



PRODUCT DATA SHEET

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Datasheet



Resources



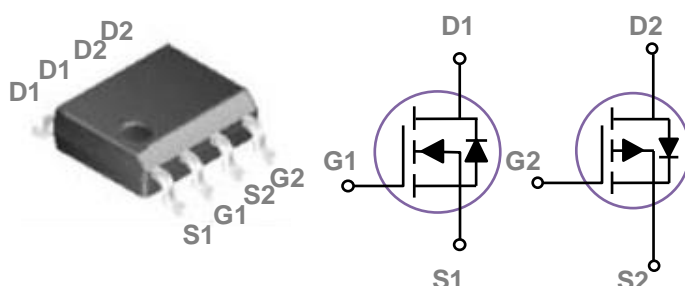
Samples

Please note: Please check the JINGAO Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.jg-semi.cn. Please email any questions regarding the system integration to JINGAO_questions@jgsemi.com.

General Description

These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

SOP-8L Pin Configuration



| BVDSS | RDSON | ID |
|-------|-------|-------|
| 40V | 20mΩ | 8.9A |
| -40V | 35mΩ | -8.0A |

Features

- Fast switching
- Green Device Available
- Suit for 4.5V Gate Drive Applications

Applications

- DC Fan
- Motor Drive Applications
- Networking
- Half / Full Bridge Topology

Absolute Maximum Ratings $T_c=25^{\circ}\text{C}$ unless otherwise noted

| Symbol | Parameter | Rating | | Units |
|-----------|--|------------|----------|-----------------------|
| V_{DS} | Drain-Source Voltage | 40 | -40 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | ± 20 | V |
| I_D | Drain Current – Continuous ($T_c=25^{\circ}\text{C}$) | 8.9 | 8.0 | A |
| | Drain Current – Continuous ($T_c=100^{\circ}\text{C}$) | 4.3 | 4.1 | A |
| I_{DM} | Drain Current – Pulsed ¹ | 26.8 | 25.8 | A |
| P_D | Power Dissipation ($T_c=25^{\circ}\text{C}$) | 2.5 | | W |
| | Power Dissipation – Derate above 25°C | 0.02 | | W/ $^{\circ}\text{C}$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | | $^{\circ}\text{C}$ |
| T_J | Operating Junction Temperature Range | -55 to 125 | | $^{\circ}\text{C}$ |

Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|----------------------|
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | --- | 50 | $^{\circ}\text{C/W}$ |
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient | --- | 62 | $^{\circ}\text{C/W}$ |

N-CH Electrical Characteristics (T_J=25 °C, unless otherwise) noted)
Off Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|---|--|------|------|------|------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V , I _D =250uA | 40 | --- | --- | V |
| ΔBV _{DSS} /ΔT _J | BV _{DSS} Temperature Coefficient | Reference to 25°C , I _D =1mA | --- | 0.04 | --- | V/°C |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =40V , V _{GS} =0V , T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =32V , V _{GS} =0V , T _J =125°C | --- | --- | 10 | uA |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±20V , V _{DS} =0V | --- | --- | ±100 | nA |

On Characteristics

| | | | | | | |
|----------------------|---|--|-----|-----|-----|-------|
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =10V , I _D =5A | --- | 20 | 35 | mΩ |
| | | V _{GS} =4.5V , I _D =3A | --- | 30 | 45 | mΩ |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.0 | 1.8 | 2.5 | V |
| ΔV _{GS(th)} | V _{GS(th)} Temperature Coefficient | | --- | -3 | --- | mV/°C |
| g _{fs} | Forward Transconductance | V _{DS} =10V , I _D =3A | --- | 3.6 | --- | S |

Dynamic and switching Characteristics

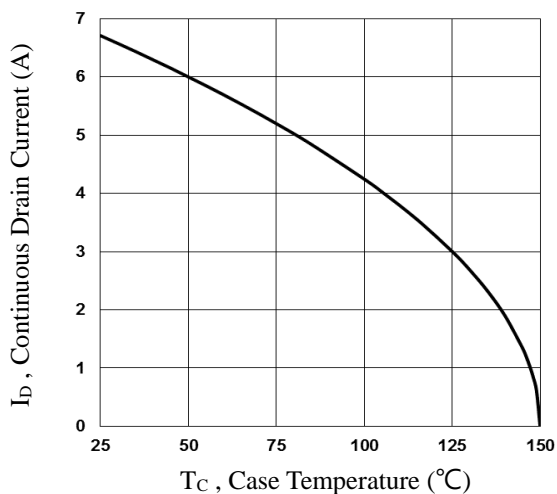
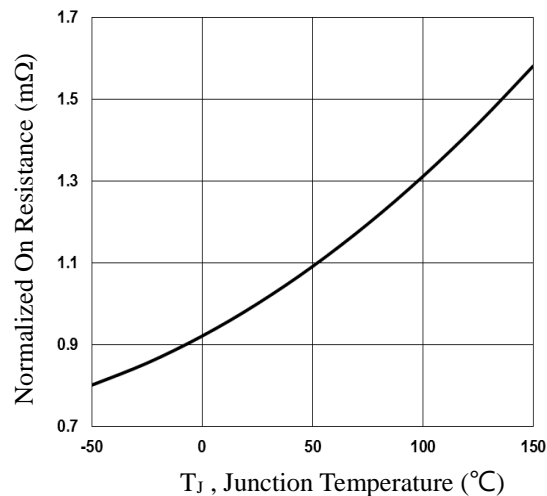
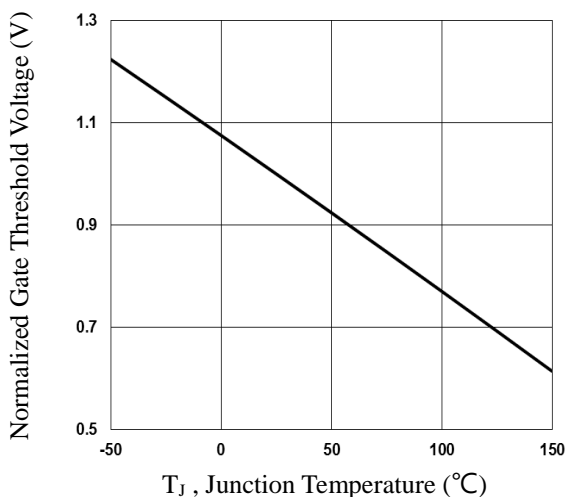
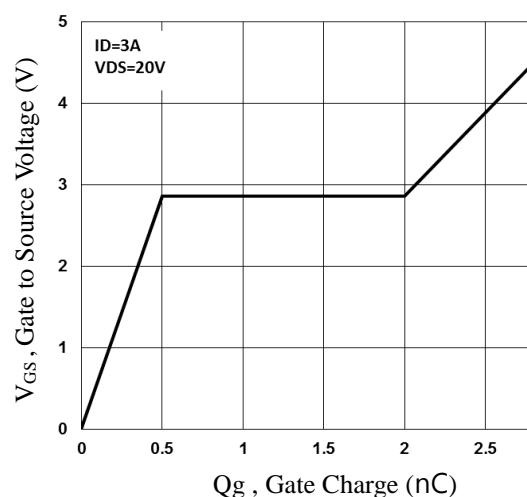
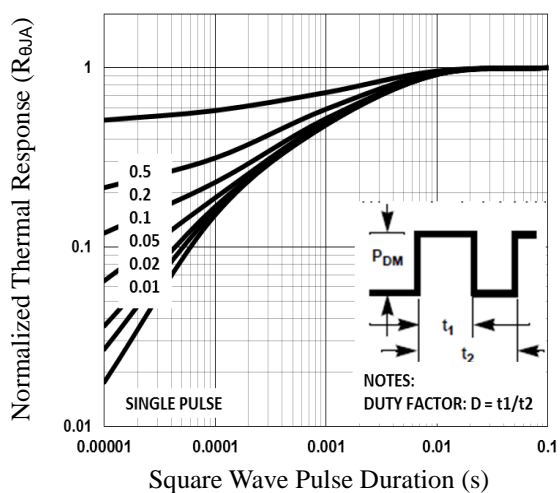
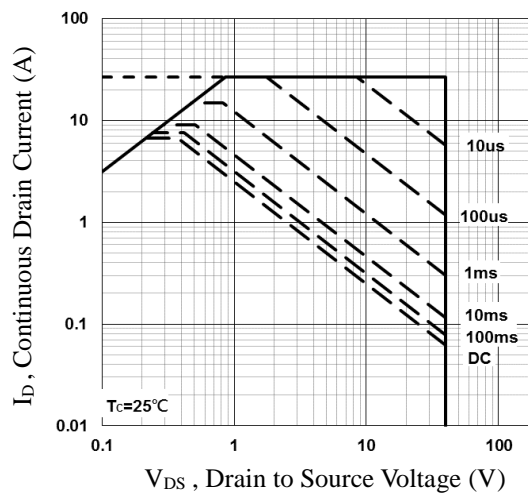
| | | | | | | |
|---------------------|-------------------------------------|--|-----|-----|-----|----|
| Q _g | Total Gate Charge ^{2, 3} | V _{DS} =20V , V _{GS} =4.5V , I _D =3A | --- | 2.8 | --- | nC |
| Q _{gs} | Gate-Source Charge ^{2, 3} | | --- | 0.5 | --- | |
| Q _{gd} | Gate-Drain Charge ^{2, 3} | | --- | 1.5 | --- | |
| T _{d(on)} | Turn-On Delay Time ^{2, 3} | V _{DD} =20V , V _{GS} =4.5V , R _G =25Ω I _D =1A | --- | 3.2 | --- | ns |
| T _r | Rise Time ^{2, 3} | | --- | 8.6 | --- | |
| T _{d(off)} | Turn-Off Delay Time ^{2, 3} | | --- | 18 | --- | |
| T _f | Fall Time ^{2, 3} | | --- | 6 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =15V , V _{GS} =0V , F=1MHz | --- | 420 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 65 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 40 | --- | |

Drain-Source Diode Characteristics and Maximum Ratings

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|---------------------------|---|------|------|------|------|
| I _S | Continuous Source Current | V _G =V _D =0V , Force Current | --- | --- | 6.7 | A |
| I _{SM} | Pulsed Source Current | | --- | --- | 13.4 | A |
| V _{SD} | Diode Forward Voltage | V _{GS} =0V , I _S =1A , T _J =25°C | --- | --- | 1.2 | V |

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
3. Essentially independent of operating temperature.


Fig.1 Continuous Drain Current vs. T_c

Fig.2 Normalized $R_{DS(on)}$ vs. T_j

Fig.3 Normalized V_{th} vs. T_j

Fig.4 Gate Charge Waveform

Fig.5 Normalized Transient Impedance

Fig.6 Maximum Safe Operation Area

P-CH Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)
Off Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|------------------------------|------------------------------------|---|------|-------|-----------|---------------------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V$, $I_D=-250\mu A$ | -40 | --- | --- | V |
| $\Delta BV_{DSS}/\Delta T_J$ | BV_{DSS} Temperature Coefficient | Reference to 25°C , $I_D=-1mA$ | --- | -0.04 | --- | V/ $^\circ\text{C}$ |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS}=-40V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$ | --- | --- | -1 | μA |
| | | $V_{DS}=-32V$, $V_{GS}=0V$, $T_J=125^\circ\text{C}$ | --- | --- | -10 | μA |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS}=\pm 10V$, $V_{DS}=0V$ | --- | --- | ± 100 | nA |

On Characteristics

| | | | | | | |
|---------------------|--------------------------------------|-----------------------------------|------|------|------|----------------------|
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}=-10V$, $I_D=-4A$ | --- | 35 | 47 | $m\Omega$ |
| | | $V_{GS}=-4.5V$, $I_D=-2A$ | --- | 47 | 70 | $m\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}=V_{DS}$, $I_D=-250\mu A$ | -1.0 | -1.6 | -2.5 | V |
| $\Delta V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | 3 | --- | mV/ $^\circ\text{C}$ |
| gfs | Forward Transconductance | $V_{DS}=-10V$, $I_D=-3A$ | --- | 5 | --- | S |

Dynamic and switching Characteristics

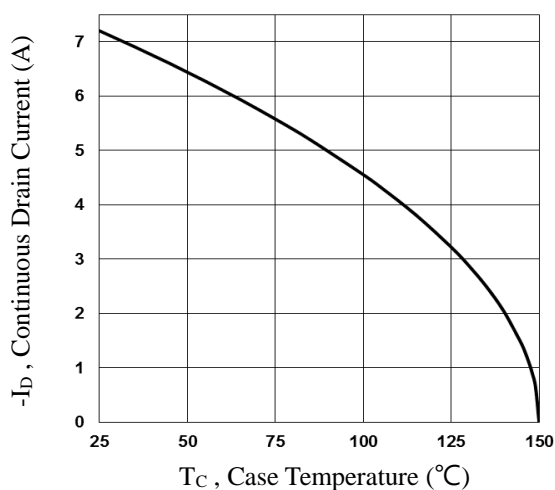
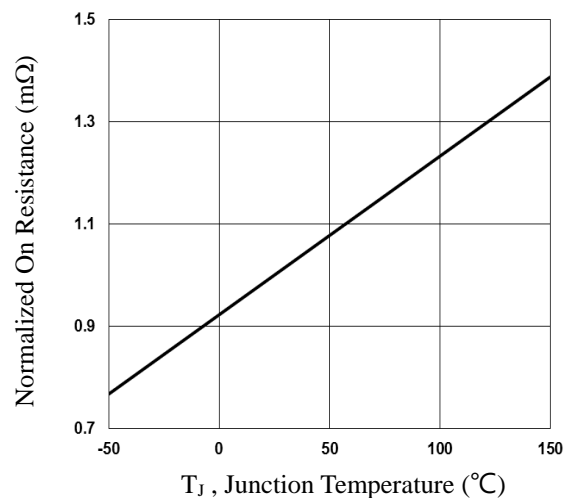
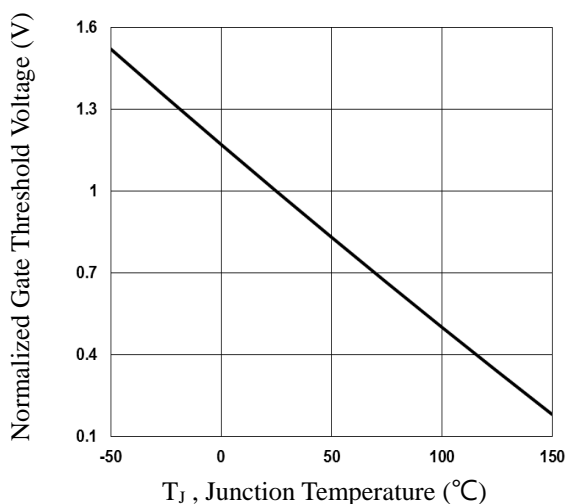
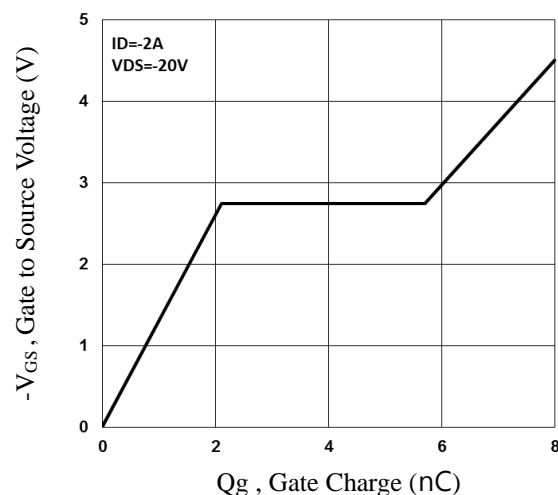
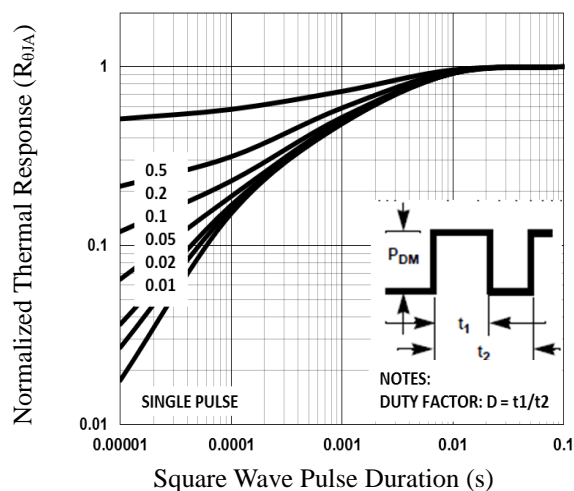
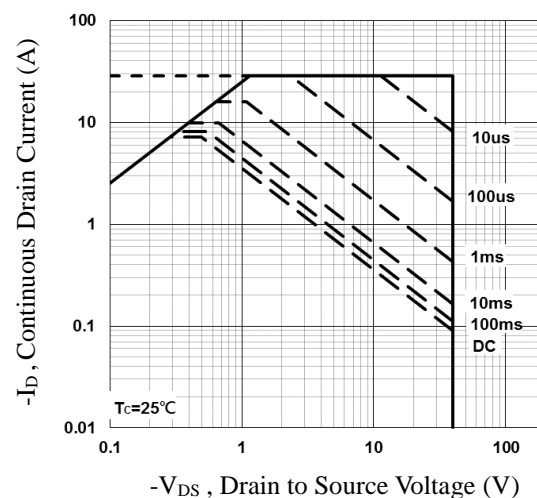
| | | | | | | |
|--------------|-------------------------------------|--|-----|------|-----|----|
| Q_g | Total Gate Charge ^{2, 3} | $V_{DS}=-20V$, $V_{GS}=-4.5V$, $I_D=-2A$ | --- | 8 | --- | nC |
| Q_{gs} | Gate-Source Charge ^{2, 3} | | --- | 2.1 | --- | |
| Q_{gd} | Gate-Drain Charge ^{2, 3} | | --- | 3.6 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time ^{2, 3} | $V_{DD}=-20V$, $V_{GS}=-4.5V$, $R_G=25\Omega$ $I_D=-1A$ | --- | 20 | --- | ns |
| T_r | Rise Time ^{2, 3} | | --- | 12 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time ^{2, 3} | | --- | 46 | --- | |
| T_f | Fall Time ^{2, 3} | | --- | 6 | --- | |
| C_{iss} | Input Capacitance | $V_{DS}=-15V$, $V_{GS}=0V$, $F=1MHz$ | --- | 1050 | --- | pF |
| C_{oss} | Output Capacitance | | --- | 110 | --- | |
| C_{rss} | Reverse Transfer Capacitance | | --- | 80 | --- | |

Drain-Source Diode Characteristics and Maximum Ratings

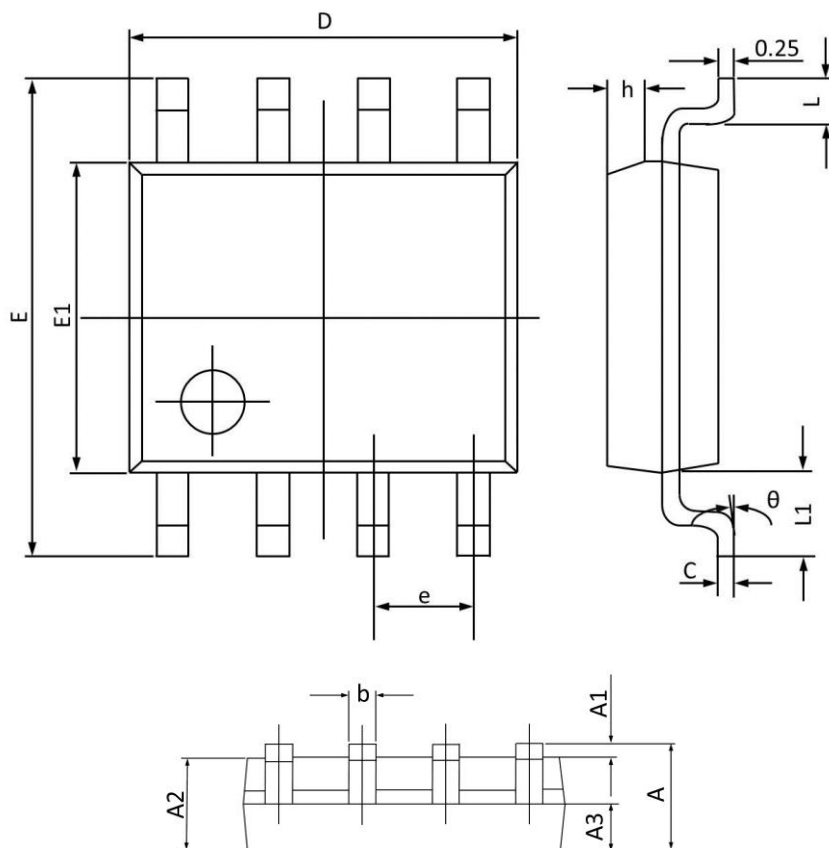
| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|----------|---------------------------|--|------|------|-------|------|
| I_S | Continuous Source Current | $V_G=V_D=0V$, Force Current | --- | --- | -6.5 | A |
| I_{SM} | Pulsed Source Current | | --- | --- | -14.4 | A |
| V_{SD} | Diode Forward Voltage | $V_{GS}=0V$, $I_S=-1A$, $T_J=25^\circ\text{C}$ | --- | --- | -1.2 | V |

Note :

- Repetitive Rating : Pulsed width limited by maximum junction temperature.
- The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- Essentially independent of operating temperature.


Fig.7 Continuous Drain Current vs. T_c

Fig.8 Normalized $R_{DS(on)}$ vs. T_j

Fig.9 Normalized V_{th} vs. T_j

Fig.10 Gate Charge Waveform

Fig.11 Normalized Transient Impedance

Fig.12 Maximum Safe Operation Area

SOP8 PACKAGE INFORMATION



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.250 | 1.650 | 0.049 | 0.065 |
| A3 | 0.500 | 0.700 | 0.020 | 0.028 |
| b | 0.380 | 0.510 | 0.015 | 0.020 |
| c | 0.170 | 0.260 | 0.007 | 0.010 |
| D | 4.700 | 5.100 | 0.185 | 0.201 |
| E | 5.800 | 6.200 | 0.228 | 0.244 |
| E1 | 3.700 | 4.100 | 0.146 | 0.161 |
| e | 1.270(BSC) | | 0.050(BSC) | |
| h | 0.250 | 0.500 | 0.010 | 0.020 |
| L | 0.400 | 0.800 | 0.016 | 0.031 |
| L1 | 1.050(BSC) | | 0.041(BSC) | |
| θ | 0° | 8° | 0° | 8° |

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