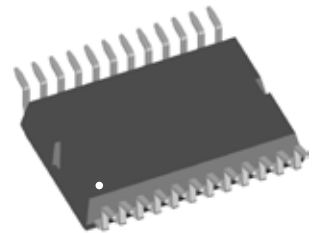
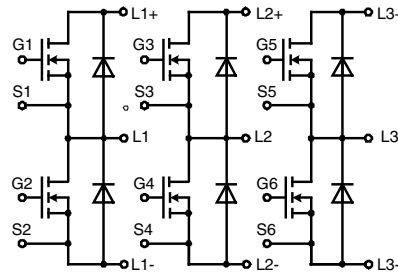


# Three phase full Bridge with Trench MOSFETs in DCB isolated high current package

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

$$I_{D25} = 90 \text{ A}$$

$$R_{DSon \text{ typ.}} = 7.5 \text{ m}\Omega$$



## MOSFETs

| Symbol    | Conditions                                            | Maximum Ratings |   |
|-----------|-------------------------------------------------------|-----------------|---|
| $V_{DSS}$ | $T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$ | 100             | V |
| $V_{GS}$  |                                                       | $\pm 20$        | V |
| $I_{D25}$ | $T_C = 25^{\circ}\text{C}$                            | 90              | A |
| $I_{D90}$ | $T_C = 90^{\circ}\text{C}$                            | 68              | A |
| $I_{F25}$ | $T_C = 25^{\circ}\text{C (diode)}$                    | 90              | A |
| $I_{F90}$ | $T_C = 90^{\circ}\text{C (diode)}$                    | 68              | A |

## Applications

- AC drives
  - in automobiles
    - electric power steering
    - starter generator
  - in industrial vehicles
    - propulsion drives
    - fork lift drives
- in battery supplied equipment

## Features

- MOSFETs in trench technology:
  - low  $R_{DSon}$
  - optimized intrinsic reverse diode
- package:
  - high level of integration
  - high current capability
  - aux. terminals for MOSFET control
  - terminals for soldering or welding connections
  - isolated DCB ceramic base plate with optimized heat transfer
- Space and weight savings

| Symbol          | Conditions                                                                                                                                | Characteristic Values<br>( $T_{VJ} = 25^{\circ}\text{C}$ , unless otherwise specified) |       |      |               |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------|------|---------------|
|                 |                                                                                                                                           | min.                                                                                   | typ.  | max. |               |
| $R_{DSon}^{1)}$ | on chip level at $V_{GS} = 10 \text{ V}$                                                                                                  |                                                                                        |       |      |               |
|                 | $T_{VJ} = 25^{\circ}\text{C}$                                                                                                             |                                                                                        | 7.5   | 8.5  | m $\Omega$    |
|                 | $T_{VJ} = 125^{\circ}\text{C}$                                                                                                            |                                                                                        | 14    |      | m $\Omega$    |
| $V_{GS(th)}$    | $V_{DS} = 20 \text{ V}; I_D = 1 \text{ mA}$                                                                                               | 2.5                                                                                    |       | 4.5  | V             |
| $I_{DSS}$       | $V_{DS} = V_{DSS}; V_{GS} = 0 \text{ V}$                                                                                                  |                                                                                        | 0.1   | 1    | $\mu\text{A}$ |
| $I_{GSS}$       | $V_{GS} = \pm 20 \text{ V}; V_{DS} = 0 \text{ V}$                                                                                         |                                                                                        |       | 0.2  | $\mu\text{A}$ |
| $Q_g$           | $V_{GS} = 10 \text{ V}; V_{DS} = 65 \text{ V}; I_D = 90 \text{ A}$                                                                        |                                                                                        | 90    |      | nC            |
| $Q_{gs}$        |                                                                                                                                           |                                                                                        | 30    |      | nC            |
| $Q_{gd}$        |                                                                                                                                           |                                                                                        | 30    |      | nC            |
| $t_{d(on)}$     | inductive load<br>$V_{GS} = 10 \text{ V}; V_{DS} = 48 \text{ V}$<br>$I_D = 70 \text{ A}; R_G = 33 \Omega;$<br>$T_J = 125^{\circ}\text{C}$ |                                                                                        | 130   |      | ns            |
| $t_r$           |                                                                                                                                           |                                                                                        | 95    |      | ns            |
| $t_{d(off)}$    |                                                                                                                                           |                                                                                        | 290   |      | ns            |
| $t_f$           |                                                                                                                                           |                                                                                        | 55    |      | ns            |
| $E_{on}$        |                                                                                                                                           |                                                                                        | 0.4   |      | mJ            |
| $E_{off}$       |                                                                                                                                           |                                                                                        | 0.4   |      | mJ            |
| $E_{recoff}$    |                                                                                                                                           |                                                                                        | 0.007 |      | mJ            |
| $R_{thJC}$      | with heat transfer paste (IXYS test setup)                                                                                                |                                                                                        |       | 1.0  | K/W           |
| $R_{thJH}$      |                                                                                                                                           |                                                                                        | 1.3   | 1.6  | K/W           |

<sup>1)</sup>  $V_{DS} = I_D \cdot (R_{DS(on)} + 2R_{Pin \text{ to Chip}})$

**Recommended replacement: MTI 85WX100GD**

**Source-Drain Diode**

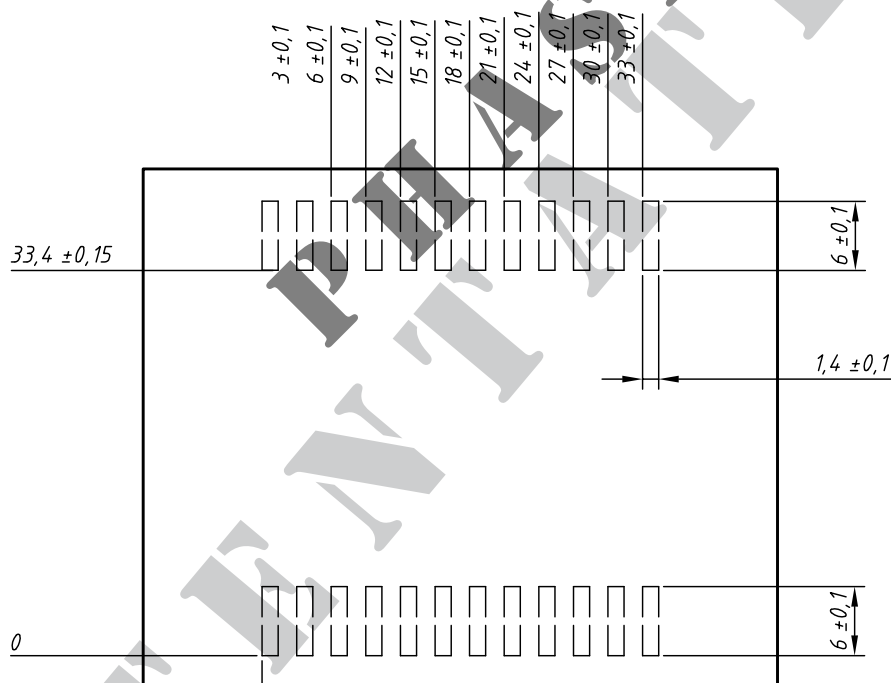
| Symbol          | Conditions                                                                    | Characteristic Values                               |      |      |    |
|-----------------|-------------------------------------------------------------------------------|-----------------------------------------------------|------|------|----|
|                 |                                                                               | (T <sub>J</sub> = 25°C, unless otherwise specified) |      |      |    |
|                 |                                                                               | min.                                                | typ. | max. |    |
| V <sub>SD</sub> | (diode) I <sub>F</sub> = 70 A; V <sub>GS</sub> = 0 V                          |                                                     | 0.9  | 1.2  | V  |
| t <sub>rr</sub> | I <sub>F</sub> = 70 A; -di <sub>F</sub> /dt = 800 A/μs; V <sub>R</sub> = 48 V |                                                     | 55   |      | ns |
| Q <sub>RM</sub> |                                                                               |                                                     | 0.95 |      | μC |
| I <sub>RM</sub> |                                                                               |                                                     | 33   |      | A  |

**Component**

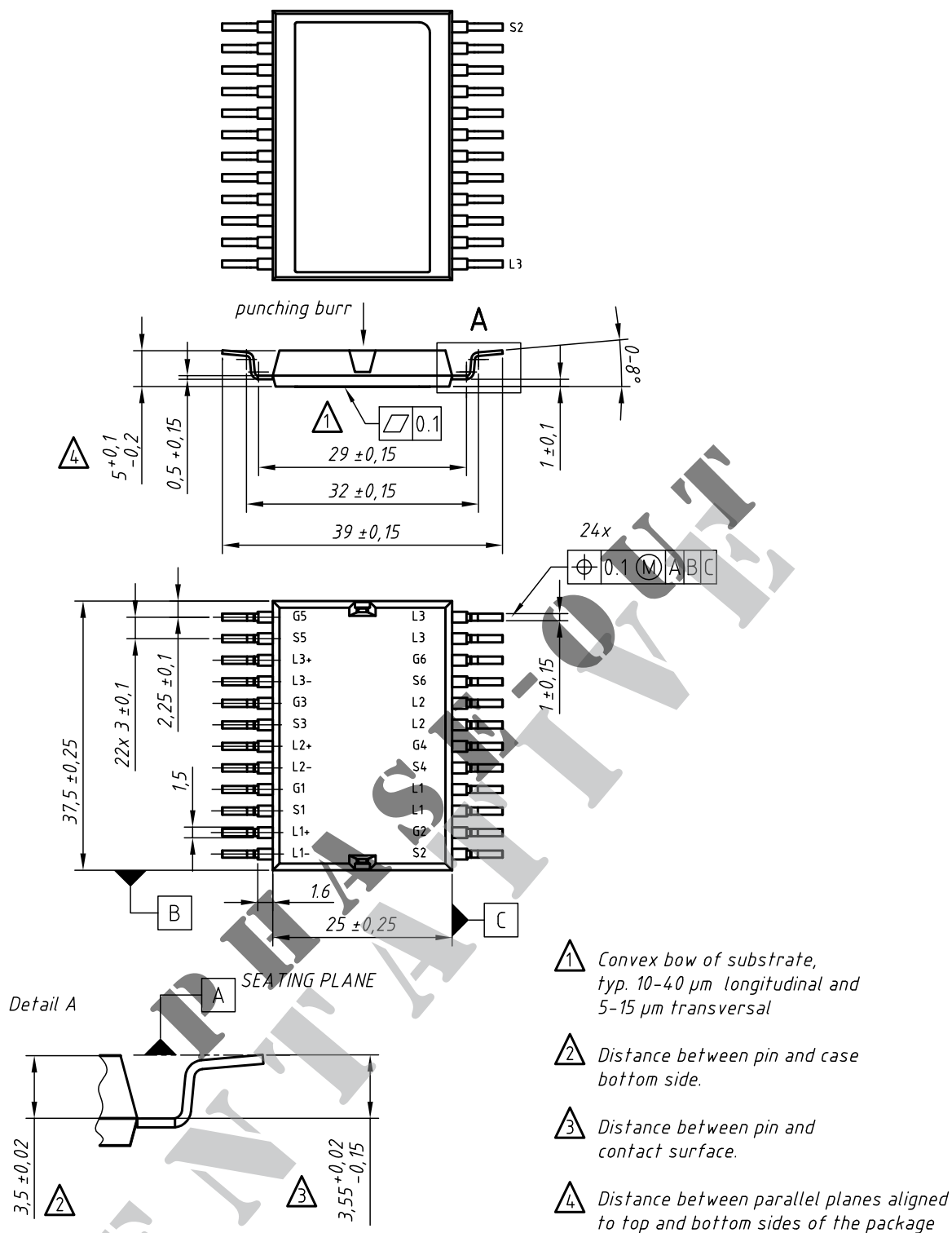
| Symbol            | Conditions                                                                                                                                | Maximum Ratings |    |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----|
| I <sub>RMS</sub>  | per pin in main current paths (P+, N-, L1, L2, L3)<br>may be additionally limited by external connections<br>2 pins for output L1, L2, L3 | 75              | A  |
| T <sub>J</sub>    |                                                                                                                                           | -55...+175      | °C |
| T <sub>stg</sub>  |                                                                                                                                           | -55...+125      | °C |
| V <sub>ISOL</sub> | I <sub>ISOL</sub> ≤ 1 mA, 50/60 Hz, f = 1 minute                                                                                          | 1000            | V~ |
| F <sub>C</sub>    | mounting force with clip                                                                                                                  | 50 - 250        | N  |

| Symbol                                 | Conditions                                                         | Characteristic Values |      |      |
|----------------------------------------|--------------------------------------------------------------------|-----------------------|------|------|
|                                        |                                                                    | min.                  | typ. | max. |
| R <sub>pin to chip</sub> <sup>1)</sup> |                                                                    |                       | tbd  | mΩ   |
| C <sub>P</sub>                         | coupling capacity between shorted pins and back side metallization |                       | 160  | pF   |
| Weight                                 |                                                                    |                       | 25   | g    |

<sup>1)</sup> V<sub>DS</sub> = I<sub>D</sub> · (R<sub>DS(on)</sub> + 2R<sub>Pin to Chip</sub>)

Remarks:

- 1) pin layout / dimensions are conditionally
- 2) soldering paste thickness: 200μm



contact pin:

- galv. tin plating, per pin side: Sn 10...25  $\mu\text{m}$ , undercoating Ni 0,2...1  $\mu\text{m}$
- stamping edges may be free of tin
- punching burr:  $\leq 0,05\text{mm}$

| Leads | Ordering | Part Name & Packing Unit Marking | Part Marking   | Delivering Mode | Base Qty. | Ordering Code |
|-------|----------|----------------------------------|----------------|-----------------|-----------|---------------|
| SMD   | Standard | GMM 3x100-01X1 - SMD             | GMM 3x100-01X1 | Blister         | 28        | 509 035       |

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

20110307

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