

## 3 Quadrants Standard TRIAC

### FEATURES

- ❑ Repetitive Peak Off-State Voltage : 600V/800V
- ❑ R.M.S On-State Current ( $I_{T(RMS)} = 20A$ )
- ❑ Gate Trigger Current : 50mA
- ❑ High commutation capability.

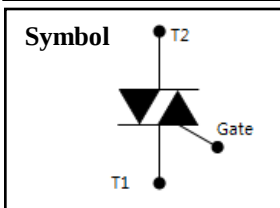
### Applications

General purpose of AC switching, heating control, motor control, etc

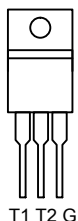
### General Description

Din-Tek's standard TRIAC product is a glass passivated device, has a high commutative performance, stable gate triggering level to temperature and high off state voltage. It is generally suitable for power and phase control in ac application

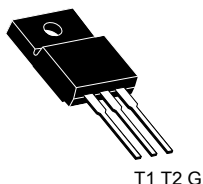
$$\begin{aligned} V_{DRM} &= 600V/800V \\ I_{T(RMS)} &= 20 A \\ I_{TSM} &= 258 A \\ I_{GT} &= 50mA \end{aligned}$$



TO-220AB



TO-220 FULLPAK



TO-247AC



### Absolute Maximum Ratings

( $T_J = 25^\circ C$  unless otherwise specified )

| Symbol       | Parameter                              | Conditions                                       | Ratings  |          | Unit             |
|--------------|----------------------------------------|--------------------------------------------------|----------|----------|------------------|
|              |                                        |                                                  | DTJ20A60 | DTJ20A80 |                  |
| $V_{DRM}$    | Repetitive Peak Off-State Voltage      | Sine wave, 50/60Hz, Gate open                    | 600      | 800      | V                |
| $V_{RRM}$    | Repetitive Peak Reverse Voltage        |                                                  | 600      | 800      | V                |
| $I_{T(AV)}$  | Average On-State Current               | Full sine wave, $T_C = 97.6^\circ C$             | 18.5     |          | A                |
| $I_{T(RMS)}$ | R.M.S. On-State Current                |                                                  | 20       |          | A                |
| $I_{TSM}$    | Surge On-State Current                 | ½ cycle, 50Hz/60Hz, Sine wave, Non repetitive    | 250/258  |          | A                |
| $I^2t$       | Fusing Current                         | $t = 10ms$                                       | 152      |          | A <sup>2</sup> S |
| $P_{GM}$     | Forward Peak Gate Power Dissipation    | $T_J = 125^\circ C$                              | 5        |          | W                |
| $P_{G(AV)}$  | Forward Average Gate Power Dissipation | $T_J = 125^\circ C$ , over any 20ms              | 1        |          | W                |
| $I_{FGM}$    | Forward Peak Gate Current              | $T_J = 125^\circ C$ , pulse width $\leq 20\mu s$ | 2        |          | A                |
| $V_{RGM}$    | Reverse Peak Gate Voltage              | $T_J = 125^\circ C$ , pulse width $\leq 20\mu s$ | 10       |          | V                |
| $T_J$        | Operating Junction Temperature         |                                                  | -40~+150 |          | $^\circ C$       |
| $T_{STG}$    | Storage Temperature                    |                                                  | -40~+150 |          | $^\circ C$       |

**Electrical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise specified )

| Symbol           | Parameter                                  | Conditions                                                     | Min                     | Typ | Max | Unit                   |
|------------------|--------------------------------------------|----------------------------------------------------------------|-------------------------|-----|-----|------------------------|
| $I_{\text{DRM}}$ | Repetitive Peak Off-State Current          | $V_D = V_{\text{DRM}}$                                         | $T_J=25^\circ\text{C}$  | -   | -   | 50 $\mu\text{A}$       |
|                  |                                            |                                                                | $T_J=125^\circ\text{C}$ | -   | -   | 5 $\text{mA}$          |
| $I_{\text{RRM}}$ | Repetitive Peak Reverse Current            | $V_D = V_{\text{DRM}}$                                         | $T_J=25^\circ\text{C}$  | -   | -   | 50 $\mu\text{A}$       |
|                  |                                            |                                                                | $T_J=125^\circ\text{C}$ | -   | -   | 5 $\text{mA}$          |
| $I_{\text{GT}}$  | Gate Trigger Current                       | $V_D = 12\text{V}$ , $R_L=330\Omega$                           | 1+, 1-, 3-              | -   | -   | 50 $\text{mA}$         |
| $V_{\text{GT}}$  | Gate Trigger Voltage                       | $V_D = 12\text{V}$ , $R_L=330\Omega$                           | 1+, 1-, 3-              | -   | -   | 2.0 $\text{V}$         |
| $V_{\text{GD}}$  | Non-Trigger Gate Voltage <sup>1</sup>      | $V_D = 12\text{V}$ , $R_L=330\Omega$ , $T_J=125^\circ\text{C}$ | 0.2                     | -   | -   | $\text{V}$             |
| $V_{\text{TM}}$  | Peak On-State Voltage                      | $I_T = 23\text{A}$ , $I_G = 50\text{mA}$                       | -                       | 1.2 | 1.6 | $\text{V}$             |
| $dv/dt$          | Critical Rate of Rise of Off-State Voltage | $V_D = 2/3 V_{\text{DRM}}$ , $T_J=125^\circ\text{C}$           | 200                     | -   | -   | $\text{V}/\mu\text{s}$ |
| $I_H$            | Holding current                            | $I_T = 0.2\text{A}$                                            | -                       | 50  | -   | $\text{mA}$            |

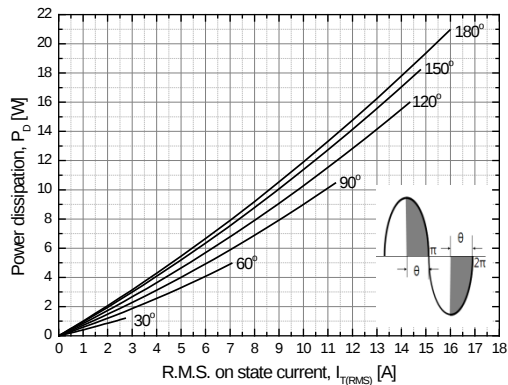
**Notes :**

1. Pulse Width  $\leq 1.0\text{ms}$ , Duty Cycle  $\leq 1\%$

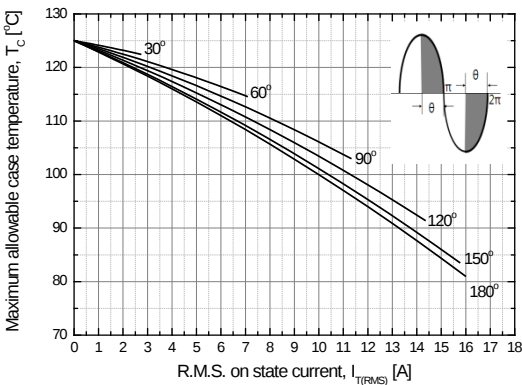
**Thermal Characteristics**

| Symbol                | Parameter          | Conditions          | Min | Typ | Max | Unit                      |
|-----------------------|--------------------|---------------------|-----|-----|-----|---------------------------|
| $R_{\theta\text{JC}}$ | Thermal Resistance | Junction to Case    |     |     | 2.1 | $^\circ\text{C}/\text{W}$ |
| $R_{\theta\text{JA}}$ | Thermal Resistance | Junction to Ambient |     |     | 58  | $^\circ\text{C}/\text{W}$ |

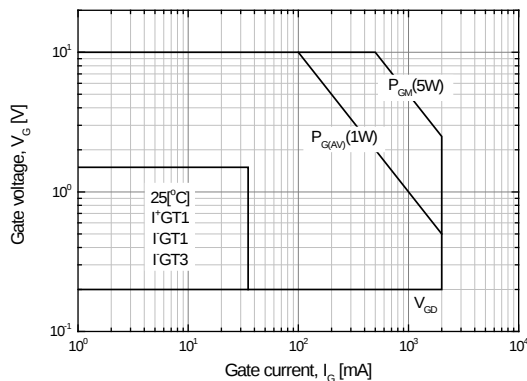
# Typical Characteristics



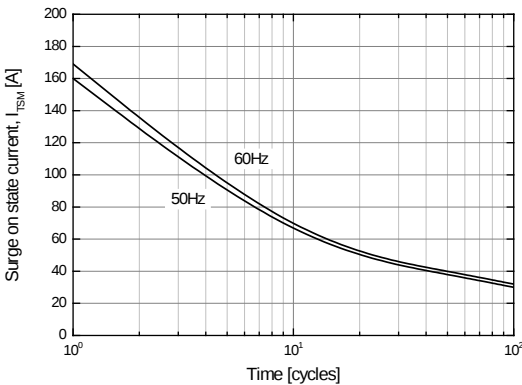
**Fig 1. R.M.S. current vs. Power dissipation**



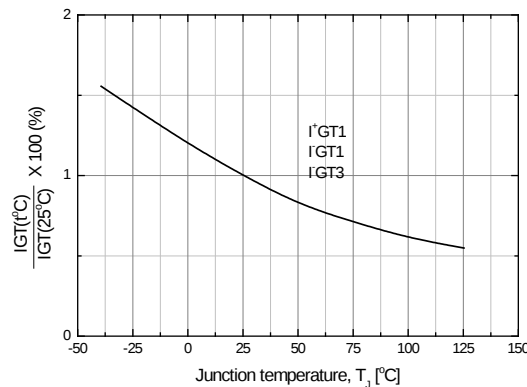
**Fig 2. R.M.S. current vs. Case temperature**



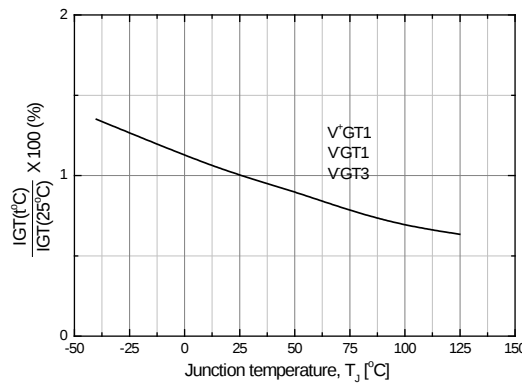
**Fig 3. Gate power characteristics**



**Fig 4. Surge on state current rating  
(Non-repetitive)**

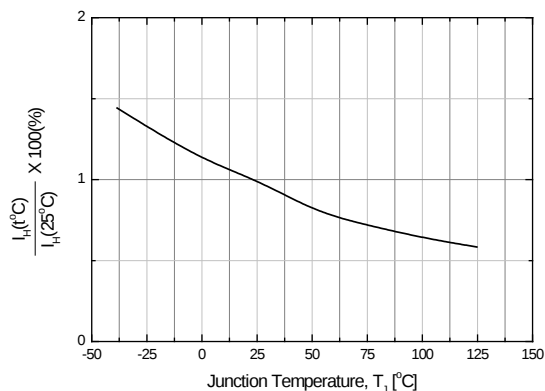


**Fig 5. Gate trigger current vs.  
junction temperature**

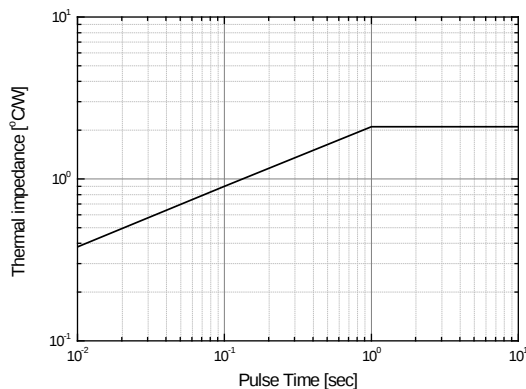


**Fig 6. Gate trigger voltage vs.  
junction temperature**

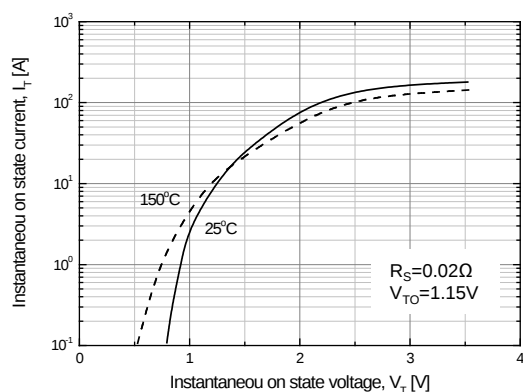
## Typical Characteristics



**Fig 7. Holding current vs.  
Junction temperature**

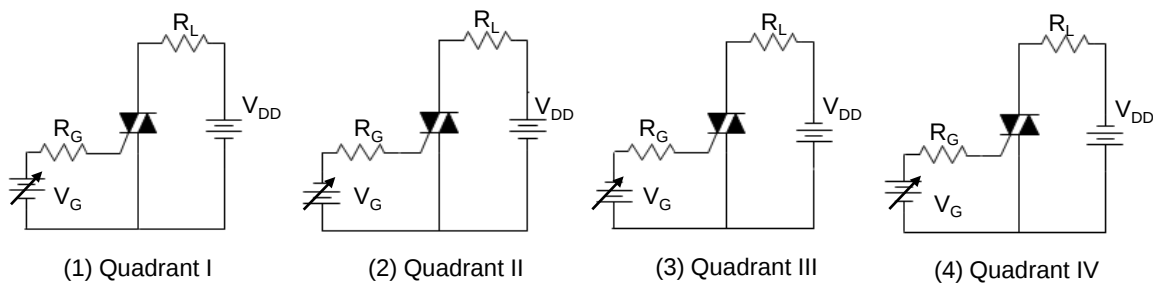


**Fig 8. Thermal Impedance vs. pulse time**



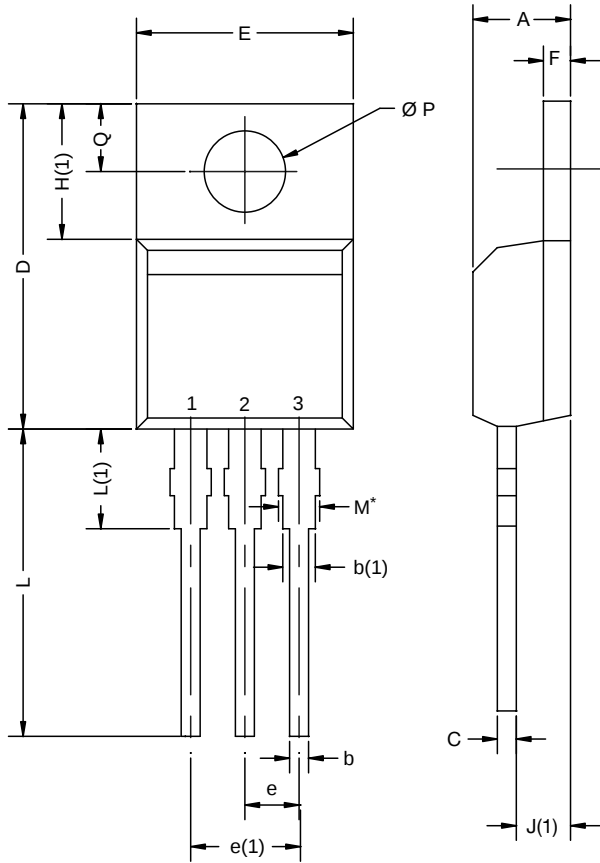
**Fig 9. Instantaneous on state current vs.  
Instantaneous on state voltage**

## Measurement of gate trigger current



Note. Whole parameter and test condition can not be over absolute maximum ratings in this datasheet.

## TO-220AB

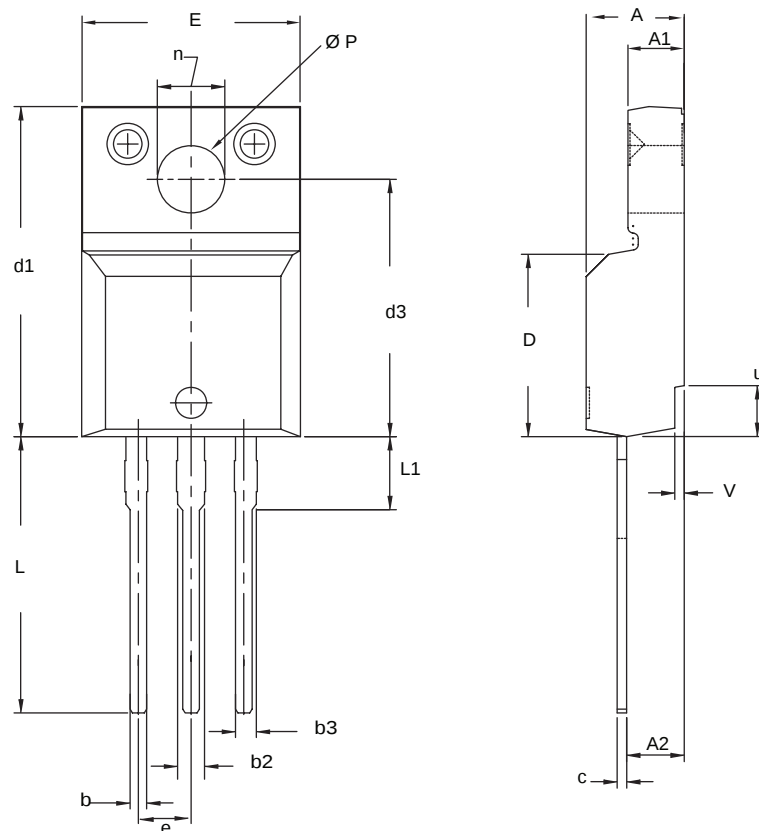


| DIM.                                         | MILLIMETERS |       | INCHES |       |
|----------------------------------------------|-------------|-------|--------|-------|
|                                              | MIN.        | MAX.  | MIN.   | MAX.  |
| A                                            | 4.25        | 4.65  | 0.167  | 0.183 |
| b                                            | 0.69        | 1.01  | 0.027  | 0.040 |
| b(1)                                         | 1.20        | 1.73  | 0.047  | 0.068 |
| c                                            | 0.36        | 0.61  | 0.014  | 0.024 |
| D                                            | 14.85       | 15.49 | 0.585  | 0.610 |
| E                                            | 10.04       | 10.51 | 0.395  | 0.414 |
| e                                            | 2.41        | 2.67  | 0.095  | 0.105 |
| e(1)                                         | 4.88        | 5.28  | 0.192  | 0.208 |
| F                                            | 1.14        | 1.40  | 0.045  | 0.055 |
| H(1)                                         | 6.09        | 6.48  | 0.240  | 0.255 |
| J(1)                                         | 2.41        | 2.92  | 0.095  | 0.115 |
| L                                            | 13.35       | 14.02 | 0.526  | 0.552 |
| L(1)                                         | 3.32        | 3.82  | 0.131  | 0.150 |
| $\varnothing P$                              | 3.54        | 3.94  | 0.139  | 0.155 |
| Q                                            | 2.60        | 3.00  | 0.102  | 0.118 |
| ECN: X12-0208-Rev. N, 08-Oct-12<br>DWG: 5471 |             |       |        |       |

### Notes

\* M = 1.32 mm to 1.62 mm (dimension including protrusion)  
Heatsink hole for HVM

**TO-220 FULLPAK (HIGH VOLTAGE)**



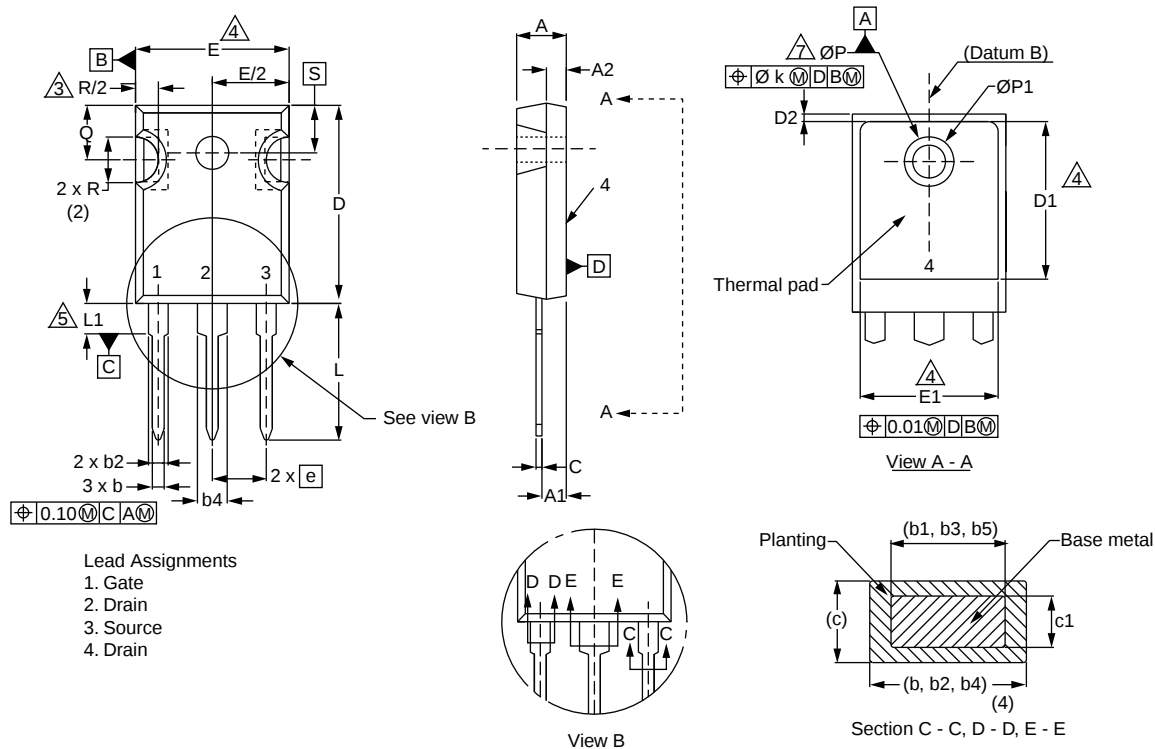
| DIM. | MILLIMETERS |        | INCHES    |       |
|------|-------------|--------|-----------|-------|
|      | MIN.        | MAX.   | MIN.      | MAX.  |
| A    | 4.570       | 4.830  | 0.180     | 0.190 |
| A1   | 2.570       | 2.830  | 0.101     | 0.111 |
| A2   | 2.510       | 2.850  | 0.099     | 0.112 |
| b    | 0.622       | 0.890  | 0.024     | 0.035 |
| b2   | 1.229       | 1.400  | 0.048     | 0.055 |
| b3   | 1.229       | 1.400  | 0.048     | 0.055 |
| c    | 0.440       | 0.629  | 0.017     | 0.025 |
| D    | 8.650       | 9.800  | 0.341     | 0.386 |
| d1   | 15.88       | 16.120 | 0.622     | 0.635 |
| d3   | 12.300      | 12.920 | 0.484     | 0.509 |
| E    | 10.360      | 10.630 | 0.408     | 0.419 |
| e    | 2.54 BSC    |        | 0.100 BSC |       |
| L    | 13.200      | 13.730 | 0.520     | 0.541 |
| L1   | 3.100       | 3.500  | 0.122     | 0.138 |
| n    | 6.050       | 6.150  | 0.238     | 0.242 |
| Ø P  | 3.050       | 3.450  | 0.120     | 0.136 |
| u    | 2.400       | 2.500  | 0.094     | 0.098 |
| v    | 0.400       | 0.500  | 0.016     | 0.020 |

ECN: X09-0126-Rev. B, 26-Oct-09  
DWG: 5972

**Notes**

1. To be used only for process drawing.
2. These dimensions apply to all TO-220, FULLPAK leadframe versions 3 leads.
3. All critical dimensions should C meet  $C_{pk} > 1.33$ .
4. All dimensions include burrs and plating thickness.
5. No chipping or package damage.

# TO-247AC (High Voltage)



| DIM. | MILLIMETERS |       | INCHES |       |
|------|-------------|-------|--------|-------|
|      | MIN.        | MAX.  | MIN.   | MAX.  |
| A    | 4.58        | 5.31  | 0.180  | 0.209 |
| A1   | 2.21        | 2.59  | 0.087  | 0.102 |
| A2   | 1.17        | 2.49  | 0.046  | 0.098 |
| b    | 0.99        | 1.40  | 0.039  | 0.055 |
| b1   | 0.99        | 1.35  | 0.039  | 0.053 |
| b2   | 1.53        | 2.39  | 0.060  | 0.094 |
| b3   | 1.65        | 2.37  | 0.065  | 0.093 |
| b4   | 2.42        | 3.43  | 0.095  | 0.135 |
| b5   | 2.59        | 3.38  | 0.102  | 0.133 |
| c    | 0.38        | 0.86  | 0.015  | 0.034 |
| c1   | 0.38        | 0.76  | 0.015  | 0.030 |
| D    | 19.71       | 20.82 | 0.776  | 0.820 |
| D1   | 13.08       | -     | 0.515  | -     |

| DIM. | MILLIMETERS |       | INCHES    |       |
|------|-------------|-------|-----------|-------|
|      | MIN.        | MAX.  | MIN.      | MAX.  |
| D2   | 0.51        | 1.30  | 0.020     | 0.051 |
| E    | 15.29       | 15.87 | 0.602     | 0.625 |
| E1   | 13.72       | -     | 0.540     | -     |
| e    | 5.46 BSC    |       | 0.215 BSC |       |
| Ø k  | 0.254       |       | 0.010     |       |
| L    | 14.20       | 16.25 | 0.559     | 0.640 |
| L1   | 3.71        | 4.29  | 0.146     | 0.169 |
| N    | 7.62 BSC    |       | 0.300 BSC |       |
| Ø P  | 3.51        | 3.66  | 0.138     | 0.144 |
| Ø P1 | -           | 7.39  | -         | 0.291 |
| Q    | 5.31        | 5.69  | 0.209     | 0.224 |
| R    | 4.52        | 5.49  | 0.178     | 0.216 |
| S    | 5.51 BSC    |       | 0.217 BSC |       |

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