

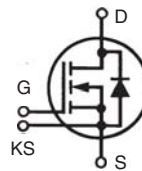
# Trench Power MOSFET

Very low  $R_{DS(on)}$

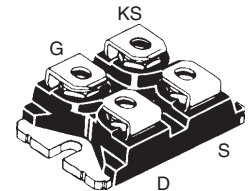
$$V_{DSS} = 100 \text{ V}$$

$$I_{D25} = 280 \text{ A}$$

$$R_{DS(on)} = 3.9 \text{ m}\Omega \text{ (typ.)}$$



SOT-227 B,  
miniBLOC



G = Gate  
S = Source

D = Drain  
KS = Kelvin Source

| Symbol        | Conditions   | Maximum Ratings                      |                  |
|---------------|--|--------------------------------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$  | 100                                  | V                |
| $V_{GS}$      | Continuous   | $\pm 20$                             | V                |
| $V_{GSM}$     | Transient  | $\pm 30$                             | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$   | 280                                  | A                |
| $I_{D90}$     | $T_C = 90^\circ\text{C}$   | 210                                  | A                |
| $I_{D(RMS)}$  | Package lead current limit   | 150                                  | A                |
| $P_D$         | $T_C = 25^\circ\text{C}$   | 770                                  | W                |
| $T_J$         |  | -55 ... +150                         | $^\circ\text{C}$ |
| $T_{JM}$      |  | 175                                  | $^\circ\text{C}$ |
| $T_{stg}$     |  | -55 ... +175                         | $^\circ\text{C}$ |
| $V_{ISOL}$    | 50/60 Hz, RMS, $t = 1 \text{ min}$<br>$I_{ISOL} \leq 1 \text{ mA}$ , $t = 1 \text{ s}$ | 2500<br>3000                         | V~<br>V~         |
| $M_d$         | Mounting torque<br>Terminal connection torque  | 1.5/13 Nm/lb.in.<br>1.5/13 Nm/lb.in. |                  |
| <b>Weight</b> |  | 30                                   | g                |

## Features

- trench MOSFET
- very low on state resistance  $R_{DS(on)}$
- fast switching
- fast body diode
- industry standard outline
- isolated package
- high reliability

## Applications

- automotive
- converters for fuel cells
- AC drives
- choppers to replace series dropping resistors used for motors, heaters etc.
- DC-DC converters
- electronic switches
- replacing relays and fuses
- power supplies
- solar inverters
- battery supplied systems
- choppers or inverters for motor control in hand tools
- battery chargers

## Advantages

- Easy to mount
- Space savings
- High power density

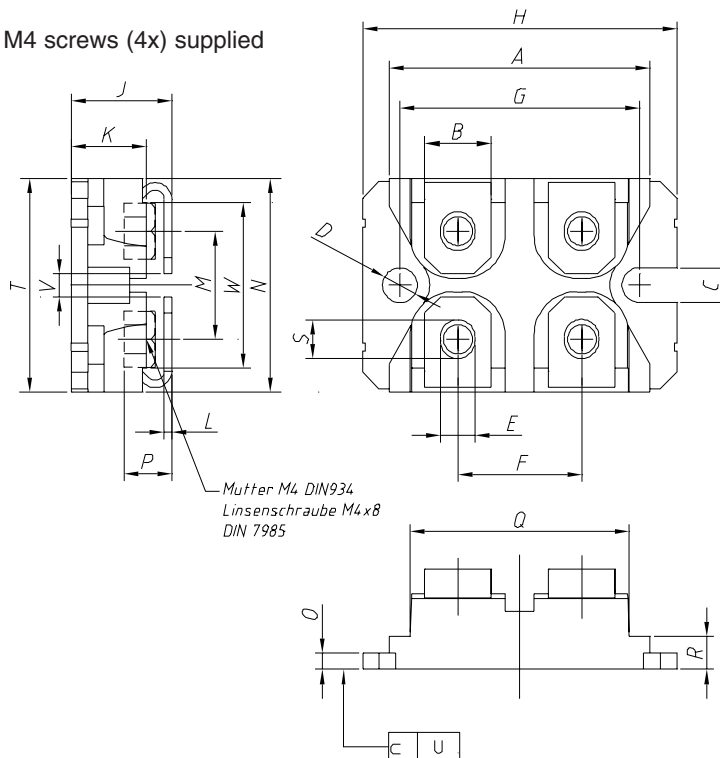
| Symbol       | Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                           |
|--------------|--|---|------|---------------------------|
|              |  | min.  | typ. | max.                      |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 140 \text{ A}$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$ |   | 3.9  | 5 m $\Omega$              |
| $V_{GH(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 4 \text{ mA}$   | 2   |      | 4 V                       |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $T_J = 25^\circ\text{C}$<br>$V_{GS} = 0 \text{ V}$ , $T_J = 125^\circ\text{C}$                |   |      | 400 $\mu\text{A}$<br>2 mA |
| $I_{GSS}$    | $V_{GS} = \pm 20 V_{DC}$ , $V_{DS} = 0$  |   |      | $\pm 400 \text{ nA}$      |

| Symbol  | Conditions  | Characteristic Values                               |      |      |
|---|---|---|------|------|
|   |   | (T <sub>J</sub> = 25°C, unless otherwise specified) |      |      |
|   |   | min.  | typ. | max. |
| <b>g<sub>fs</sub></b>   | V <sub>DS</sub> = 10 V, I <sub>D</sub> = 100 A, pulse test  |   | 220  | S    |
| <b>C<sub>ISS</sub></b><br><b>C<sub>OSS</sub></b><br><b>C<sub>rSS</sub></b>                            | } V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz  |   | 18   | nF   |
|   |   |   | 2.2  | nF   |
|   |   |   | 1.2  | nF   |
| <b>t<sub>d(on)</sub></b><br><b>t<sub>r</sub></b><br><b>t<sub>d(off)</sub></b><br><b>t<sub>f</sub></b> | } V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 30 V, I <sub>D</sub> = 100 A<br>R <sub>G</sub> = 2.5 Ω (external) |   | 35   | ns   |
|   |   |   | 85   | ns   |
|   |   |   | 150  | ns   |
|   |   |   | 70   | ns   |
| <b>Q<sub>g(on)</sub></b><br><b>Q<sub>gs</sub></b><br><b>Q<sub>gd</sub></b>                            | } V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 80 V, I <sub>D</sub> = 100 A                                      |   | 440  | nC   |
|   |   |   | 75   | nC   |
|   |   |   | 180  | nC   |
| <b>R<sub>thJC</sub></b><br><b>R<sub>thCH</sub></b>  | with heat transfer paste  |   | 0.19 | K/W  |
|   |   |   | 0.05 | K/W  |

| Symbol   | Conditions   | Characteristic Values                               |      |        |
|--|--|---|------|--------|
|  |  | (T <sub>J</sub> = 25°C, unless otherwise specified) |      |        |
|  |  | min.  | typ. | max.   |
| <b>I<sub>S</sub></b>                           | V <sub>GS</sub> = 0 V  |   |      | 380 A  |
| <b>I<sub>SM</sub></b>                          | Repetitive, pulse width limited by T <sub>JM</sub>   |   |      | 570 A  |
| <b>V<sub>SD</sub></b>                          | I <sub>F</sub> = 280 A, V <sub>GS</sub> = 0 V,<br>Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 % |   |      | 1.70 V |
| <b>t<sub>rr</sub></b><br><b>I<sub>RM</sub></b> | } I <sub>F</sub> = 300 A, V <sub>R</sub> = 30 V<br>-di/dt = 400 A/μs                         |   | 80   | ns     |
|  |  |   |      | 35     |

**miniBLOC, SOT-227 B**

M4 screws (4x) supplied



| Dim. | Millimeter |       | Inches |       |
|------|------------|-------|--------|-------|
|      | Min.       | Max.  | Min.   | Max.  |
| A    | 31.50      | 31.88 | 1.240  | 1.255 |
| B    | 7.80       | 8.20  | .307   | .323  |
| C    | 4.09       | 4.29  | .161   | .169  |
| D    | 4.09       | 4.29  | .161   | .169  |
| E    | 4.09       | 4.29  | .161   | .169  |
| F    | 14.91      | 15.11 | .587   | .595  |
| G    | 30.12      | 30.30 | 1.186  | 1.193 |
| H    | 37.80      | 38.23 | 1.489  | 1.505 |
| J    | 11.68      | 12.22 | .460   | .481  |
| K    | 8.92       | 9.60  | .351   | .378  |
| L    | 0.76       | 0.84  | .030   | .033  |
| M    | 12.60      | 12.85 | .496   | .506  |
| N    | 25.15      | 25.42 | .990   | 1.001 |
| O    | 1.98       | 2.13  | 0.78   | .084  |
| P    | 4.95       | 5.97  | .195   | .235  |
| Q    | 26.54      | 26.90 | 1.045  | 1.059 |
| R    | 3.94       | 4.42  | .155   | .174  |
| S    | 4.72       | 4.85  | .186   | .191  |
| T    | 24.59      | 25.07 | .968   | .987  |
| U    | -0.05      | 0.10  | -.002  | .004  |
| V    | 3.30       | 4.57  | .130   | .180  |
| W    | 19.81      | 21.08 | .780   | .830  |

IXYS reserves the right to change limits, test conditions, and dimensions.

© 2004 IXYS All rights reserved