

## Fast Switching Emitter Controlled Diode

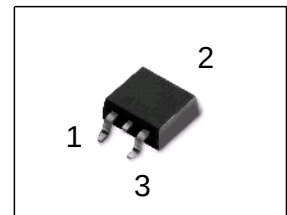
### Feature

- 1200 V Emitter Controlled technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- Easy paralleling
- Qualified according to JEDEC<sup>0)</sup> for target applications
- \* RoHS compliant

### Product Summary

|            |      |    |
|------------|------|----|
| $V_{RRM}$  | 1200 | V  |
| $I_F$      | 30   | A  |
| $V_F$      | 1.65 | V  |
| $T_{jmax}$ | 150  | °C |

PG-TO263-3-2



| Type      | Package      | Ordering Code | Marking | Pin 1 | PIN 2 | PIN 3 |
|-----------|--------------|---------------|---------|-------|-------|-------|
| IDB30E120 | PG-TO263-3-2 | -             | D30E120 | NC    | C     | A     |

### Maximum Ratings, at $T_j = 25\text{ °C}$ , unless otherwise specified

| Parameter                                                  | Symbol         | Value      | Unit |
|------------------------------------------------------------|----------------|------------|------|
| Repetitive peak reverse voltage                            | $V_{RRM}$      | 1200       | V    |
| Continuous forward current                                 | $I_F$          | 30         | A    |
| $T_C=25\text{ °C}$                                         |                | 50         |      |
| $T_C=90\text{ °C}$                                         |                | 30         |      |
| Surge non repetitive forward current                       | $I_{FSM}$      | 102        |      |
| $T_C=25\text{ °C}$ , $t_p=10\text{ ms}$ , sine halfwave    |                |            |      |
| Maximum repetitive forward current                         | $I_{FRM}$      | 76.5       |      |
| $T_C=25\text{ °C}$ , $t_p$ limited by $T_{jmax}$ , $D=0.5$ |                |            |      |
| Power dissipation                                          | $P_{tot}$      | 138        | W    |
| $T_C=25\text{ °C}$                                         |                | 66         |      |
| $T_C=90\text{ °C}$                                         |                |            |      |
| Operating and storage temperature                          | $T_j, T_{stg}$ | -55...+150 | °C   |
| Soldering temperature                                      | $T_S$          | 260        | °C   |
| reflow soldering, MSL1                                     |                |            |      |

## Thermal Characteristics

| Parameter                                      | Symbol     | Values |      |      | Unit |
|------------------------------------------------|------------|--------|------|------|------|
|                                                |            | min.   | typ. | max. |      |
| Characteristics                                |            |        |      |      |      |
| Thermal resistance, junction - case            | $R_{thJC}$ | -      | -    | 0.9  | K/W  |
| Thermal resistance, junction - ambient, leaded | $R_{thJA}$ | -      | -    | 62   |      |
| SMD version, device on PCB:                    | $R_{thJA}$ |        |      |      |      |
| @ min. footprint                               |            | -      | -    | 62   |      |
| @ 6 cm <sup>2</sup> cooling area <sup>1)</sup> |            | -      | 35   | -    |      |

## Electrical Characteristics, at $T_j = 25^\circ\text{C}$ , unless otherwise specified

| Parameter                                                                                | Symbol | Values |             |             | Unit    |
|------------------------------------------------------------------------------------------|--------|--------|-------------|-------------|---------|
|                                                                                          |        | min.   | typ.        | max.        |         |
| Static Characteristics                                                                   |        |        |             |             |         |
| Reverse leakage current<br>$V_R=1200V, T_j=25^{\circ}C$<br>$V_R=1200V, T_j=150^{\circ}C$ | $I_R$  | -<br>- | -<br>-      | 100<br>2500 | $\mu A$ |
| Forward voltage drop<br>$I_F=30A, T_j=25^{\circ}C$<br>$I_F=30A, T_j=150^{\circ}C$        | $V_F$  | -<br>- | 1.65<br>1.7 | 2.15<br>-   | V       |

<sup>0</sup>J-STD20 and JESD22

<sup>1</sup>Device on 40mm\*40mm\*1.5mm epoxy PCB FR4 with 6cm<sup>2</sup> (one layer, 70  $\mu\text{m}$  thick) copper area for drain connection. PCB is vertical without blown air.

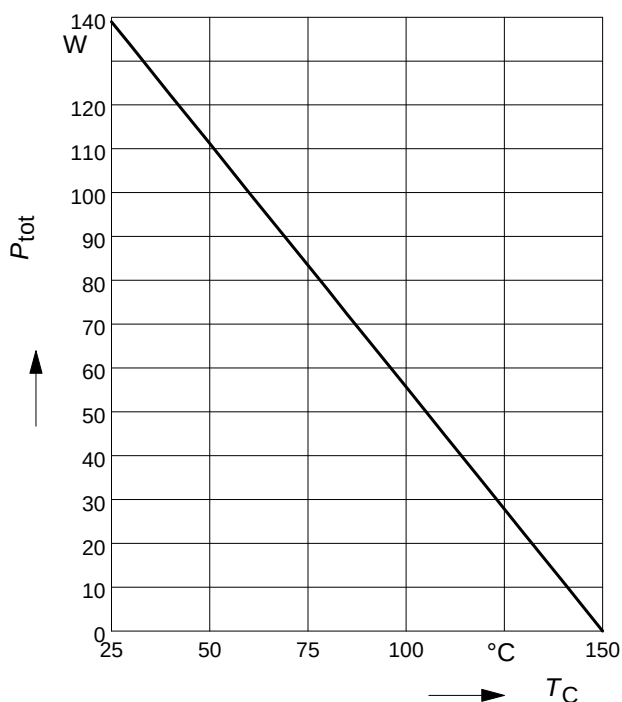
**Electrical Characteristics**, at  $T_j = 25^\circ\text{C}$ , unless otherwise specified

| Parameter                                                                                                                                                                                                                  | Symbol    | Values      |                      |             | Unit |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|----------------------|-------------|------|
|                                                                                                                                                                                                                            |           | min.        | typ.                 | max.        |      |
| Dynamic Characteristics                                                                                                                                                                                                    |           |             |                      |             |      |
| Reverse recovery time<br><br>$V_R=800V, I_F=30A, di_F/dt=850A/\mu s, T_j=25^{\circ}C$<br>$V_R=800V, I_F=30A, di_F/dt=850A/\mu s, T_j=125^{\circ}C$<br>$V_R=800V, I_F=30A, di_F/dt=850A/\mu s, T_j=150^{\circ}C$            | $t_{rr}$  | -<br>-<br>- | 243<br>355<br>380    | -<br>-<br>- | ns   |
| Peak reverse current<br><br>$V_R=800V, I_F = 30 A, di_F/dt=850A/\mu s, T_j=25^{\circ}C$<br>$V_R=800V, I_F =30A, di_F/dt=850A/\mu s, T_j=125^{\circ}C$<br>$V_R=800V, I_F =30A, di_F/dt=850A/\mu s, T_j=150^{\circ}C$        | $I_{rrm}$ | -<br>-<br>- | 23.7<br>28.3<br>29.5 | -<br>-<br>- | A    |
| Reverse recovery charge<br><br>$V_R=800V, I_F=30A, di_F/dt=850A/\mu s, T_j=25^{\circ}C$<br>$V_R=800V, I_F =30A, di_F/dt=850A/\mu s, T_j=125^{\circ}C$<br>$V_R=800V, I_F =30A, di_F/dt=850A/\mu s, T_j=150^{\circ}C$        | $Q_{rr}$  | -<br>-<br>- | 2630<br>4700<br>5200 | -<br>-<br>- | nC   |
| Reverse recovery softness factor<br><br>$V_R=800V, I_F=30A, di_F/dt=850A/\mu s, T_j=25^{\circ}C$<br>$V_R=800V, I_F=30A, di_F/dt=850A/\mu s, T_j=125^{\circ}C$<br>$V_R=800V, I_F=30A, di_F/dt=850A/\mu s, T_j=150^{\circ}C$ | S         | -<br>-<br>- | 6<br>7.4<br>7.5      | -<br>-<br>- |      |

### 1 Power dissipation

$$P_{\text{tot}} = f(T_C)$$

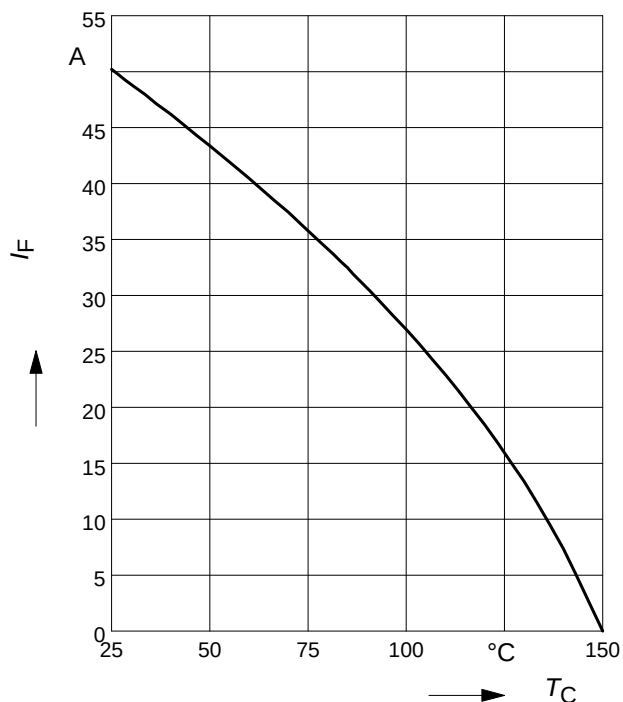
parameter:  $T_j \leq 150^\circ\text{C}$



### 2 Diode forward current

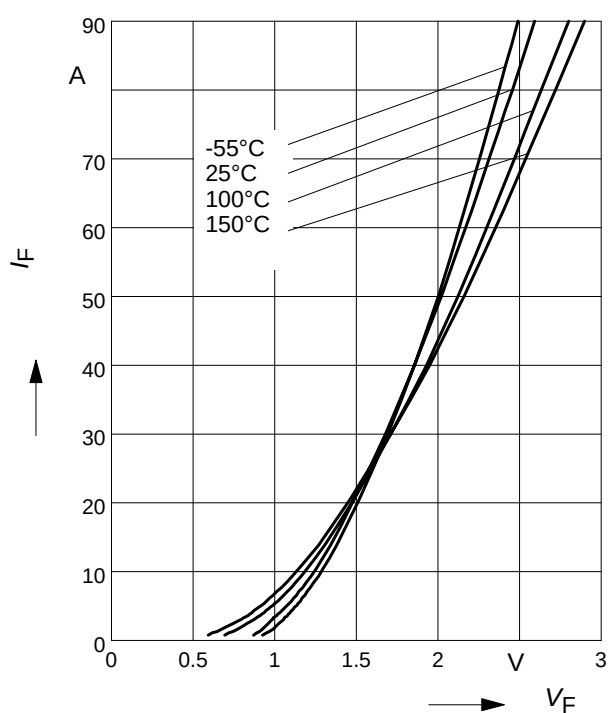
$$I_F = f(T_C)$$

parameter:  $T_j \leq 150^\circ\text{C}$



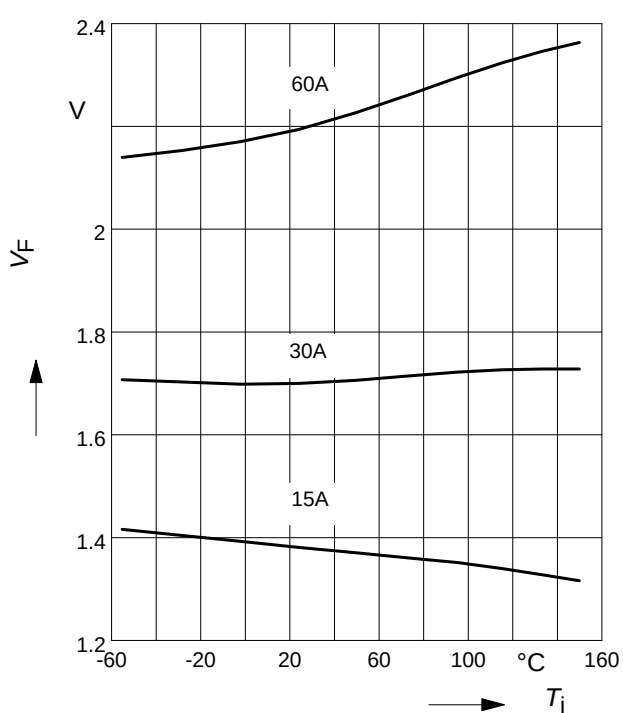
### 3 Typ. diode forward current

$$I_F = f(V_F)$$



### 4 Typ. diode forward voltage

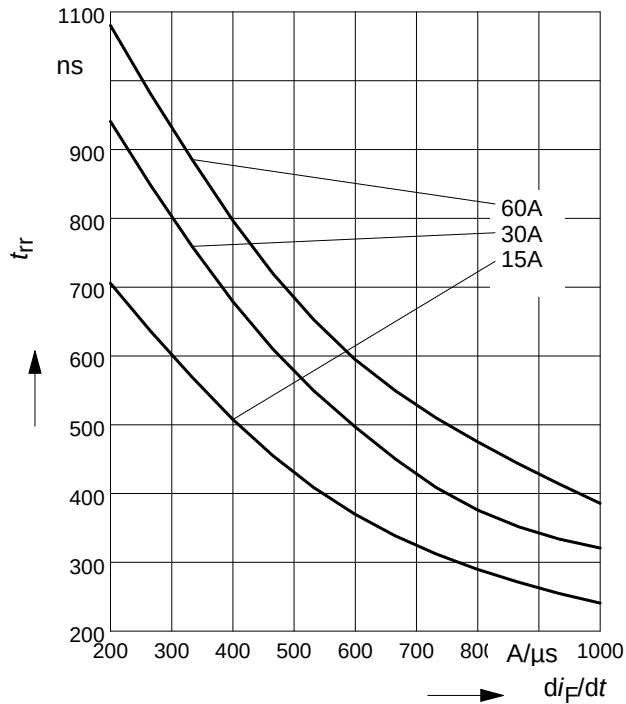
$$V_F = f(T_j)$$



### 5 Typ. reverse recovery time

$$t_{rr} = f(dI_F/dt)$$

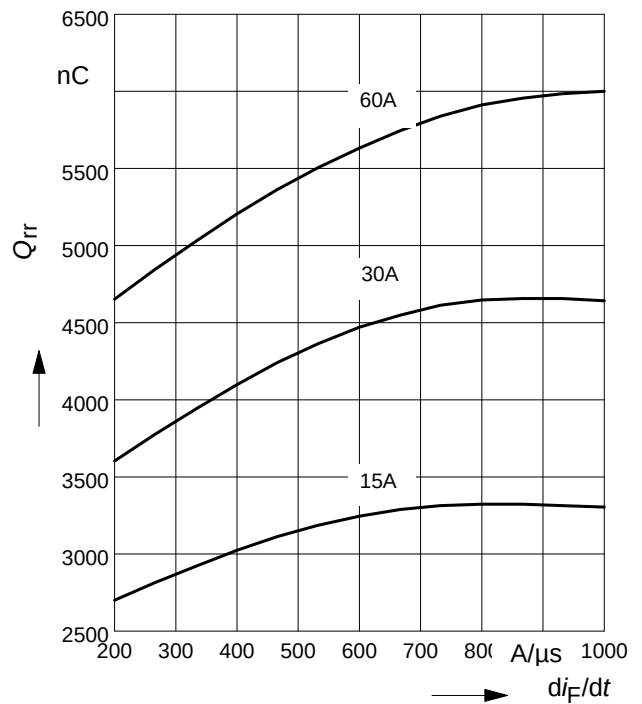
parameter:  $V_R = 800V$ ,  $T_j = 125^\circ C$



### 6 Typ. reverse recovery charge

$$Q_{rr} = f(dI_F/dt)$$

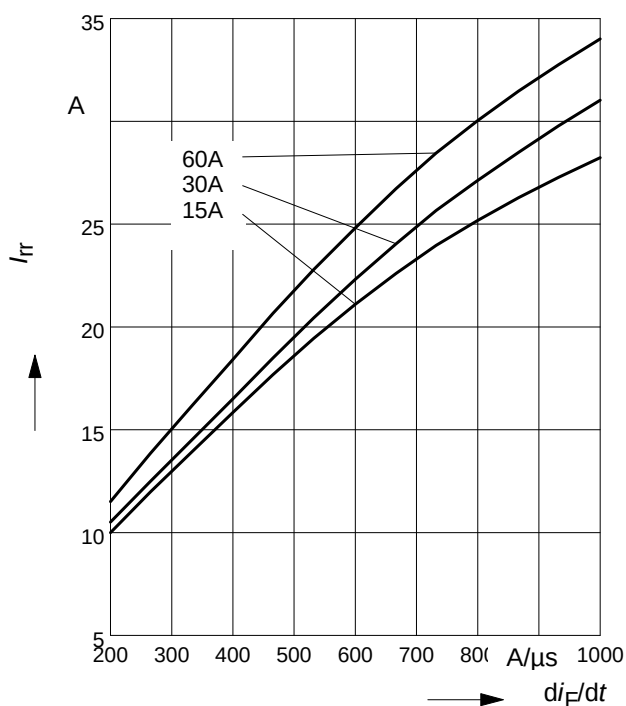
parameter:  $V_R = 800V$ ,  $T_j = 125^\circ C$



### 7 Typ. reverse recovery current

$$I_{rr} = f(dI_F/dt)$$

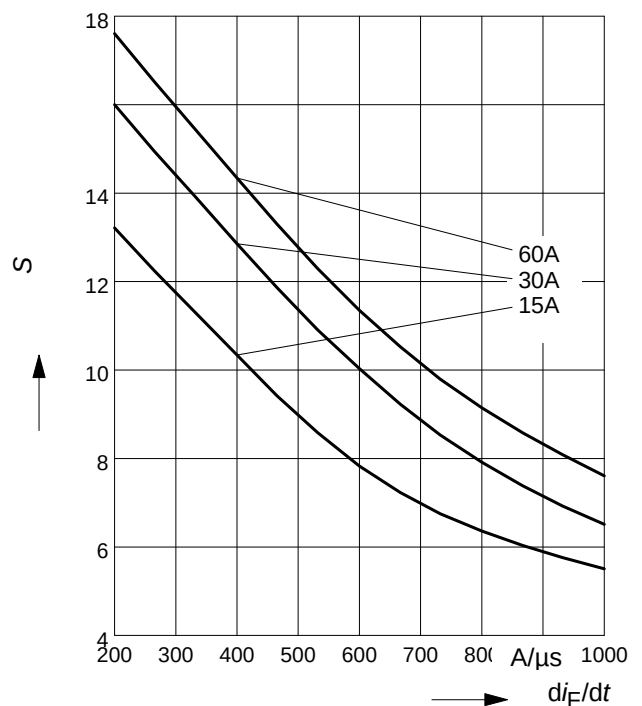
parameter:  $V_R = 800V$ ,  $T_j = 125^\circ C$



### 8 Typ. reverse recovery softness factor

$$S = f(dI_F/dt)$$

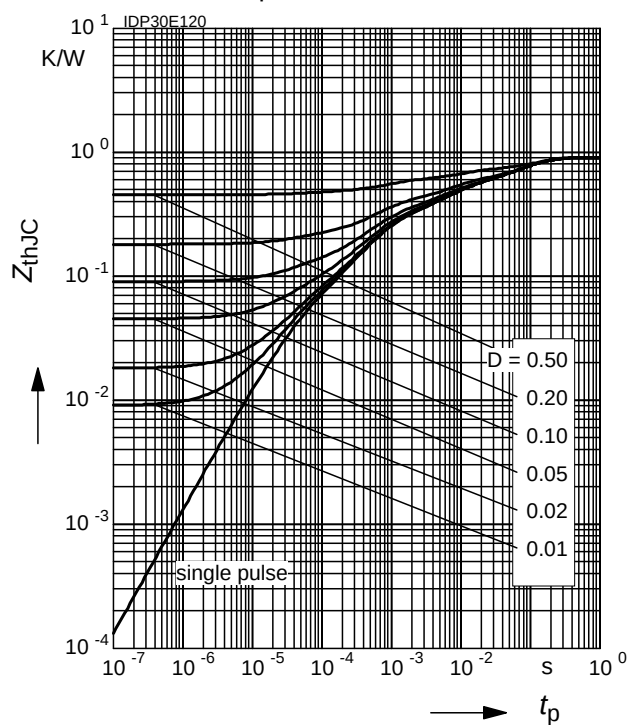
parameter:  $V_R = 800V$ ,  $T_j = 125^\circ C$

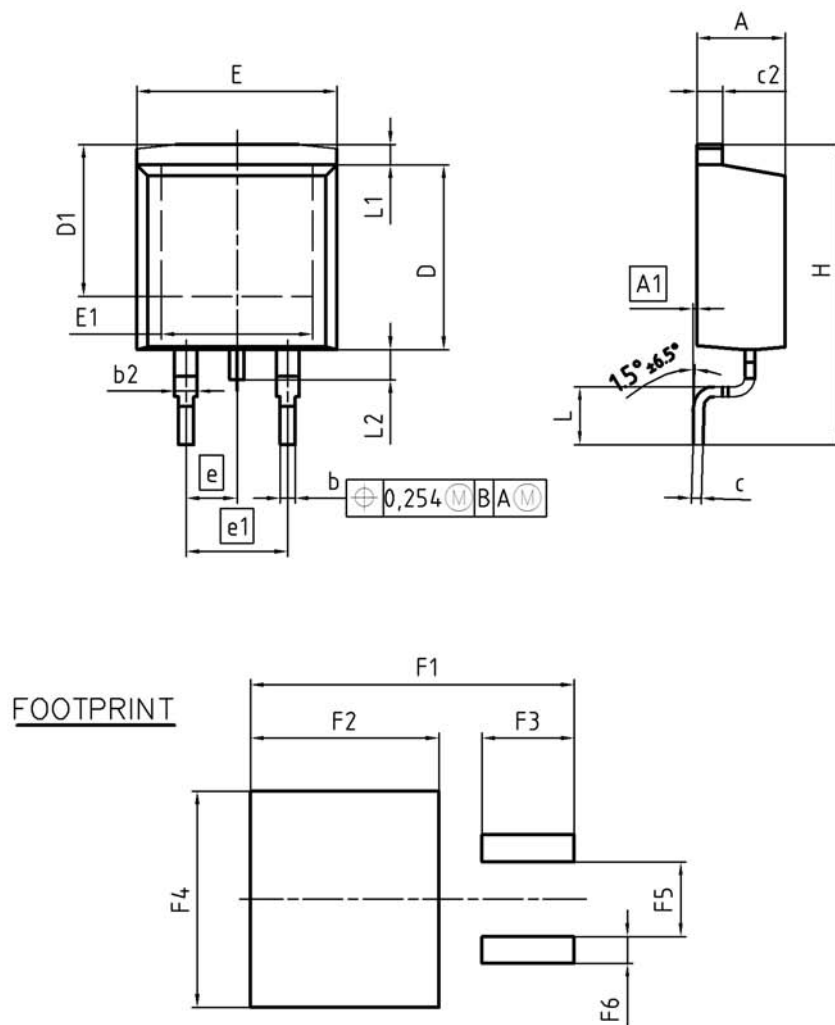


## 9 Max. transient thermal impedance

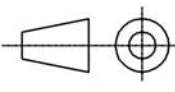
$$Z_{thJC} = f(t_p)$$

parameter :  $D = t_p/T$





| DIM | MILLIMETERS |       | INCHES |       |
|-----|-------------|-------|--------|-------|
|     | MIN         | MAX   | MIN    | MAX   |
| A   | 4.30        | 4.57  | 0.169  | 0.180 |
| A1  | 0.00        | 0.25  | 0.000  | 0.010 |
| b   | 0.65        | 0.85  | 0.026  | 0.033 |
| b2  | 0.95        | 1.15  | 0.037  | 0.045 |
| c   | 0.33        | 0.65  | 0.013  | 0.026 |
| c2  | 1.17        | 1.40  | 0.046  | 0.055 |
| D   | 8.51        | 9.45  | 0.335  | 0.372 |
| D1  | 7.10        | 7.90  | 0.280  | 0.311 |
| E   | 9.80        | 10.31 | 0.386  | 0.406 |
| E1  | 6.50        | 8.60  | 0.256  | 0.339 |
| e   | 2.54        |       | 0.100  |       |
| e1  | 5.08        |       | 0.200  |       |
| N   | 2           |       | 2      |       |
| H   | 14.61       | 15.88 | 0.575  | 0.625 |
| L   | 2.29        | 3.00  | 0.090  | 0.118 |
| L1  | 0.70        | 1.60  | 0.028  | 0.063 |
| L2  | 1.00        | 1.78  | 0.039  | 0.070 |
| F1  | 16.05       | 16.25 | 0.632  | 0.640 |
| F2  | 9.30        | 9.50  | 0.366  | 0.374 |
| F3  | 4.50        | 4.70  | 0.177  | 0.185 |
| F4  | 10.70       | 10.90 | 0.421  | 0.429 |
| F5  | 3.65        | 3.85  | 0.144  | 0.152 |
| F6  | 1.25        | 1.45  | 0.049  | 0.057 |

|                                                                                                              |
|--------------------------------------------------------------------------------------------------------------|
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| SCALE<br>0 5 5 7.5mm                                                                                         |
| EUROPEAN PROJECTION<br> |
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