



### General Description

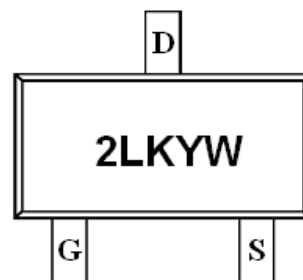
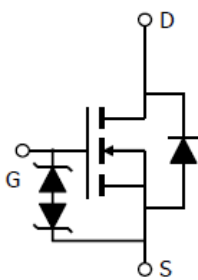
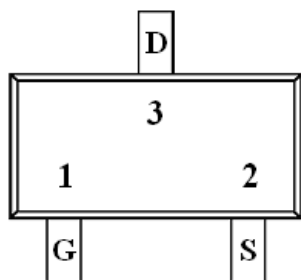
AFN7002LKAS, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent  $R_{DS(ON)}$ , low gate charge.

These devices are particularly suited for low voltage power management, such as smart phone and notebook computer and other battery powered circuits, and low in-line power loss are needed in commercial industrial surface mount applications.

### Features

- 60V/0.50A ,  $R_{DS(ON)}=1.6\Omega@V_{GS}=10V$
- 60V/0.40A ,  $R_{DS(ON)}=2.5\Omega@V_{GS}=4.5V$
- 60V/0.05A ,  $R_{DS(ON)}=4.5\Omega@V_{GS}=2.5V$
- Super high density cell design for extremely low  $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- ESD Protection Diode design-in
- SOT-23 package design

### Pin Description ( SOT-23 )



### Application

- Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories, Transistors, etc.
- High saturation current capability. Direct Logic-Level Interface: TTL/CMOS
- Battery Operated Systems
- Solid-State Relays

### Pin Define

| Pin | Symbol | Description |
|-----|--------|-------------|
| 1   | G      | Gate        |
| 2   | S      | Source      |
| 3   | D      | Drain       |

### Ordering Information

| Part Ordering No. | Part Marking | Package | Unit        | Quantity |
|-------------------|--------------|---------|-------------|----------|
| AFN7002LKASS23RG  | 2LKYW        | SOT-23  | Tape & Reel | 3000 EA  |

- ※ 2LK Parts code
- ※ Y Year code ( 0 ~ 9 )
- ※ W Week code ( A ~ Z = 1 ~ 26 / a ~ z = 27 ~ 52 )
- ※ AFN7002LKASS23RG : 7" Tape & Reel ; Pb- Free ; Halogen -Free



### Absolute Maximum Ratings

(T<sub>A</sub>=25°C Unless otherwise noted)

| Parameter                                       | Symbol           | Typical                      | Unit |
|-------------------------------------------------|------------------|------------------------------|------|
| Drain-Source Voltage                            | V <sub>DSS</sub> | 60                           | V    |
| Gate –Source Voltage                            | V <sub>GSS</sub> | ±20                          | V    |
| Continuous Drain Current(T <sub>J</sub> =150°C) | I <sub>D</sub>   | T <sub>A</sub> =25°C<br>0.5  | A    |
|                                                 |                  | T <sub>A</sub> =70°C<br>0.2  |      |
| Pulsed Drain Current                            | I <sub>DM</sub>  | 0.65                         | A    |
| Continuous Source Current(Diode Conduction)     | I <sub>S</sub>   | 0.45                         | A    |
| Power Dissipation                               | P <sub>D</sub>   | T <sub>A</sub> =25°C<br>1.25 | W    |
|                                                 |                  | T <sub>A</sub> =70°C<br>0.8  |      |
| Operating Junction Temperature                  | T <sub>J</sub>   | 150                          | °C   |
| Storage Temperature Range                       | T <sub>STG</sub> | -55/150                      | °C   |
| Thermal Resistance-Junction to Ambient          | R <sub>θJA</sub> | 120                          | °C/W |

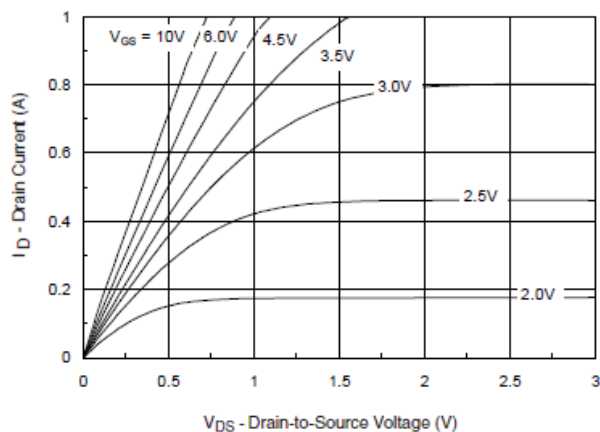
### Electrical Characteristics

(T<sub>A</sub>=25°C Unless otherwise noted)

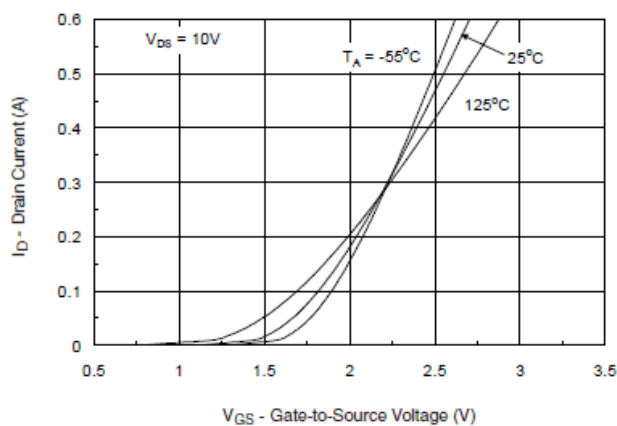
| Parameter                       | Symbol               | Conditions                                                                               | Min. | Typ  | Max. | Unit |
|---------------------------------|----------------------|------------------------------------------------------------------------------------------|------|------|------|------|
| <b>Static</b>                   |                      |                                                                                          |      |      |      |      |
| Drain-Source Breakdown Voltage  | V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA                                               | 60   |      |      | V    |
| Gate Threshold Voltage          | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA                                 | 0.7  | 1.0  | 1.3  |      |
| Gate Leakage Current            | I <sub>GSS</sub>     | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                               |      |      | 5    | uA   |
| Zero Gate Voltage Drain Current | I <sub>DSS</sub>     | V <sub>DS</sub> =48V, V <sub>GS</sub> =0V                                                |      |      | 1    | uA   |
|                                 |                      | V <sub>DS</sub> =48V, V <sub>GS</sub> =0V                                                |      |      | 10   |      |
|                                 |                      | T <sub>J</sub> =85°C                                                                     |      |      |      |      |
| Drain-Source On-Resistance      | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =0.50A                                              |      | 0.95 | 1.6  | Ω    |
|                                 |                      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> =0.40A                                            |      | 1.25 | 2.5  |      |
|                                 |                      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> =0.05A                                            |      | 2.65 | 4.5  |      |
| Forward Transconductance        | g <sub>FS</sub>      | V <sub>DS</sub> =10V, I <sub>D</sub> =0.2A                                               |      | 0.2  |      | S    |
| Diode Forward Voltage           | V <sub>SD</sub>      | I <sub>S</sub> =0.2A, V <sub>GS</sub> =0V                                                |      | 0.82 | 1.4  | V    |
| <b>Dynamic</b>                  |                      |                                                                                          |      |      |      |      |
| Total Gate Charge               | Q <sub>g</sub>       | V <sub>DS</sub> =30V, V <sub>GS</sub> =10V<br>I <sub>D</sub> ≧0.25A                      |      | 1.5  | 2.5  | pC   |
| Gate-Source Charge              | Q <sub>gs</sub>      |                                                                                          |      | 0.2  |      |      |
| Gate-Drain Charge               | Q <sub>gd</sub>      |                                                                                          |      | 0.5  |      |      |
| Input Capacitance               | C <sub>iss</sub>     | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V<br>f=1MHz                                      |      | 28   |      | pF   |
| Output Capacitance              | C <sub>oss</sub>     |                                                                                          |      | 10   |      |      |
| Reverse Transfer Capacitance    | C <sub>rss</sub>     |                                                                                          |      | 5    |      |      |
| Turn-On Time                    | t <sub>d(on)</sub>   | V <sub>DD</sub> =30V, R <sub>G</sub> =6Ω<br>I <sub>D</sub> ≧0.25A, V <sub>GEN</sub> =10V |      | 3    | 7    | ns   |
|                                 | t <sub>r</sub>       |                                                                                          |      | 12   | 30   |      |
| Turn-Off Time                   | t <sub>d(off)</sub>  |                                                                                          |      | 18   | 40   |      |
|                                 | t <sub>f</sub>       |                                                                                          |      | 8    | 15   |      |



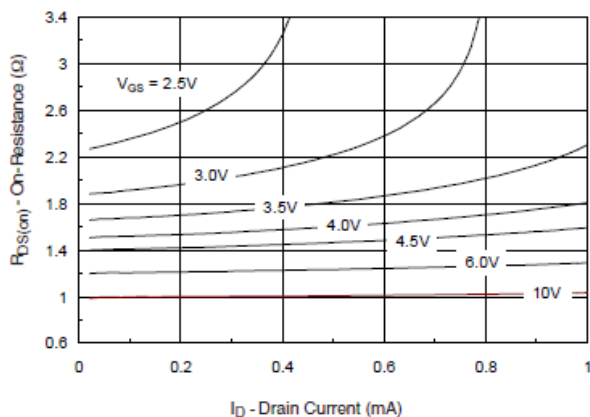
## Typical Characteristics



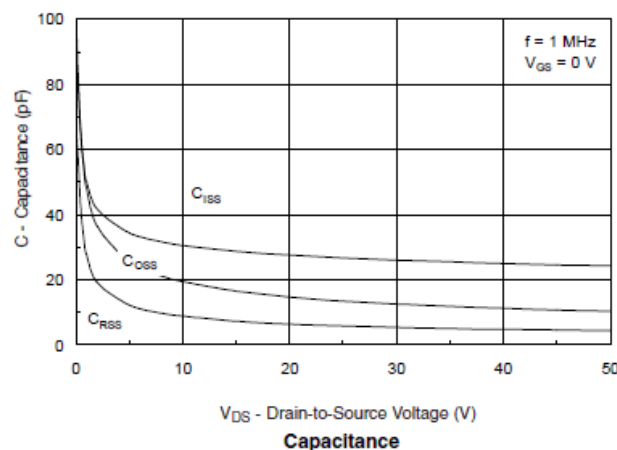
Output Characteristics



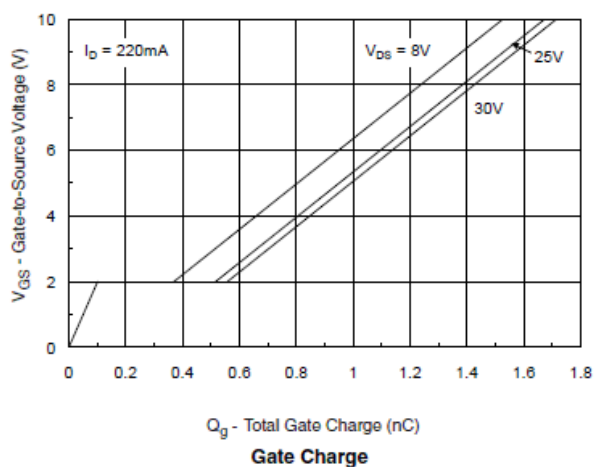
Transfer Characteristics



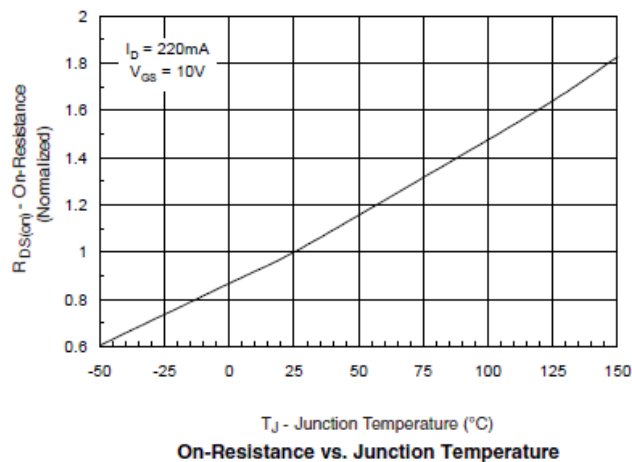
On-Resistance vs. Drain Current



Capacitance



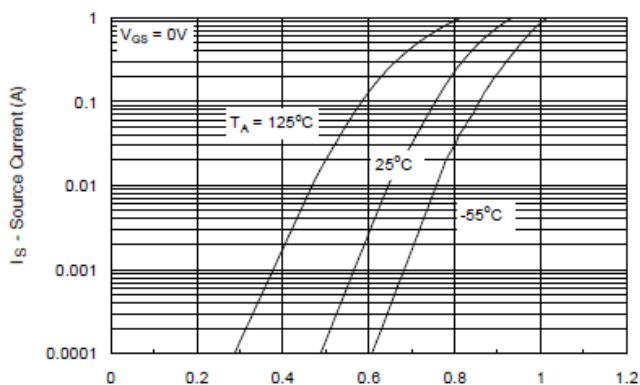
Gate Charge



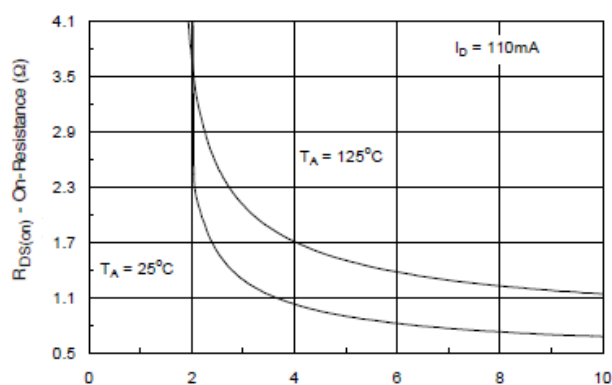
On-Resistance vs. Junction Temperature



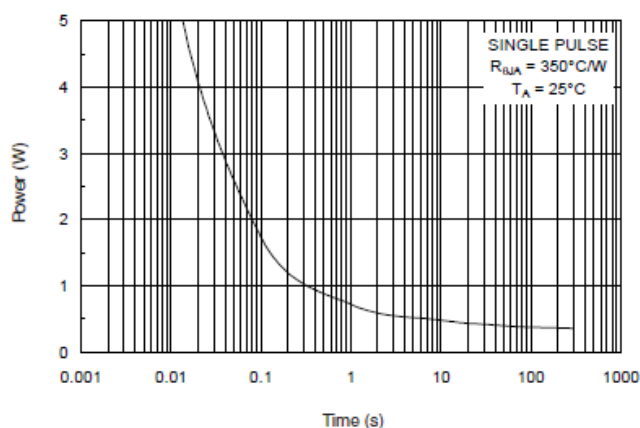
## Typical Characteristics



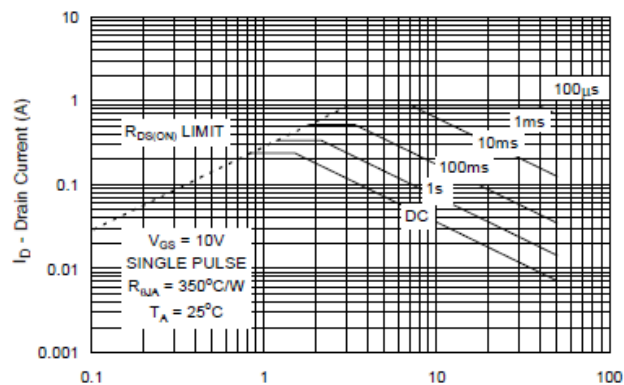
Source-Drain Diode Forward Voltage



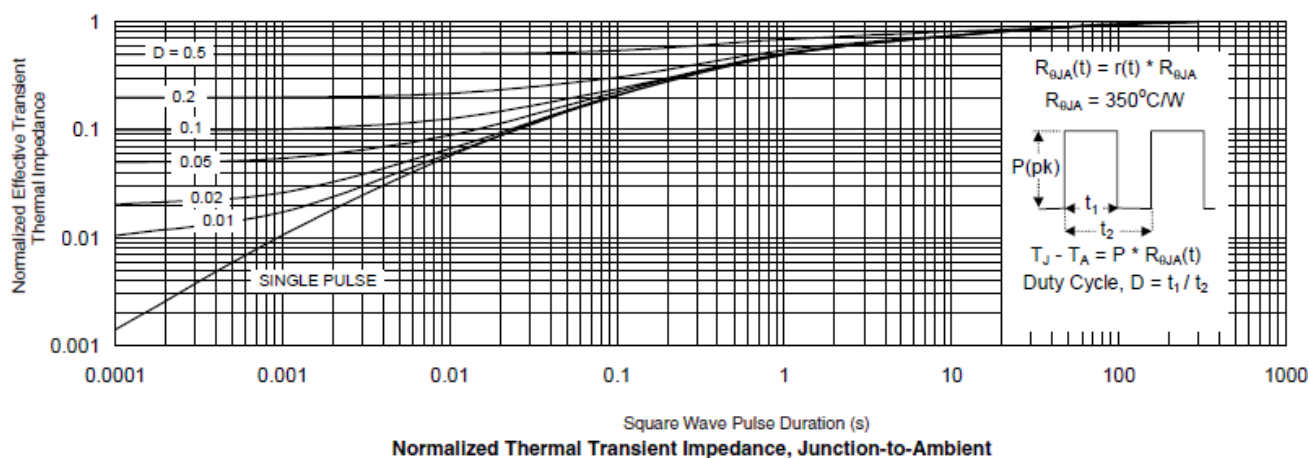
On-Resistance vs. Gate-to-Source Voltage



Single Pulse Power



Safe Operating Area  
\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

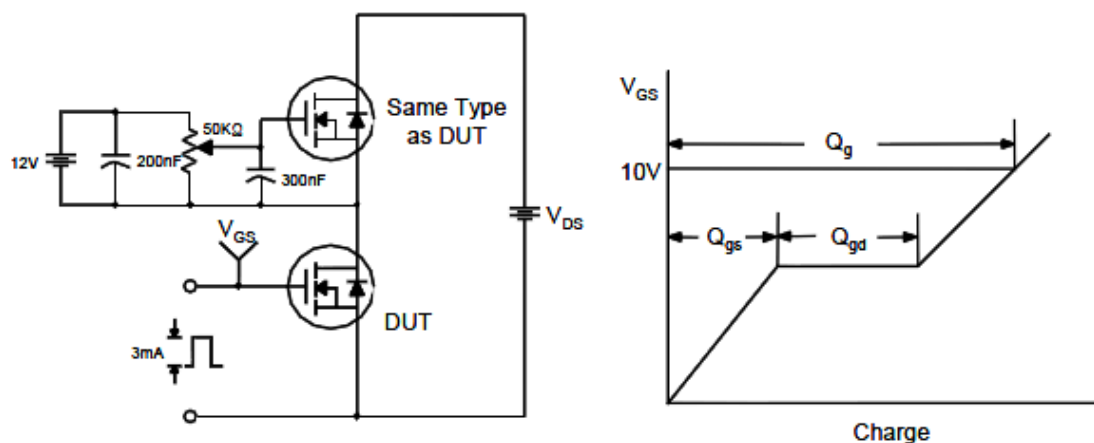


Normalized Thermal Transient Impedance, Junction-to-Ambient

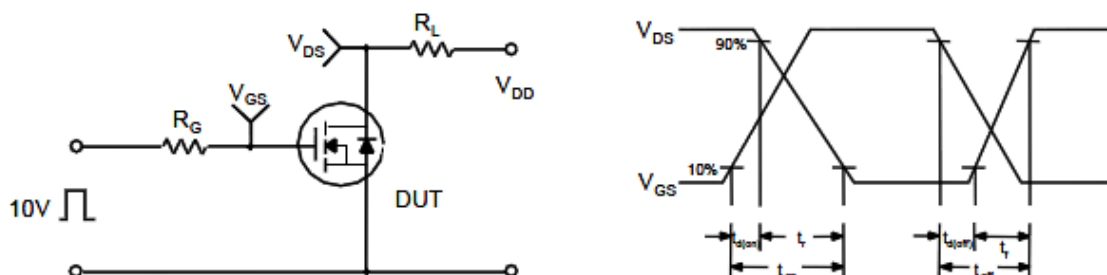


## Typical Characteristics

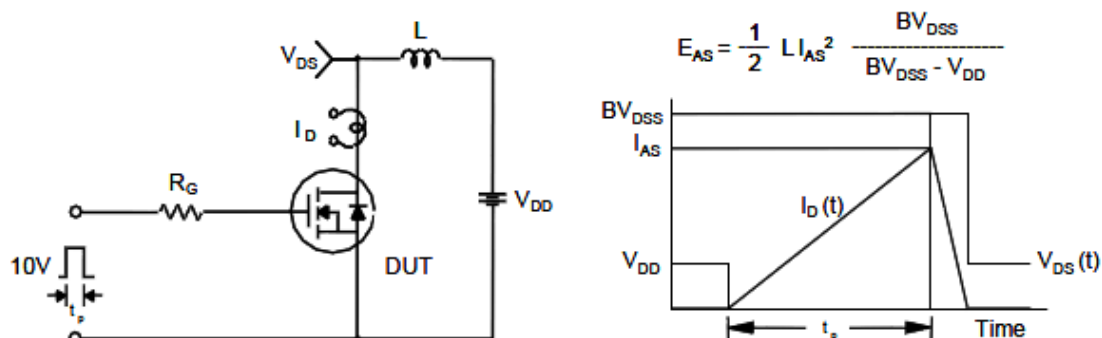
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

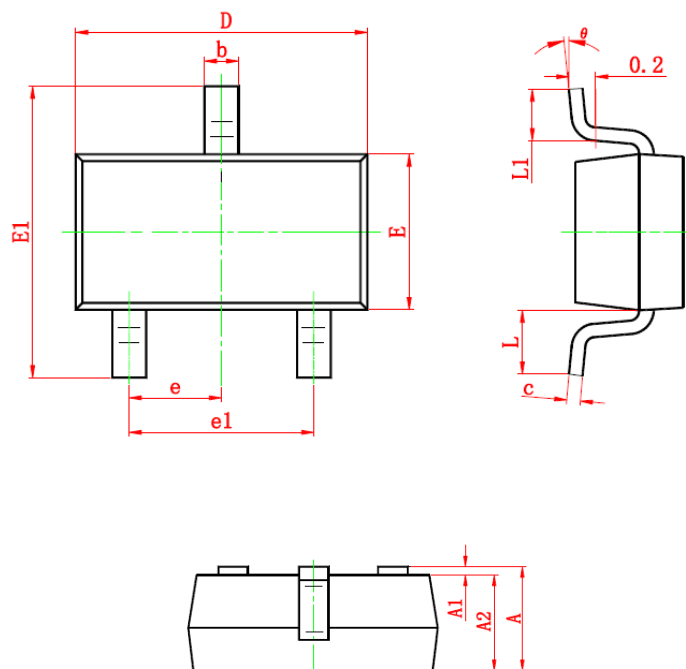


Unclamped Inductive Switching Test Circuit & Waveforms





### Package Information ( SOT-23 )



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min                       | Max   | Min                  | Max   |
| A        | 0.900                     | 1.200 | 0.035                | 0.043 |
| A1       | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2       | 0.900                     | 1.100 | 0.035                | 0.039 |
| b        | 0.300                     | 0.500 | 0.012                | 0.020 |
| c        | 0.080                     | 0.150 | 0.003                | 0.006 |
| D        | 2.800                     | 3.000 | 0.110                | 0.118 |
| E        | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1       | 2.250                     | 2.550 | 0.089                | 0.100 |
| e        | 0.950 TYP                 |       | 0.037 TYP            |       |
| e1       | 1.800                     | 2.000 | 0.071                | 0.079 |
| L        | 0.550 REF                 |       | 0.022 REF            |       |
| L1       | 0.300                     | 0.500 | 0.012                | 0.020 |
| $\theta$ | 0°                        | 8°    | 0°                   | 6°    |

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