# 3rd Generation thinQ!™ SiC Schottky Diode

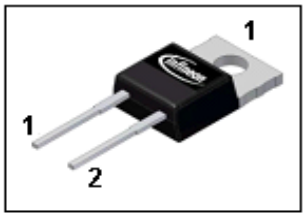
## Features

- Revolutionary semiconductor material - Silicon Carbide
- Switching behavior benchmark
- No reverse recovery / No forward recovery
- Temperature independent switching behavior
- High surge current capability
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC[1)] for target applications
- Breakdown voltage tested at 20mA[2)]
- Optimized for high temperature operation
- Lowest Figure of Merit $Q_C/I_F$

## Product Summary

| | | |
|---|---|---|
| $V_{DC}$ | 600 | V |
| $Q_C$ | 12 | nC |
| $I_F$; $T_C$< 130 °C | 8 | A |

PG-TO220-2




**thinQ! 3G Diode designed for fast switching applications like:**

- SMPS e.g.; CCM PFC
- Motor Drives; Solar Applications; UPS

| Type | Package | Marking | Pin 1 | Pin 2 |
|---|---|---|---|---|
| IDH08SG60C | PG-TO220-2 | D08G60C | C | A |

## Maximum ratings

| Parameter | Symbol | Conditions | Value | Unit |
|---|---|---|---|---|
| Continuous forward current | $I_F$ | $T_C$<130 °C | 8 | A |
| Surge non-repetitive forward current, sine halfwave | $I_{F,SM}$ | $T_C$=25 °C, $t_p$=10 ms | 42 | |
| | | $T_C$=150 °C, $t_p$=10 ms | 36 | |
| Non-repetitive peak forward current | $I_{F,max}$ | $T_C$=25 °C, $t_p$=10 µs | 350 | |
| $i^2t$ value | $\int i^2dt$ | $T_C$=25 °C, $t_p$=10 ms | 9 | $A^2s$ |
| | | $T_C$=150 °C, $t_p$=10 ms | 6.5 | |
| Repetitive peak reverse voltage | $V_{RRM}$ | $T_j$=25 °C | 600 | V |
| Diode dv/dt ruggedness | $dv/dt$ | $V_R$= 0….480 V | 50 | V/ns |
| Power dissipation | $P_{tot}$ | $T_C$=25 °C | 100 | W |
| Operating and storage temperature | $T_j$, $T_{stg}$ | | -55 ... 175 | °C |
| Soldering temperature, wavesoldering only allowed at leads | $T_{sold}$ | 1.6mm (0.063 in.) from case for 10s | 260 | |
| Mounting torque | | M3 and M3.5 screws | 60 | Ncm |

| Parameter | Symbol | Conditions | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | min. | typ. | max. | |
| **Thermal characteristics** | | | | | | |
| Thermal resistance, junction - case | $R_{thJC}$ | | - | - | 1.5 | K/W |
| Thermal resistance, junction - ambient | $R_{thJA}$ | Thermal resistance, junction- ambient, leaded | - | - | 62 | |
| **Electrical characteristics,** at $T_j$=25 °C, unless otherwise specified | | | | | | |
| **Static characteristics** | | | | | | |
| DC blocking voltage | $V_{DC}$ | $I_R$=0.05 mA, $T_j$=25 °C | 600 | - | - | V |
| Diode forward voltage | $V_F$ | $I_F$=8 A, $T_j$=25 °C | - | 1.8 | 2.1 | |
| | | $I_F$=8 A, $T_j$=150 °C | - | 2.2 | - | |
| Reverse current | $I_R$ | $V_R$=600 V, $T_j$=25 °C | - | 0.6 | 70 | µA |
| | | $V_R$=600 V, $T_j$=150 °C | - | 2.5 | 700 | |
| **AC characteristics** | | | | | | |
| Total capacitive charge | $Q_c$ | $V_R$=400 V, $I_F \leq I_{F,max}$, $di_F/dt$=200 A/µs, $T_j$=150 °C | - | 12 | - | nC |
| Switching time[3] | $t_c$ | | - | - | <10 | ns |
| Total capacitance | $C$ | $V_R$=1 V, $f$=1 MHz | - | 240 | - | pF |
| | | $V_R$=300 V, $f$=1 MHz | - | 30 | - | |
| | | $V_R$=600 V, $f$=1 MHz | - | 30 | - | |

[1] J-STD20 and JESD22

[2] All devices tested under avalanche conditions, for a time periode of 10ms, at 20mA.

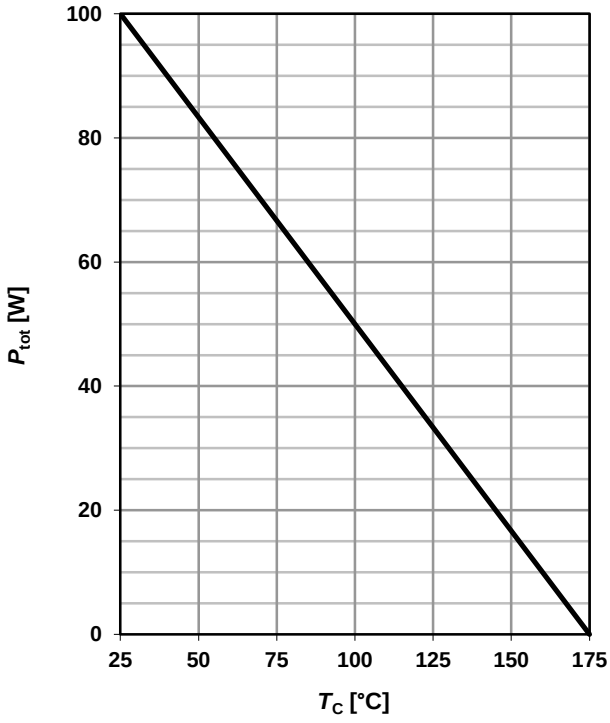
[3] $t_c$ is the time constant for the capacitive displacement current waveform (independent from $T_j$, $I_{LOAD}$ and di/dt), different from $t_{rr}$ which is dependent on $T_j$, $I_{LOAD}$ and di/dt. No reverse recovery time constant $t_{rr}$ due to absence of minority carrier injection.

[4] Under worst case $Z_{th}$ conditions.

[5] Only capacitive charge occuring, guaranteed by design.

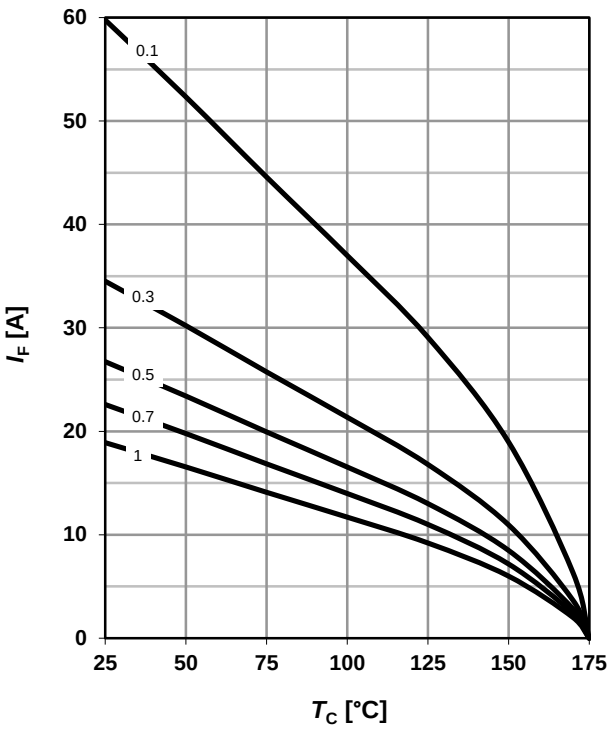
## 1 Power dissipation

$P_{tot}$=f($T_C$); parameter: $R_{thJC(max)}$



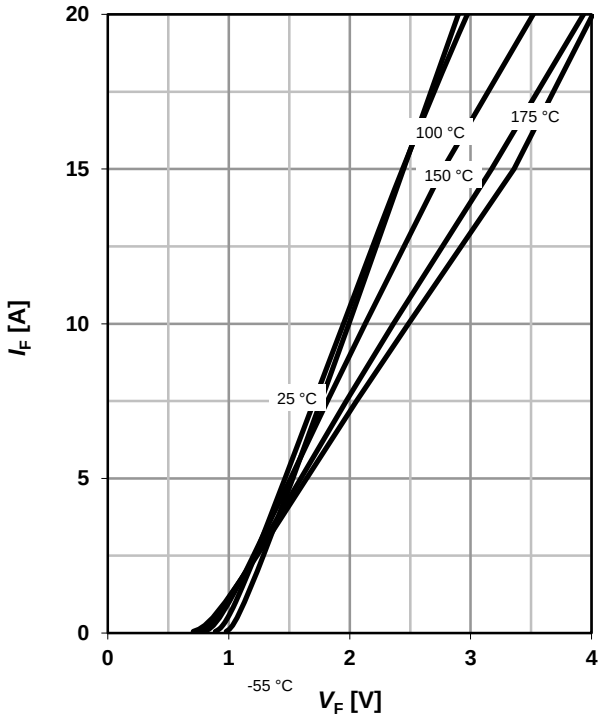

## 2 Diode forward current

$I_F$=f($T_C$)[4]; $T_j$≤175 °C; parameter: $D = t_p/T$



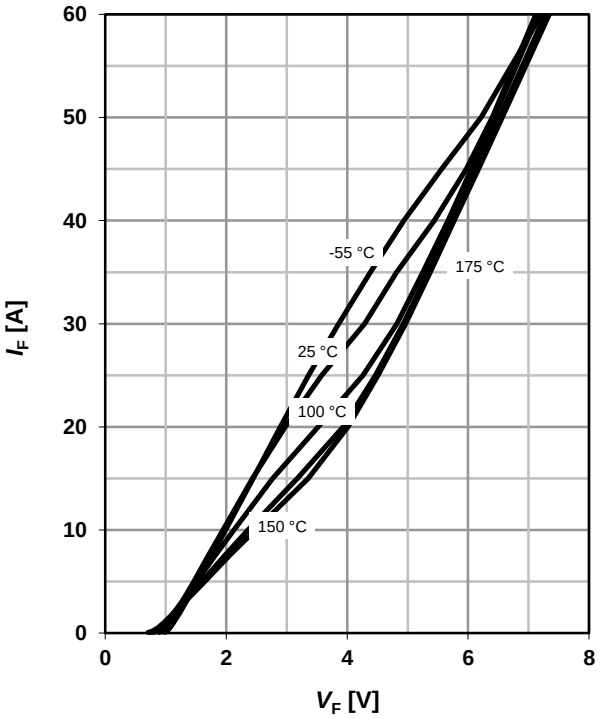

## 3 Typ. forward characteristic

$I_F$=f($V_F$); $t_p$=400 µs; parameter:$T_j$



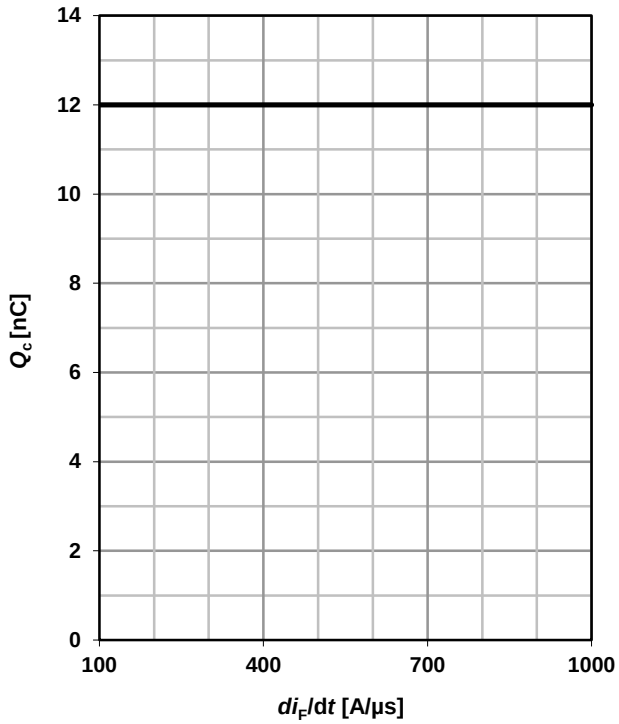

## 4 Typ. forward characteristic in surge current mode

$I_F$=f($V_F$); $t_p$=400 µs; parameter: $T_j$



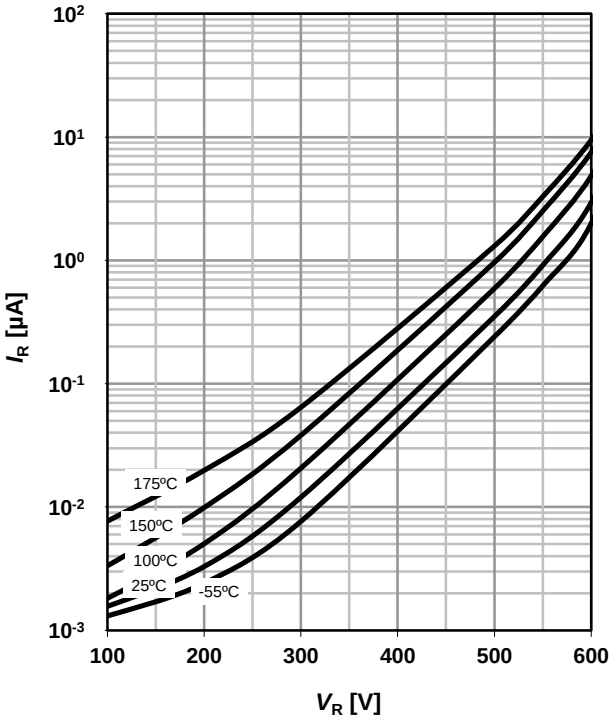
**5 Typ. capacitance charge vs. current slope**

$Q_C=f(di_F/dt)$[5]; $I_F \leq I_{F,max}$



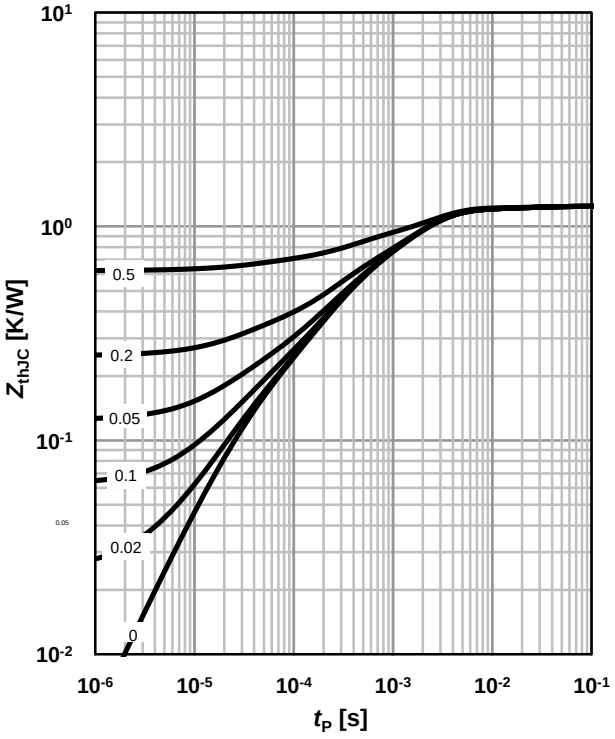

**6 Typ. reverse current vs. reverse voltage**

$I_R=f(V_R)$; parameter: $T_j$



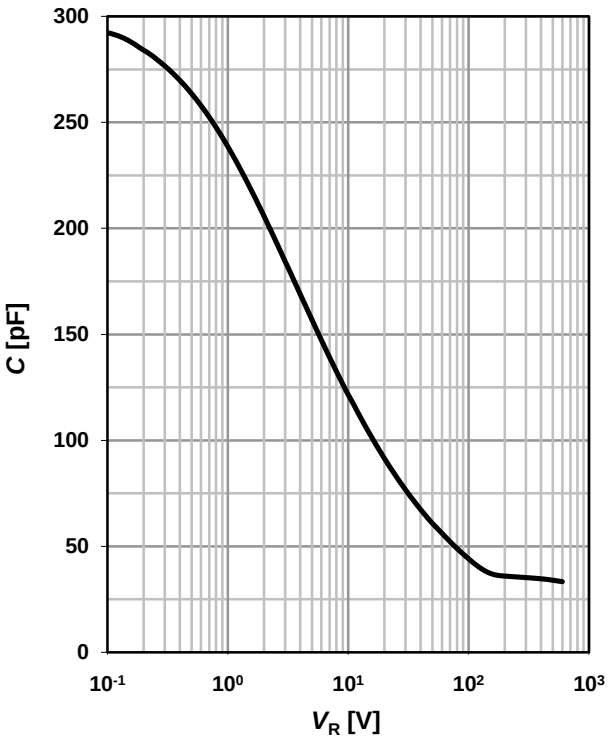

**7 Typ. transient thermal impedance**

$Z_{thJC}=f(t_p)$; parameter: $D = t_P/T$



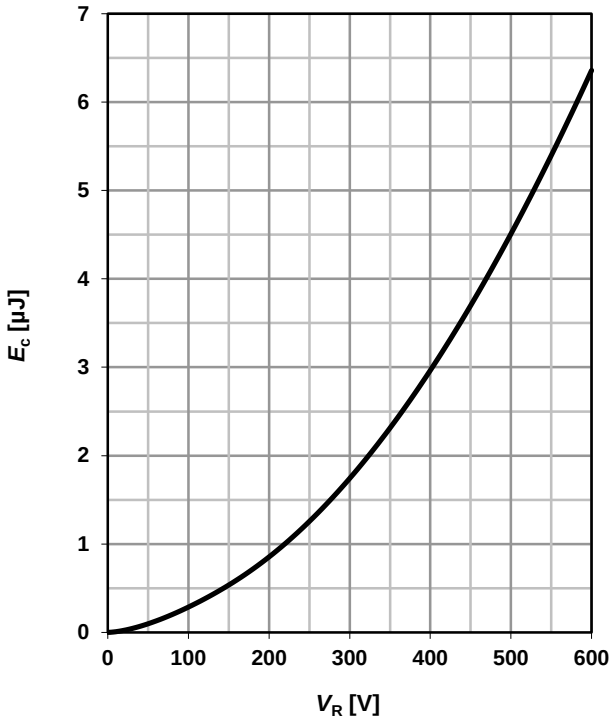

**8 Typ. capacitance vs. reverse voltage**

$C=f(V_R)$; $T_C$=25 °C, $f$=1 MHz

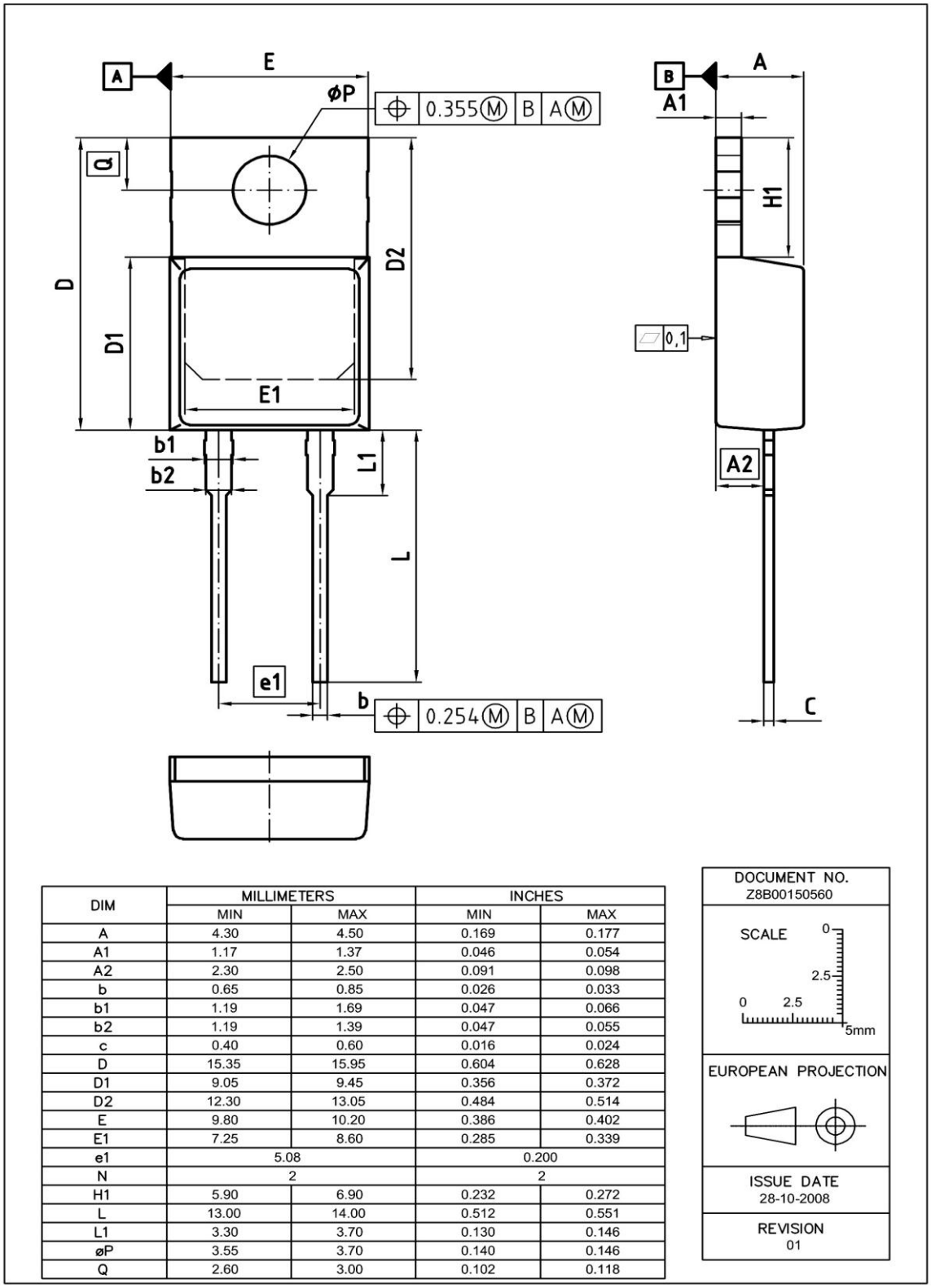


## 9 Typ. C stored energy

$E_C=f(V_R)$



**PG-TO220-2: Outline**




| DIM | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 4.30 | 4.50 | 0.169 | 0.177 |
| A1 | 1.17 | 1.37 | 0.046 | 0.054 |
| A2 | 2.30 | 2.50 | 0.091 | 0.098 |
| b | 0.65 | 0.85 | 0.026 | 0.033 |
| b1 | 1.19 | 1.69 | 0.047 | 0.066 |
| b2 | 1.19 | 1.39 | 0.047 | 0.055 |
| c | 0.40 | 0.60 | 0.016 | 0.024 |
| D | 15.35 | 15.95 | 0.604 | 0.628 |
| D1 | 9.05 | 9.45 | 0.356 | 0.372 |
| D2 | 12.30 | 13.05 | 0.484 | 0.514 |
| E | 9.80 | 10.20 | 0.386 | 0.402 |
| E1 | 7.25 | 8.60 | 0.285 | 0.339 |
| e1 | 5.08 | | 0.200 | |
| N | 2 | | 2 | |
| H1 | 5.90 | 6.90 | 0.232 | 0.272 |
| L | 13.00 | 14.00 | 0.512 | 0.551 |
| L1 | 3.30 | 3.70 | 0.130 | 0.146 |
| øP | 3.55 | 3.70 | 0.140 | 0.146 |
| Q | 2.60 | 3.00 | 0.102 | 0.118 |

Dimensions in mm/inches

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