

# N-Channel Enhancement Mode MOSFET

## 1. Product Information

### 1.1 Features

- ☒ Surface-mounted package
- ☒ Low gate charge

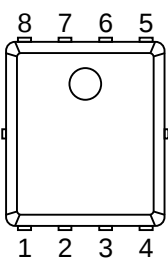
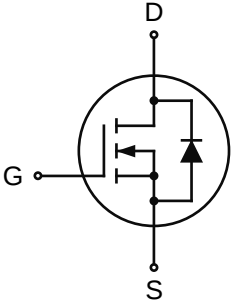
### 1.2 Applications

- ☒ Motor driver appliances
- ☒ Adapter appliances
- ☒ High power inverter system

### 1.3 Quick reference

- ☒  $BV \geq 60\text{ V}$
- ☒  $P_{\text{tot}} \leq 56\text{ W}$
- ☒  $I_D \leq 78\text{ A}$
- ☒  $R_{\text{DS(ON)}} \leq 4.8\text{ m}\Omega @ V_{\text{GS}} = 10\text{ V}$
- ☒  $R_{\text{DS(ON)}} \leq 6.0\text{ m}\Omega @ V_{\text{GS}} = 6\text{ V}$
- ☒  $R_{\text{DS(ON)}} \leq 7.5\text{ m}\Omega @ V_{\text{GS}} = 4.5\text{ V}$

## 2. Pin Description

| Pin     | Description | Simplified Outline                                                                                              | Symbol                                                                                |
|---------|-------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1,2,3   | Source      | <br>Top View<br>PDFN 5x6-8L |  |
| 4       | Gate        |                                                                                                                 |                                                                                       |
| 5,6,7,8 | Drain       |                                                                                                                 |                                                                                       |

### 3. Limiting Values

| Symbol            | Parameter                               | Conditions                                                | Min  | Max      | Unit                          |
|-------------------|-----------------------------------------|-----------------------------------------------------------|------|----------|-------------------------------|
| $V_{DS}$          | Drain-Source Voltage                    | $T_C = 25\text{ }^{\circ}\text{C}$                        | 60   | -        | V                             |
| $V_{GS}$          | Gate-Source Voltage                     | $T_C = 25\text{ }^{\circ}\text{C}$                        | -    | $\pm 20$ | V                             |
| $I_D^*$           | Drain Current                           | $T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$  | -    | 78       | A                             |
|                   |                                         | $T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$ | -    | 49       |                               |
| $I_{DM}^*$        | Pulsed Drain Current                    | $T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$  | -    | 312      | A                             |
| $P_{tot}^*$       | Total Power Dissipation                 | $T_C = 25\text{ }^{\circ}\text{C}$                        | -    | 56       | W                             |
| $T_{stg}$         | Storage Temperature                     |                                                           | - 55 | 150      | $^{\circ}\text{C}$            |
| $T_J$             | Junction Temperature                    |                                                           | -    | 150      | $^{\circ}\text{C}$            |
| $I_S$             | Continuous-Source Current               | $T_C = 25\text{ }^{\circ}\text{C}$                        | -    | 78       | A                             |
| $E_{AS}^*$        | Single Pulsed Avalanche Energy          | $V_{DD}=50\text{V}, L=1.0\text{mH}$                       | -    | 162      | mJ                            |
| $R_{\theta JC}^*$ | Thermal Resistance- Junction to Case    |                                                           | -    | 2.2      | $^{\circ}\text{C} / \text{W}$ |
| $R_{\theta JA}^*$ | Thermal Resistance- Junction to Ambient |                                                           | -    | 43       | $^{\circ}\text{C} / \text{W}$ |

Notes :

- \* Surface Mounted on 1 in<sup>2</sup> pad area,  $t \leq 10\text{ sec}$
- \*\* Pulse width  $\leq 10\text{ }\mu\text{s}$ , duty cycle  $\leq 1\%$
- \*\*\* Limited by bonding wire

### 4. Marking Information

| Product Name | Marking                                                                                                                               |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------|
| KJ0406GM     | <div style="display: inline-block; background-color: black; color: white; padding: 2px 5px;">0406M<br/>YWWXXX</div> YWW:<br>Date Code |

### 5. Ordering Code

| Product Name | Package    | Reel Size | Tape width | Quantity | Note |
|--------------|------------|-----------|------------|----------|------|
| KJ0406GM     | PDFN5x6-8L |           |            | 5000     |      |

Note: KUAJIEXIN defines “ Green ” as lead-free ( RoHS compliant ) and halogen free ( Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C )

## 6. Electrical Characteristics (T<sub>A</sub> = 25 °C Unless Otherwise Noted)

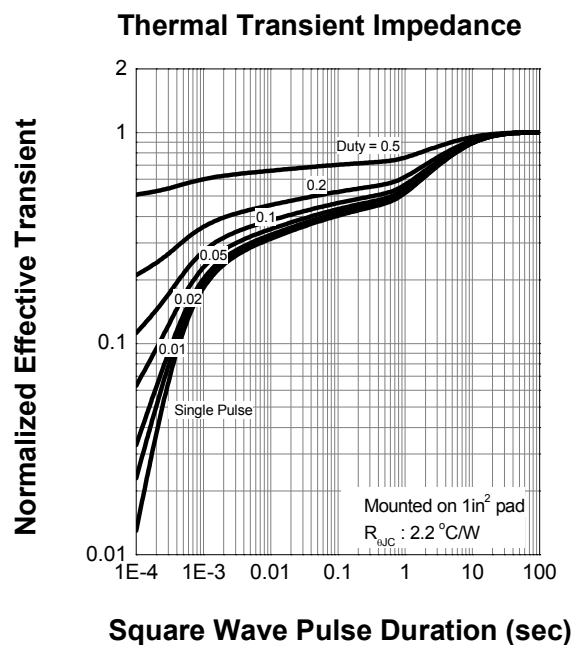
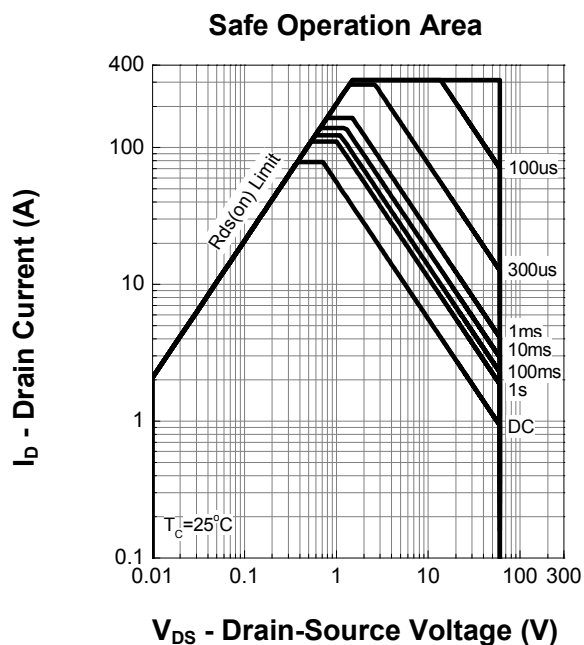
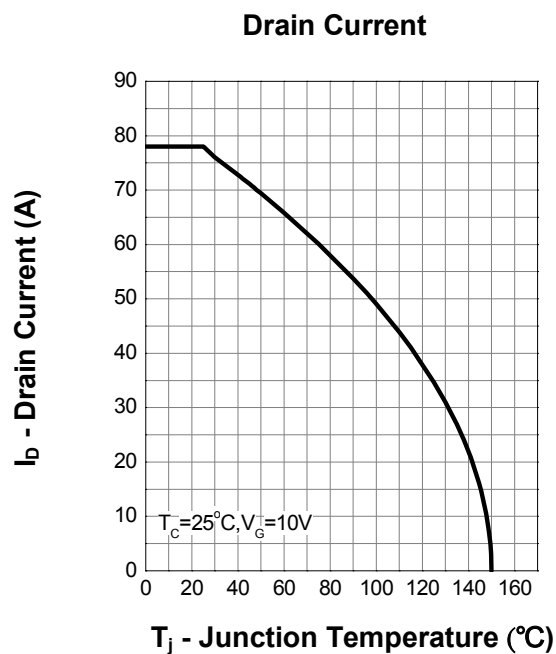
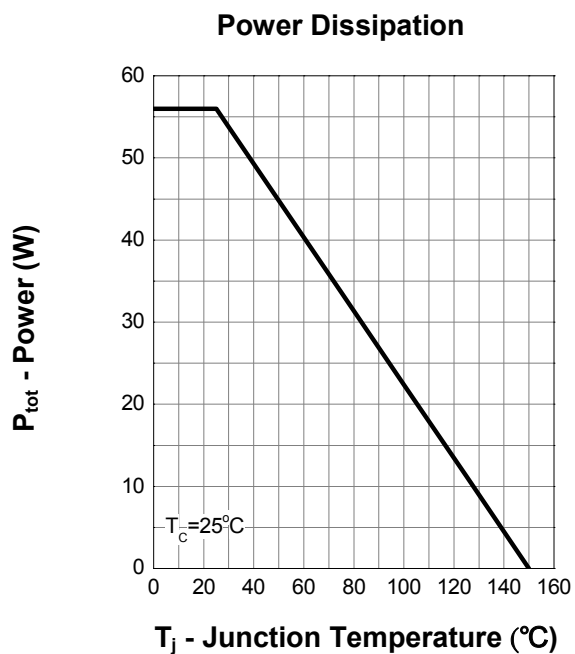
| Symbol                                   | Parameter                      | Conditions                                                                                                                    | Min | Typ  | Max   | Unit |
|------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----|------|-------|------|
| Static Characteristics                   |                                |                                                                                                                               |     |      |       |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage | V <sub>GS</sub> = 0 V, I <sub>DS</sub> = 250 μA                                                                               | 60  | -    | -     | V    |
| V <sub>GS(th)</sub>                      | Gate Threshold Voltage         | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> = 250 μA                                                                  | 1.0 | -    | 2.0   | V    |
| I <sub>DSS</sub>                         | Drain Leakage Current          | V <sub>DS</sub> = 48 V, V <sub>GS</sub> = 0 V                                                                                 | -   | -    | 1     | μA   |
| I <sub>GSS</sub>                         | Gate Leakage Current           | V <sub>GS</sub> = ± 20 V, V <sub>DS</sub> = 0 V                                                                               | -   | -    | ± 100 | nA   |
| R <sub>DS(ON)</sub> <sup>a</sup>         | Channel On-State Resistance    | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A                                                                                 | -   | 4.2  | 4.8   | mΩ   |
|                                          | Channel On-State Resistance    | V <sub>GS</sub> = 6 V, I <sub>D</sub> = 15 A                                                                                  | -   | 4.9  | 6.0   |      |
|                                          | Channel On-State Resistance    | V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 10 A                                                                                | -   | 5.9  | 7.5   |      |
| Diode Characteristics                    |                                |                                                                                                                               |     |      |       |      |
| V <sub>SD</sub> <sup>a</sup>             | Diode Forward Voltage          | I <sub>SD</sub> = 20 A, V <sub>GS</sub> = 0 V                                                                                 | -   | -    | 1.3   | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time          | I <sub>SD</sub> = 20 A, dI <sub>SD</sub> / dt = 100 A / μs                                                                    | -   | 36   | -     | ns   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge        |                                                                                                                               | -   | 19   | -     | nC   |
| Dynamic Characteristics <sup>b</sup>     |                                |                                                                                                                               |     |      |       |      |
| C <sub>iss</sub>                         | Input Capacitance              | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 30 V<br>Frequency = 1 MHz                                                            | -   | 1855 | -     | pF   |
| C <sub>oss</sub>                         | Output Capacitance             |                                                                                                                               | -   | 736  | -     |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance   |                                                                                                                               | -   | 56   | -     |      |
| t <sub>d(on)</sub>                       | Turn-on Delay Time             | V <sub>DS</sub> = 30 V, V <sub>GEN</sub> = 10 V,<br>R <sub>G</sub> = 3.9 Ω, R <sub>L</sub> = 1.5 Ω,<br>I <sub>DS</sub> = 20 A | -   | 9    | -     | nS   |
| t <sub>r</sub>                           | Turn-on Rise Time              |                                                                                                                               | -   | 26   | -     |      |
| t <sub>d(off)</sub>                      | Turn-off Delay Time            |                                                                                                                               | -   | 34   | -     |      |
| t <sub>f</sub>                           | Turn-off Fall Time             |                                                                                                                               | -   | 29   | -     |      |
| Gate Charge Characteristics <sup>b</sup> |                                |                                                                                                                               |     |      |       |      |
| Q <sub>g</sub>                           | Total Gate Charge              | V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 30 V,<br>I <sub>DS</sub> = 20 A                                                     | -   | 41   | -     | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge             |                                                                                                                               | -   | 7.6  | -     |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge              |                                                                                                                               | -   | 9    | -     |      |

Notes :

a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2 %

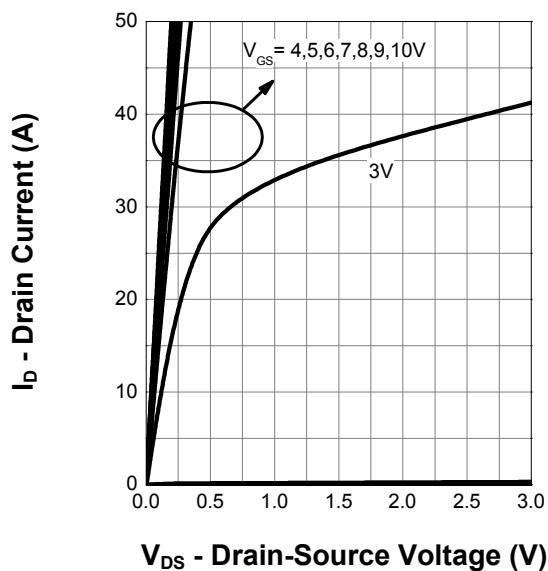
b : Guaranteed by design, not subject to production testing

## 7. Typical Characteristics

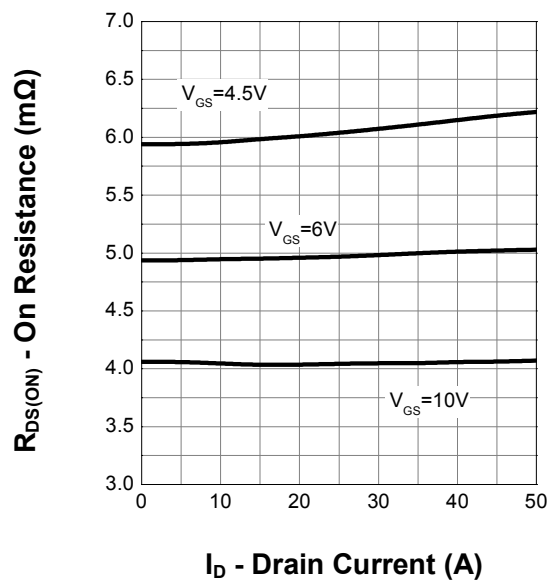


## 7. Typical Characteristics (cont.)

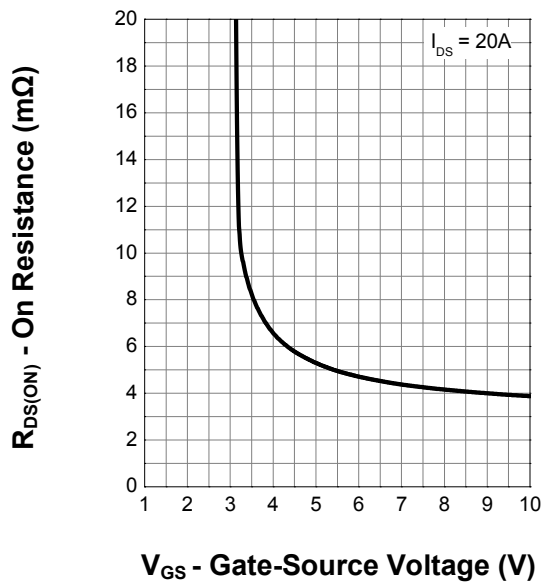
Output Characteristics



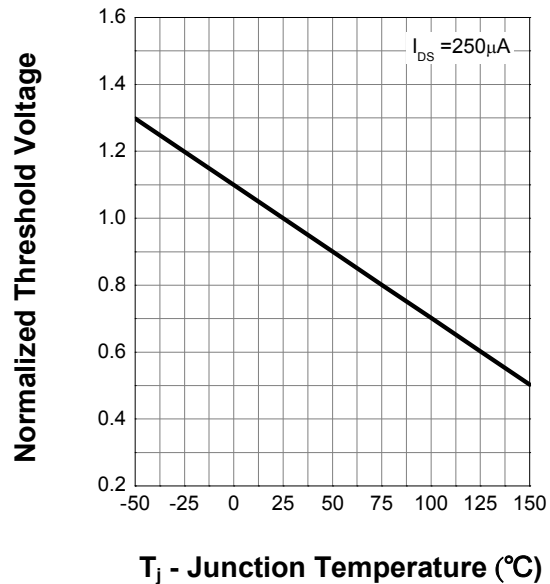
Drain-Source On Resistance



Transfer Characteristics

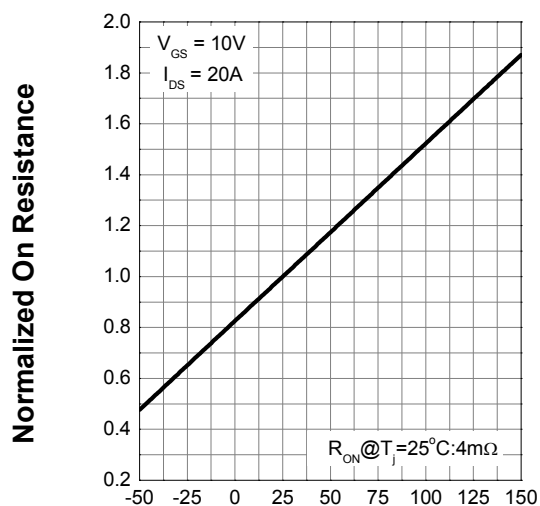


Gate Threshold Voltage



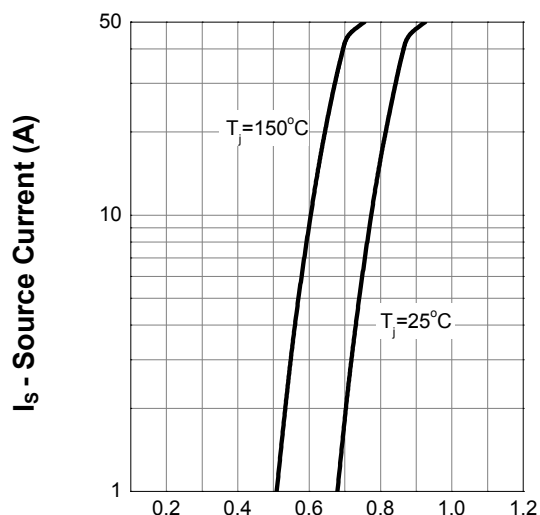
## 7. Typical Characteristics (cont.)

Drain-Source On Resistance



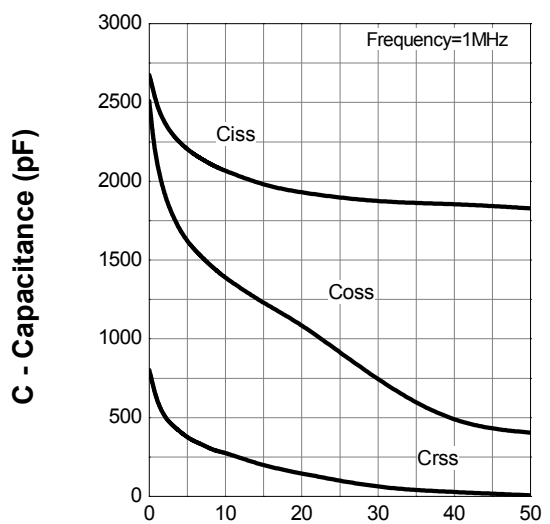
$T_j$  - Junction Temperature ( $^{\circ}\text{C}$ )

Source-Drain Diode Forward



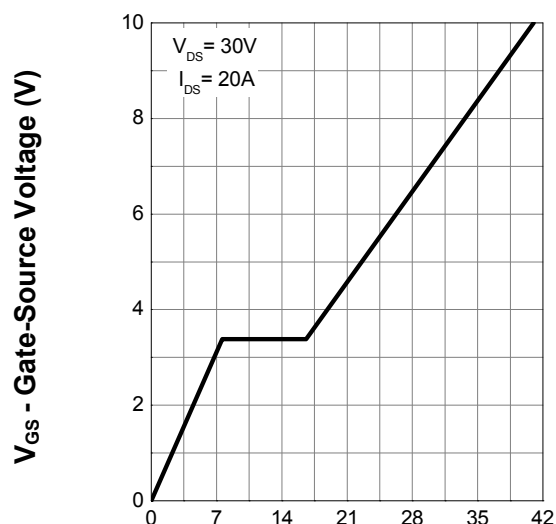
$V_{SD}$  - Source-Drain Voltage (V)

Capacitance



$V_{DS}$  - Drain-Source Voltage (V)

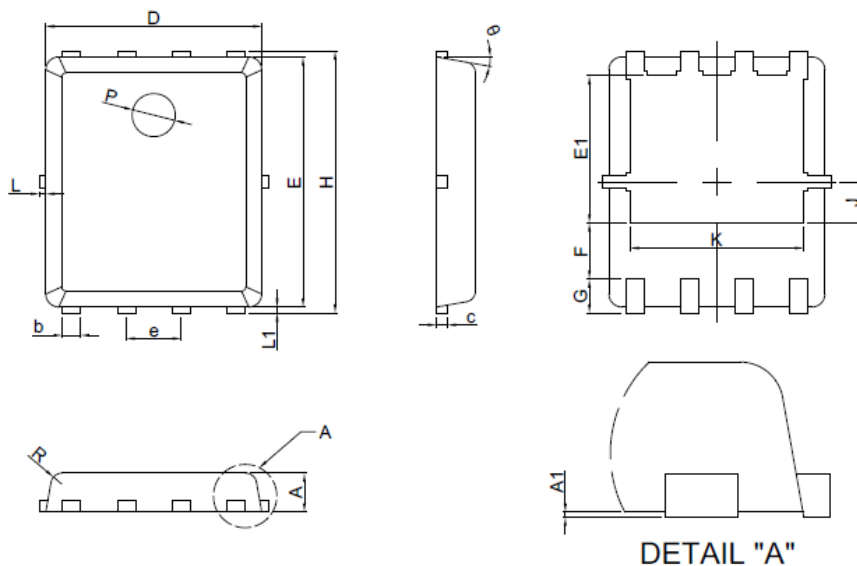
Gate Charge



$Q_G$  - Gate Charge (nC)

## 8. Package Dimensions

PDFN5x6-8L



| Symbol | Dimensions In Millimeters |      |
|--------|---------------------------|------|
|        | MIN.                      | MAX. |
| A      | 0.80                      | 1.00 |
| A1     | 0.00                      | 0.05 |
| b      | 0.35                      | 0.49 |
| c      | 0.254 REF                 |      |
| D      | 4.90                      | 5.10 |
| F      | 1.40 REF                  |      |
| E      | 5.70                      | 5.90 |
| e      | 1.27 BSC                  |      |
| H      | 5.95                      | 6.20 |
| L1     | 0.10                      | 0.18 |
| G      | 0.60 REF                  |      |
| K      | 4.00 REF                  |      |
| L      | -                         | 0.15 |
| J      | 0.95 BSC                  |      |
| P      | 1.00 REF                  |      |
| E1     | 3.40 REF                  |      |
| θ      | 6°                        | 14°  |
| R      | 0.25 REF                  |      |