

## General Description

The WSR200N08A is the highest performance trench N-Ch MOSFET with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The WSR200N08A meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

## Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

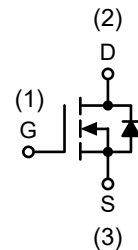
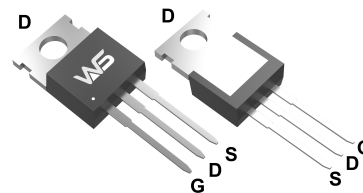
## Product Summary

| $BV_{DSS}$ | $R_{DS(ON)}$ | $I_D$ |
|------------|--------------|-------|
| 80V        | 3m $\Omega$  | 200A  |

## Applications

- Switching application
- Power Management for Inverter Systems.

## TO-220-3L Pin Configuration



## Absolute Maximum Ratings

| Symbol                | Parameter  | Rating     | Units      |
|-----------------------|--|------------|------------|
| $V_{DS}$              | Drain-Source Voltage                                 | 80         | V          |
| $V_{GS}$              | Gate-Source Voltage                                  | $\pm 25$   | V          |
| $I_D@T_C=25^\circ C$  | Continuous Drain Current, $V_{GS} @ 10V^1$           | 200        | A          |
| $I_D@T_C=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$           | 144        | A          |
| $I_{DM}$              | Pulsed Drain Current <sup>2</sup> , $T_C=25^\circ C$ | 790        | A          |
| EAS                   | Avalanche Energy, Single pulse, $L=0.5mH$            | 1496       | mJ         |
| $I_{AS}$              | Avalanche Current, Single pulse, $L=0.5mH$           | 200        | A          |
| $P_D@T_C=25^\circ C$  | Total Power Dissipation <sup>4</sup>                 | 345        | W          |
| $P_D@T_C=100^\circ C$ | Total Power Dissipation <sup>4</sup>                 | 173        | W          |
| $T_{STG}$             | Storage Temperature Range                            | -55 to 175 | $^\circ C$ |
| $T_J$                 | Operating Junction Temperature Range                 | 175        | $^\circ C$ |

## Thermal Data

| Symbol          | Parameter  | Typ. | Max. | Unit         |
|-----------------|--|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient <sup>1</sup> | ---  | 62.5 | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case <sup>1</sup>    | ---  | 0.43 | $^\circ C/W$ |

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

| Symbol                              | Parameter                                      | Conditions  | Min. | Typ.  | Max. | Unit  |
|-------------------------------------|--|---|------|-------|------|-------|
| BV <sub>DSS</sub>                   | Drain-Source Breakdown Voltage                 | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA  | 80   | ---   | ---  | V     |
| ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | BV <sub>DSS</sub> Temperature Coefficient      | Reference to 25°C, I <sub>D</sub> =1mA  | ---  | 0.096 | ---  | V/°C  |
| R <sub>DS(ON)</sub>                 | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =100A  | ---  | 3.0   | 4.0  | mΩ    |
| V <sub>GS(th)</sub>                 | Gate Threshold Voltage                         | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA                            | 2.0  | 3.0   | 4.0  | V     |
| ΔV <sub>GS(th)</sub>                | V <sub>GS(th)</sub> Temperature Coefficient    |   | ---  | -5.5  | ---  | mV/°C |
| I <sub>DSS</sub>                    | Drain-Source Leakage Current                   | V <sub>DS</sub> =80V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                     | ---  | ---   | 1    | uA    |
|                                     |  | V <sub>DS</sub> =80V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C                     | ---  | ---   | 10   |       |
| I <sub>GSS</sub>                    | Gate-Source Leakage Current                    | V <sub>GS</sub> =±25V, V <sub>DS</sub> =0V  | ---  | ---   | ±100 | nA    |
| R <sub>g</sub>                      | Gate Resistance                                | V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz                                    | ---  | 3.2   | ---  | Ω     |
| Q <sub>g</sub>                      | Total Gate Charge (10V)                        | V <sub>DS</sub> =80V, V <sub>GS</sub> =10V, I <sub>D</sub> =30A                     | ---  | 197   | ---  | nC    |
| Q <sub>gs</sub>                     | Gate-Source Charge                             |   | ---  | 31    | ---  |       |
| Q <sub>gd</sub>                     | Gate-Drain Charge                              |   | ---  | 75    | ---  |       |
| T <sub>d(on)</sub>                  | Turn-On Delay Time                             | V <sub>DD</sub> =50V, V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω, I <sub>D</sub> =30A | ---  | 18    | ---  | ns    |
| T <sub>r</sub>                      | Rise Time                                      |   | ---  | 28    | ---  |       |
| T <sub>d(off)</sub>                 | Turn-Off Delay Time                            |   | ---  | 42    | ---  |       |
| T <sub>f</sub>                      | Fall Time                                      |   | ---  | 54    | ---  |       |
| C <sub>iss</sub>                    | Input Capacitance                              | V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz                                   | ---  | 8154  | ---  | pF    |
| C <sub>oss</sub>                    | Output Capacitance                             |   | ---  | 1029  | ---  |       |
| C <sub>rss</sub>                    | Reverse Transfer Capacitance                   |   | ---  | 650   | ---  |       |

**Guaranteed Avalanche Characteristics**

| Symbol | Parameter                                  | Conditions  | Min. | Typ. | Max. | Unit |
|--------|--|---|------|------|------|------|
| EAS    | Single Pulse Avalanche Energy <sup>5</sup> | V <sub>DD</sub> =25V, L=0.5mH, I <sub>AS</sub> =28A | 160  | ---  | ---  | mJ   |

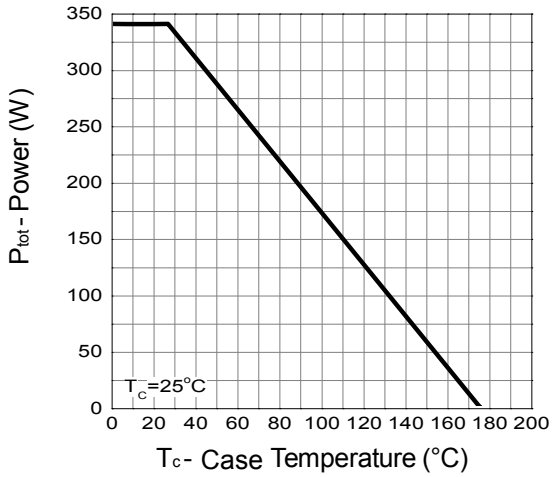
**Diode Characteristics**

| Symbol          | Parameter                                | Conditions   | Min. | Typ. | Max. | Unit |
|-----------------|--|--|------|------|------|------|
| I <sub>S</sub>  | Continuous Source Current <sup>1,6</sup> | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current              | ---  | ---  | 200  | A    |
| I <sub>SM</sub> | Pulsed Source Current <sup>2,6</sup>     |  | ---  | ---  | 350  | A    |
| V <sub>SD</sub> | Diode Forward Voltage <sup>2</sup>       | V <sub>GS</sub> =0V, I <sub>S</sub> =15A, T <sub>J</sub> =25°C | ---  | ---  | 1.2  | V    |
| t <sub>rr</sub> | Reverse Recovery Time                    | I <sub>F</sub> =15A, dI/dt=100A/μs, T <sub>J</sub> =25°C       | ---  | 30   | ---  | nS   |
| Q <sub>rr</sub> | Reverse Recovery Charge                  |  | ---  | 52   | ---  | nC   |

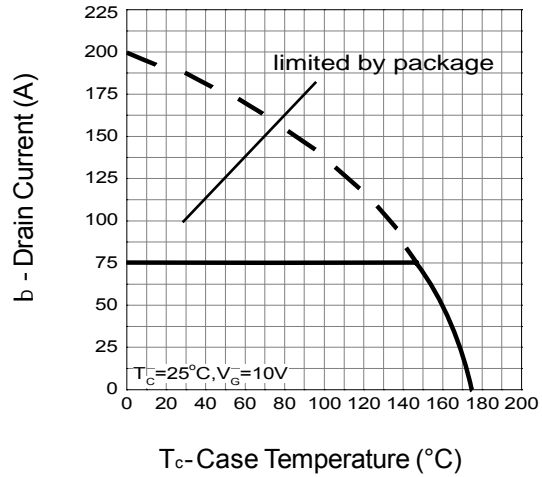
Note \* : Pulse test ; pulse width ≤300μs, duty cycle ≤2%.

**Typical Operating Characteristics**

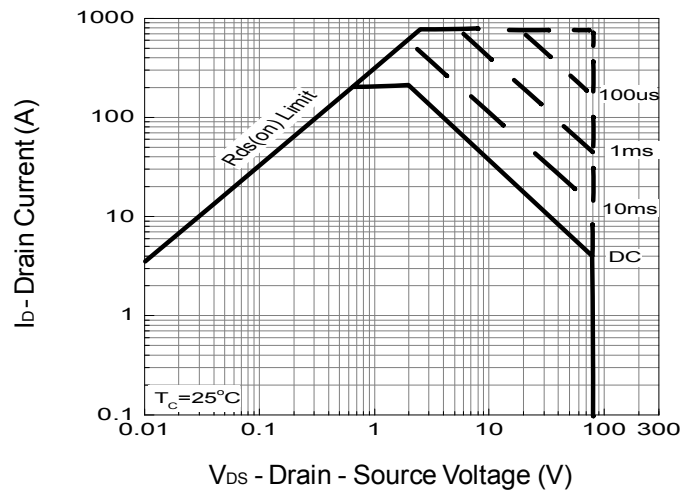
**Power Dissipation**



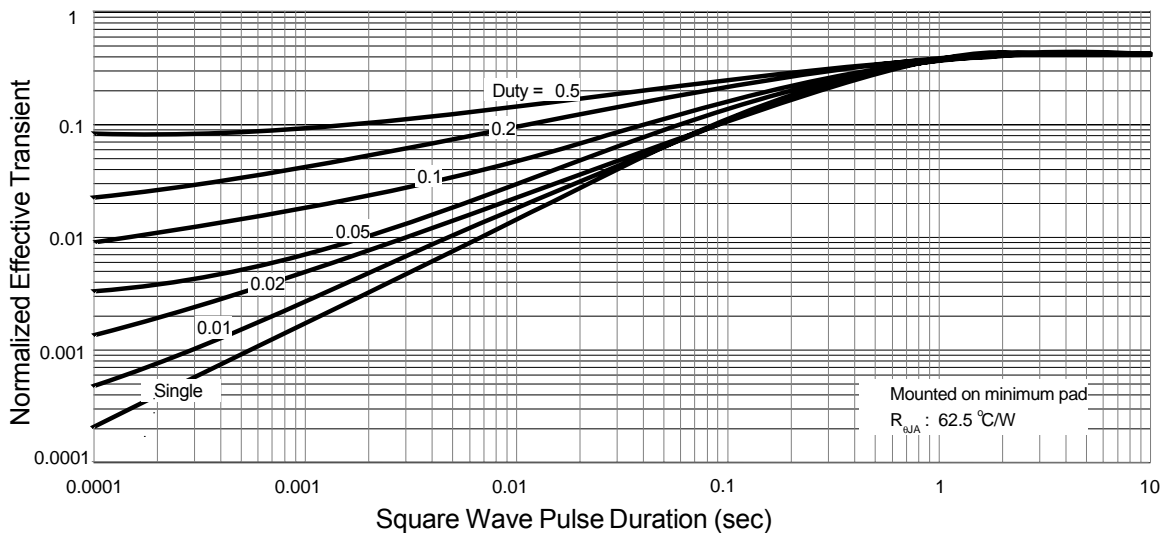
**Drain Current**



**Safe Operation Area**

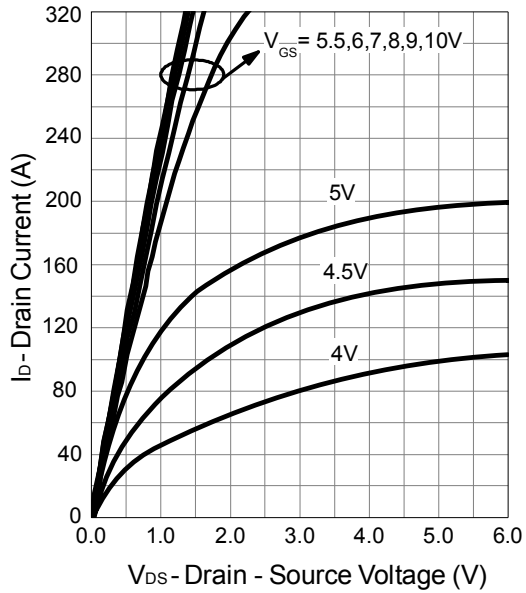


**Thermal Transient Impedance**

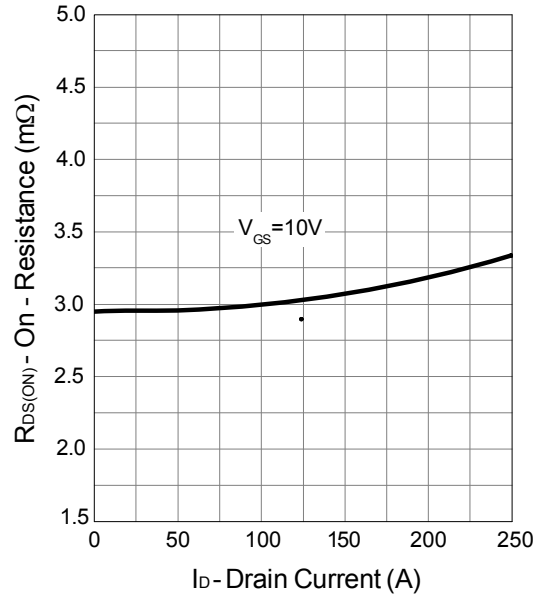


**Typical Operating Characteristics (Cont.)**

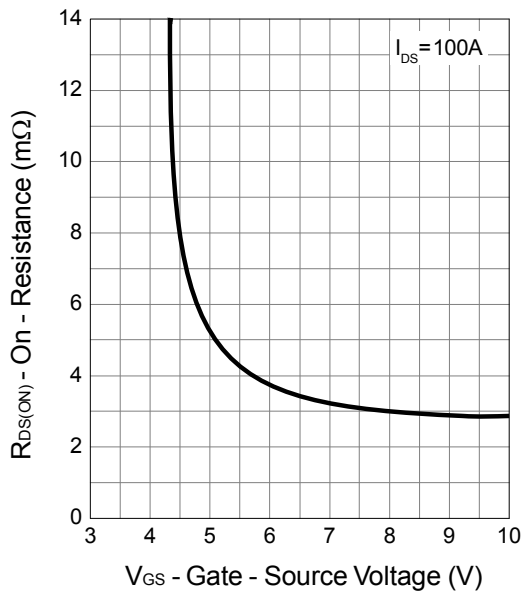
**Output Characteristics**



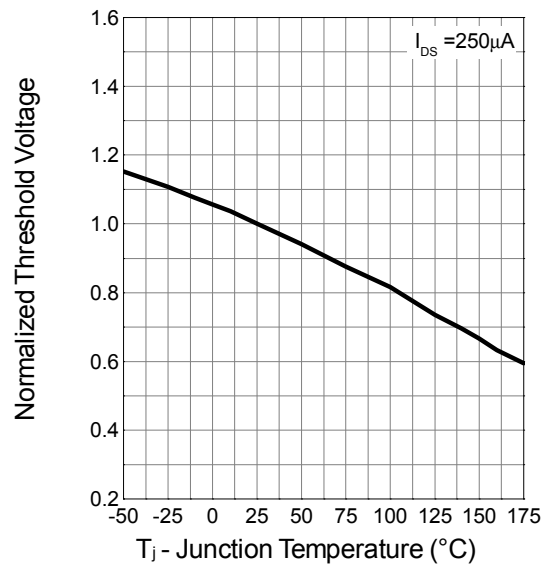
**Drain-Source On Resistance**



**Gate-Source On Resistance**

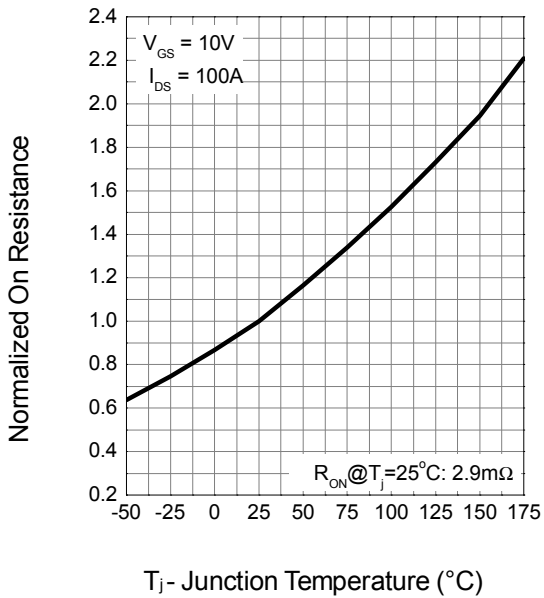


**Gate Threshold Voltage**

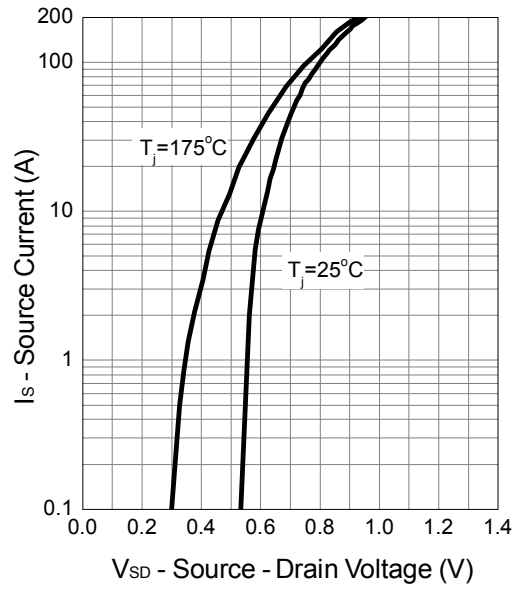


**Typical Operating Characteristics (Cont.)**

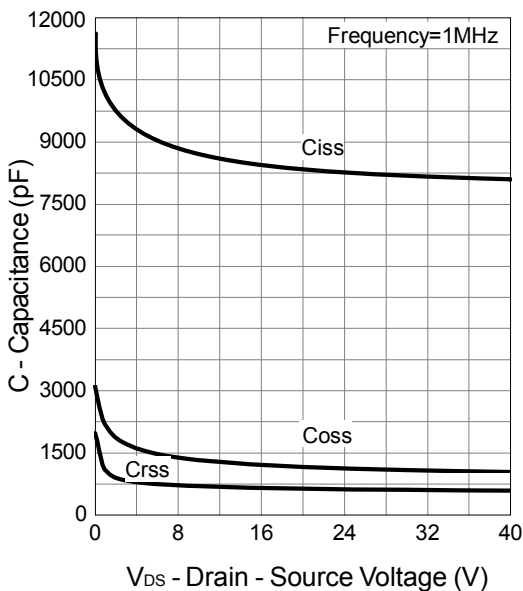
**Drain-Source On Resistance**



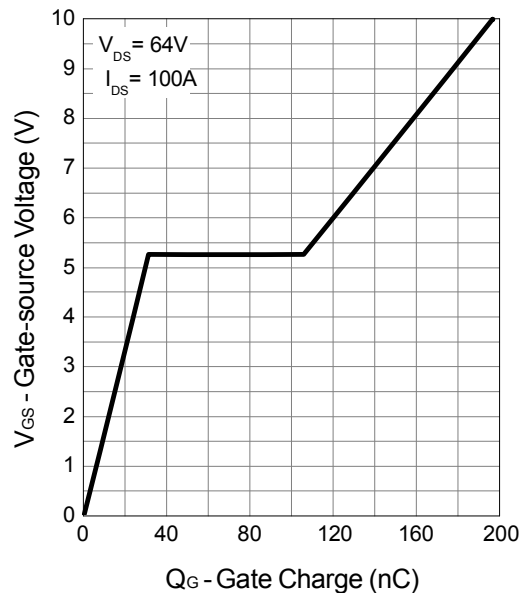
**Source-Drain Diode Forward**

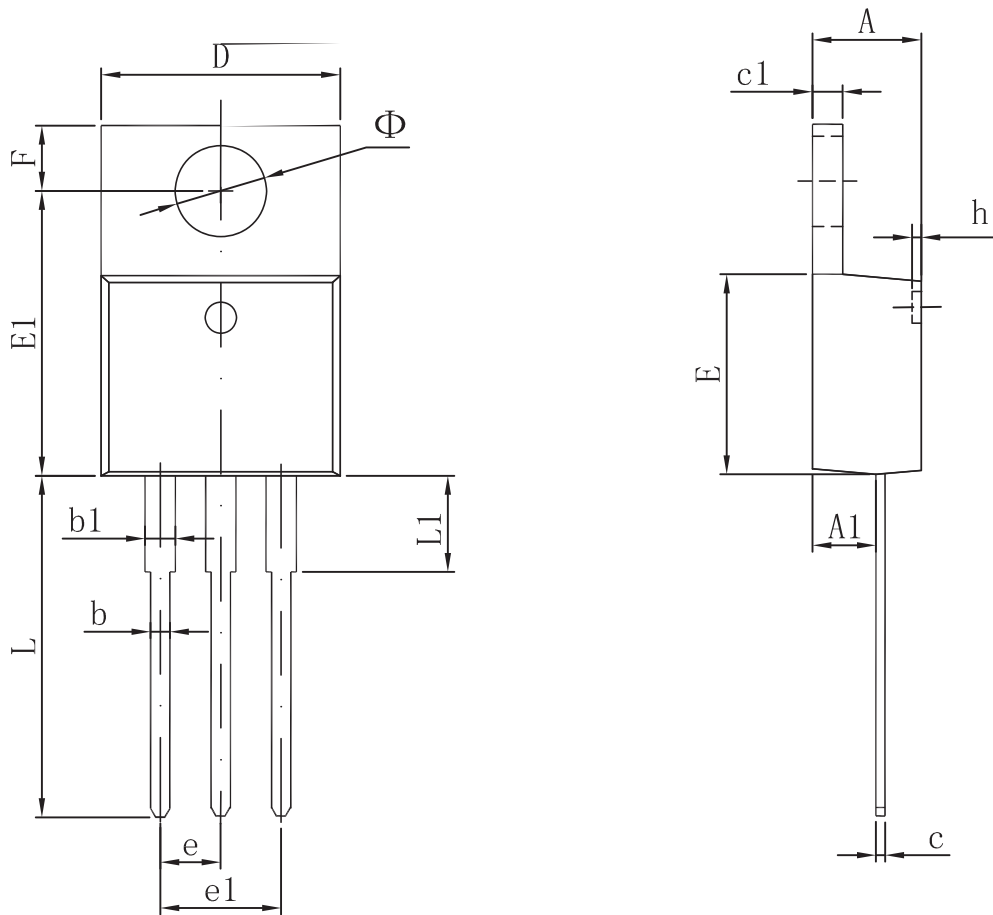


**Capacitance**



**Gate Charge**



**Packaging information**


| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min                       | Max    | Min                  | Max   |
| A      | 4.470                     | 4.670  | 0.176                | 0.184 |
| A1     | 2.520                     | 2.820  | 0.099                | 0.111 |
| b      | 0.710                     | 0.910  | 0.028                | 0.036 |
| b1     | 1.170                     | 1.370  | 0.046                | 0.054 |
| c      | 0.310                     | 0.530  | 0.012                | 0.021 |
| c1     | 1.170                     | 1.370  | 0.046                | 0.054 |
| D      | 10.010                    | 10.310 | 0.394                | 0.406 |
| E      | 8.500                     | 8.900  | 0.335                | 0.350 |
| E1     | 12.060                    | 12.460 | 0.475                | 0.491 |
| e      | 2.540 TYP                 |        | 0.100 TYP            |       |
| e1     | 4.980                     | 5.180  | 0.196                | 0.204 |
| F      | 2.590                     | 2.890  | 0.102                | 0.114 |
| h      | 0.000                     | 0.300  | 0.000                | 0.012 |
| L      | 13.400                    | 13.800 | 0.528                | 0.543 |
| L1     | 3.560                     | 3.960  | 0.140                | 0.156 |
| $\Phi$ | 3.735                     | 3.935  | 0.147                | 0.155 |



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