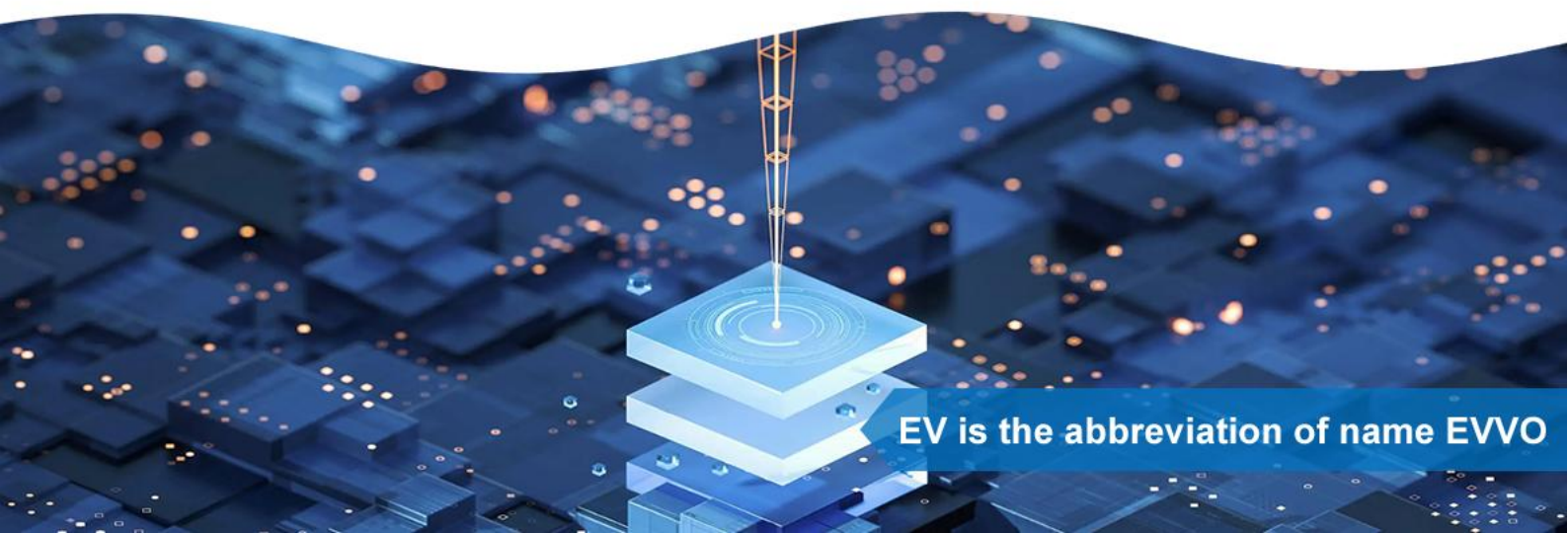
EVVOSEMI®
THINK CHANGE DO

ESD TVS MOS LDO Diode Sensor DC-DC

# Product Specification

| | |
|---|---|
| Domestic Part Number | IRF3717 |
| Overseas Part Number | IRF3717 |
| Equivalent Part Number | IRF3717 |



# 20V N-Channel Enhancement Mode MOSFET

## Description

The IRF3717 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 Battery protection or in other Switching application.

## General Features

$V_{DS}$ = 20V $I_D$ =20 A

$R_{DS(ON)}$ < 6.5 mΩ @ $V_{GS}$=4.5V

## Application

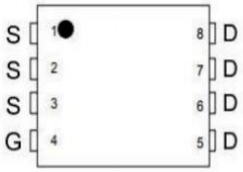
Battery protection

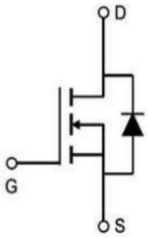
Load switch

Uninterruptible power supply

## SOP-8L Pin Configuration


Top View




## Absolute Maximum Ratings ($T_C$=25°C unless otherwise specified)

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 20 | V |
| $V_{GS}$ | Gate-Source Voltage | ±12 | V |
| $I_D$@$T_C$=25°C | Continuous Drain Current, $V_{GS}$ @ 4.5V[1] | 20 | A |
| $I_D$@$T_C$=100°C | Continuous Drain Current, $V_{GS}$ @ 4.5V[1] | 15 | A |
| $I_D$@$T_A$=25°C | Continuous Drain Current, $V_{GS}$ @ 4.5V[1] | 7.3 | A |
| $I_D$@$T_A$=70°C | Continuous Drain Current, $V_{GS}$ @ 4.5V[1] | 5.8 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 50 | A |
| EAS | Single Pulse Avalanche Energy[3] | 8.1 | mJ |
| $I_{AS}$ | Avalanche Current | 12.7 | A |
| $P_D$@$T_C$=25°C | Total Power Dissipation[4] | 20.8 | W |
| $P_D$@$T_A$=25°C | Total Power Dissipation[4] | 2 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | °C |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | °C |
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient [1] | 62 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case[1] | 6 | °C/W |

**20V N-Channel Enhancement Mode MOSFET**

## Electrical Characteristics ($T_J$=25℃, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 20 | --- | --- | V |
| $BV_{DSS}/T_J$ | BVDSS Temperature Coefficient | Reference to 25℃ , $I_D$=1mA | --- | 0.023 | --- | V/℃ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=4.5V , $I_D$=10A | --- | 4.9 | 6.5 | mΩ |
| | | $V_{GS}$=2.5V , $I_D$=8A | | 7 | 9 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 0.4 | 0.7 | 1.0 | V |
| $V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | -4.2 | --- | mV/℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=24V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=24V , $V_{GS}$=0V , $T_J$=55℃ | --- | --- | 5 | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±12V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=5V , $I_D$=10A | --- | 5.5 | --- | S |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 2.3 | --- | Ω |
| $Q_g$ | Total Gate Charge (4.5V) | $V_{DS}$=15V , $V_{GS}$=4.5V , $I_D$=10A | --- | 4.9 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 1.66 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 1.85 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=15V , $V_{GS}$=4.5V , $R_G$=3.3 $I_D$=10A | --- | 1.6 | --- | ns |
| $T_r$ | Rise Time | | --- | 15.8 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 13 | --- | |
| $T_f$ | Fall Time | | --- | 4.8 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V , $V_{GS}$=0V , f=1MHz | --- | 416 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 62 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 51 | --- | |
| $I_S$ | Continuous Source Current[1,5] | $V_G$=$V_D$=0V , Force Current | --- | --- | 24 | A |
| $I_{SM}$ | Pulsed Source Current[2,5] | | --- | --- | 50 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$=10A , dI/dt=100A/μs , $T_J$=25℃ | --- | 8.7 | --- | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | --- | 1.95 | --- | nC |

Note :

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

2.The data tested by pulsed , pulse width .The EAS data shows Max. rating .

3.he test condition is V≦300us , duty cycle $_{DD=25}$≦V,V 2%$_{GS}$ =10V,L=0.1mH,$I_{AS}$=12.7A

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

5.The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation.

20V N-Channel Enhancement Mode MOSFET

## Typical Characteristics

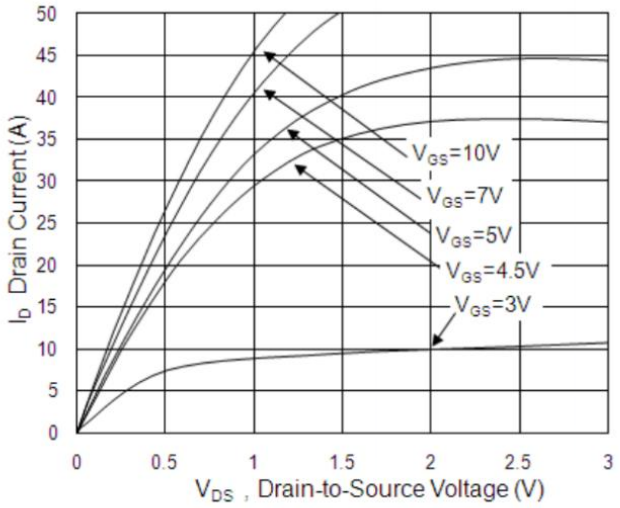



**Fig.1 Typical Output Characteristics**

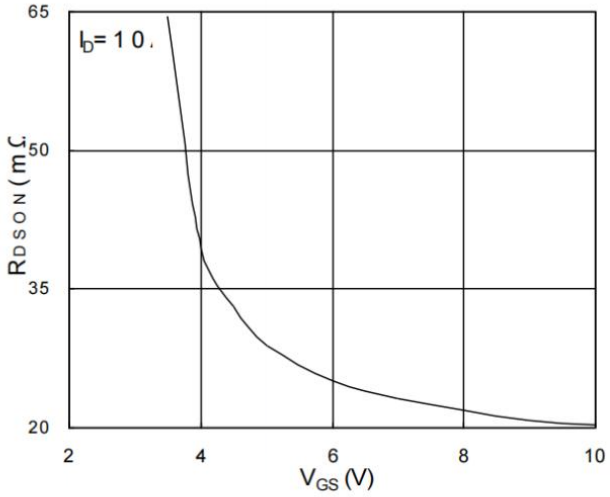



**Fig.2 On-Resistance vs. Gate-Source**

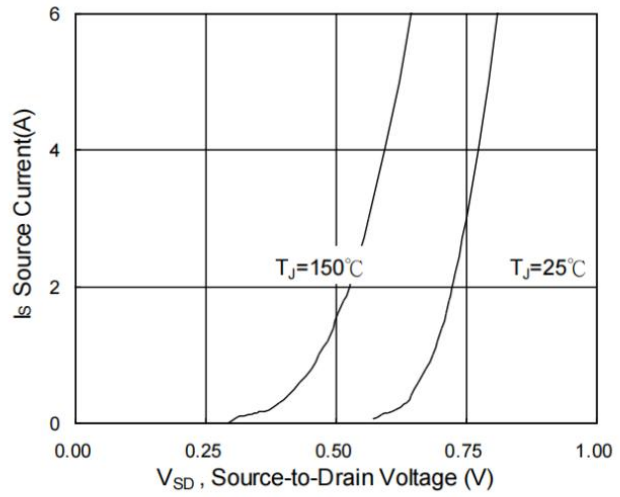



**Fig.3 Forward Characteristics Of Reverse**

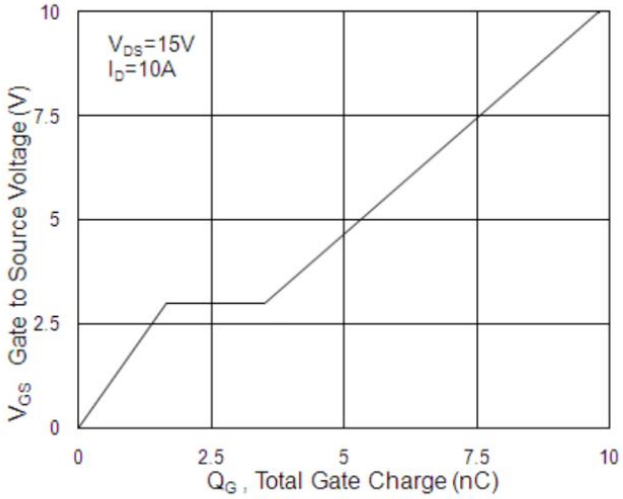



**Fig.4 Gate-Charge Characteristics**

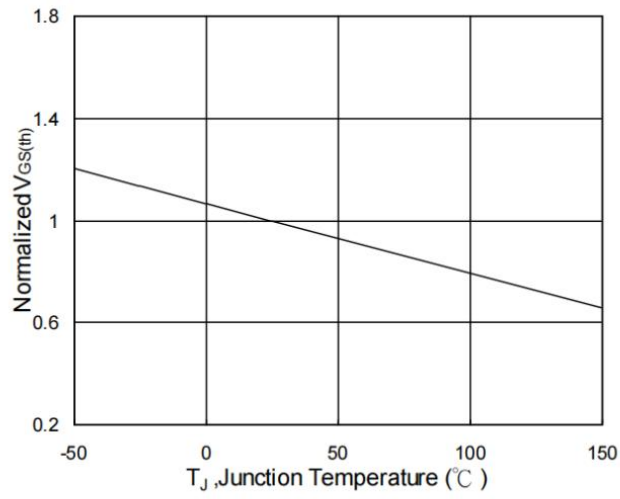



**Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$**

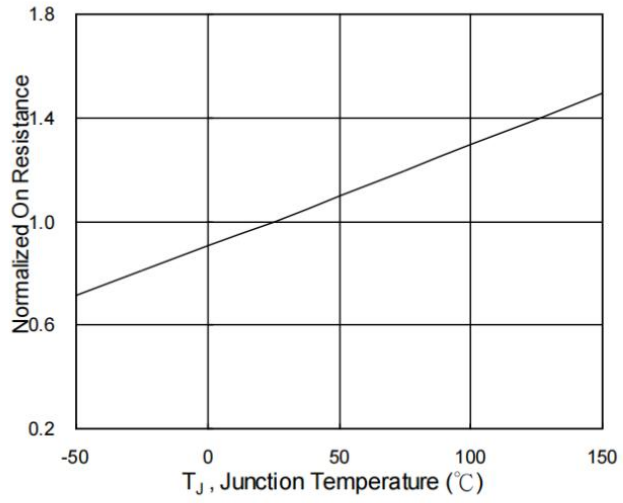



**Fig.6 Normalized $R_{DSON}$ vs. $T_J$**

## 20V N-Channel Enhancement Mode MOSFET

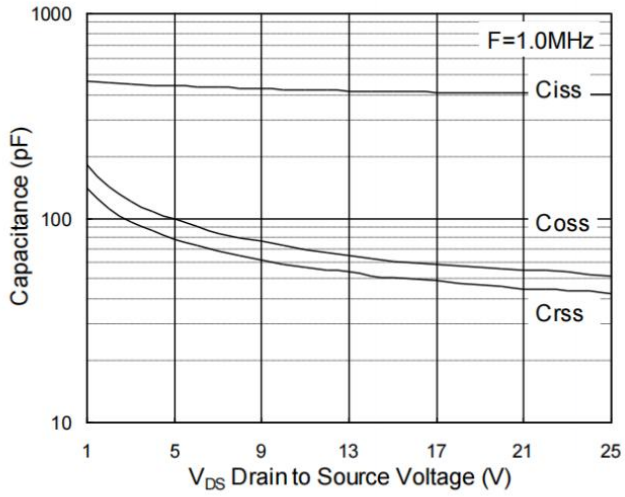



**Fig.7 Capacitance**

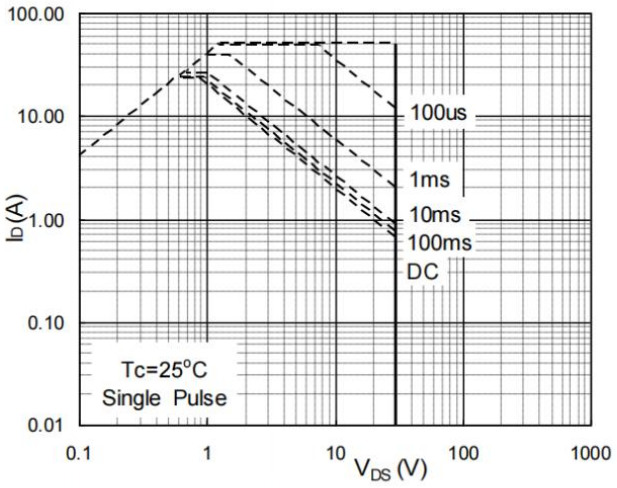



**Fig.8 Safe Operating Area**

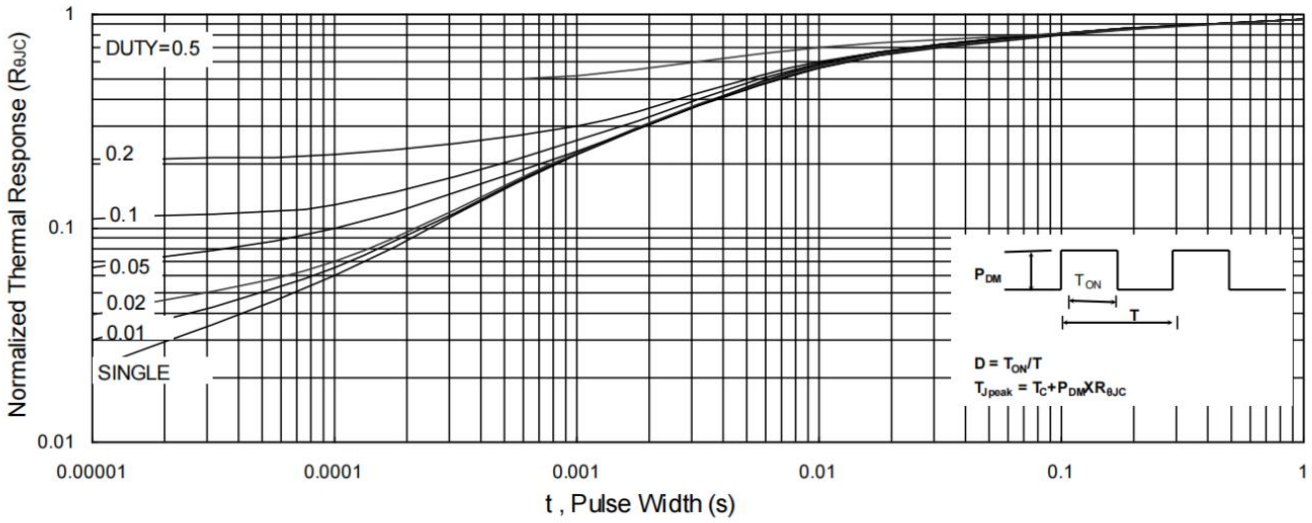



**Fig.9 Normalized Maximum Transient Thermal Impedance**

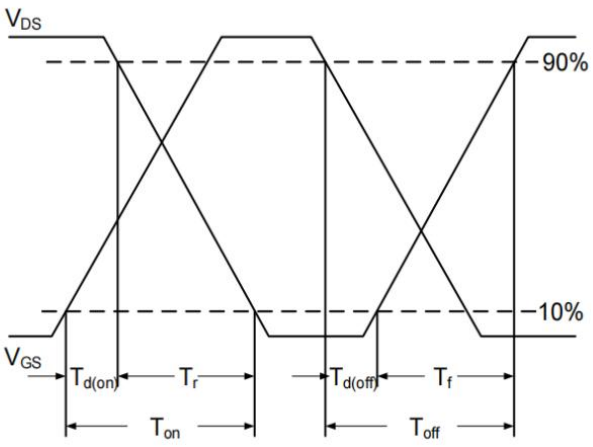



**Fig.10 Switching Time Waveform**

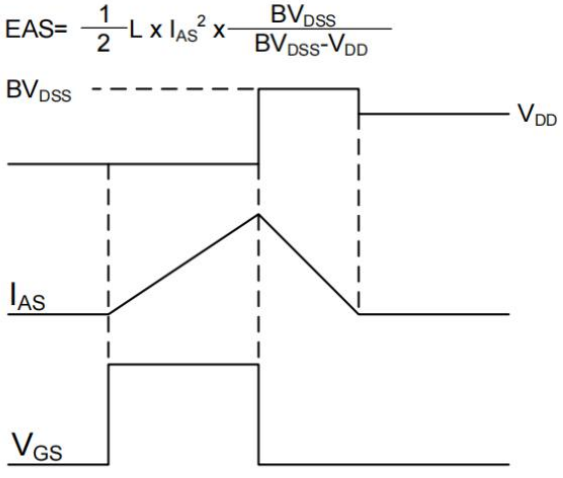
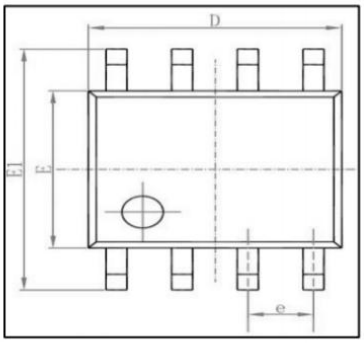
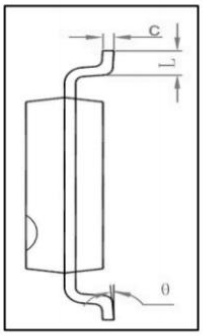
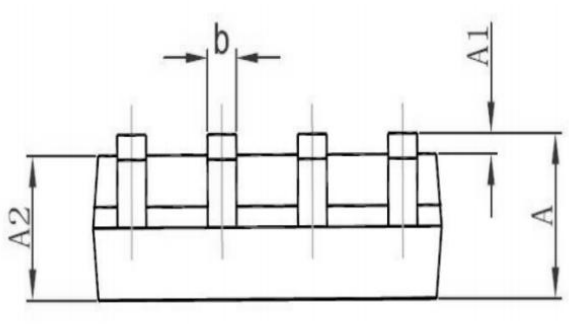



**Fig.11 Unclamped Inductive Switching Waveform**

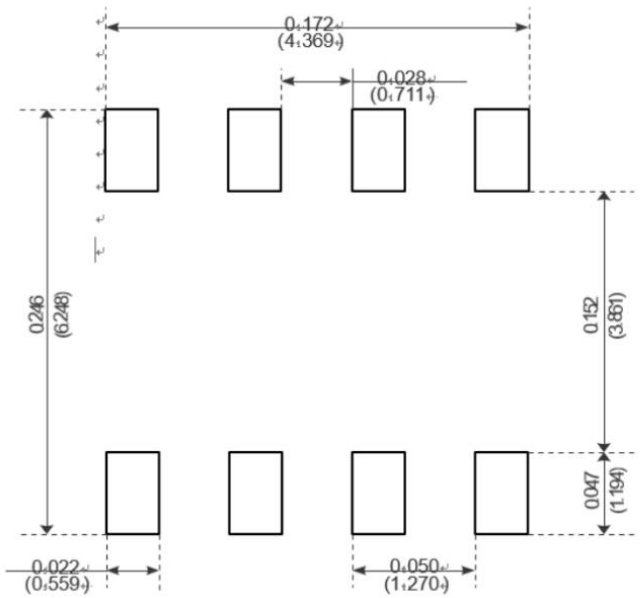
## Package Mechanical Data-SOP-8/ESOP-8




| 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° |




Recommended Minimum Pads

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