



N-Channel Enhancement Mode Power MOSFET

Description

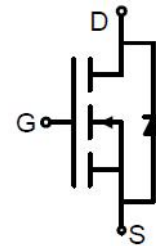
The PED2420 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

General Features

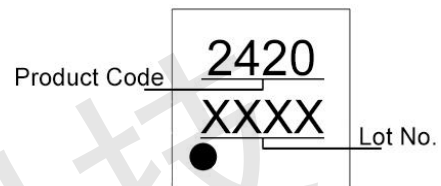
- $V_{DS} = 30V$, $I_D = 8A$
 $R_{DS(ON)} < 14m\Omega @ V_{GS}=10V$
 $R_{DS(ON)} < 19m\Omega @ V_{GS}=4.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

Application

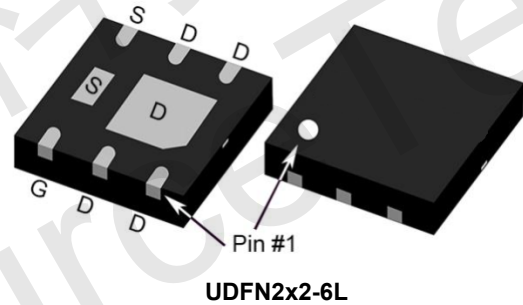
- PWM applications
- Load switch
- Power management



Schematic diagram



Marking



Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| Parameter | Symbol | Rating | Unit |
|--|----------------|------------|------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | 8 | A |
| Drain Current-Continuous (TA=70°C) | I_D | 6.3 | A |
| Pulsed Drain Current (Note 1) | I_{DM} | 32 | A |
| Maximum Power Dissipation | P_D | 2.6 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | °C |

Thermal Characteristic

| | | | |
|--|-----------------|----|------|
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 48 | °C/W |
|--|-----------------|----|------|



Electrical Characteristics (TA=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|--------------|---|-----|-----|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 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 |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1 | 1.7 | 2.5 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=7A$ | - | 11 | 14 | m Ω |
| | | $V_{GS}=4.5V, I_D=6A$ | - | 15 | 19 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=5V, I_D=8A$ | - | 24 | - | S |
| Dynamic Characteristics (Note 4) | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$ | - | 840 | - | pF |
| Output Capacitance | C_{oss} | | - | 120 | - | pF |
| Reverse Transfer Capacitance (Note 4) | C_{rss} | | - | 85 | - | pF |
| Switching Characteristics | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=15V, I_D=2A, R_L=1\Omega,$ $V_{GS}=10V, R_G=3\Omega$ | - | 4.2 | - | nS |
| Turn-on Rise Time | t_r | | - | 8.2 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 31 | - | nS |
| Turn-Off Fall Time | t_f | | - | 4 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=15V, I_D=6A, V_{GS}=10V$ | - | 14 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 2.4 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 3 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V_{SD} | $V_{GS}=0V, I_S=1A$ | - | - | 1.2 | V |
| Diode Forward Current (Note 2) | I_S | | - | - | 8 | A |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to product.



Typical Electrical and Thermal Characteristics



Figure 1 Switching Test Circuit

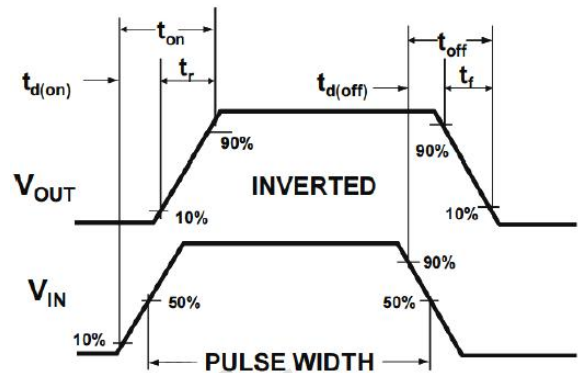


Figure 2 Switching Waveform

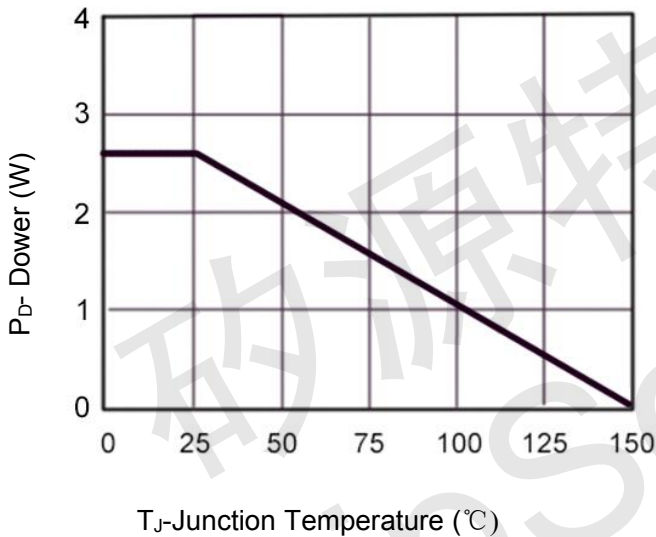


Figure 3 Power De-rating

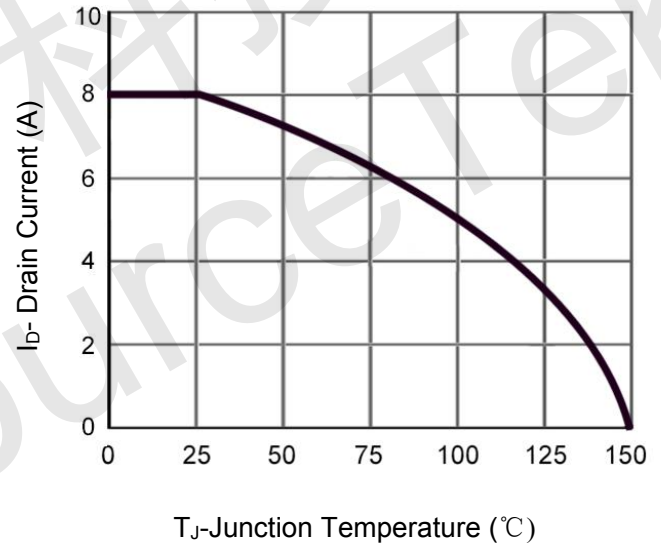


Figure 4 Drain Current

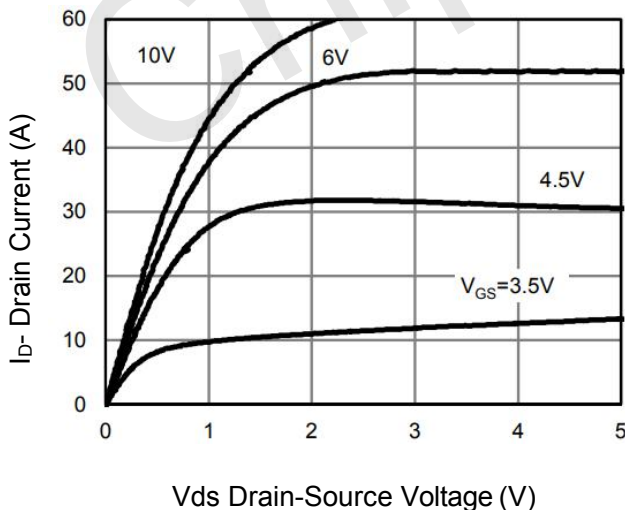


Figure 5 Output Characteristics

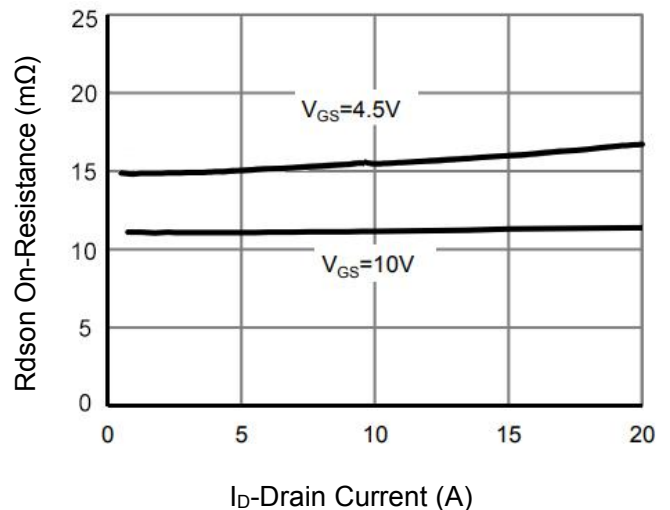


Figure 6 R_{dson} vs Drain Current

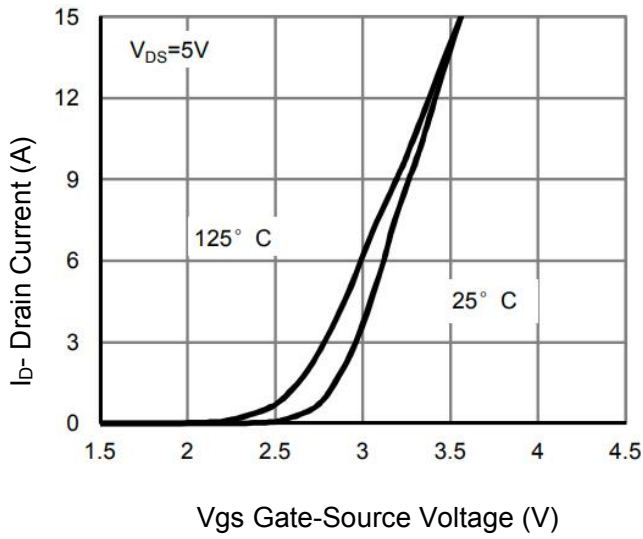


Figure 7 Transfer Characteristics

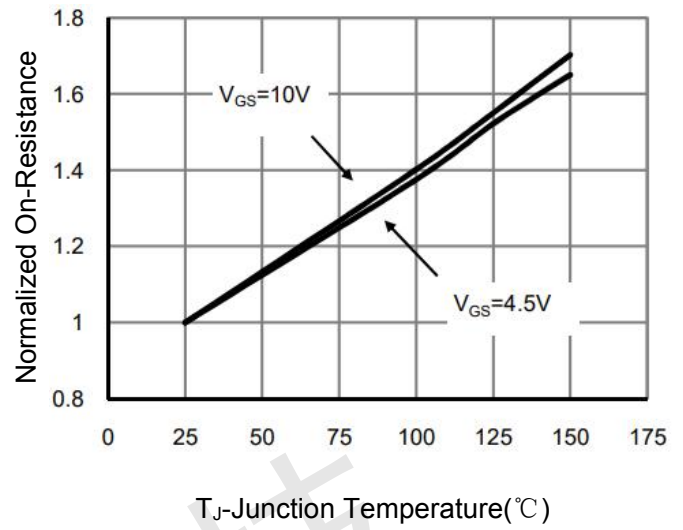


Figure 8 Rdson vs Junction Temperature

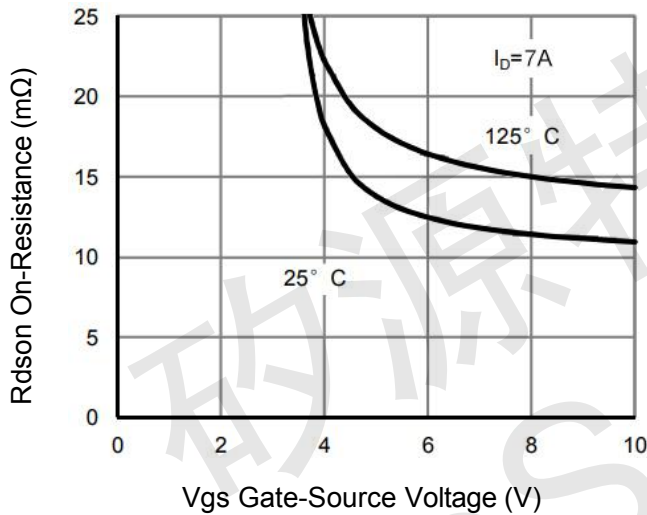


Figure 9 Rdson vs Vgs

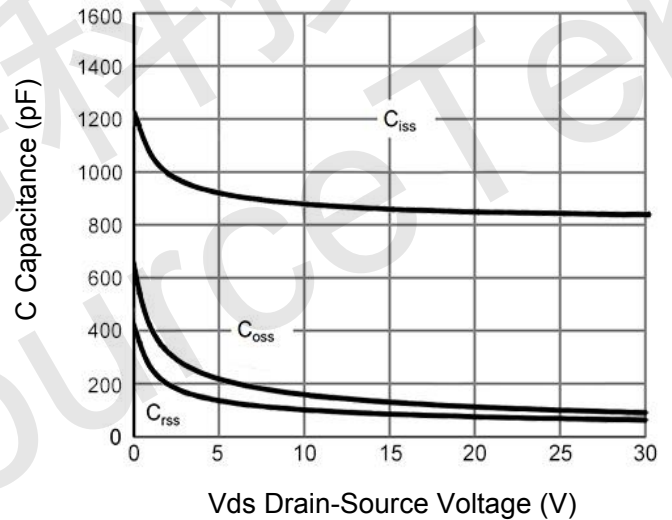


Figure 10 Capacitance vs Vds

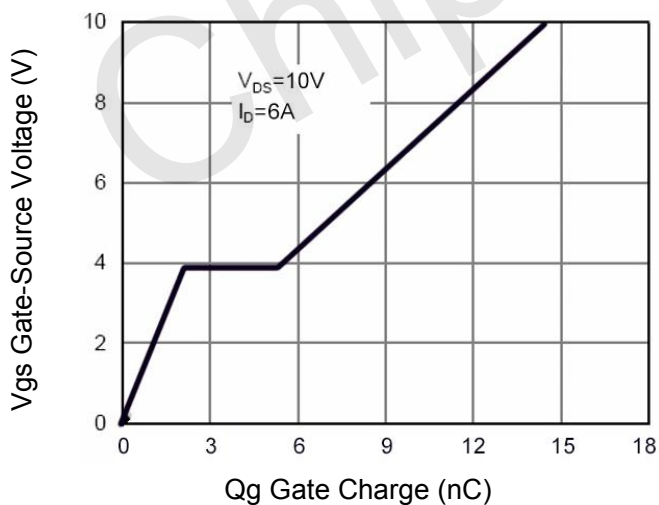


Figure 11 Gate Charge

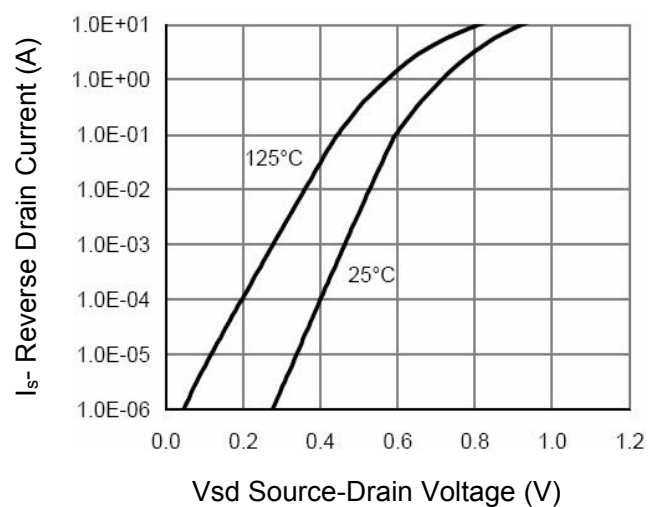


Figure 12 Source- Drain Diode Forward

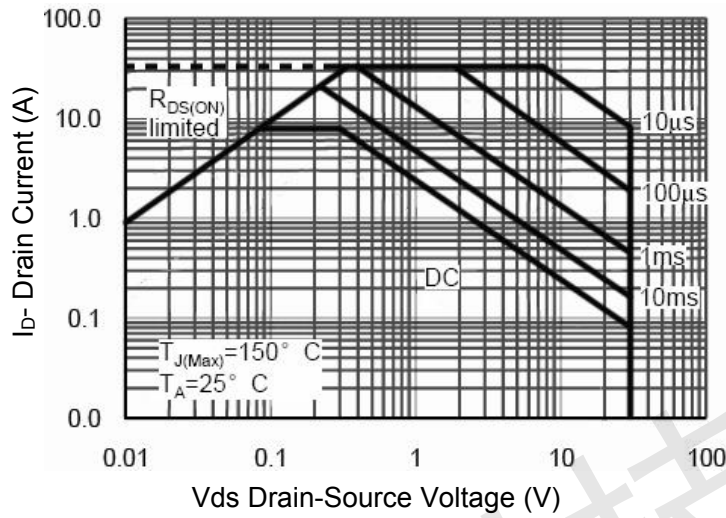


Figure 13 Safe Operation Area

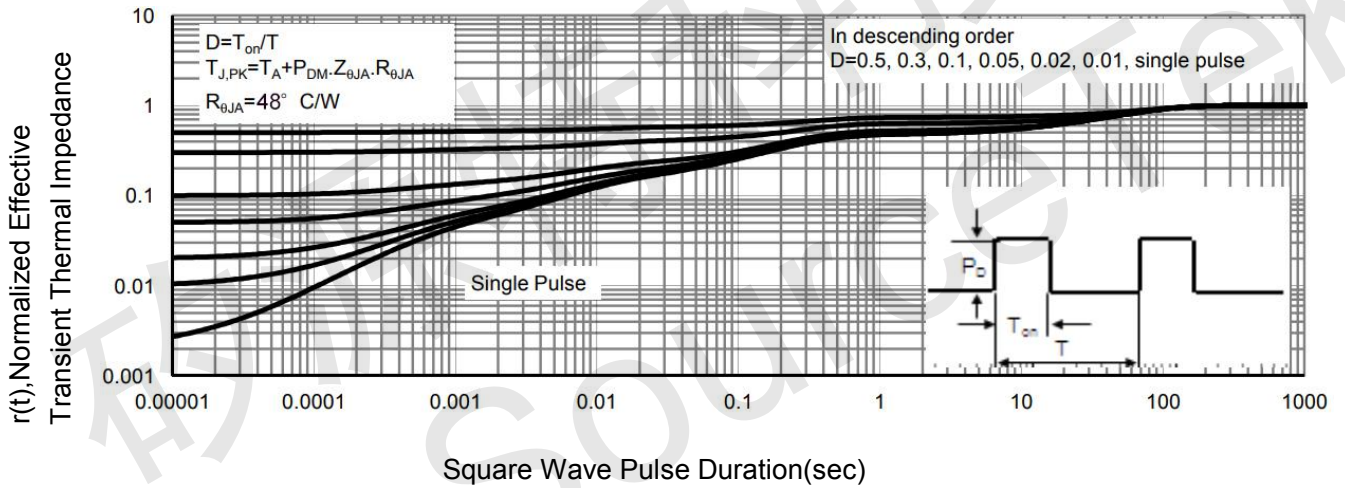
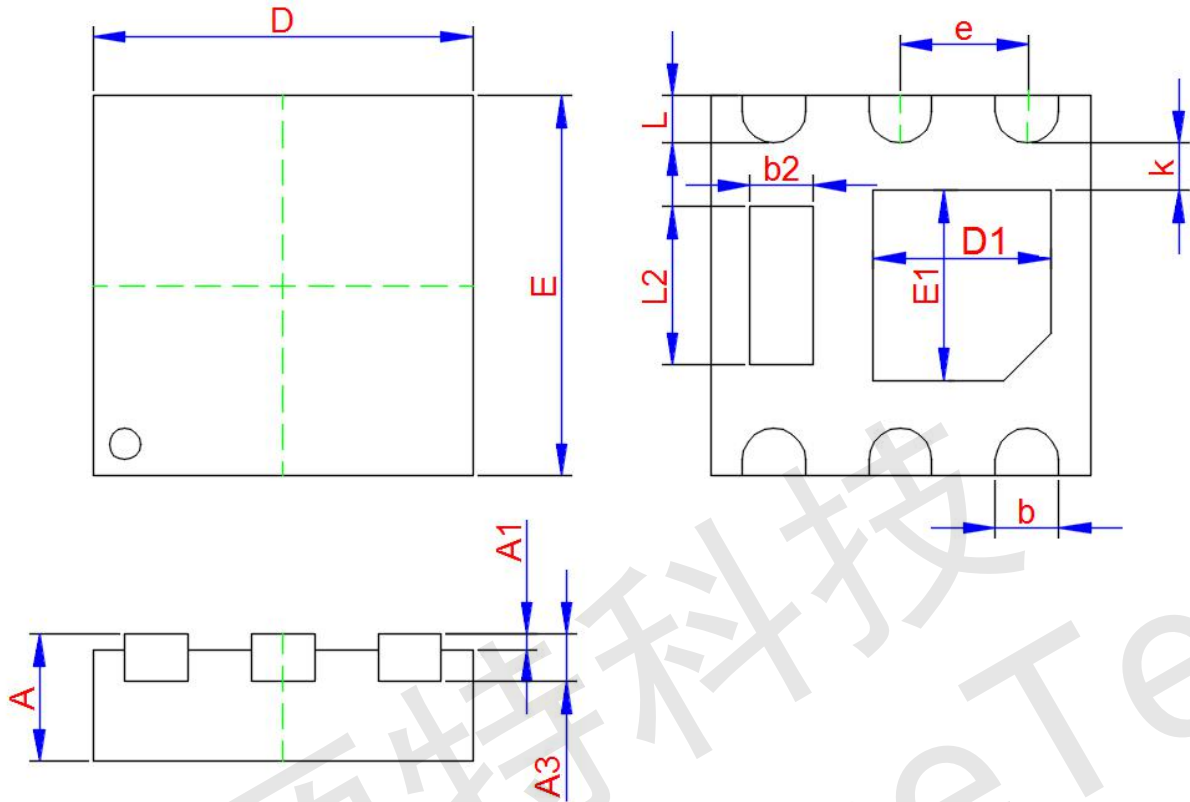


Figure 14 Normalized Maximum Transient Thermal Impedance



UDFN2x2-6L Package Information



| Symbol | Dimensions In Millimeters | | |
|--------|---------------------------|-------|-------|
| | Min. | Typ. | Max. |
| A | 0.450 | 0.500 | 0.550 |
| A1 | 0.000 | - | 0.050 |
| A3 | 0.120 | 0.150 | 0.190 |
| D | 1.950 | 2.000 | 2.050 |
| E | 1.950 | 2.000 | 2.050 |
| D1 | 0.970 | 1.000 | 1.030 |
| E1 | 0.970 | 1.000 | 1.030 |
| b | 0.250 | 0.300 | 0.350 |
| L | 0.200 | 0.250 | 0.300 |
| b2 | 0.250 | 0.300 | 0.350 |
| L2 | 0.750 | 0.800 | 0.850 |
| k | 0.250MIN. | | |
| e | 0.650TYP. | | |