	0.90	0.95
b	0.66	0.70	0.80
b1	2.96	3.00	3.10
c	0.25	0.30	0.35
D	6.30	6.50	6.70
E	3.30	3.50	3.70
E1	6.80	7.00	7.20
e1	4.40	4.60	4.80
L	0.90	—	1.15
θ	0°	5°	10°
e	2.3 BSC		