

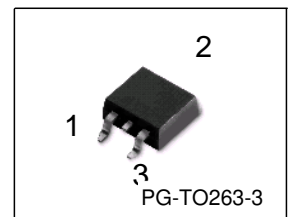
**Fast Switching Emitter Controlled Diode**

**Feature**

- 600V Emitter Controlled technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- 175°C operating temperature
- Easy paralleling
- Qualified according to JEDEC<sup>0)</sup> for target applications
- \* RoHS compliant

**Product Summary**

|            |     |    |
|------------|-----|----|
| $V_{RRM}$  | 600 | V  |
| $I_F$      | 30  | A  |
| $V_F$      | 1.5 | V  |
| $T_{jmax}$ | 175 | °C |



| Type     | Package    | Ordering Code | Marking | Pin 1 | PIN 2 | PIN 3 |
|----------|------------|---------------|---------|-------|-------|-------|
| IDB30E60 | PG-TO263-3 | -             | D30E60  | NC    | C     | A     |

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

| Parameter   | Symbol    | Value         | Unit |
|---|-----------|---------------|------|
| Repetitive peak reverse voltage   | $V_{RRM}$ | 600           | V    |
| Continuous forward current<br>$T_C = 25\text{ °C}$<br>$T_C = 90\text{ °C}$                            | $I_F$     | 52.3<br>34.9  | A    |
| Surge non repetitive forward current<br>$T_C = 25\text{ °C}$ , $t_p = 10\text{ ms}$ , sine halfwave   | $I_{FSM}$ | 117           | A    |
| Maximum repetitive forward current<br>$T_C = 25\text{ °C}$ , $t_p$ limited by $t_{j,max}$ , $D = 0.5$ | $I_{FRM}$ | 81            | A    |
| Power dissipation<br>$T_C = 25\text{ °C}$<br>$T_C = 90\text{ °C}$                                     | $P_{tot}$ | 142.9<br>80.9 | W    |
| Operating junction temperature  | $T_j$     | -40...+175    | °C   |
| Storage temperature   | $T_{stg}$ | -55...+150    |      |
| Soldering temperature<br>1.6mm (0.063 in.) from case for 10 s   | $T_S$     | 260           |      |

**Thermal Characteristics**

| Parameter   | Symbol     | Values |      |      | Unit |
|---|------------|--------|------|------|------|
|   |            | min.   | typ. | max. |      |
| <b>Characteristics</b>  |            |        |      |      |      |
| Thermal resistance, junction - case   | $R_{thJC}$ | -      | -    | 1.05 | K/W  |
| Thermal resistance, junction - ambient, leaded  | $R_{thJA}$ | -      | -    | 62   |      |
| SMD version, device on PCB:<br>@ min. footprint<br>@ 6 cm <sup>2</sup> cooling area <sup>1)</sup> | $R_{thJA}$ | -      | -    | 62   |      |
|   |            | -      | 35   | -    |      |

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

| Parameter  | Symbol | Values |            |            | Unit          |
|--|--------|--------|------------|------------|---------------|
|  |        | min.   | typ.       | max.       |               |
| <b>Static Characteristics</b>  |        |        |            |            |               |
| Reverse leakage current<br>$V_R=600\text{V}$ , $T_j=25\text{°C}$<br>$V_R=600\text{V}$ , $T_j=150\text{°C}$ | $I_R$  | -      | -          | 50<br>2500 | $\mu\text{A}$ |
| Forward voltage drop<br>$I_F=30\text{A}$ , $T_j=25\text{°C}$<br>$I_F=30\text{A}$ , $T_j=150\text{°C}$      | $V_F$  | -      | 1.5<br>1.5 | 2<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.

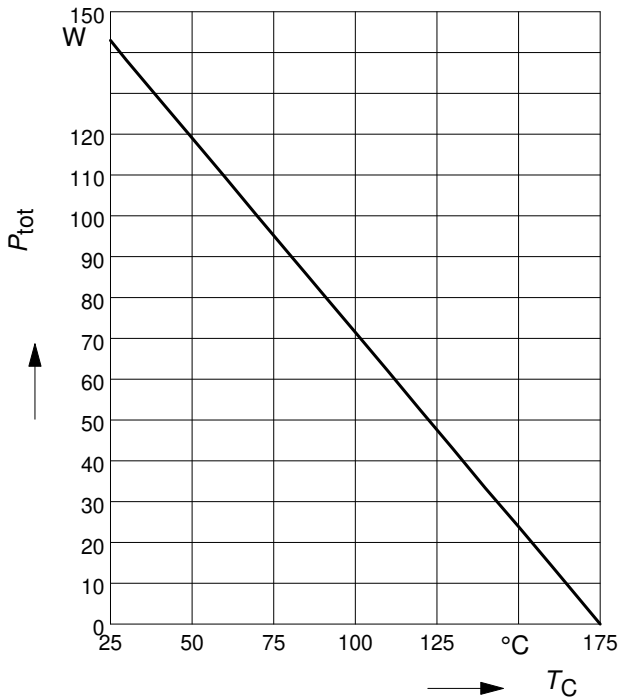
**Electrical Characteristics**, at  $T_j = 25\text{ °C}$ , unless otherwise specified

| Parameter   | Symbol    | Values |                      |      | Unit |
|---|-----------|--------|----------------------|------|------|
|   |           | min.   | typ.                 | max. |      |
| <b>Dynamic Characteristics</b>  |           |        |                      |      |      |
| Reverse recovery time<br>$V_R=400\text{V}$ , $I_F=30\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=25\text{°C}$<br>$V_R=400\text{V}$ , $I_F=30\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=125\text{°C}$<br>$V_R=400\text{V}$ , $I_F=30\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$            | $t_{rr}$  | -      | 126<br>171<br>178    | -    | ns   |
| Peak reverse current<br>$V_R=400\text{V}$ , $I_F = 30\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=25\text{°C}$<br>$V_R=400\text{V}$ , $I_F = 30\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=125\text{°C}$<br>$V_R=400\text{V}$ , $I_F = 30\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$       | $I_{rrm}$ | -      | 19<br>22<br>24       | -    | A    |
| Reverse recovery charge<br>$V_R=400\text{V}$ , $I_F=30\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=25\text{°C}$<br>$V_R=400\text{V}$ , $I_F = 30\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=125\text{°C}$<br>$V_R=400\text{V}$ , $I_F = 30\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$      | $Q_{rr}$  | -      | 1100<br>1950<br>2150 | -    | nC   |
| Reverse recovery softness factor<br>$V_R=400\text{V}$ , $I_F=30\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=25\text{°C}$<br>$V_R=400\text{V}$ , $I_F=30\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=125\text{°C}$<br>$V_R=400\text{V}$ , $I_F=30\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$ | $S$       | -      | 4<br>4.6<br>4.8      | -    |      |

**1 Power dissipation**

$P_{tot} = f(T_C)$

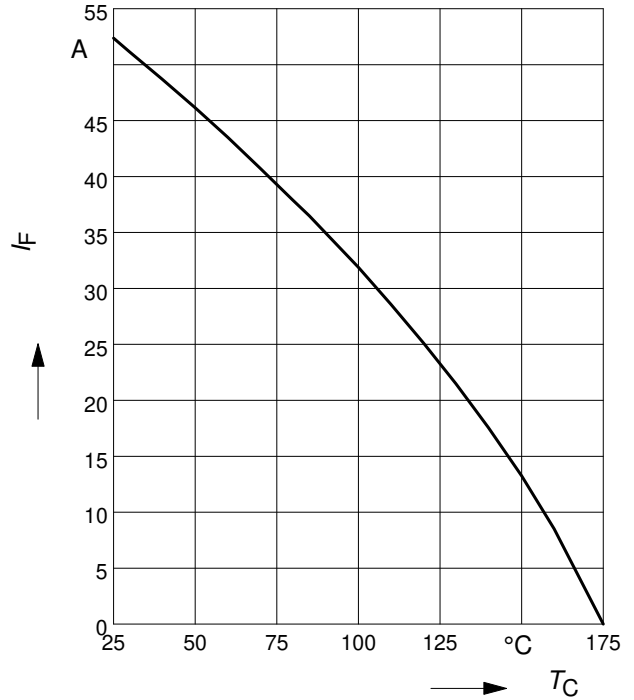
parameter:  $T_j \leq 175\text{ °C}$



**2 Diode forward current**

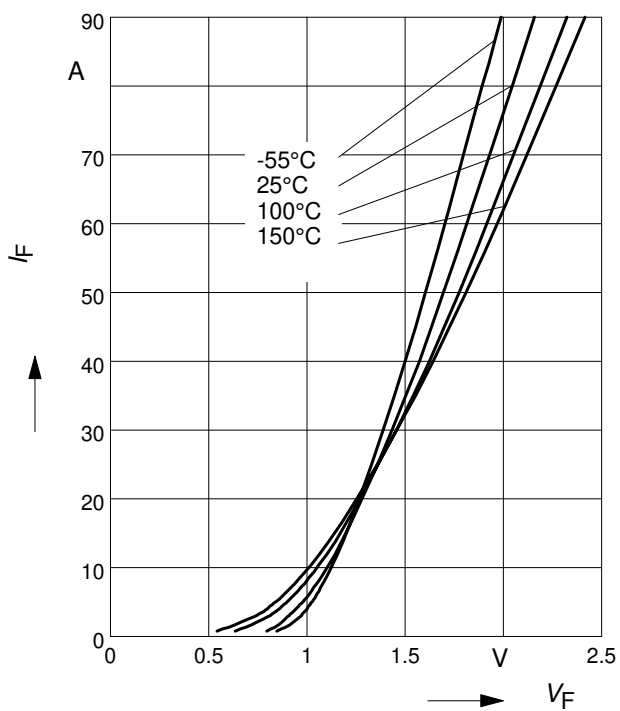
$I_F = f(T_C)$

parameter:  $T_j \leq 175\text{ °C}$



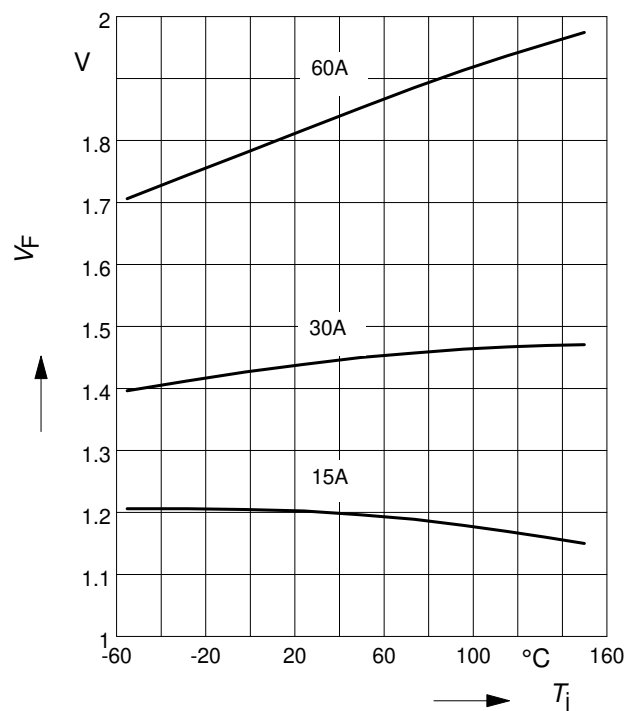
**3 Typ. diode forward current**

$I_F = f(V_F)$



**4 Typ. diode forward voltage**

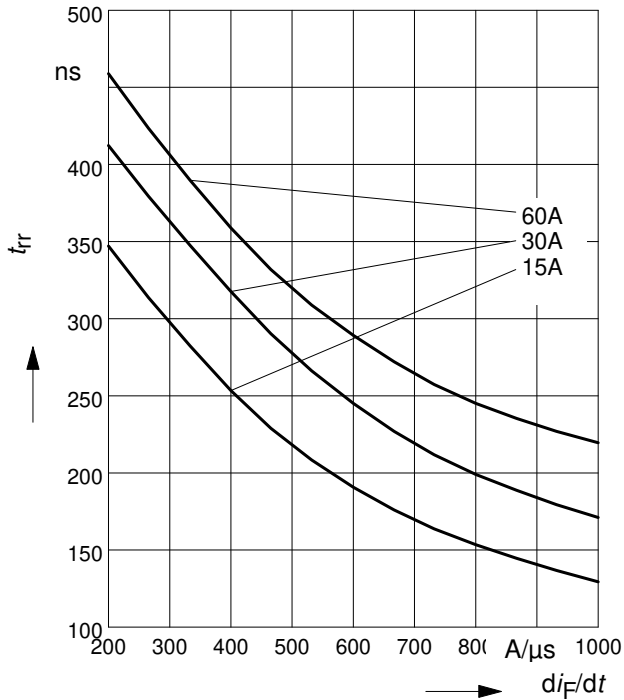
$V_F = f(T_j)$



**5 Typ. reverse recovery time**

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

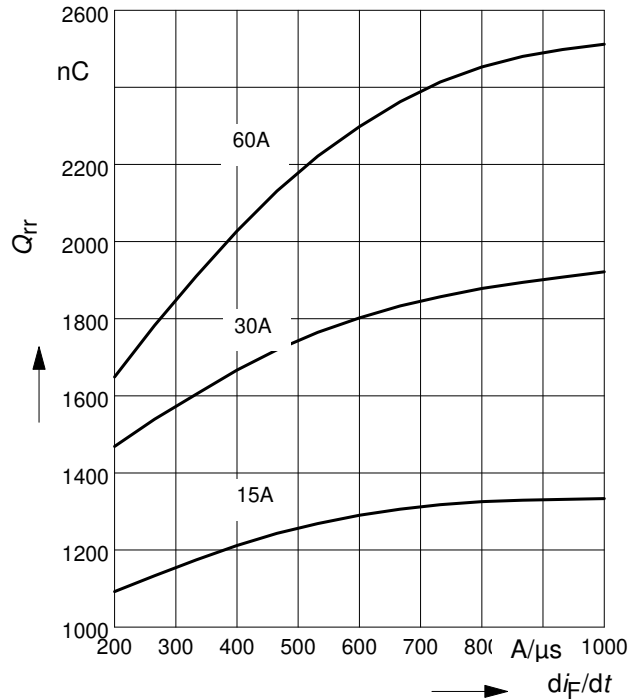
parameter:  $V_R = 400V, T_j = 125^\circ C$



**6 Typ. reverse recovery charge**

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

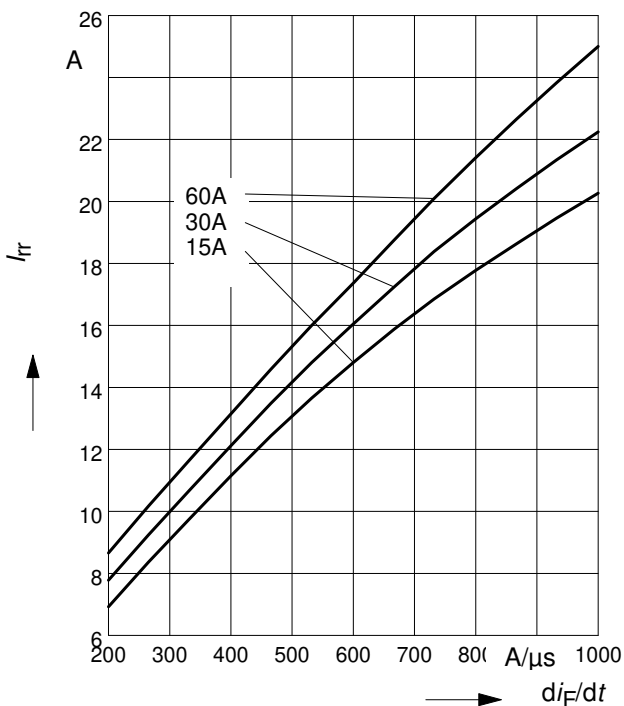
parameter:  $V_R = 400V, T_j = 125^\circ C$



**7 Typ. reverse recovery current**

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

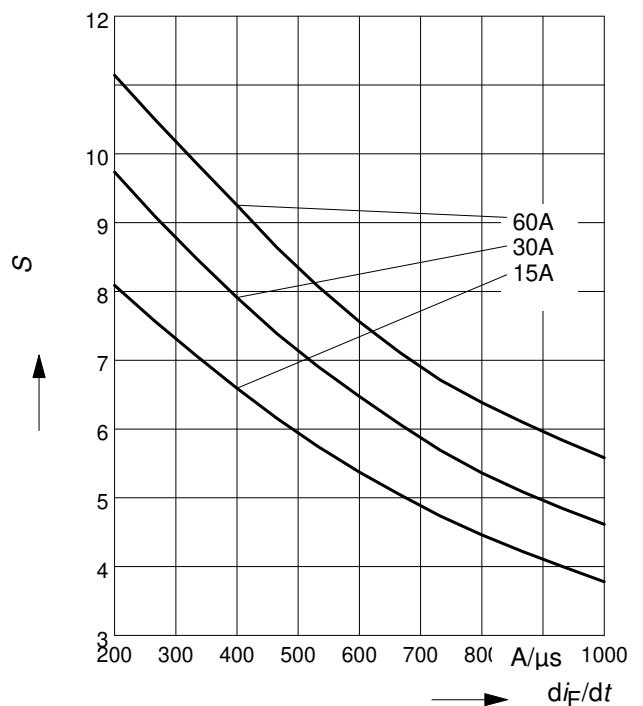
parameter:  $V_R = 400V, T_j = 125^\circ C$



**8 Typ. reverse recovery softness factor**

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

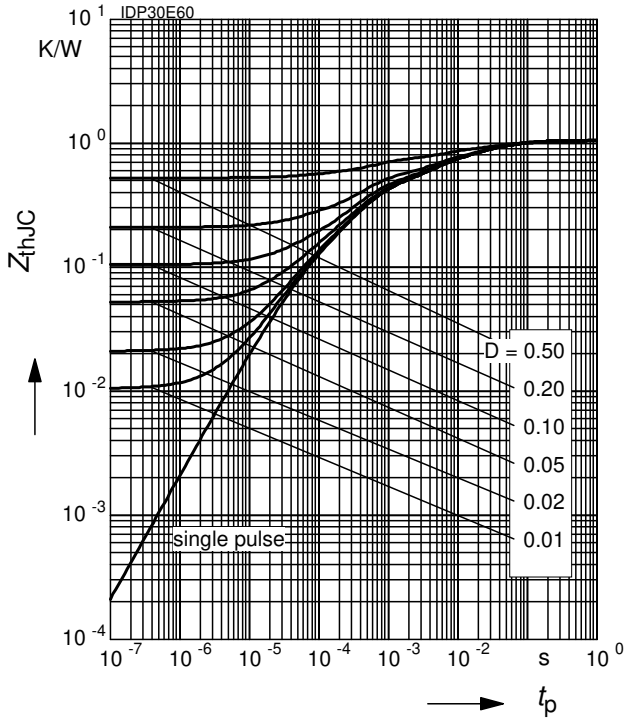
parameter:  $V_R = 400V, T_j = 125^\circ C$

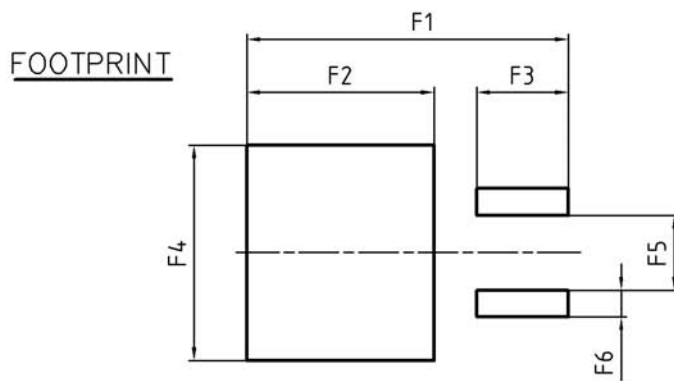
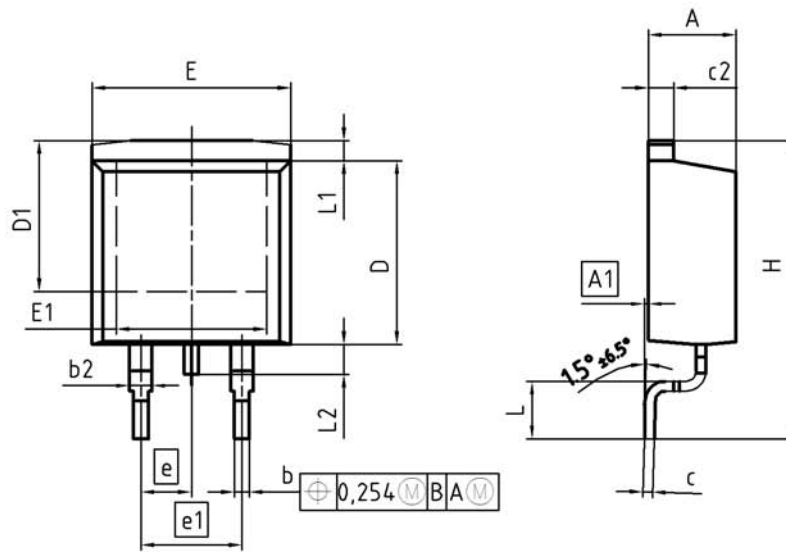


**9 Max. transient thermal impedance**

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

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

7.5mm

EUROPEAN PROJECTION

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