

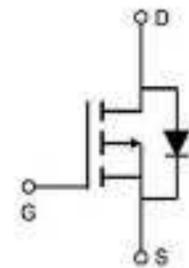
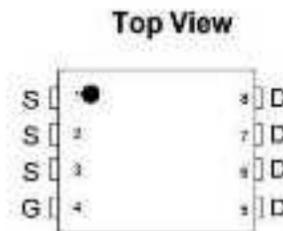
-60V P - Channel MOSFET

Description

-60V /-6.2A Power MOSFET

Very low on-resistance $R_{DS(on)}$ @ $V_{GS}=4.5V$

Pb-free lead plating; RoHS compliant

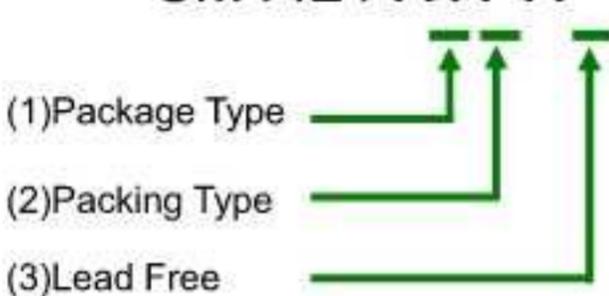


General Features

V_{DS}	-60	V
$R_{DS(on),TYP@VGS=10V}$	35.0	m Ω
$R_{DS(on),TYP@VGS=4.5}$	55.0	m Ω
I_D	-6.2	A

- High power and current handling capability
- Lead free product is acquired
- Surface mount package

◆ Ordering Information

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
SM4421PRL	SM4421PRG	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
SM4421 X X X 			(1) P: SOP-8 (2) R: Tape Reel (3) G: Halogen Free; L: Lead Free								



◆ Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	- 60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	- 6.2	A
Drain Current-Pulsed ^(Note 1)	I_{DM}	- 9.9	A
Maximum Power Dissipation	P_D	3.1	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^{\circ}\text{C}$

a:Fused current that based on wire numbers and diameter

b:Repetitive Rating: Pulse width limited by the maximum junction temperature

c:1-in² 2oz Cu PCB board

-1

◆ Electrical Characteristics ($T_A=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	- 60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-60V, V_{GS}=0V$	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.5	-2.3	-3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-6.2A$	-	35.0	50.0	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-6.2A$	45	-	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=-15V, f=1MHz$	-	2417	-	PF
Output Capacitance	C_{oss}		-	179	-	PF
Reverse Transfer Capacitance	C_{rss}		-	120	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}=-10V, V_{DS}=-15V, R_L=0.75\Omega, R_{GEN}=3\Omega$	-	17	-	nS
Turn-on Rise Time	t_r		-	13.6	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	47.6	-	nS
Turn-Off Fall Time	t_f		-	15.3	-	nS
Total Gate Charge	Q_g	$V_{GS}=-10V, V_{DS}=-15V, I_D=-6.2A$	-	22.7	-	nC
Gate-Source Charge	Q_{gs}		-	6.44	-	nC
Gate-Drain Charge	Q_{gd}		-	9.2	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V_{SD}	$I_S=-1A, V_{GS}=0V$	-	-	-1	V

Note: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycles $\leq 2\%$

d: Guaranteed by design: not subject to production testing

Typical Electrical and Thermal Characteristics

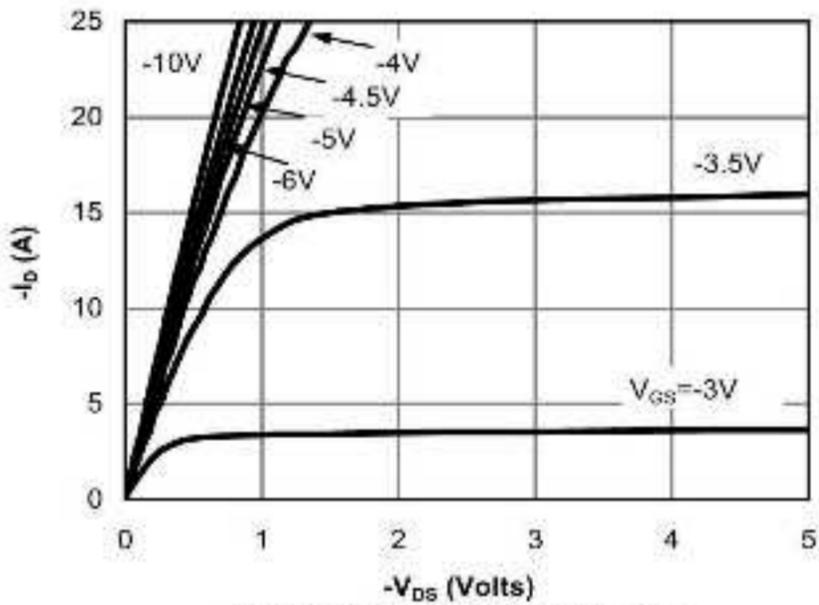


Fig 1: On-Region Characteristics

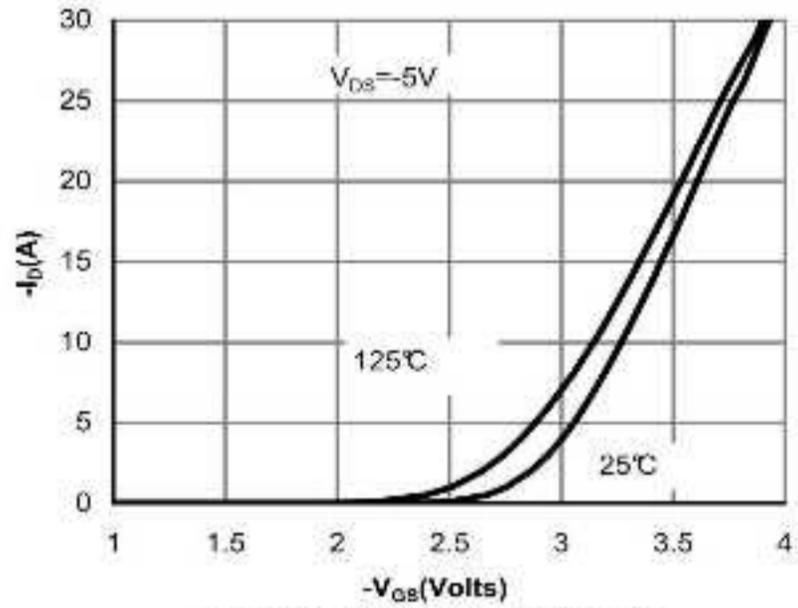


Figure 2: Transfer Characteristics

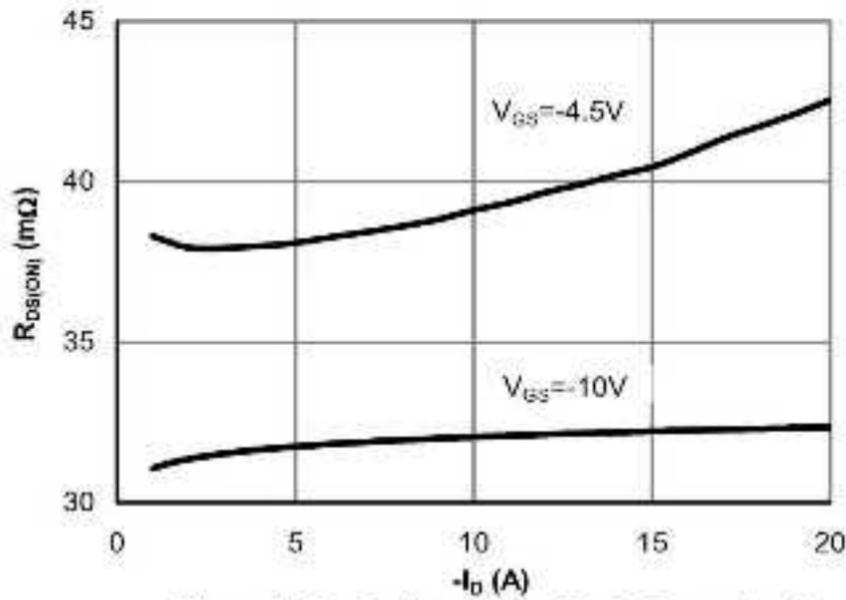


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

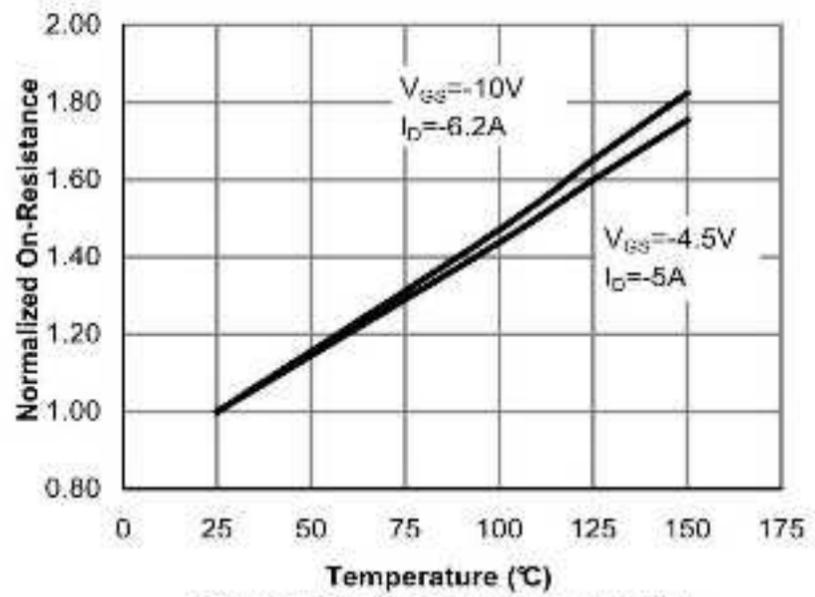


Figure 4: On-Resistance vs. Junction Temperature

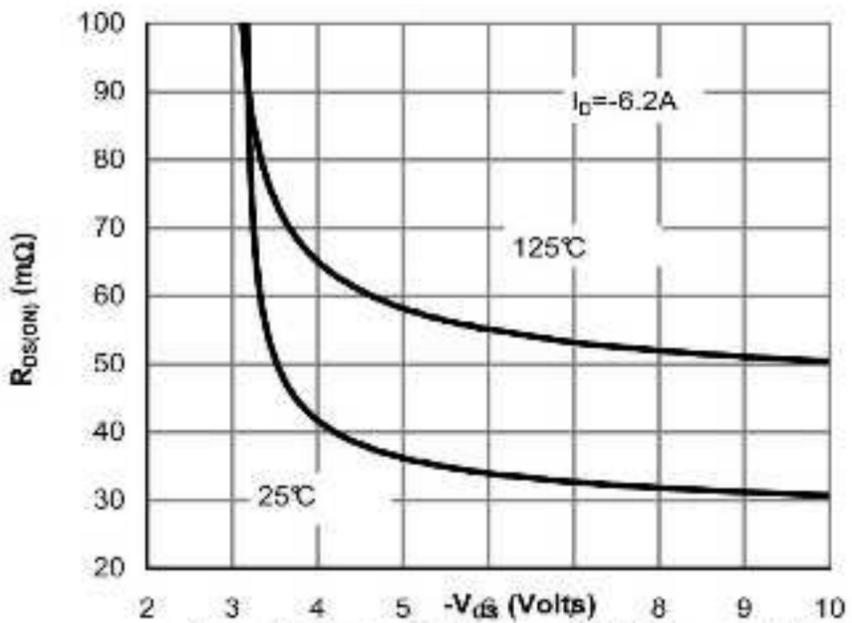


Figure 5: On-Resistance vs. Gate-Source Voltage

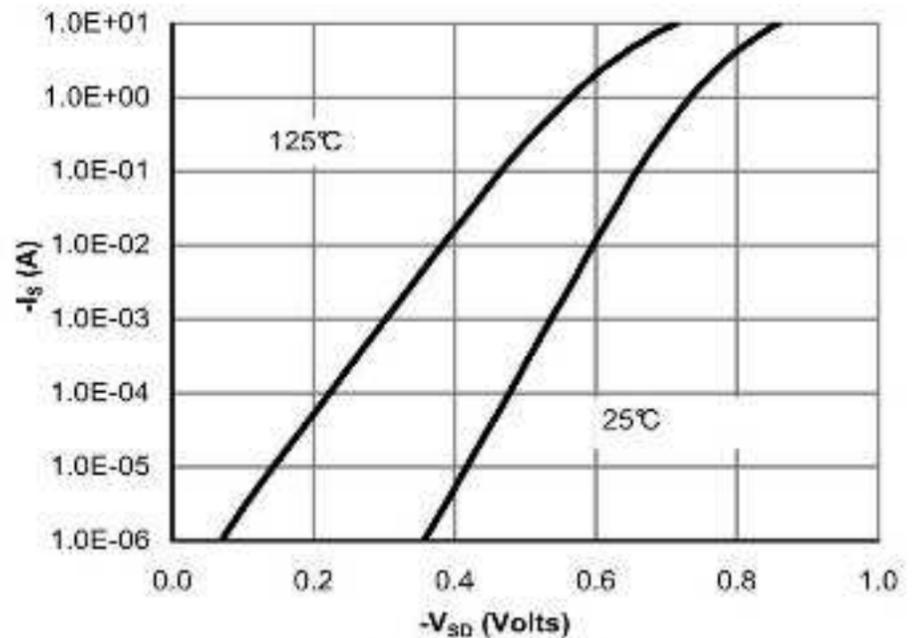


Figure 6: Body-Diode Characteristics

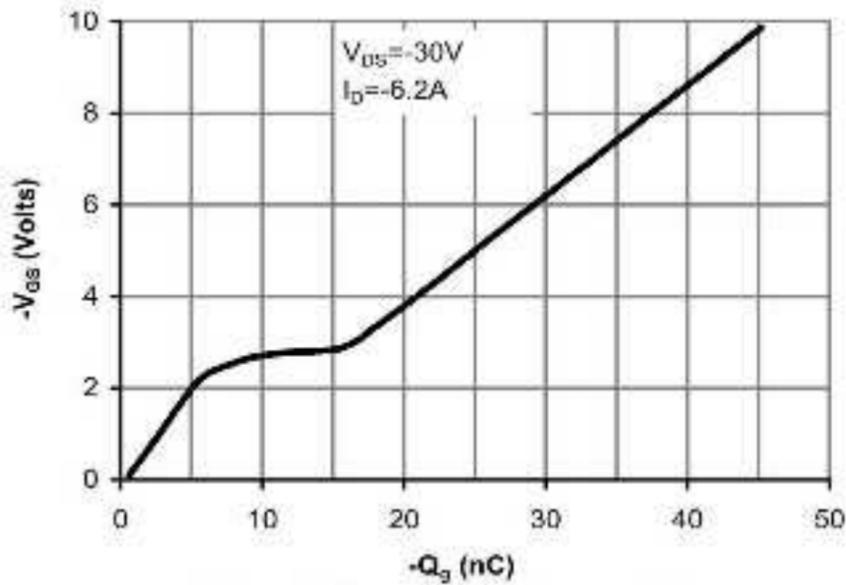


Figure 7: Gate-Charge Characteristics

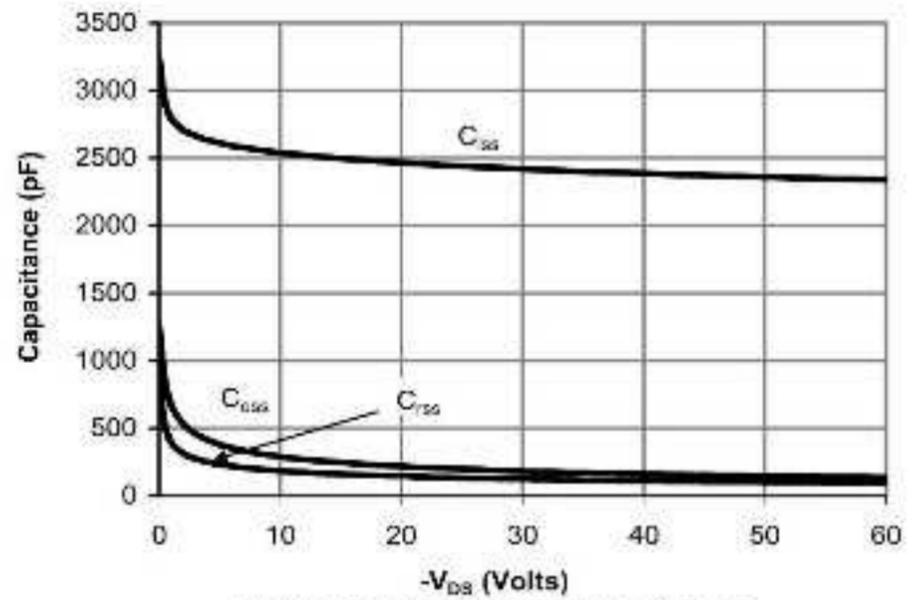


Figure 8: Capacitance Characteristics

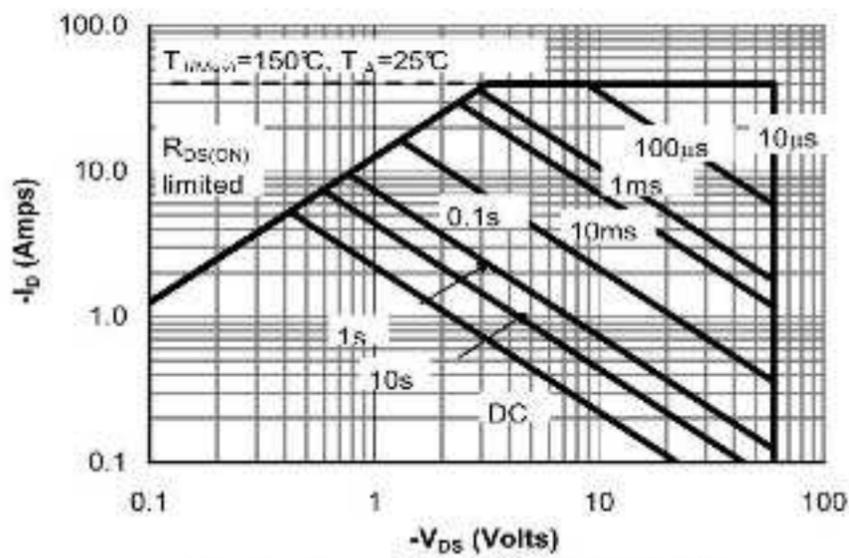


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

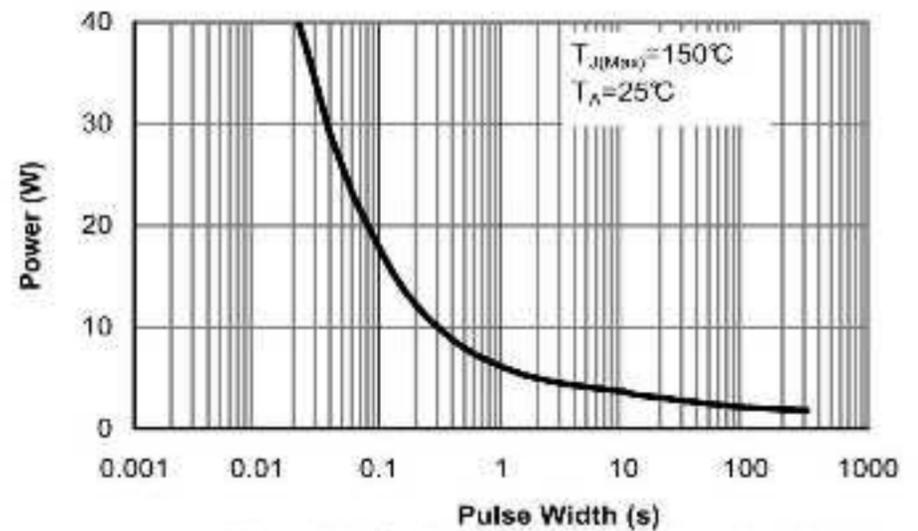


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

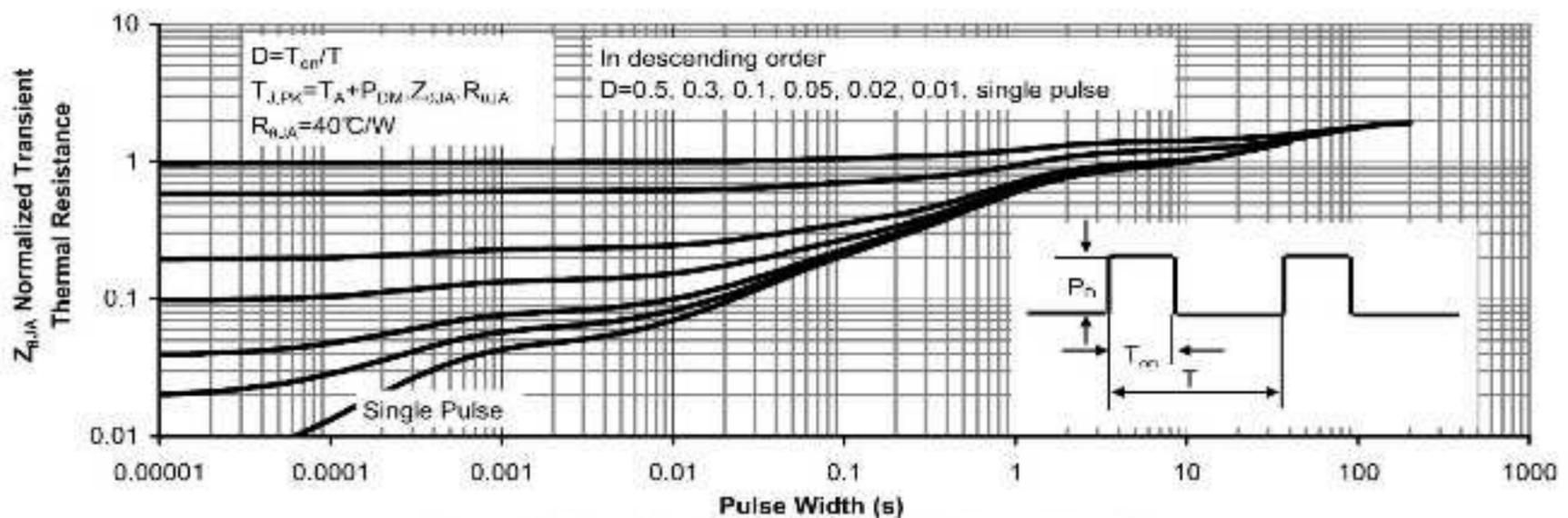
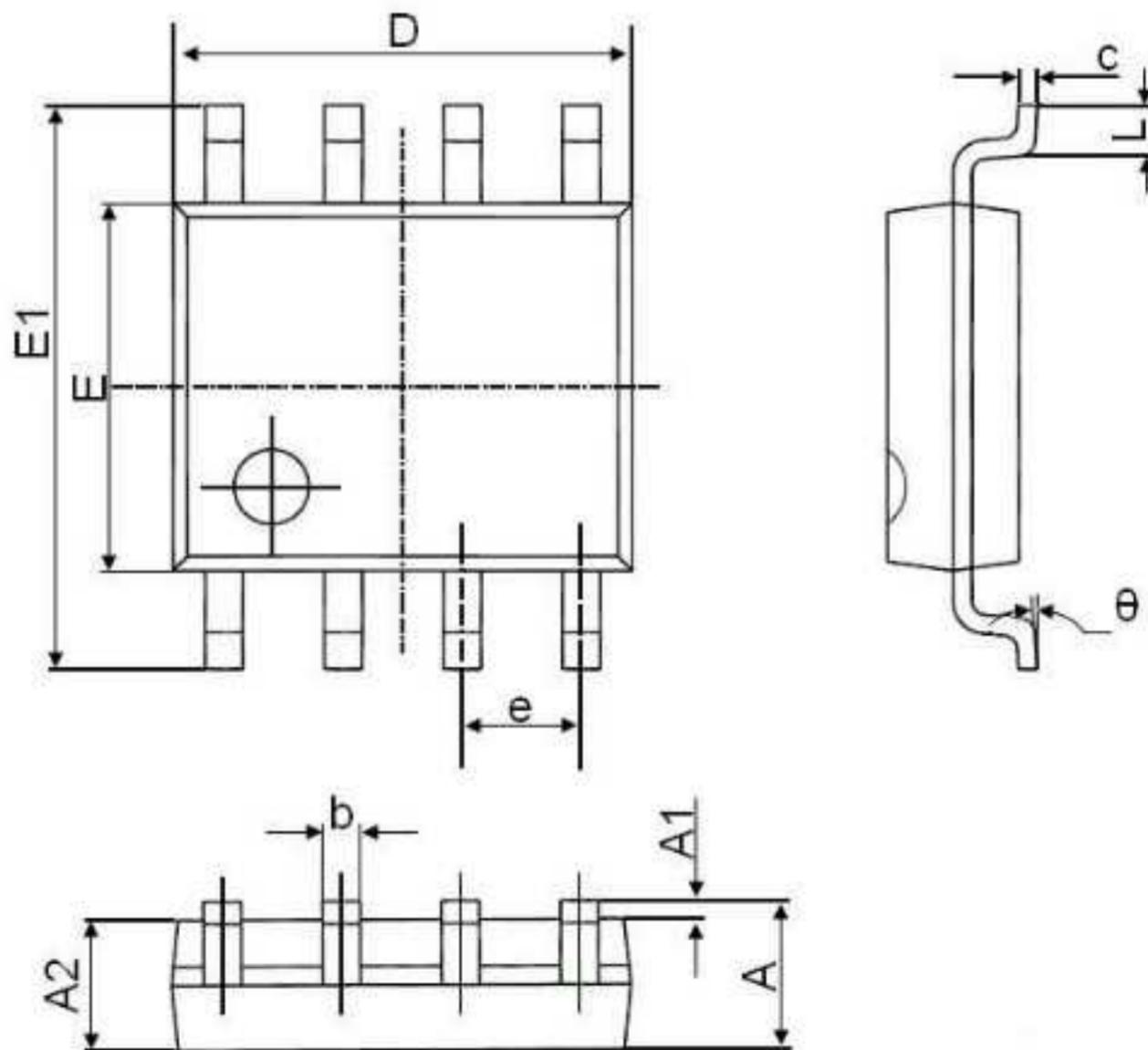


Figure 11: Normalized Maximum Transient Thermal Impedance

SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°