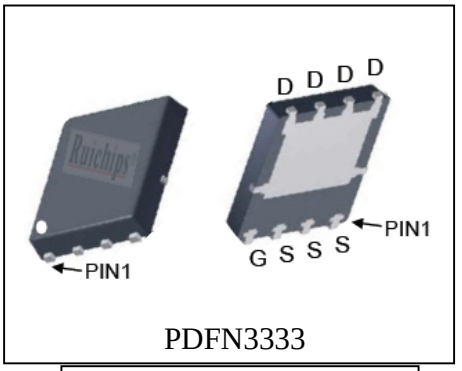
# RU30L30M

## P-Channel Advanced Power MOSFET

## Features

- -30V/-30A,
  $R_{DS(ON)}$ =12mΩ(Typ.)@$V_{GS}$=-10V
  $R_{DS(ON)}$ =20mΩ(Typ.)@$V_{GS}$=-4.5V
- Super High Dense Cell Design
- Reliable and Rugged
- 100% avalanche tested
- Lead Free and Green Devices Available (RoHS Compliant)

## Pin Description

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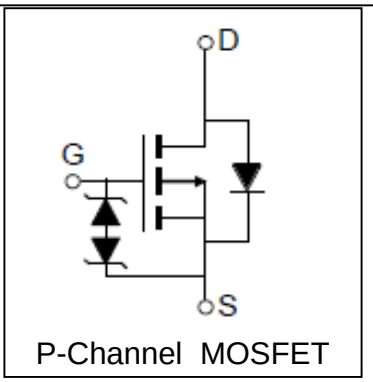



P-Channel MOSFET

## Applications

- Power Management
- Load Switching

## Absolute Maximum Ratings

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| **Common Ratings** ($T_C$=25°C Unless Otherwise Noted) | | | | |
| $V_{DSS}$ | Drain-Source Voltage | | -30 | V |
| $V_{GSS}$ | Gate-Source Voltage | | ±20 | |
| $T_J$ | Maximum Junction Temperature | | 150 | °C |
| $T_{STG}$ | Storage Temperature Range | | -55 to 150 | °C |
| $I_S$ | Diode Continuous Forward Current | $T_C$=25°C | -30① | A |
| **Mounted on Large Heat Sink** | | | | |
| $I_{DP}$ | 300μs Pulse Drain Current Tested | $T_C$=25°C | -96② | A |
| $I_D$ | Continuous Drain Current($V_{GS}$=-10V) | $T_C$=25°C | -30① | A |
| | | $T_C$=100°C | -19① | |
| | | $T_A$=25°C | -9.3③ | |
| | | $T_A$=70°C | -7.5③ | |
| $P_D$ | Maximum Power Dissipation | $T_C$=25°C | 33 | W |
| | | $T_C$=100°C | 13 | |
| | | $T_A$=25°C | 3.5③ | |
| | | $T_A$=70°C | 2.3③ | |

| | | | |
|---|---|---|---|
| **Mounted on Large Heat Sink** | | | |
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case | 3.8 | °C/W |
| $R_{\theta JA}$ ③ | Thermal Resistance-Junction to Ambient | 35 | °C/W |
| **Drain-Source Avalanche Ratings** | | | |
| $E_{AS}$ ④ | Avalanche Energy, Single Pulsed | 42 | mJ |

## Electrical Characteristics ($T_C$=25°C Unless Otherwise Noted)

| Symbol | Parameter | Test Condition | RU30L30M | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| **Static Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_{DS}$=-250μA | -30 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=-30V, $V_{GS}$=0V | | | -1 | μA |
| | | $T_J$=85°C | | | -30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_{DS}$=-250μA | -1 | - | -2.5 | V |
| $I_{GSS}$ | Gate Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0V | | | ±10 | μA |
| $R_{DS(ON)}$ ⑤ | Drain-Source On-state Resistance | $V_{GS}$=-10V, $I_{DS}$=-20A | | 12 | 20 | mΩ |
| | | $V_{GS}$=-4.5V, $I_{DS}$=-16A | | 20 | 34 | mΩ |
| **Diode Characteristics** | | | | | | |
| $V_{SD}$ ⑤ | Diode Forward Voltage | $I_{SD}$=-1A, $V_{GS}$=0V | | | -1 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_{SD}$=-20A, $dI_{SD}/dt$=100A/μs | | 45 | | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | | 26 | | nC |
| **Dynamic Characteristics** ⑥ | | | | | | |
| $R_G$ | Gate Resistance | $V_{GS}$=0V,$V_{DS}$=0V,F=1MHz | | 1.8 | | Ω |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=-15V, Frequency=1.0MHz | | 2300 | | pF |
| $C_{oss}$ | Output Capacitance | | | 250 | | |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 160 | | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}$=-15V, $R_L$=0.75Ω, $I_{DS}$=-20A, $V_{GEN}$=-10V, $R_G$=6Ω | | 17 | | ns |
| $t_r$ | Turn-on Rise Time | | | 32 | | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | | 37 | | |
| $t_f$ | Turn-off Fall Time | | | 15 | | |
| **Gate Charge Characteristics** ⑥ | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{DS}$=-24V, $V_{GS}$=10V, $I_{DS}$=-20A | | 42 | | nC |
| $Q_{gs}$ | Gate-Source Charge | | | 9 | | |
| $Q_{gd}$ | Gate-Drain Charge | | | 13 | | |

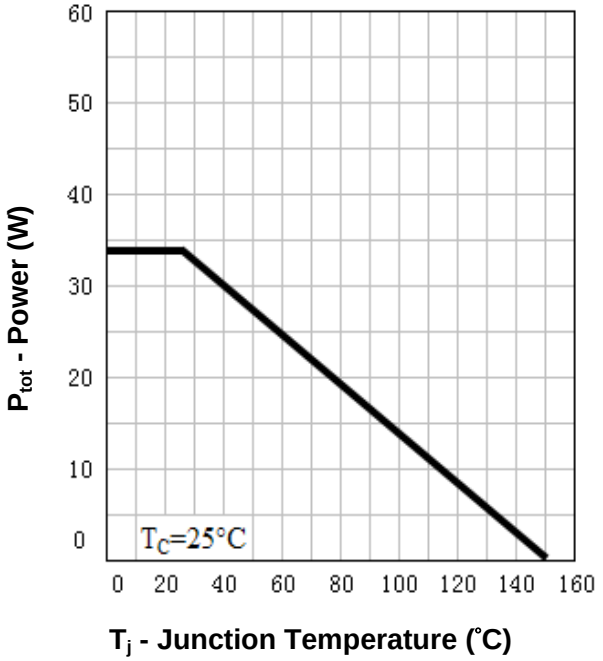
Notes: ① Max current is limited by the source bonding.
② Pulse width limited by safe operating area.
③ When mounted on 1 inch square copper board, t ≤10sec.
④ Limited by $T_{Jmax}$, $I_{AS}$ =13A, $V_{DD}$ =-24V, $R_G$ = 50Ω , Starting $T_J$ = 25°C.
⑤ Pulse test ; Pulse width≤300μs, duty cycle≤2%.
⑥ Guaranteed by design, not subject to production testing.

## Ordering and Marking Information

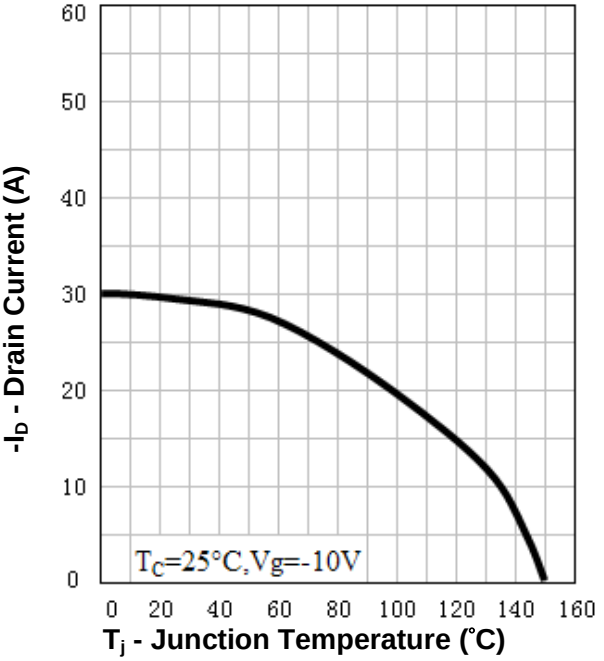
| Device | Marking | Package | Packaging | Quantity | Reel Size | Tape width |
|---|---|---|---|---|---|---|
| RU30L30M | 30L30 | PDFN3333 | Tape&Reel | 5000 | 13'' | 12mm |

## Typical Characteristics

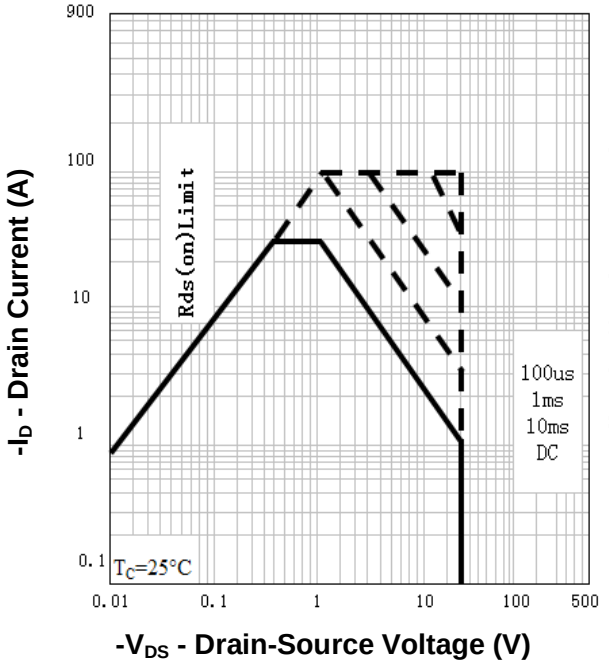
**Power Dissipation**



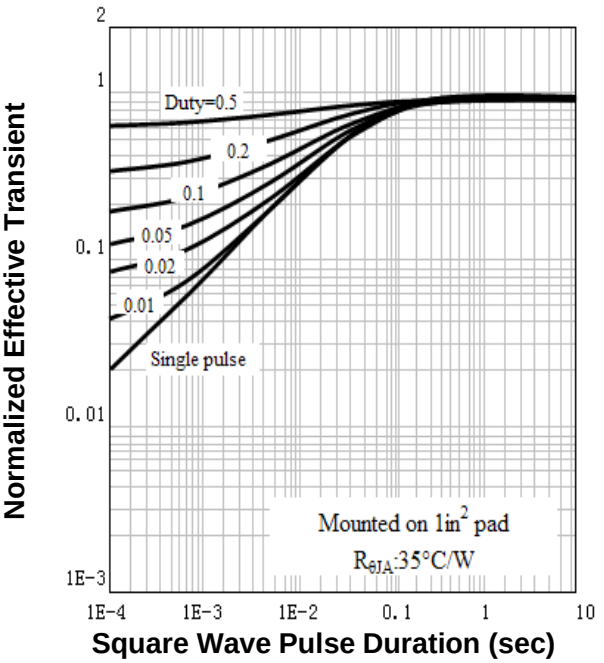

**Drain Current**




**Safe Operation Area**

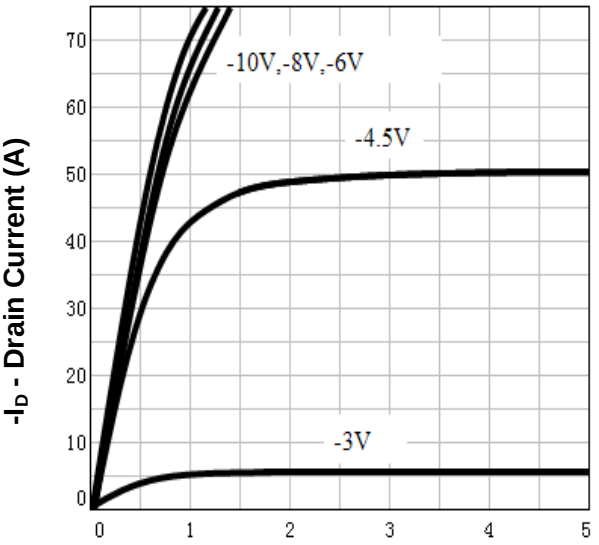



**Thermal Transient Impedance**

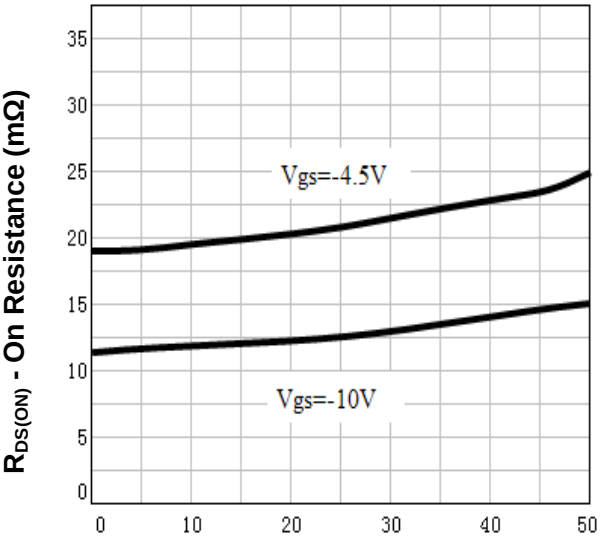


# Typical Characteristics

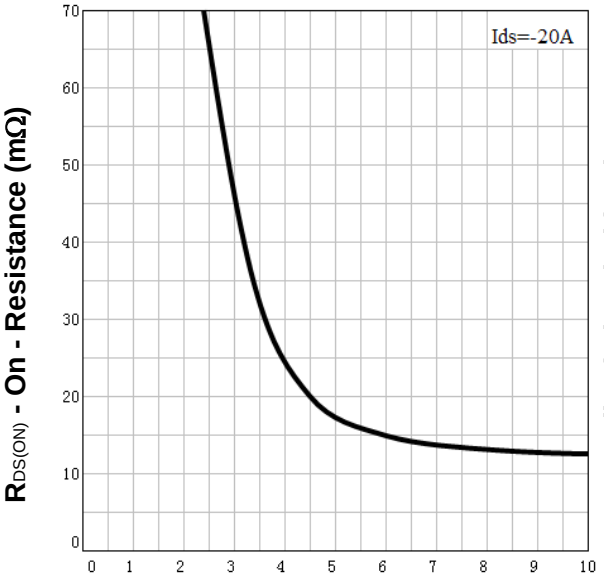
**Output Characteristics**



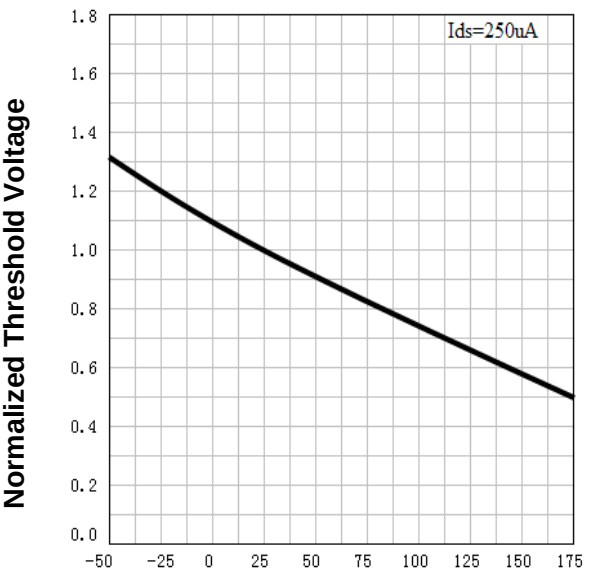

**Drain-Source On Resistance**




**Drain-Source On Resistance**

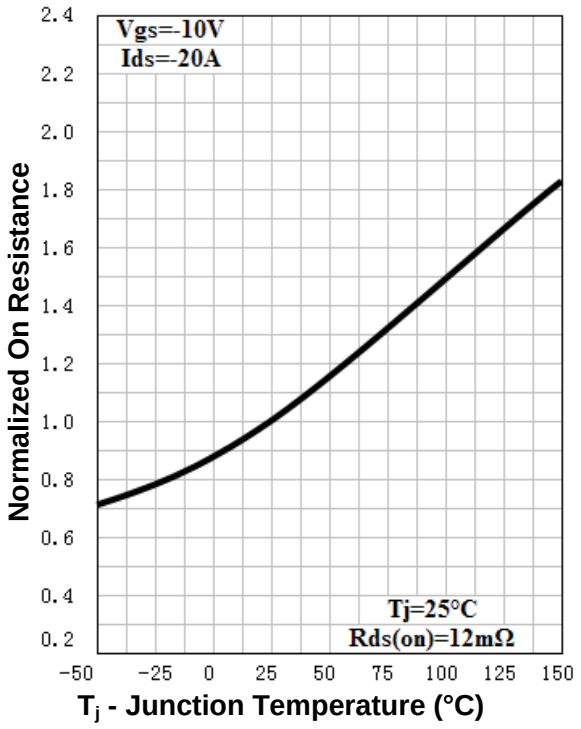



**Gate Threshold Voltage**

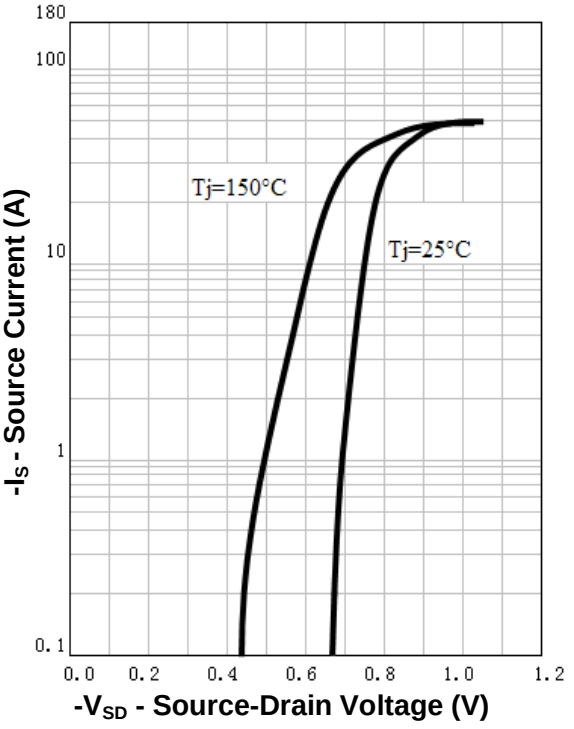


# Typical Characteristics

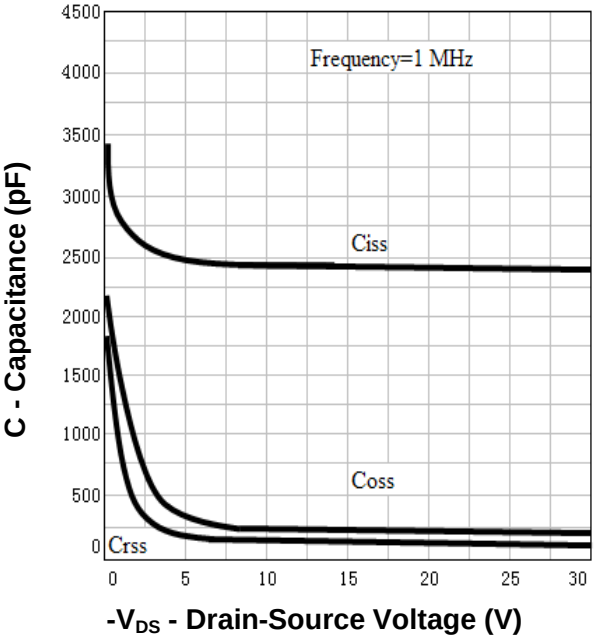
### Drain-Source On Resistance



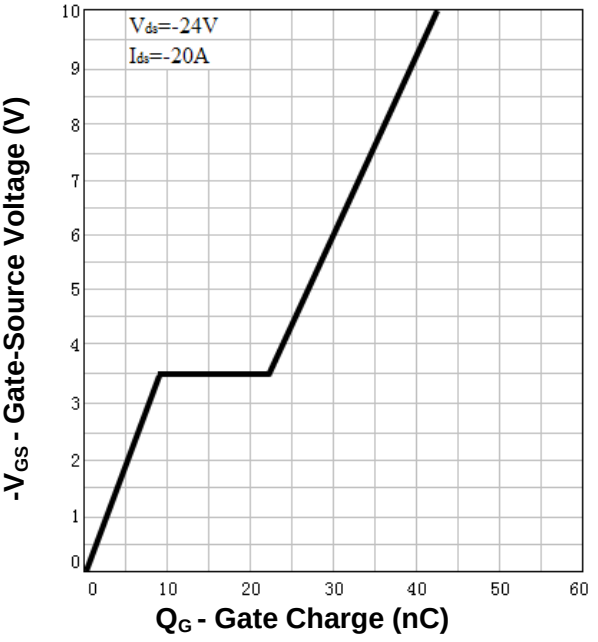

### Source-Drain Diode Forward



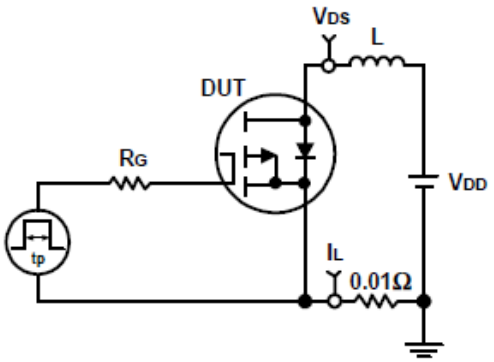

### Capacitance

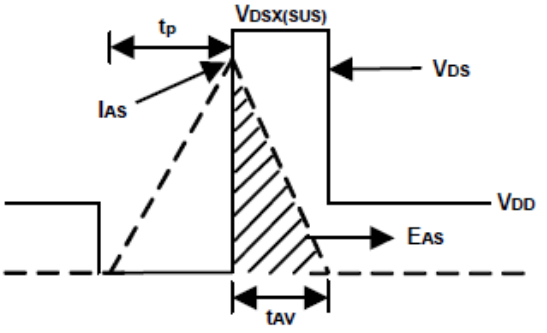



### Gate Charge

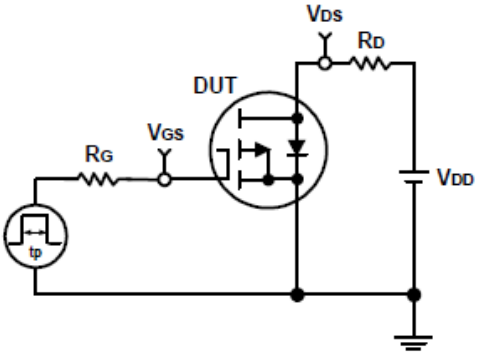


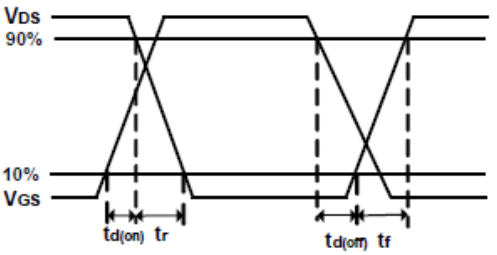
## Avalanche Test Circuit and Waveforms




## Switching Time Test Circuit and Waveforms



## Package Information

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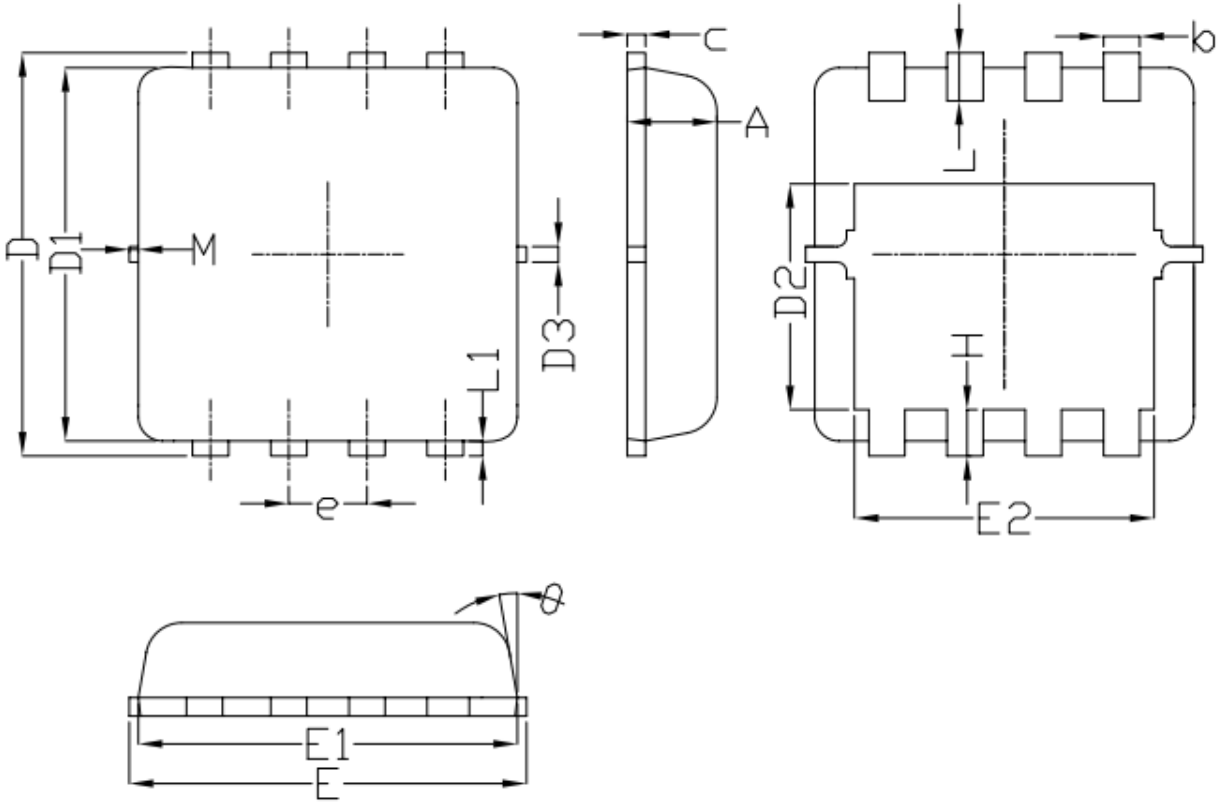


| SYMBOL | MM | | | INCH | | | SYMBOL | MM | | | INCH | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX | | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.70 | 0.75 | 0.80 | 0.028 | 0.030 | 0.031 | E1 | 3.00 | 3.15 | 3.20 | 0.118 | 0.124 | 0.126 |
| b | 0.25 | 0.30 | 0.35 | 0.010 | 0.012 | 0.014 | E2 | 2.39 | 2.49 | 2.59 | 0.094 | 0.098 | 0.102 |
| c | 0.10 | 0.15 | 0.25 | 0.004 | 0.006 | 0.010 | e | 0.65BSC | | | 0.026BSC | | |
| D | 3.25 | 3.35 | 3.45 | 0.128 | 0.132 | 0.136 | H | 0.30 | 0.39 | 0.50 | 0.012 | 0.015 | 0.020 |
| D1 | 3.00 | 3.10 | 3.20 | 0.118 | 0.122 | 0.126 | L | 0.30 | 0.40 | 0.50 | 0.012 | 0.016 | 0.020 |
| D2 | 1.78 | 1.88 | 1.98 | 0.070 | 0.074 | 0.078 | L1 | - | 0.13 | - | - | 0.005 | - |
| D3 | - | 0.13 | - | - | 0.005 | - | θ | - | 10° | 12° | - | 10° | 12° |
| E | 3.20 | 3.30 | 3.40 | 0.126 | 0.130 | 0.134 | M | - | - | 0.15 | | | 0.006 |

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