

DESCRIPTION

The MXN3345 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 load switch or in PWM applications.

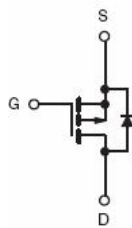
GENERAL FEATURES

- $V_{DS}=-30V$, $I_D=-30A$
 $R_{DS(ON)}(Typ.)=22m\Omega$ @ $V_{GS}=-4.5V$
 $R_{DS(ON)}(Typ.)=12m\Omega$ @ $V_{GS}=-10V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

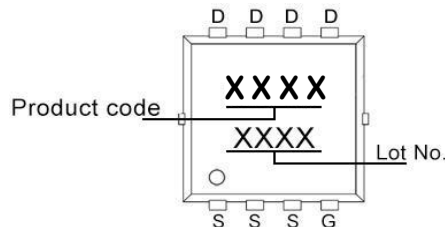
APPLICATION

- PWM applications
- Load switch
- Power management

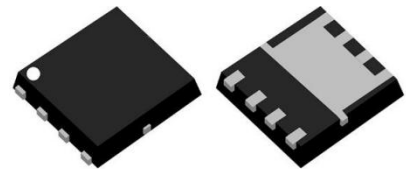
PINOUT



Schematic diagram



Marking and pin Assignment



DFN3X3-8L view

ORDERING INFORMATION

| Part Number | Storage Temperature | Package | Devices Per Reel |
|-------------|---------------------|-----------|------------------|
| MXN3345 | -55°C to 150°C | DFN3X3-8L | 5000 |

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

| Parameter | Symbol | Limit | Unit |
|--|----------------|------------|------------|
| Drain-Source Voltage | V_{DS} | -30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous ($T_C=25^\circ C$) | I_D | -30 | A |
| Drain Current-Pulsed ^(Note1) | I_{DM} | -80 | A |
| Drain Current-Continuous | I_{DSM} | -11 | A |
| Maximum Power Dissipation | P_{DSM} | 3.1 | W |
| Maximum Power Dissipation ($T_C=25^\circ C$) | P_D | 29 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | $^\circ C$ |

THERMAL RESISTANCE

| | | | |
|--|-----------------|-----|--------------|
| Thermal Resistance, Junction-to-Ambient ^(Note2) | $R_{\theta JA}$ | 40 | $^\circ C/W$ |
| Thermal Resistance, Junction-to-Case, Steady State | $R_{\theta JC}$ | 4.2 | $^\circ C/W$ |

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 2. Surface Mounted on FR4 Board, $t \leq 10$ sec.



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

| Parameter | Symbol | Conditions | 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 (Note3)

| | | | | | | |
|----------------------------------|--------------|--------------------------------|----|------|------|-----------|
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -1 | -1.4 | -2.5 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=-4.5V, I_D=-7A$ | - | 22 | 26 | $m\Omega$ |
| | | $V_{GS}=-10V, I_D=-8A$ | - | 12 | 15 | $m\Omega$ |
| Forward Transconductance | g_{FS} | $V_{DS}=-10V, I_D=-10A$ | 20 | - | - | S |

Dynamic Characteristics (Note4)

| | | | | | | |
|------------------------------|-----------|------------------------------------|---|------|---|------|
| Input Capacitance | C_{iss} | $V_{DS}=-15V, V_{GS}=0V, F=1.0MHz$ | - | 1600 | - | pF |
| Output Capacitance | C_{oss} | | - | 350 | - | pF |
| Reverse Transfer Capacitance | C_{rss} | | - | 300 | - | pF |

Switching Characteristics (Note4)

| | | | | | | |
|---------------------|--------------|---|---|-----|---|----|
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DS}=-15V, I_D=-10A, V_{GS}=-10V, R_{GEN}=1\Omega$ | - | 10 | - | nS |
| Turn-on Rise Time | t_r | | - | 15 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 110 | - | nS |
| Turn-Off Fall Time | t_f | | - | 70 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=-15V, I_D=-10A, V_{GS}=-10V$ | - | 30 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 5.5 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 8 | - | nC |

Drain-Source Diode Characteristics

| | | | | | | |
|-------------------------------|----------|----------------------|------|---|------|---|
| Diode Forward Voltage (Note3) | V_{SD} | $V_{GS}=0V, I_S=-2A$ | -0.4 | - | -1.0 | V |
|-------------------------------|----------|----------------------|------|---|------|---|

Note 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

Note 4. Guaranteed by design, not subject to production

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Switching Test Circuit

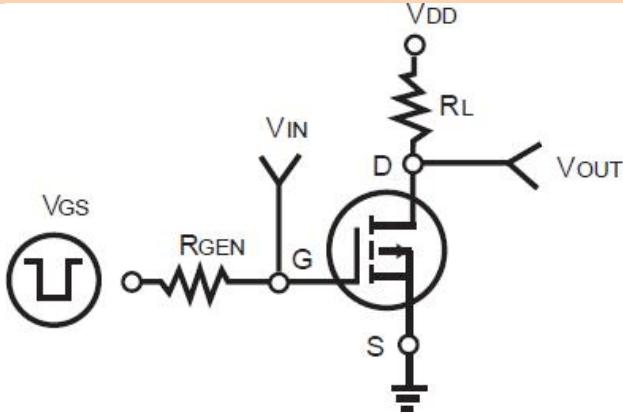


Figure 2. Switching Waveform

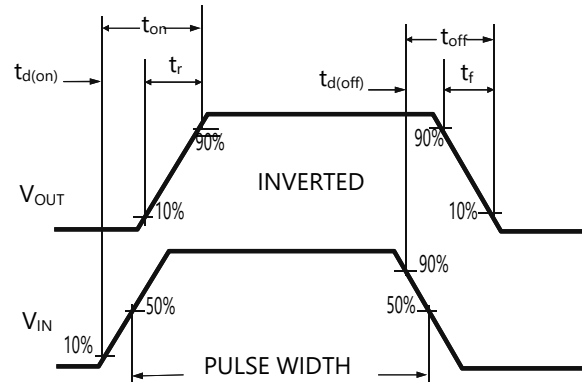


Figure 3. Power Dissipation

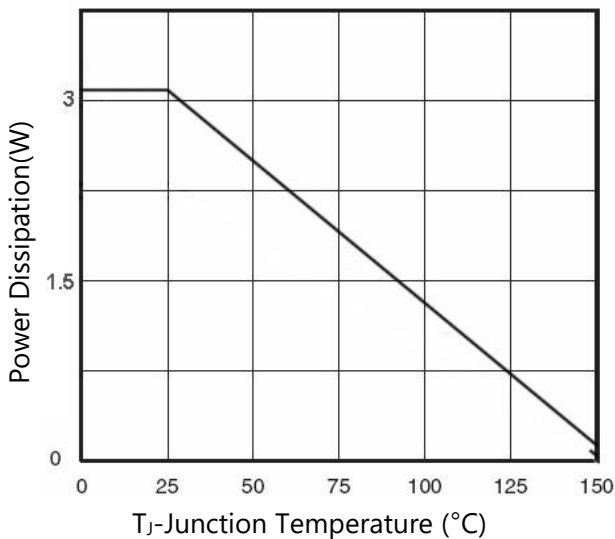


Figure 4. Drain Current

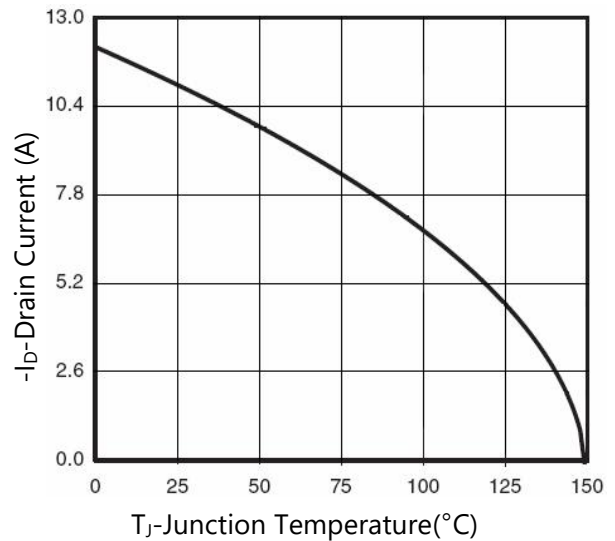


Figure 5. Output Characteristics

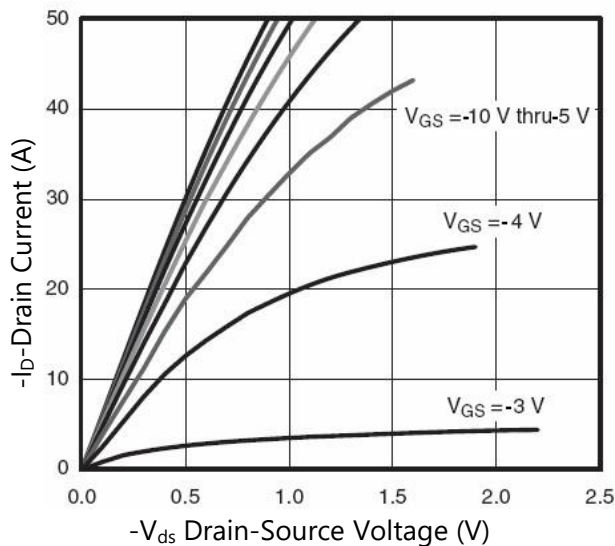
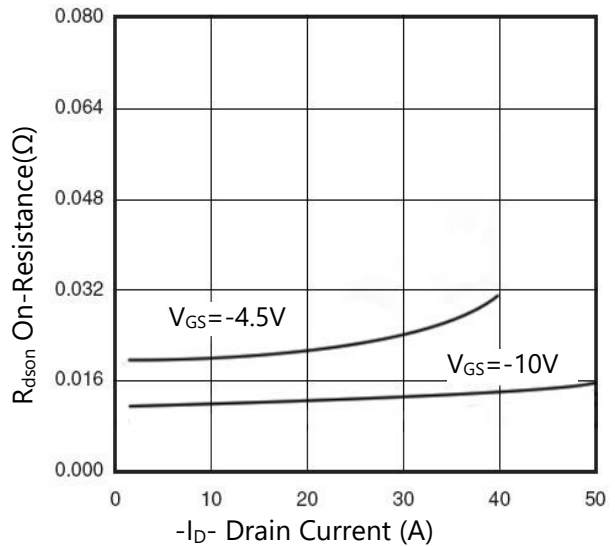


Figure 6. Drain-Source On-Resistance





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Transfer Characteristics

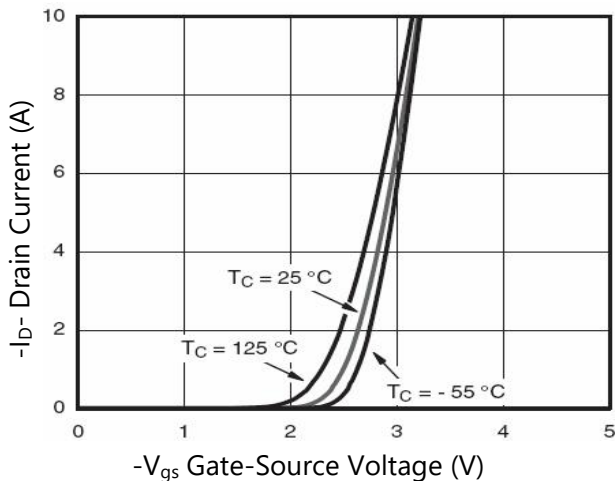


Figure 8. Drain-Source On-Resistance

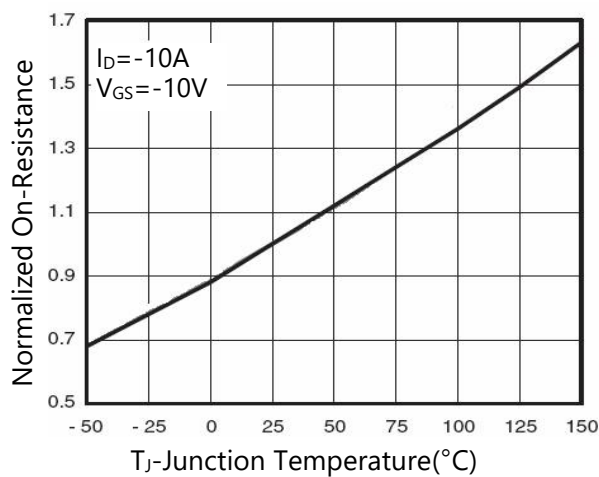


Figure 9. R_{dson} vs V_{gs}

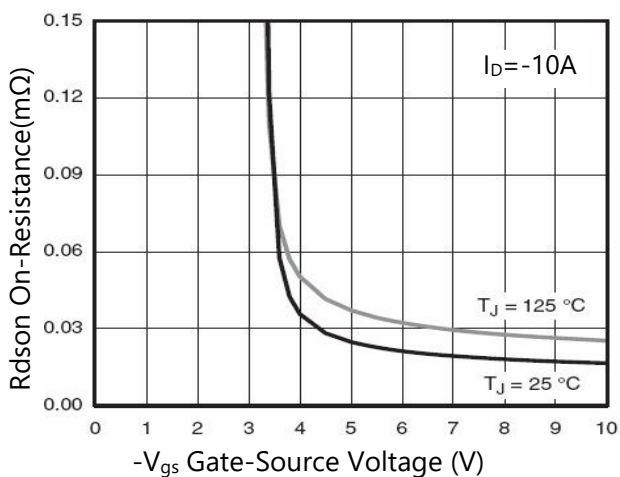


Figure 10. Capacitance vs V_{ds}

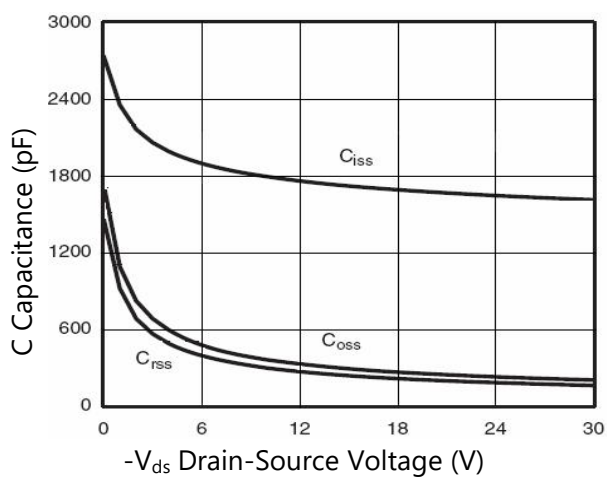


Figure 11. Gate Charge

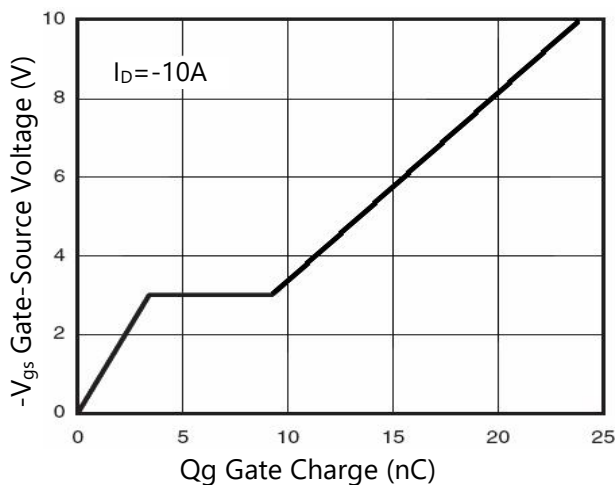
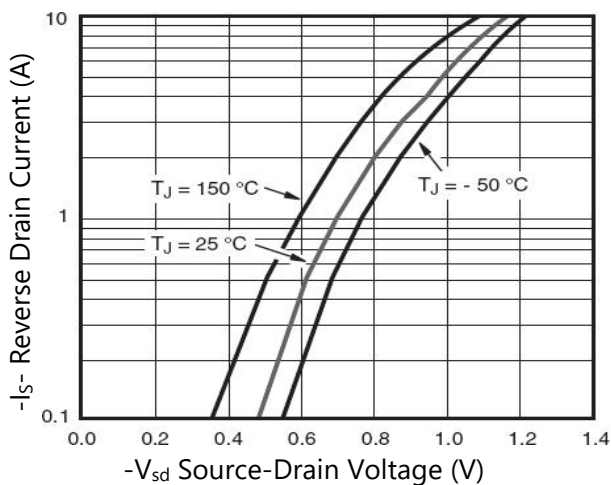


Figure 12. Source- Drain Diode Forward



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 11. Safe Operation Area

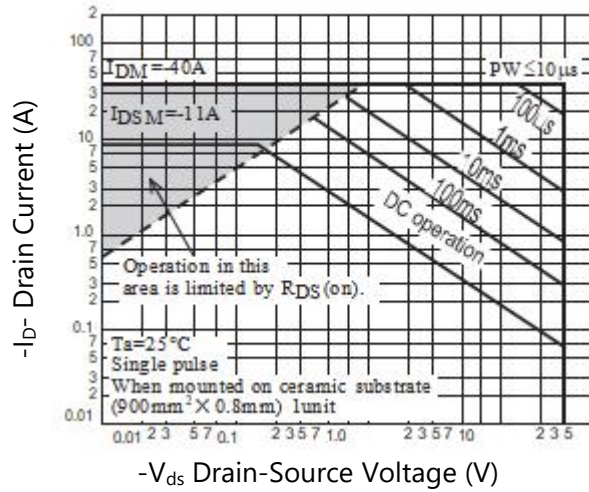
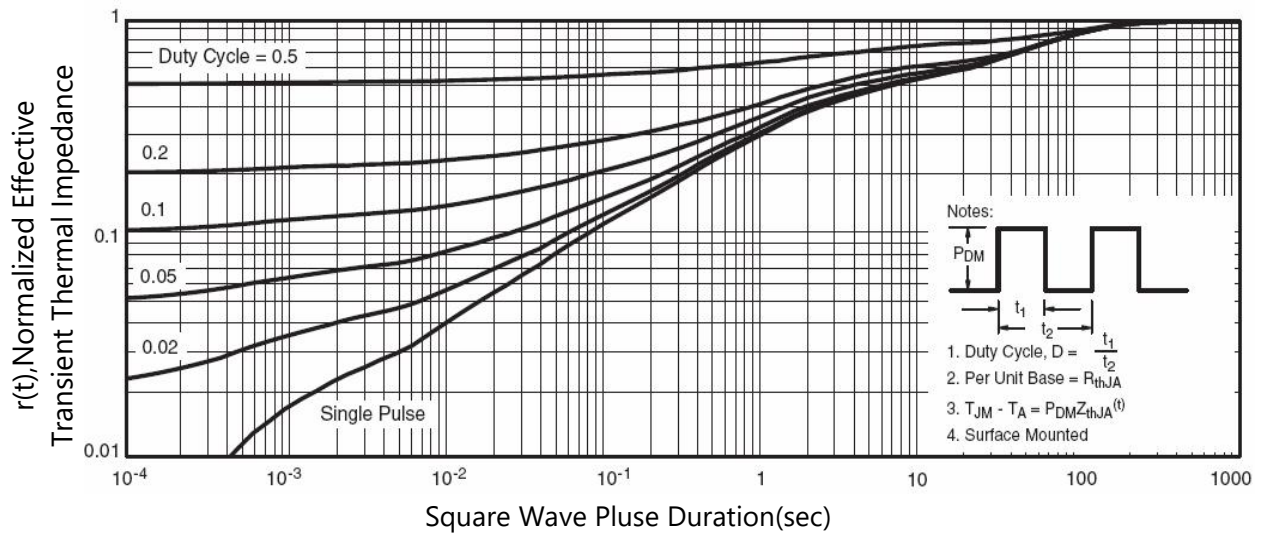
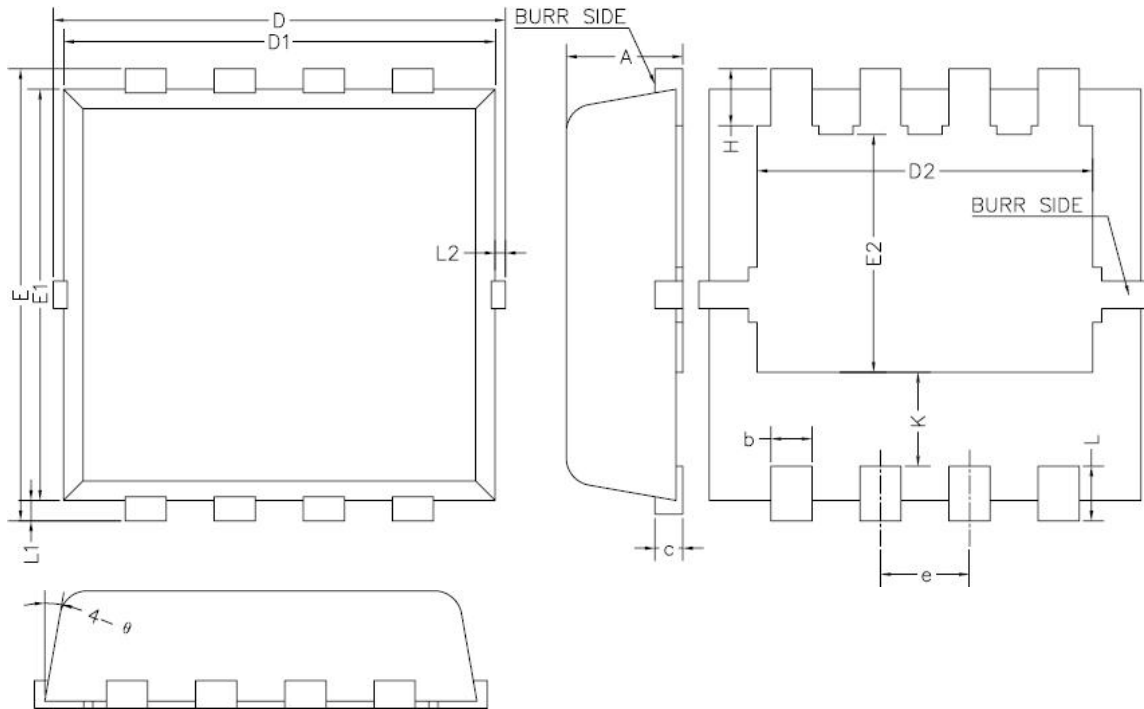


Figure 12. Normalized Maximum Transient Thermal Impedance



PACKAGE INFORMATION

DFN3x3-8L



| Symbol | Dimensions In Millimeters | | |
|--------|---------------------------|------|------|
| | Min. | Typ. | Max. |
| A | 0.70 | 0.80 | 0.90 |
| b | 0.25 | 0.30 | 0.35 |
| c | 0.14 | 0.16 | 0.20 |
| D | 3.10 | 3.30 | 3.50 |
| D1 | 3.05 | 3.16 | 3.25 |
| D2 | 2.35 | 2.45 | 2.55 |
| e | 0.55 | 0.65 | 0.75 |
| E | 3.10 | 3.30 | 3.50 |
| E1 | 2.90 | 3.00 | 3.10 |
| E2 | 1.64 | 1.74 | 1.84 |
| H | 0.32 | 0.42 | 0.52 |
| K | 0.59 | 0.69 | 0.79 |
| L | 0.25 | 0.40 | 0.55 |
| L1 | 0.10 | 0.15 | 0.20 |
| L2 | - | - | 0.16 |
| θ | 8° | 10° | 12° |