

DESCRIPTION

The MX4408 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a wide variety of applications.

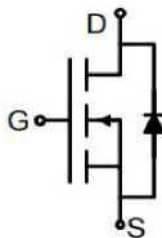
GENERAL FEATURES

- $V_{DS}=30V$, $I_D=13A$
 $R_{DS(ON)}(Typ.)=10m\Omega$ @ $V_{GS}=4.5V$
 $R_{DS(ON)}(Typ.)=7m\Omega$ @ $V_{GS}=10V$
- High density cell design for ultra low R_{Dson}
- Lead free product is acquired

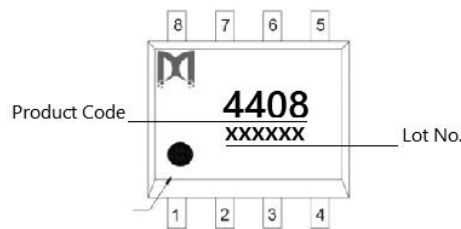
APPLICATION

- Battery protection
- Load switch
- Power management

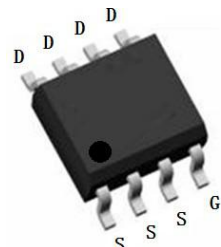
PINOUT



Schematic diagram



Marking and pin Assignment



SOP-8 top view

ORDERING INFORMATION

Part Number	Marking	Storage Temperature	Package	Devices Per Reel
MX4408	4408	-55°C to 150°C	SOP-8	3000

ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage ($V_{GS}=0V$)	V_{DS}	30	V
Gate-Source Voltage ($V_{DS}=0V$)	V_{GS}	± 20	V
Drain Current-Continuous ($T_C=25^\circ C$) ^(Note1)	I_D	13	A
Drain Current-Continuous ($T_C=100^\circ C$)	I_D	7	A
Drain Current-Continuous@ Current-Pulsed ^(Note2)	$I_{DM(pluse)}$	44	A
Maximum Power Dissipation	P_D	3	W
Avalanche Energy ^(Note 3)	E_{AS}	90	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

THERMAL RESISTANCE

Parameter	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	42	$^\circ C/W$

Notes 1.The maximum current rating is package limited.

Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3.EAS condition: $T_J=25^\circ C, V_{DD}=30V, V_G=10V, R_G=25\Omega$,


ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
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On/Off Characteristics

Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=6A$	-	10	12	m Ω
		$V_{GS}=10V, I_D=11A$	-	7	9	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=11A$	-	12	-	S

Dynamic Characteristics

Gate resistance	R_g	$V_{DS}=0V, V_{GS}=0V, F=1.0\text{MHz}$	-	1.2	-	Ω
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, F=1.0\text{MHz}$	-	1050	-	pF
Output Capacitance	C_{oss}		-	214	-	pF
Reverse Transfer Capacitance	C_{rss}		-	148	-	pF
Total Gate Charge	Q_g	$V_{DS}=25V, I_D=11A, V_{GS}=10V$	-	25	-	nC
Gate-Source Charge	Q_{gs}		-	2.5	-	nC
Gate-Drain Charge	Q_{gd}		-	9	-	nC

Switching Characteristics

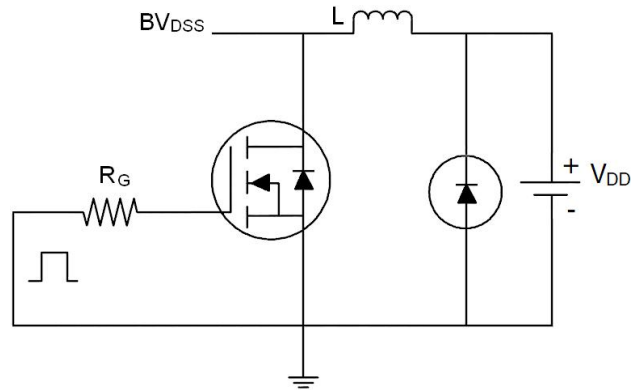
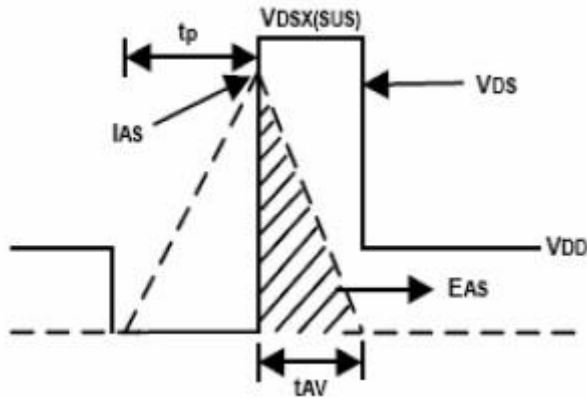
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=15V, R_L=0.75\Omega, V_{GS}=10V, R_{GEN}=3\Omega$	-	5	-	nS
Turn-on Rise Time	t_r		-	10	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	18	-	nS
Turn-Off Fall Time	t_f		-	6	-	nS

Source-Drain Diode Characteristics

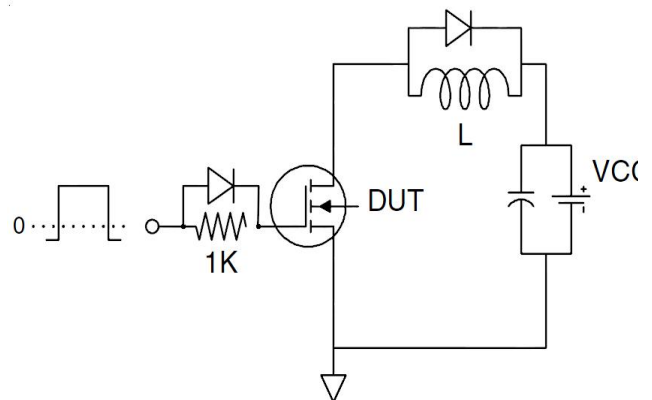
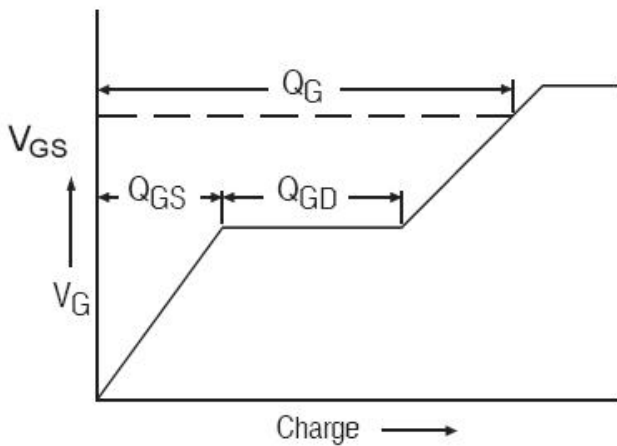
Forward On Voltage	V_{SD}	$V_{GS}=0V, I_S=11A$	-	-	1.2	V
Source-Drain Current(Body Diode)	I_{SD}		-	-	13	A

TYPICAL PERFORMANCE CHARACTERISTICS

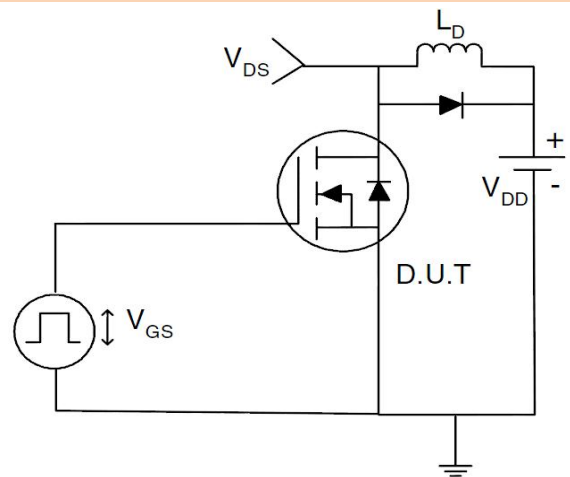
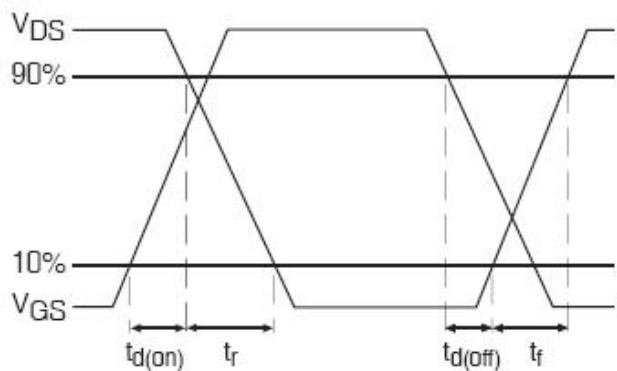
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit:



3) Switch Time Test Circuit:



TYPICAL PERFORMANCE CHARACTERISTICS

Figure1. Output Characteristics

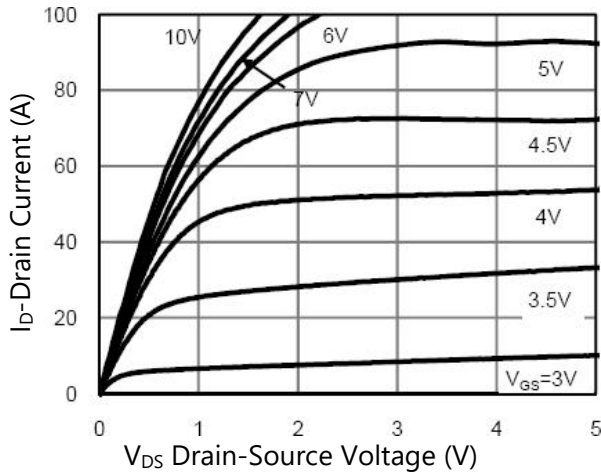


Figure2. Transfer Characteristics

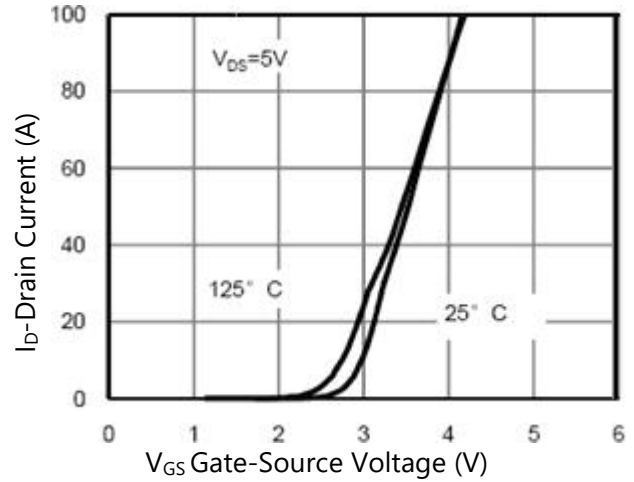


Figure3. BV_{DSS} vs Junction Temperature

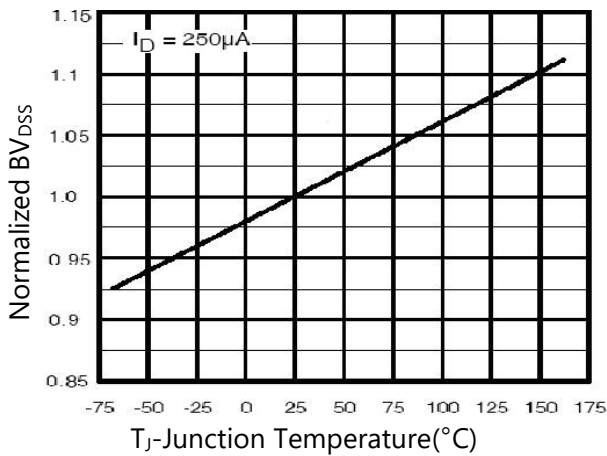


Figure4. Drain Current

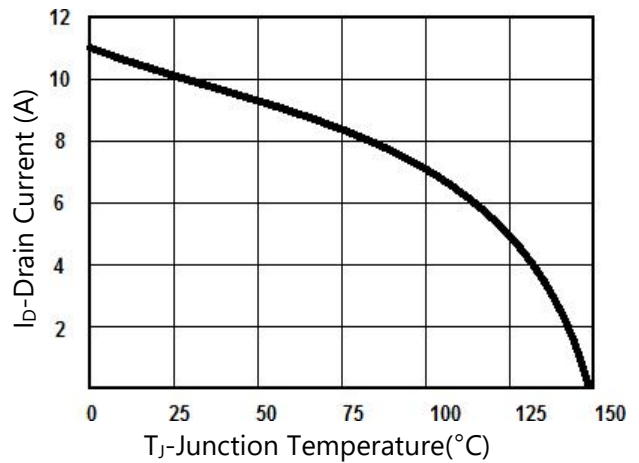


Figure5. $V_{GS(th)}$ vs Junction Temperature

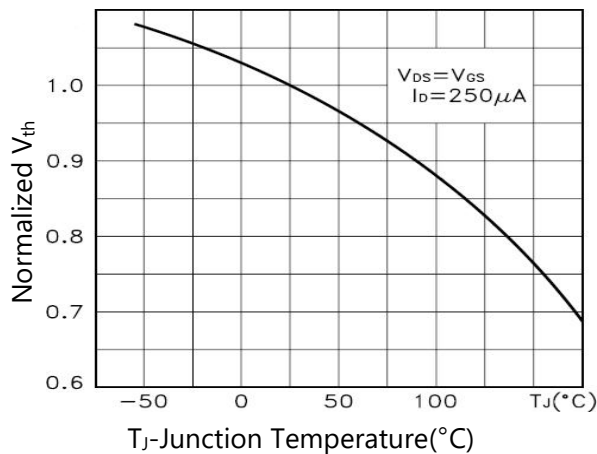
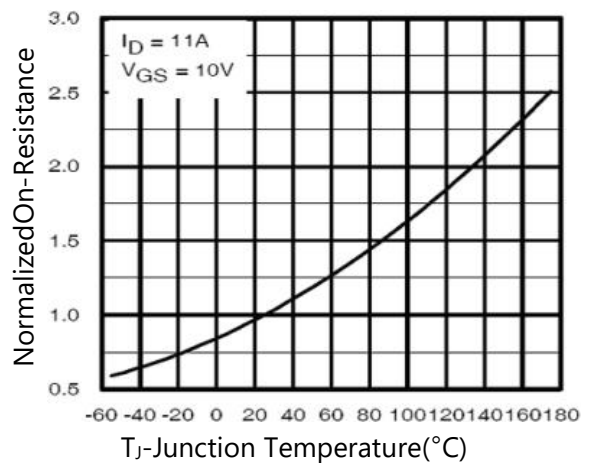


Figure6. R_{dson} Vs Junction Temperature



TYPICAL PERFORMANCE CHARACTERISTICS

Figure7. Gate Charge

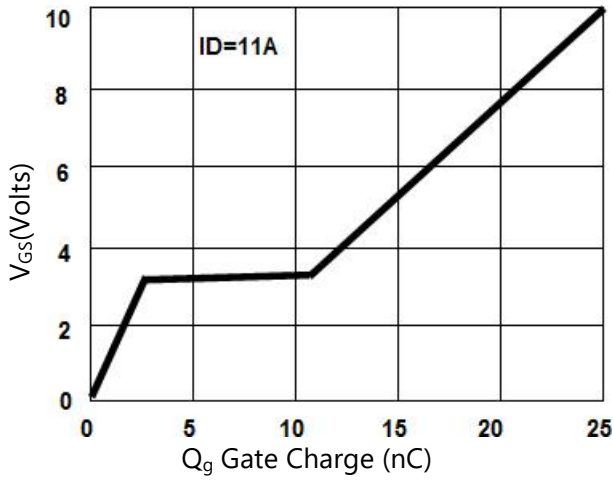


Figure8. Capacitance

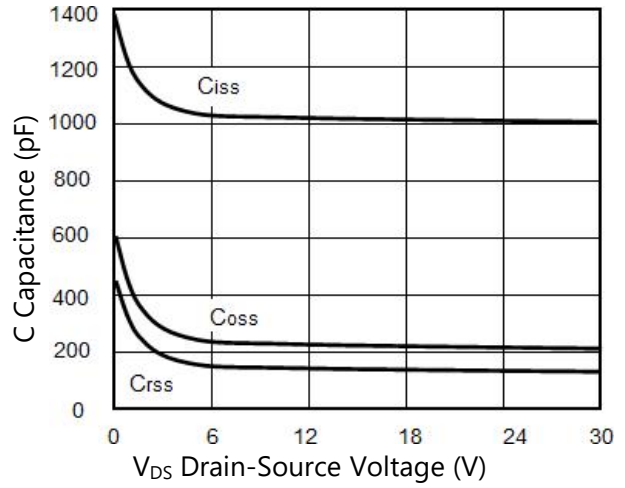


Figure9. Body-Diode Characteristics

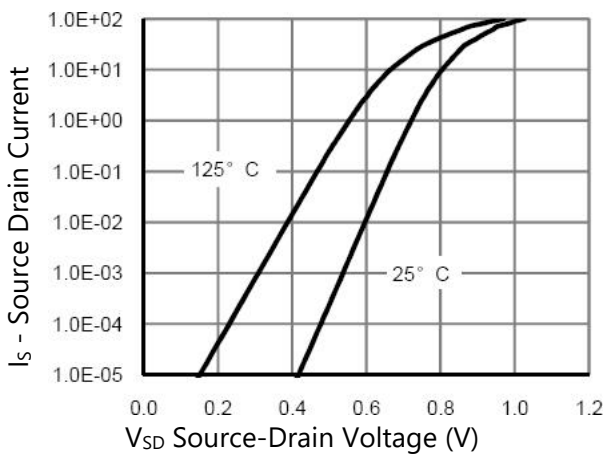


Figure10. Safe Operation Area

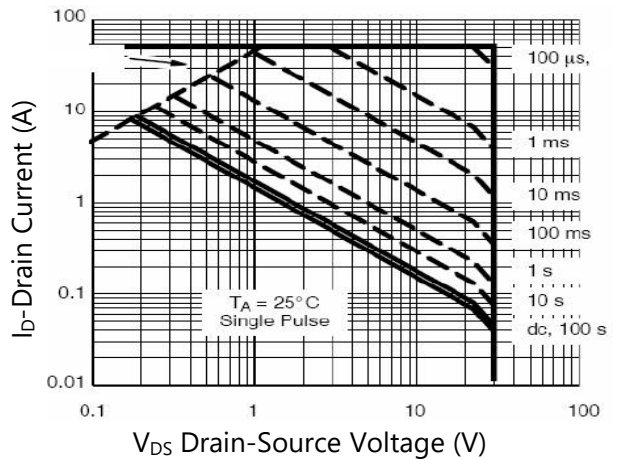
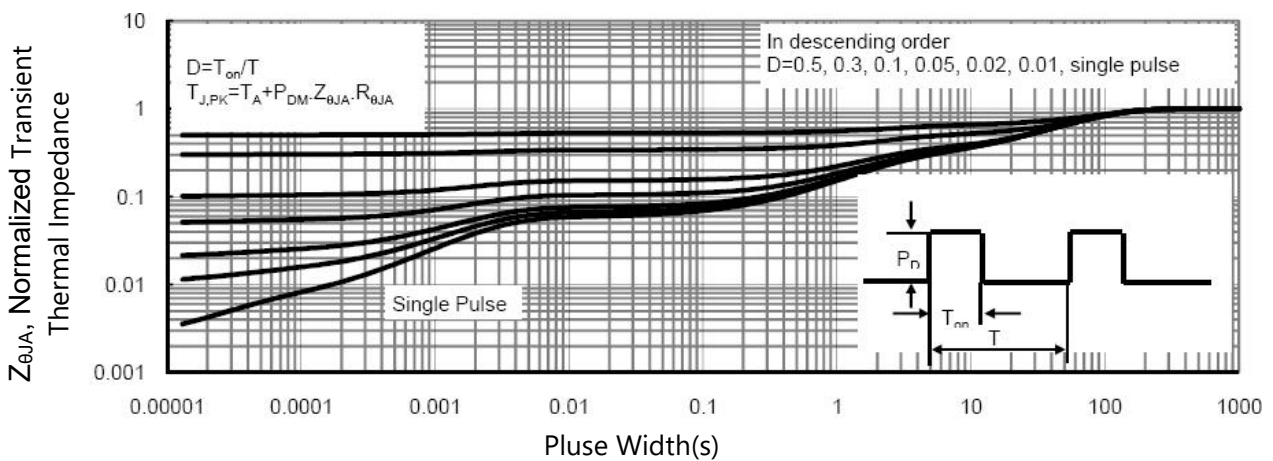
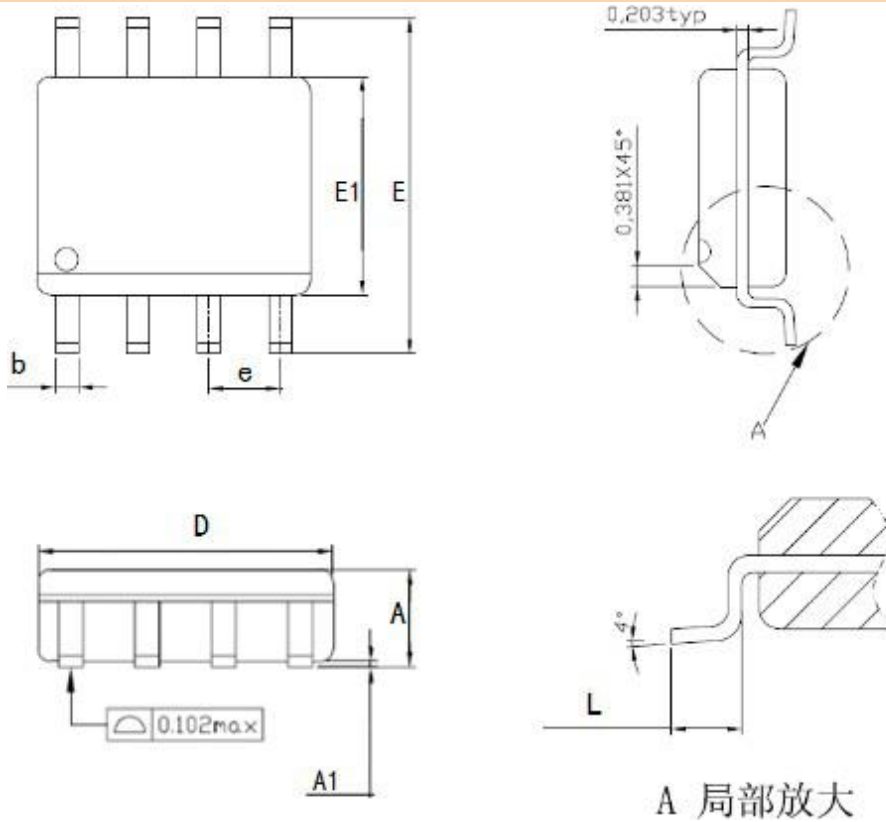


Figure11. Normalized Maximum Transient Thermal Impedance



PACKAGE INFORMATION

SOP-8



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	1.35	1.55	1.75
A1	0.1	0.15	0.2
b	0.346	0.406	0.466
D	4.8	4.89	4.98
E	5.75	6.00	6.25
E1	3.81	3.90	3.99
e	1.27 TYP		
L	0.106	0.838	1.27