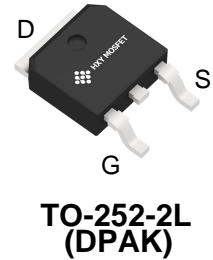




Description

The STD80N4F6 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 Battery protection or in other Switching application.



TO-252-2L
(DPAK)

General Features

$V_{DS} = 40V$ $I_D = 80A$

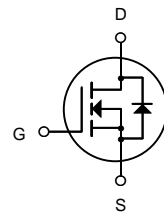
$R_{DS(ON)} < 5.4m\Omega @ V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|------------|-----------------|------------|----------|
| STD80N4F6 | TO-252-2L(DPAK) | HXY MOSFET | 2500 |

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|-------------------------|--|------------|--------------|
| V_{DS} | Drain-Source Voltage | 40 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D @ T_C=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 60 | A |
| $I_D @ T_C=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 38 | A |
| I_{DM} | Pulsed Drain Current | 240 | A |
| EAS | Single Pulse Avalanche Energy | 100 | mJ |
| I_{AS} | Avalanche Current | 28 | A |
| $P_D @ T_C=25^\circ C$ | Total Power Dissipation | 114 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ C$ |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient | 37 | $^\circ C/W$ |



Electrical Characteristics (T_c=25°C unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|----------------------|--|---|------|------|------|------|
| V _{(BR)DSS} | Drain-Source Breakdown Voltage | I _D = 250μA, V _{GS} = 0V | 40 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} = 40V, V _{GS} = 0V | | | 1.0 | μA |
| I _{GSS} | Gate-Body Leakage Current | V _{DS} = 0V, V _{GS} = ±20V | | | ±100 | nA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} = V _{GS} , I _D = 250μA | 1.3 | 1.9 | 2.5 | V |
| R _{DS(on)} | Static Drain-Source ON-Resistance ⁽⁴⁾ | V _{GS} = 10V, I _D = 30A | | 5.4 | 7.0 | mΩ |
| | | V _{GS} = 4.5V, I _D = 20A | | 8.1 | 10.5 | mΩ |
| C _{iss} | Input Capacitance | V _{GS} = 0V, V _{DS} = 20V, f = 1MHz | | 2443 | | pF |
| C _{oss} | Output Capacitance | | | 167 | | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 138 | | pF |
| Q _g | Total Gate Charge | V _{GS} = 0 to 10V V _{DS} = 20V, I _D = 20A | | 48 | | nC |
| Q _{gs} | Gate Source Charge | | | 10 | | nC |
| Q _{gd} | Gate Drain("Miller") Charge | | | 10 | | nC |
| t _{d(on)} | Turn-On DelayTime | V _{GS} = 10V, V _{DD} = 20V I _D = 20A, R _{GEN} = 3Ω | | 10 | | ns |
| t _r | Turn-On Rise Time | | | 28 | | ns |
| t _{d(off)} | Turn-Off DelayTime | | | 40 | | ns |
| t _f | Turn-Off Fall Time | | | 7 | | ns |
| I _S | Maximum Continuous Drain to Source Diode Forward Current | | | | 60 | A |
| I _{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | | | 240 | A |
| V _{SD} | Drain to Source Diode Forward Voltage | V _{GS} = 0V, I _S = 30A | | | 1.2 | V |
| trr | Body Diode Reverse Recovery Time | I _F = 20A, di/dt = 100A/us | | 11 | | ns |
| Qrr | Body Diode Reverse Recovery Charge | | | 5 | | nC |

- Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25C, V_{DD}=20V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=20A
3. R_{θJA} is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.



Typical Electrical and Thermal Characteristics (Curves)

Figure 1: Output Characteristics

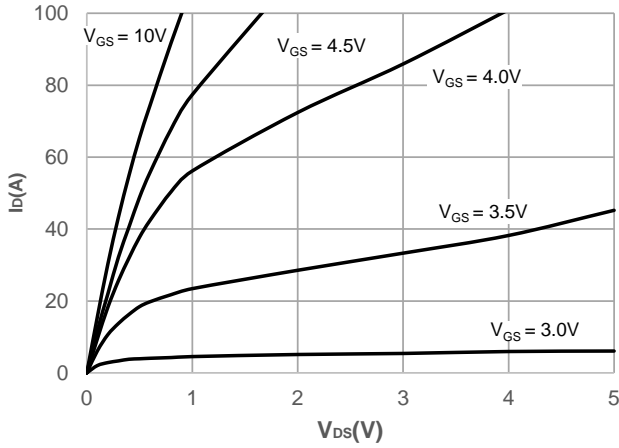


Figure 3: On-resistance vs. Drain Current

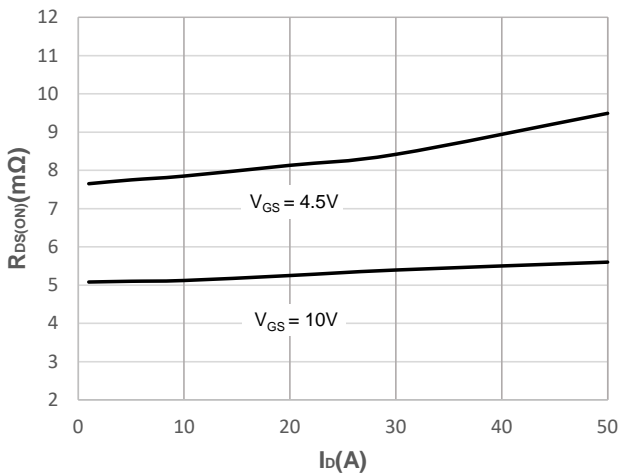


Figure 5: Gate Charge Characteristics

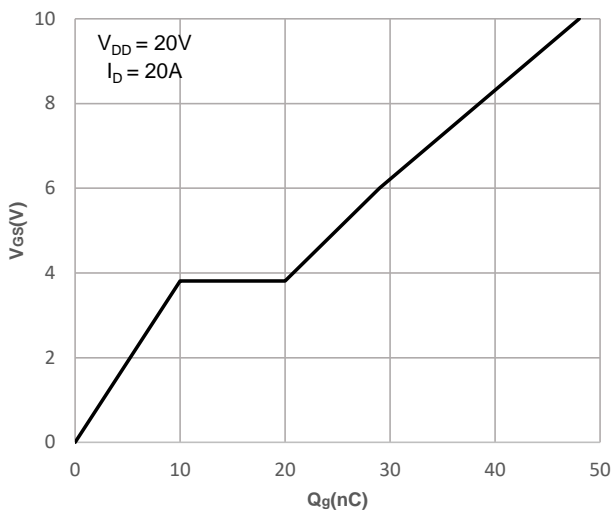


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

Figure 2: Typical Transfer Characteristics

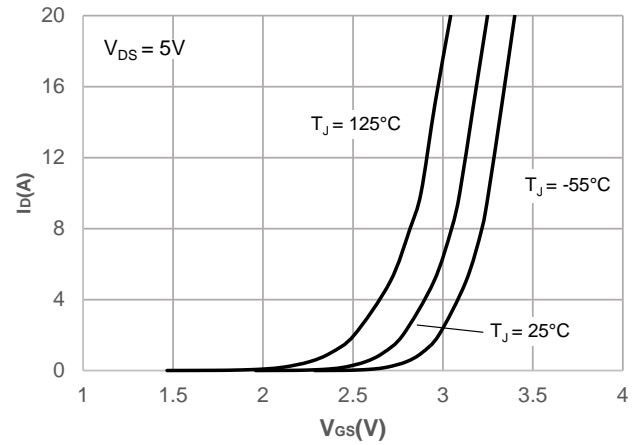


Figure 4: Body Diode Characteristics

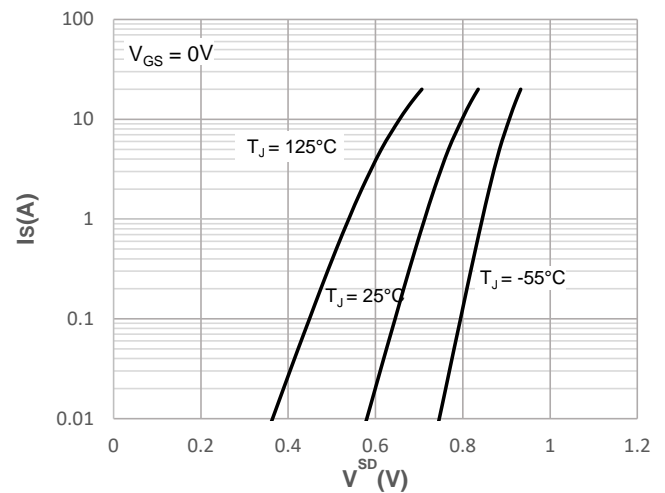


Figure 6: Capacitance Characteristics

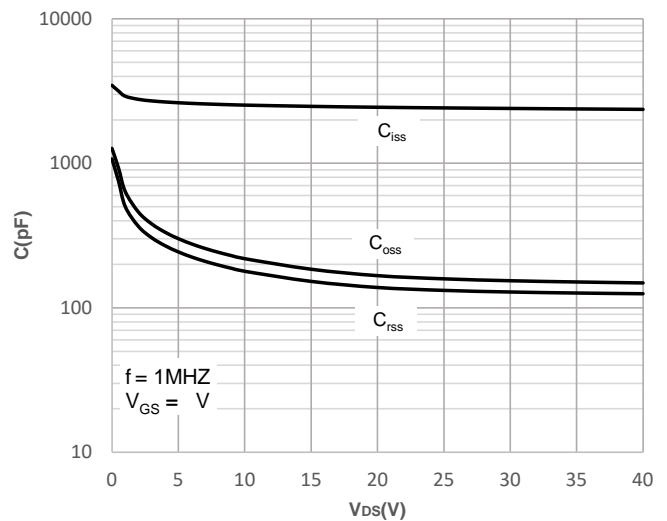


Figure 8: Normalized on Resistance vs. Junction Temperature

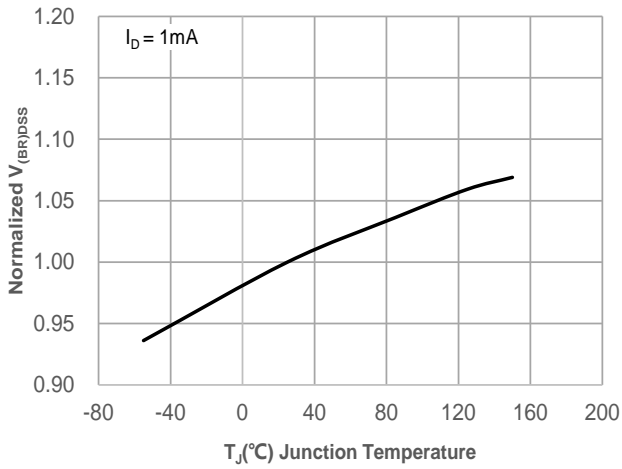


Figure 9: Maximum Safe Operating Area

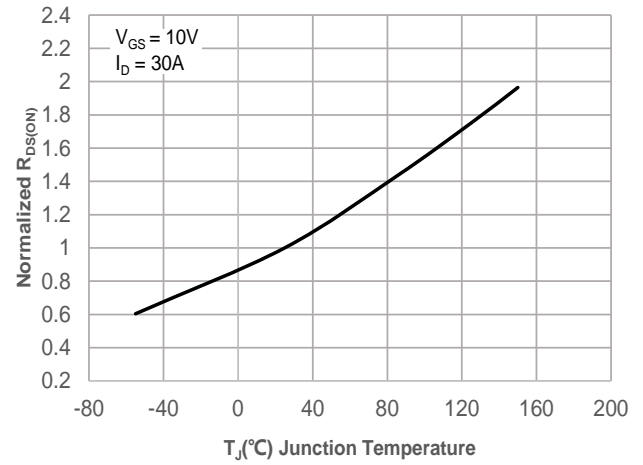


Figure 10: Maximum Continuous Drianc Current vs. Case Temperature

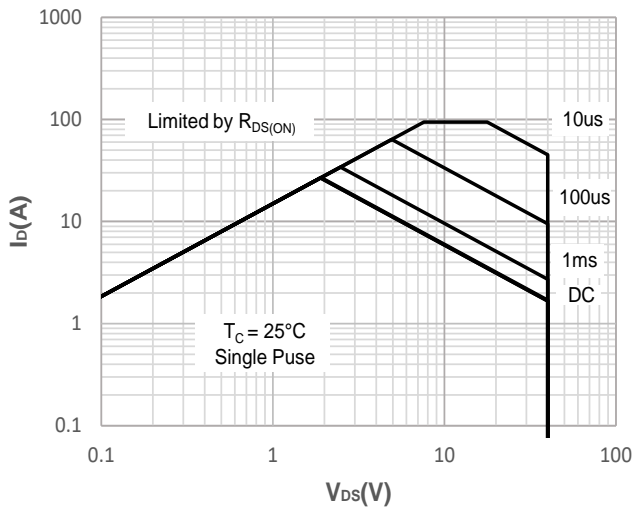


Figure 11: Normalized Maximum Transient Thermal Impedance

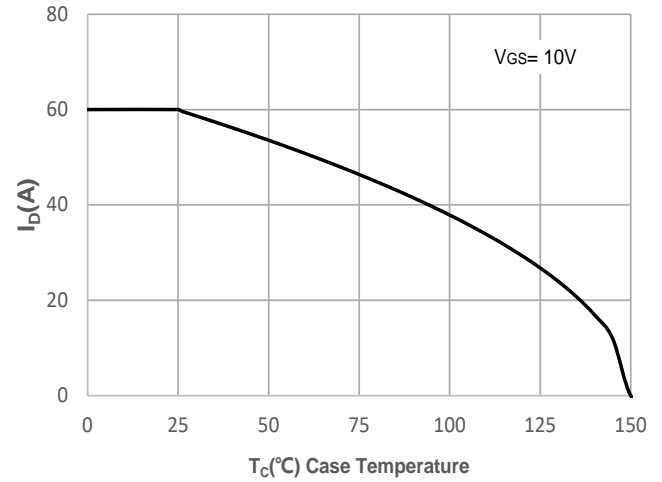
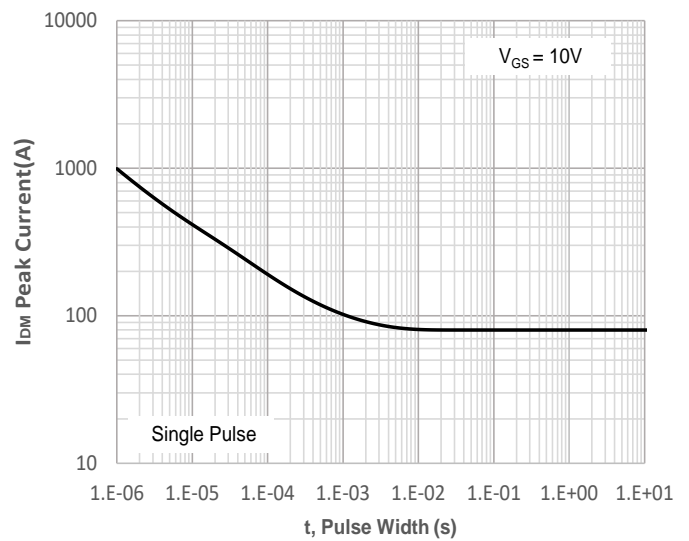
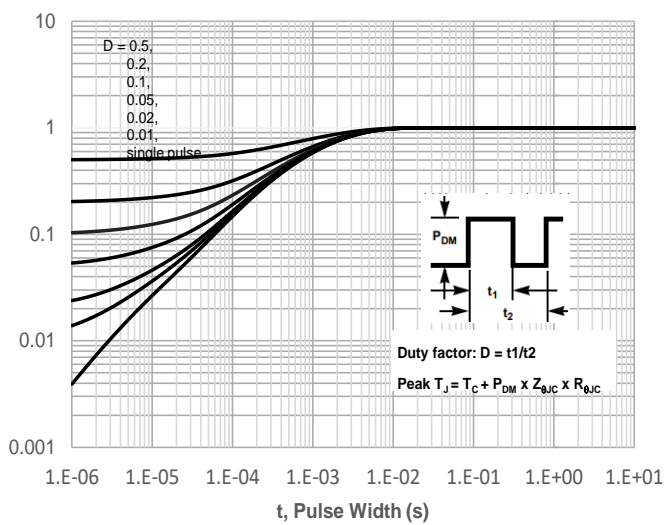


Figure 12: Peak Current Capacity





Test Circuit

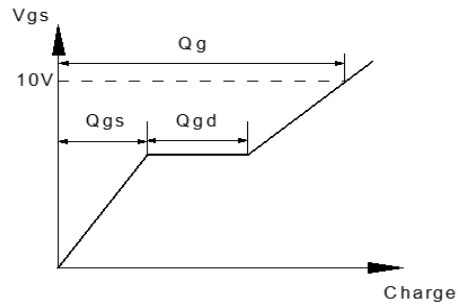
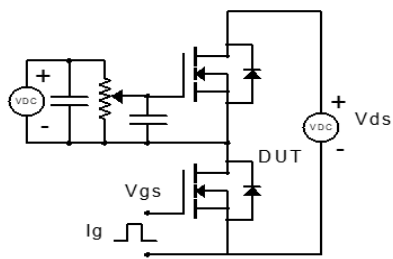


Figure 1: Gate Charge Test Circuit & Waveform

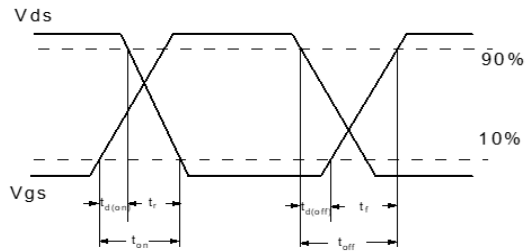
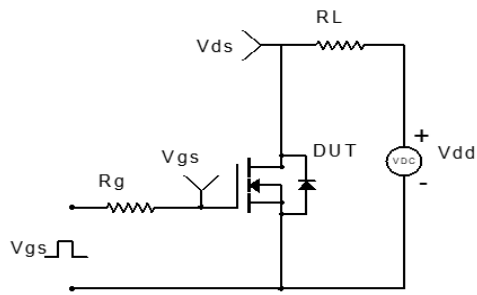


Figure 2: Resistive Switching Test Circuit & Waveform

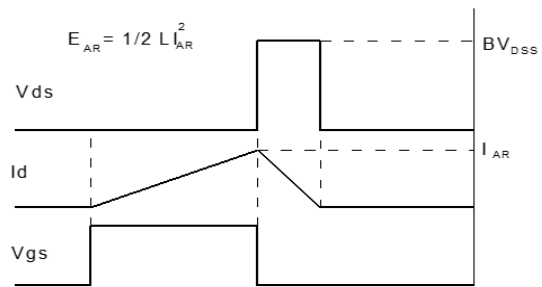
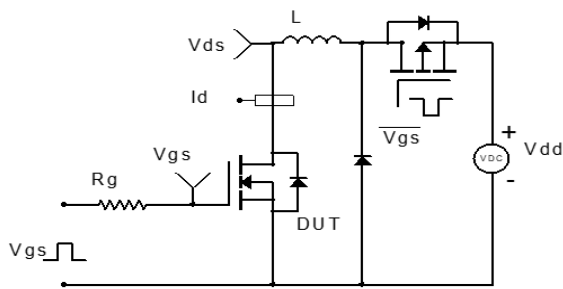


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

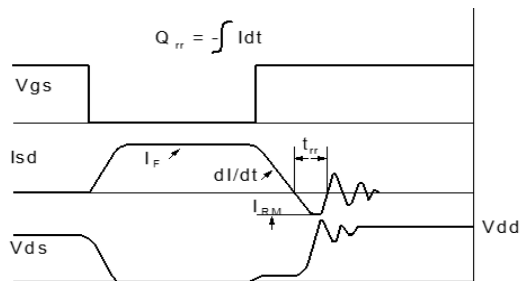
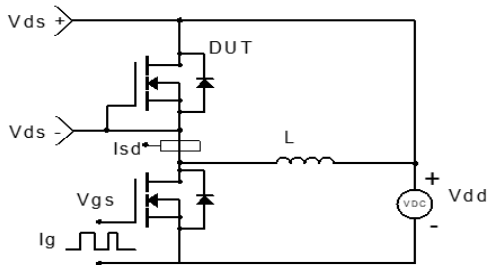
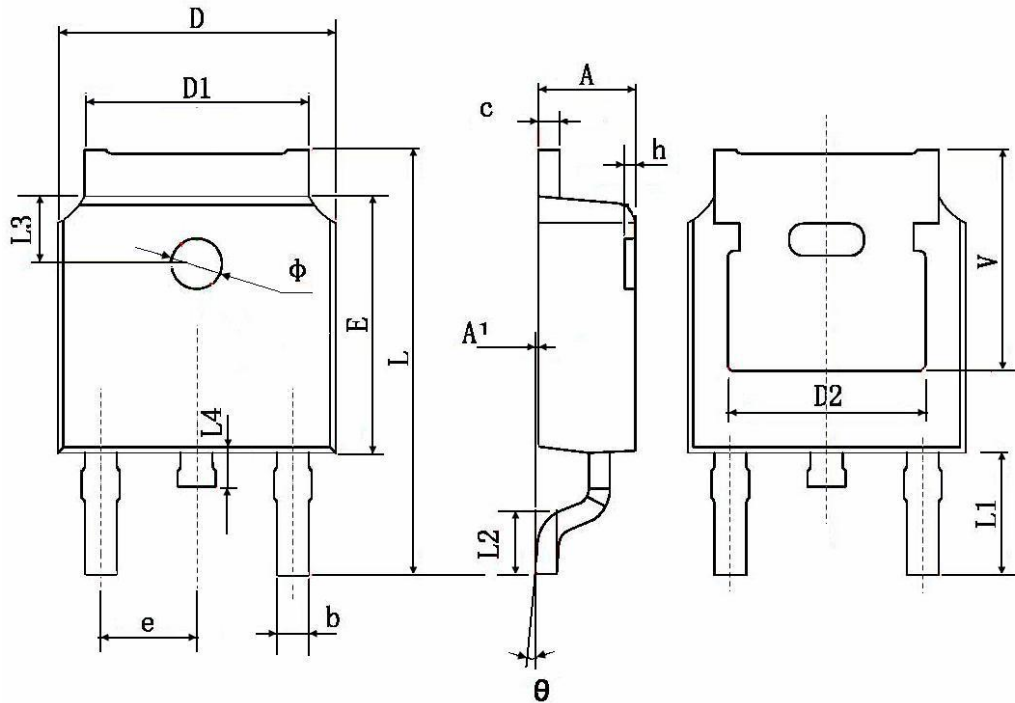


Figure 4: Diode Recovery Test Circuit & Waveform



TO-252-2L(DPAK) 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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