



Features

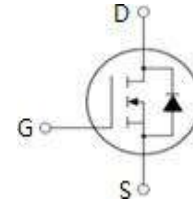
- Low On-Resistance
- Fast Switching Speed
- 100% avalanche tested
- Lead Free and Green Devices Available (RoHS Compliant)

Product Summary

| | | |
|-----------------------------|-----|------------|
| V_{DSS} | 40 | V |
| $R_{DS(ON)-Typ@V_{GS}=10V}$ | 4.0 | m Ω |
| I_D | 80 | A |

Application

- DC/DC Converters
- On board power for server
- Synchronous rectification



N-channel

Absolute Maximum Ratings

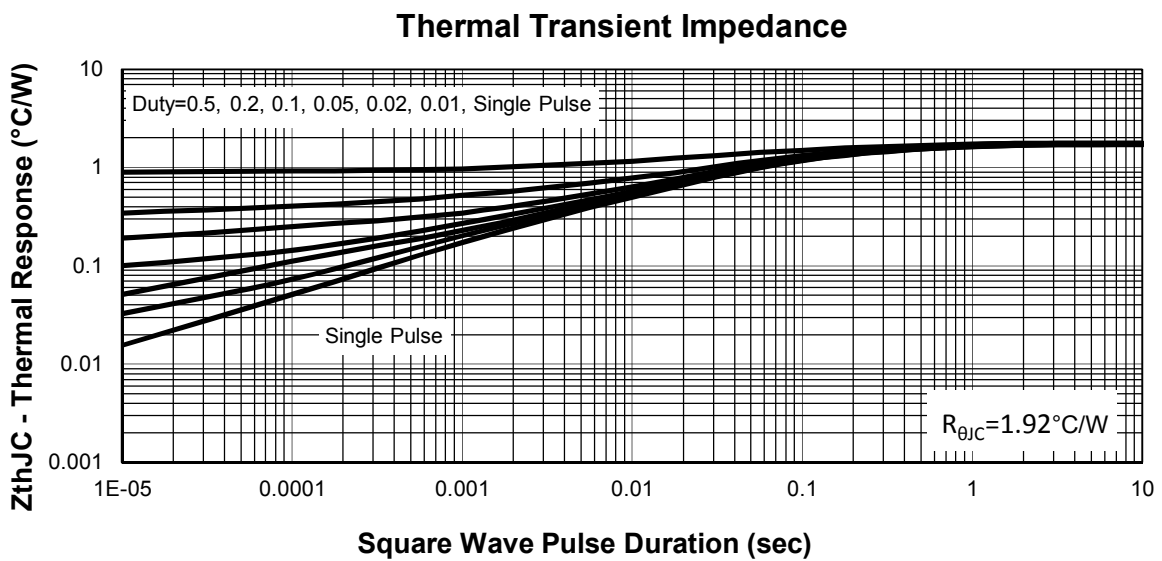
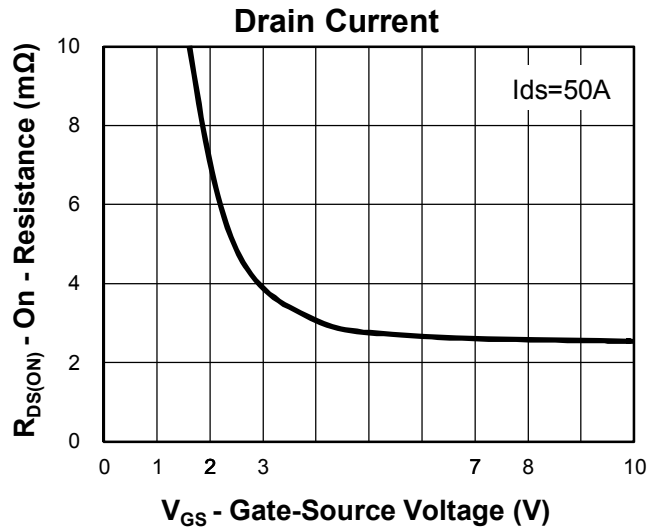
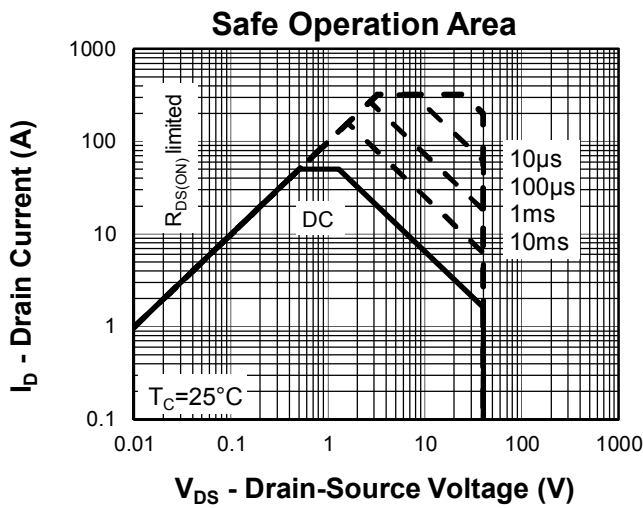
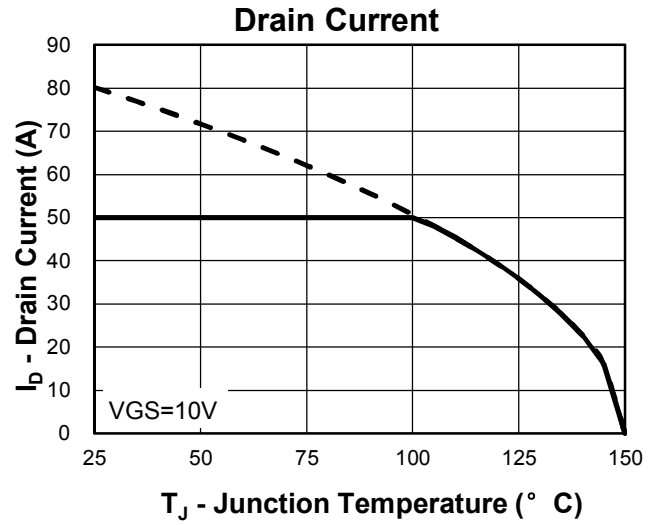
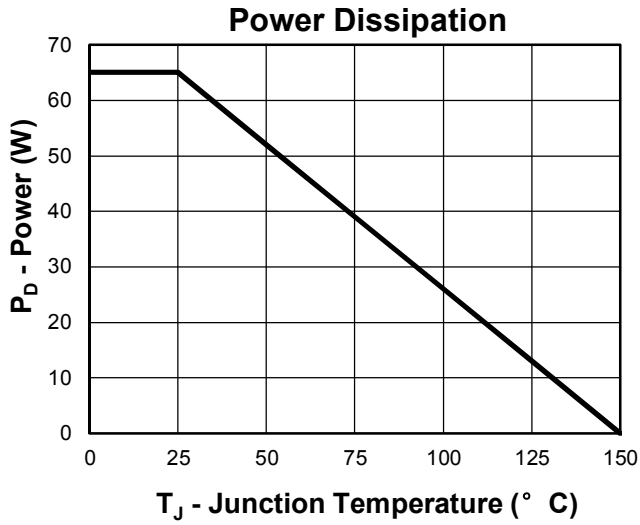
| Symbol | Parameter | Rating | Unit |
|--|---|-------------------------------|------------------|
| Common Ratings ($T_C=25^\circ\text{C}$ Unless Otherwise Noted) | | | |
| V_{DSS} | Drain-Source Voltage | 40 | V |
| V_{GSS} | Gate-Source Voltage | ± 20 | |
| T_J | Maximum Junction Temperature | 150 | $^\circ\text{C}$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| I_S | Diode Continuous Forward Current | $T_C=25^\circ\text{C}$ 80 | A |
| Mounted on Large Heat Sink | | | |
| $I_{DP}^{①}$ | 300 μs Pulse Drain Current Tested | $T_C=25^\circ\text{C}$ 320 | A |
| $I_D^{②}$ | Continuous Drain Current@ $T_C(V_{GS}=10V)$ | $T_C=25^\circ\text{C}$ 80 | A |
| | | $T_C=100^\circ\text{C}$ 51 | |
| | Continuous Drain Current@ $T_A(V_{GS}=10V)^{③}$ | $T_A=25^\circ\text{C}$ 25 | |
| | | $T_A=70^\circ\text{C}$ 19 | |
| P_D | Maximum Power Dissipation@ T_C | $T_C=25^\circ\text{C}$ 65 | W |
| | | $T_C=100^\circ\text{C}$ 26 | |
| | Maximum Power Dissipation@ $T_A^{③}$ | $T_A=25^\circ\text{C}$ 4.2 | |
| | | $T_A=70^\circ\text{C}$ 2.7 | |

| Symbol | Parameter | Rating | Unit |
|---------------------------------------|--|--------|--------------------|
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case | 2.4 | $^\circ\text{C/W}$ |
| $R_{\theta JA}^{③}$ | Thermal Resistance-Junction to Ambient | 62 | $^\circ\text{C/W}$ |
| Drain-Source Avalanche Ratings | | | |
| $E_{AS}^{④}$ | Avalanche Energy, Single Pulsed | 121 | mJ |

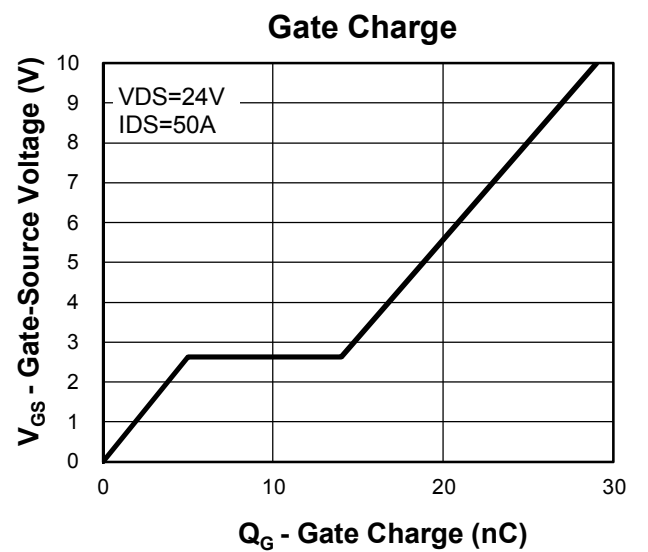
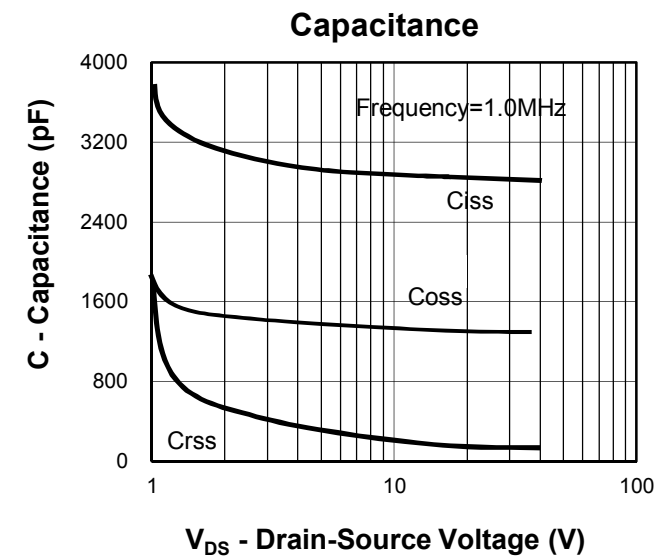
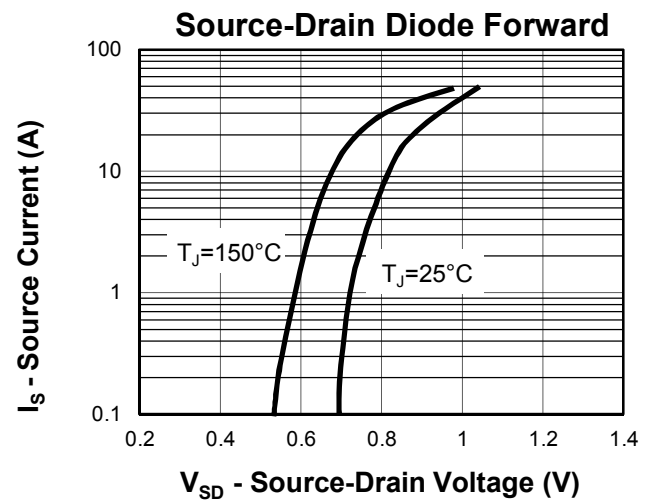
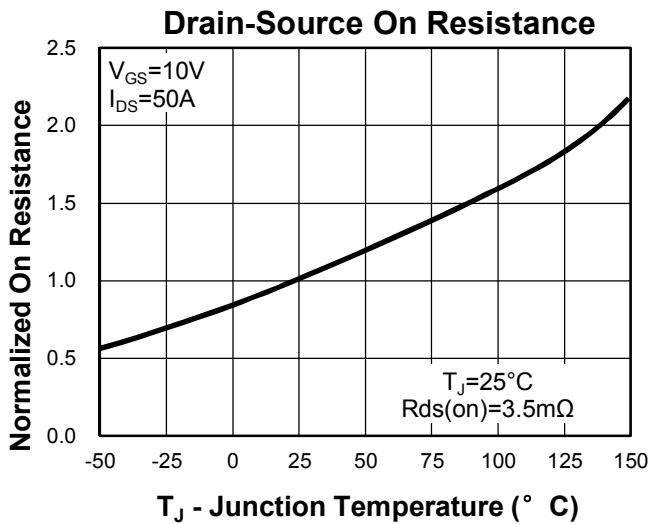
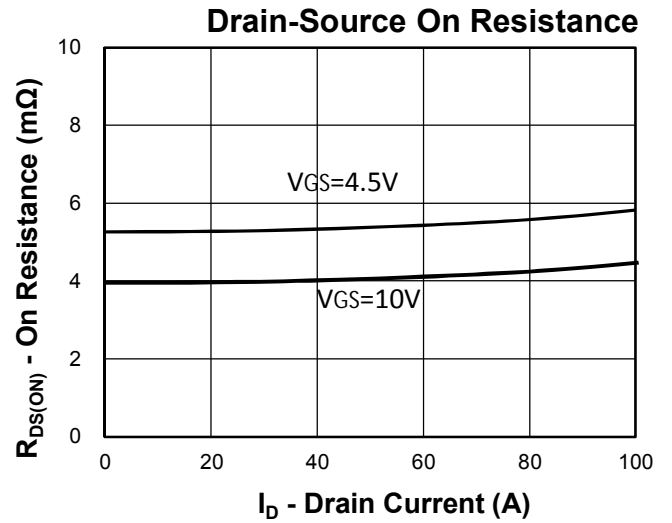
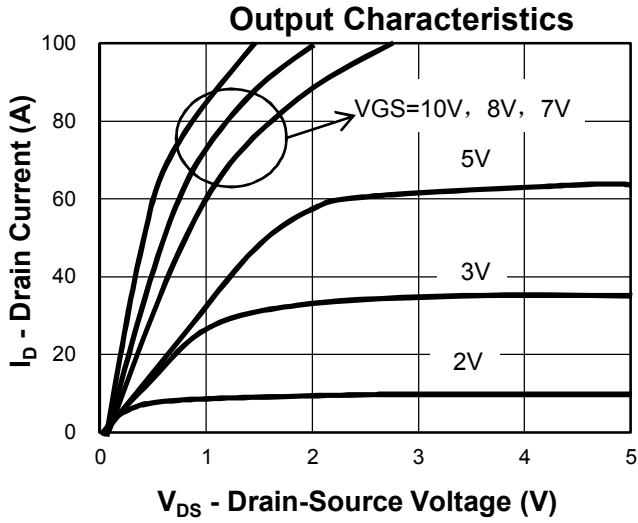
Electrical Characteristics ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)

| Symbol | Parameter | Test Condition | LIMIT | | | Unit |
|---|----------------------------------|---|-------|------|-----------|-----------|
| | | | Min. | Typ. | Max. | |
| Static Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_{DS}=250\mu A$ | 40 | | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=40V, V_{GS}=0V$ | | | 1 | μA |
| | | $T_J=125^\circ C$ | | | 30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_{DS}=250\mu A$ | 1 | | 2.5 | V |
| I_{GSS} | Gate Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | | | ± 100 | nA |
| $R_{DS(ON)}^{⑤}$ | Drain-Source On-state Resistance | $V_{GS}=4.5V, I_{DS}=35A$ | | 5.5 | 6.0 | $m\Omega$ |
| | | $V_{GS}=10V, I_{DS}=50A$ | | 4.0 | 4.5 | $m\Omega$ |
| Diode Characteristics | | | | | | |
| $V_{SD}^{⑤}$ | Diode Forward Voltage | $I_{SD}=50A, V_{GS}=0V$ | | | 1.2 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD}=50A, di_{SD}/dt=100A/\mu s$ | | 18 | | ns |
| Q_{rr} | Reverse Recovery Charge | | | 29 | | nC |
| Dynamic Characteristics ^⑥ | | | | | | |
| R_G | Gate Resistance | $V_{GS}=0V, V_{DS}=0V, F=1MHz$ | | 1.3 | | Ω |
| C_{iss} | Input Capacitance | $V_{GS}=0V,$ $V_{DS}=20V,$ Frequency=1.0MHz | | 3027 | | pF |
| C_{oss} | Output Capacitance | | | 1513 | | |
| C_{rss} | Reverse Transfer Capacitance | | | 155 | | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}=20V, I_{DS}=50A,$ $V_{GEN}=10V, R_G=4.7\Omega$ | | 13 | | ns |
| t_r | Turn-on Rise Time | | | 21 | | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | | 29 | | |
| t_f | Turn-off Fall Time | | | 9 | | |
| Gate Charge Characteristics ^⑥ | | | | | | |
| Q_g | Total Gate Charge | $V_{DS}=32V, V_{GS}=10V,$ $I_{DS}=50A$ | | 29 | | nC |
| Q_{gs} | Gate-Source Charge | | | 5 | | |
| Q_{gd} | Gate-Drain Charge | | | 9 | | |

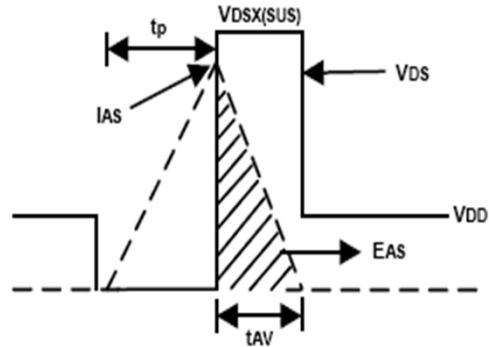
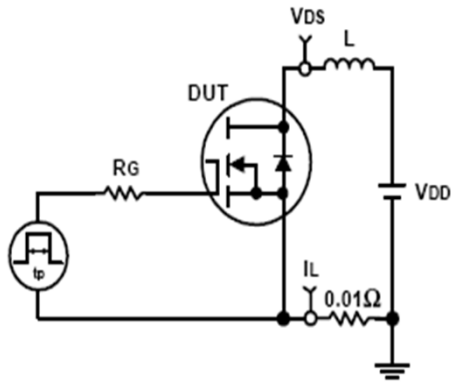
Typical Characteristics



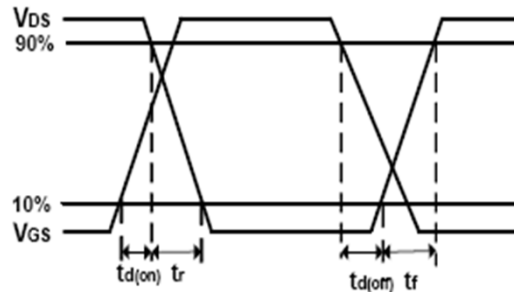
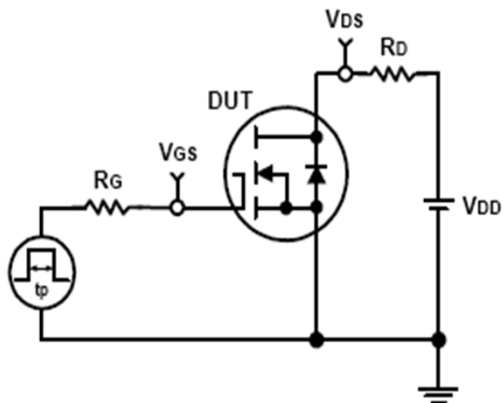
Typical Characteristics



Avalanche Test Circuit and Waveforms

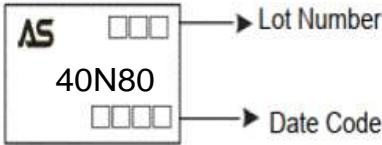


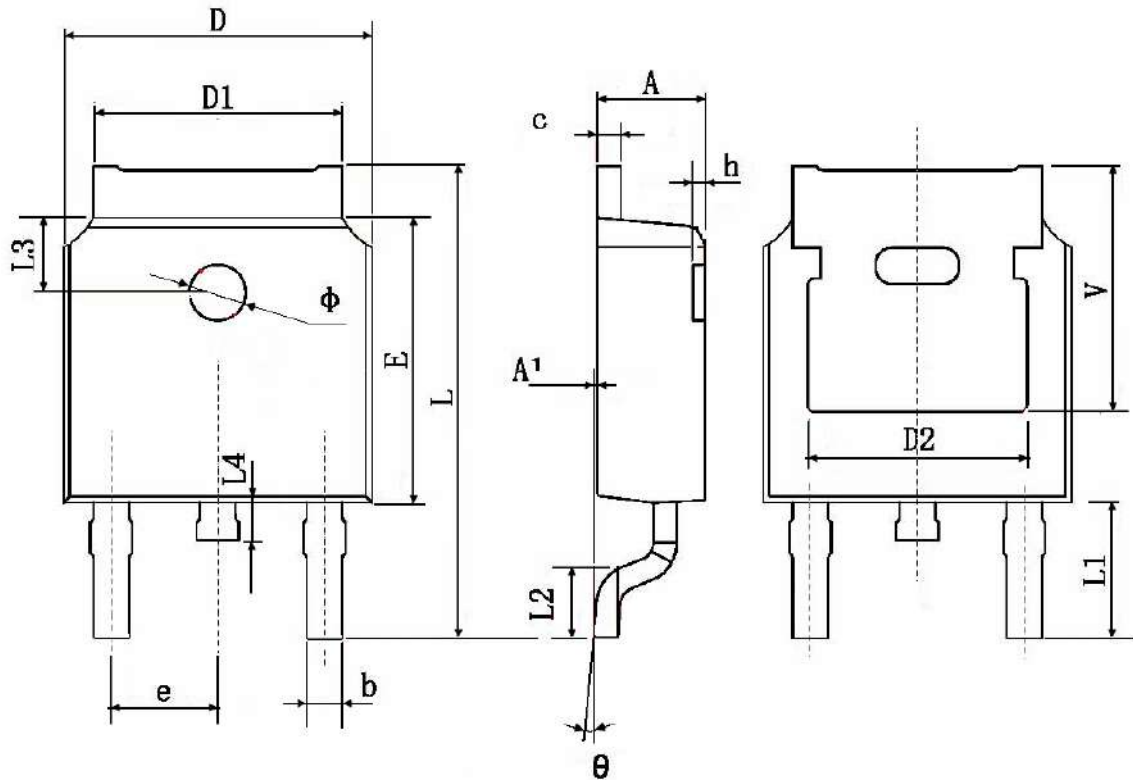
Switching Time Test Circuit and Waveforms



Ordering and Marking Information

| Ordering Device No. | Marking | Package | Packing | Quantity |
|---------------------|---------|---------|-----------|-----------|
| ASDM40N80KQ-R | 40N80 | TO-252 | Tape&Reel | 2500/Reel |

| PACKAGE | MARKING |
|---------|---|
| TO-252 |  <p>AS □□□ → Lot Number 40N80 □□□□ → Date Code</p> |

TO-252 Package Information


| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 2.200 | 2.400 | 0.087 | 0.094 |
| A1 | 0.000 | 0.127 | 0.000 | 0.005 |
| b | 0.660 | 0.860 | 0.026 | 0.034 |
| c | 0.460 | 0.580 | 0.018 | 0.023 |
| D | 6.500 | 6.700 | 0.256 | 0.264 |
| D1 | 5.100 | 5.460 | 0.201 | 0.215 |
| D2 | 0.483 TYP. | | 0.190 TYP. | |
| E | 6.000 | 6.200 | 0.236 | 0.244 |
| e | 2.186 | 2.386 | 0.086 | 0.094 |
| L | 9.800 | 10.400 | 0.386 | 0.409 |
| L1 | 2.900 TYP. | | 0.114 TYP. | |
| L2 | 1.400 | 1.700 | 0.055 | 0.067 |
| L3 | 1.600 TYP. | | 0.063 TYP. | |
| L4 | 0.600 | 1.000 | 0.024 | 0.039 |
| Φ | 1.100 | 1.300 | 0.043 | 0.051 |
| θ | 0° | 8° | 0° | 8° |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| V | 5.350 TYP. | | 0.211 TYP. | |

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