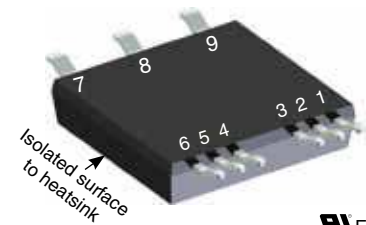
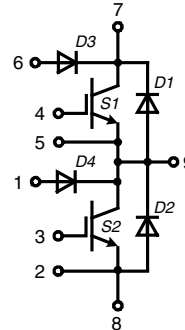


# XPT IGBT phaseleg ISOPLUS™ Surface Mount Power Device

$$\begin{aligned} I_{C25} &= 63 \text{ A} \\ V_{CES} &= 1200 \text{ V} \\ V_{CE(sat) \text{ typ}} &= 1.85 \text{ V} \end{aligned}$$



E72873

## IGBTs S1, S2

| Symbol              | Conditions                                                                                                                     | Maximum Ratings |               |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------|
| $V_{CES}$           | $T_{VJ} = 25^{\circ}\text{C}$ to $150^{\circ}\text{C}$                                                                         | 1200            | V             |
| $V_{GES}$           |                                                                                                                                | $\pm 20$        | V             |
| $I_{C25}$           | $T_C = 25^{\circ}\text{C}$                                                                                                     | 63              | A             |
| $I_{C80}$           | $T_C = 80^{\circ}\text{C}$                                                                                                     | 45              | A             |
| $I_{CM}$            | $V_{GE} = 15 \text{ V}; R_G = 27 \Omega; T_{VJ} = 125^{\circ}\text{C}$<br>RBSOA, clamped inductive load; $L = 100 \mu\text{H}$ | 105             | A             |
| $V_{CEK}$           |                                                                                                                                | $V_{CES}$       |               |
| $t_{SC}$<br>(SCSOA) | $V_{CE} = 900 \text{ V}; V_{GE} = \pm 15 \text{ V}; R_G = 27 \Omega; T_{VJ} = 125^{\circ}\text{C}$<br>none repetitive          | 10              | $\mu\text{s}$ |
| $P_{tot}$           | $T_{VJ} = 25^{\circ}\text{C}$                                                                                                  | 230             | W             |

| Symbol | Conditions | Characteristic Values |  |  |  |
|--------|------------|-----------------------|--|--|--|
|--------|------------|-----------------------|--|--|--|

(T<sub>VJ</sub> = 25°C, unless otherwise specified)

|                                                                        |                                                                                                                                                | min. | typ.                                 | max. |                                          |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------|------|------------------------------------------|
| $V_{CE(sat)}$                                                          | $I_C = 35 \text{ A}; V_{GE} = 15 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$<br>$T_{VJ} = 125^{\circ}\text{C}$                                     |      | 1.85<br>2.2                          | 2.15 | V<br>V                                   |
| $V_{GE(th)}$                                                           | $I_C = 1.5 \text{ mA}; V_{GE} = V_{CE}$                                                                                                        | 5.4  |                                      | 6.5  | V                                        |
| $I_{CES}$                                                              | $V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$<br>$T_{VJ} = 125^{\circ}\text{C}$                                        |      | 0.25                                 | 0.15 | mA<br>mA                                 |
| $I_{GES}$                                                              | $V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$                                                                                              |      |                                      | 200  | nA                                       |
| $t_{d(on)}$<br>$t_r$<br>$t_{d(off)}$<br>$t_f$<br>$E_{on}$<br>$E_{off}$ | Inductive load; $T_{VJ} = 125^{\circ}\text{C}$<br>$V_{CE} = 600 \text{ V}; I_C = 35 \text{ A}$<br>$V_{GE} = \pm 15 \text{ V}; R_G = 27 \Omega$ |      | 70<br>40<br>250<br>100<br>3.8<br>4.1 |      | ns<br>ns<br>ns<br>ns<br>mJ<br>mJ         |
| $C_{ies}$                                                              |                                                                                                                                                |      | tbd                                  |      | pF                                       |
| $Q_{Gon}$                                                              |                                                                                                                                                |      | 107                                  |      | nC                                       |
| $R_{thJC}$                                                             |                                                                                                                                                |      | 0.75                                 | 0.55 | K/W                                      |
| $R_{thJH}$                                                             |                                                                                                                                                |      |                                      | 0.95 | K/W                                      |
|                                                                        |                                                                                                                                                |      |                                      |      | with heatsink compound (IXYS test setup) |

## Features

### • XPT IGBT

- low saturation voltage
- positive temperature coefficient for easy paralleling
- fast switching
- short tail current for optimized performance in resonant circuits

### • Sonic™ diode

- fast reverse recovery
- low operating forward voltage
- low leakage current

### • V<sub>CEsat</sub> detection diode

- integrated into package
- very fast diode

### • Package

- isolated back surface
- low coupling capacity between pins and heatsink
- PCB space saving
- enlarged creepage towards heatsink
- application friendly pinout
- low inductive current path
- high reliability

## Applications

### • Phaseleg

- buck-boost chopper

### • Full bridge

- power supplies
- induction heating
- four quadrant DC drives
- controlled rectifier

### • Three phase bridge

- AC drives
- controlled rectifier

### Diodes D1, D2

| Symbol                                               | Conditions                                                                                                               | Maximum Ratings       |      |      |     |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------|------|------|-----|
| I <sub>F25</sub>                                     | T <sub>C</sub> = 25°C                                                                                                    |                       | 40   | A    |     |
| I <sub>F80</sub>                                     | T <sub>C</sub> = 80°C                                                                                                    |                       | 27   | A    |     |
| Symbol                                               | Conditions                                                                                                               | Characteristic Values |      |      |     |
| (T <sub>VJ</sub> = 25°C, unless otherwise specified) |                                                                                                                          |                       |      |      |     |
|                                                      |                                                                                                                          | min.                  | typ. | max. |     |
| V <sub>F</sub>                                       | I <sub>F</sub> = 35 A                                                                                                    |                       | 2.1  | 2.4  | V   |
|                                                      |                                                                                                                          |                       | 2.1  |      | V   |
| I <sub>RM</sub>                                      | I <sub>F</sub> = 35 A; R <sub>G</sub> = 27 Ω; T <sub>VJ</sub> = 125°C<br>V <sub>R</sub> = 600 V; V <sub>GE</sub> = -15 V |                       | 30   |      | A   |
| t <sub>rr</sub>                                      |                                                                                                                          |                       | 350  |      | ns  |
| E <sub>rec</sub>                                     |                                                                                                                          |                       | tbd  |      | mJ  |
| R <sub>thJC</sub>                                    | per diode                                                                                                                |                       |      | 0.9  | K/W |
| R <sub>thJH</sub>                                    | with heatsink compound (IXYS test setup)                                                                                 |                       | 1.2  | 1.5  | K/W |

### Diodes D3, D4

| Symbol          | Conditions                                                                    | Maximum Ratings                                      |      |      |      |    |
|-----------------|-------------------------------------------------------------------------------|------------------------------------------------------|------|------|------|----|
| V <sub>R</sub>  | T <sub>C</sub> = 25°C to 150°C                                                |                                                      | 1200 |      | V    |    |
| Symbol          | Conditions                                                                    | Characteristic Values                                |      |      |      |    |
|                 |                                                                               | (T <sub>VJ</sub> = 25°C, unless otherwise specified) |      |      |      |    |
|                 |                                                                               |                                                      | min. | typ. | max. |    |
| V <sub>F</sub>  | I <sub>F</sub> = 1 A                                                          | T <sub>VJ</sub> = 25°C                               |      | 1.7  | 2.2  | V  |
|                 |                                                                               | T <sub>VJ</sub> = 125°C                              |      | 1.5  |      | V  |
| I <sub>R</sub>  | V <sub>R</sub> = 1200 V                                                       | T <sub>VJ</sub> = 25°C                               |      |      | 2    | μA |
|                 |                                                                               | T <sub>VJ</sub> = 125°C                              |      | 30   |      | μA |
| I <sub>RM</sub> | I <sub>F</sub> = 1 A; di <sub>F</sub> /dt = -100 A/μs; T <sub>VJ</sub> = 25°C |                                                      |      | 2.3  |      | A  |
| t <sub>rr</sub> |                                                                               | V <sub>R</sub> = 100 V; V <sub>GE</sub> = 0 V        |      | 40   |      | ns |

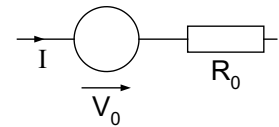
### Component

| Symbol     | Conditions                                                | Maximum Ratings       |            |      |    |
|------------|-----------------------------------------------------------|-----------------------|------------|------|----|
| $T_{VJ}$   |                                                           |                       | -55...+150 | °C   |    |
| $T_{stg}$  |                                                           |                       | -55...+125 | °C   |    |
| $V_{ISOL}$ | $I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}$              |                       | 2500       | V~   |    |
| $F_C$      | mounting force                                            |                       | 40 ... 130 | N    |    |
| Symbol     | Conditions                                                | Characteristic Values |            |      |    |
|            |                                                           | min.                  | typ.       | max. |    |
| $C_P$      | coupling capacity between shorted pins and backside metal |                       | 90         |      | pF |
| $d_S, d_A$ | pin - pin                                                 | 1.65                  |            |      | mm |
| $d_S, d_A$ | pin - backside metal                                      | 4                     |            |      | mm |
| CTI        |                                                           | 400                   |            |      |    |
| Weight     |                                                           |                       | 8          |      | g  |

| Ordering | Ordering Name     | Marking on Product | Delivering Mode | Base Qty | Ordering Code |
|----------|-------------------|--------------------|-----------------|----------|---------------|
| Standard | IXA 40PG1200DHGLB | IXA40PG1200DHGLB   | Tape&Reel       | 200      | tbd           |

### Equivalent Circuits for Simulation

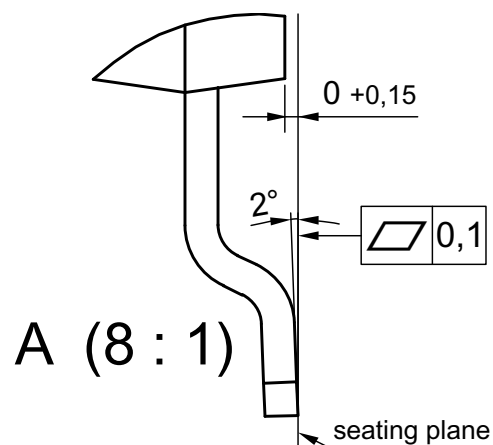
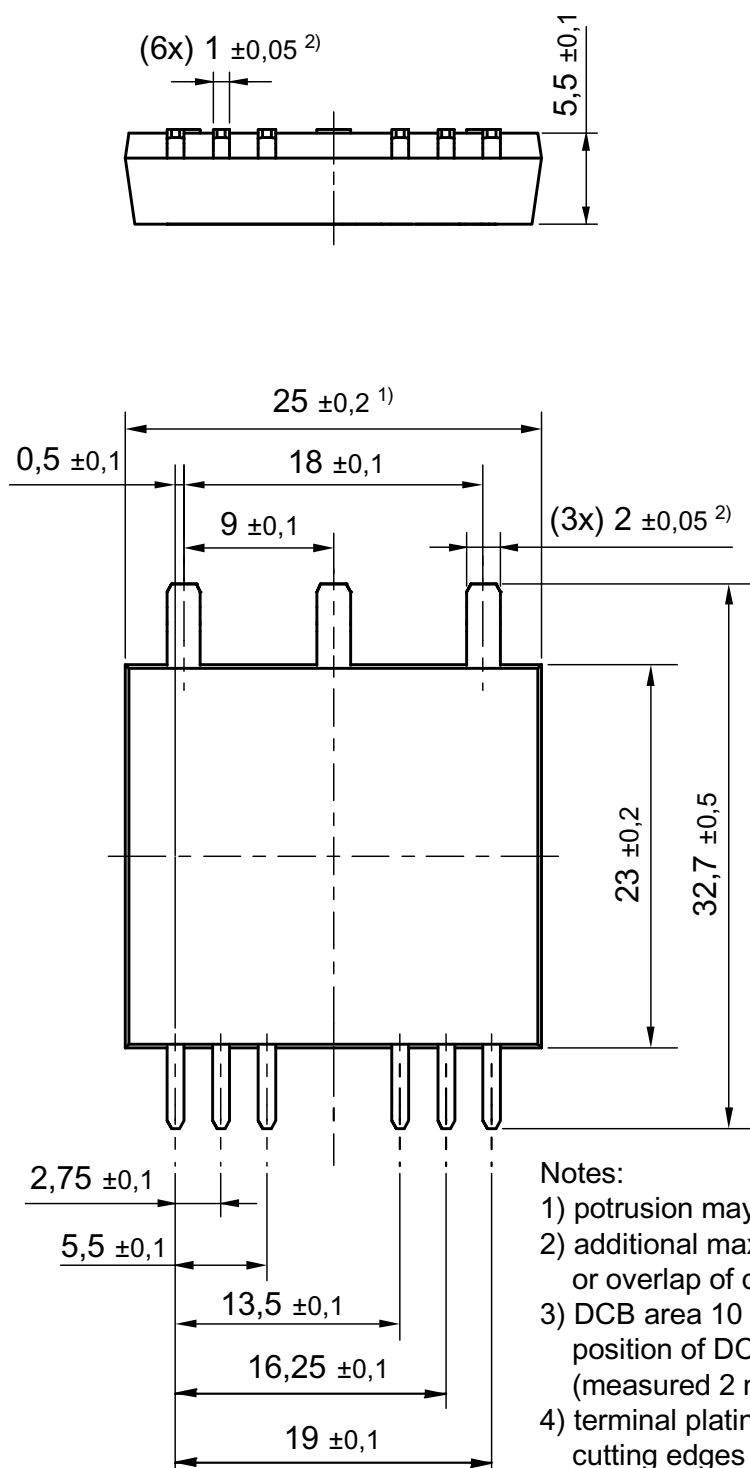
#### Conduction



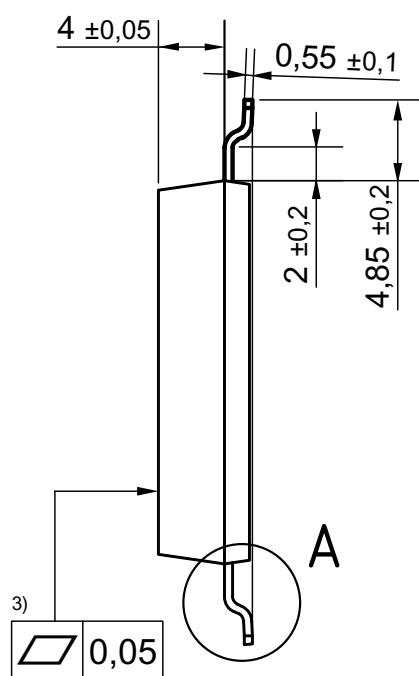
IGBTs (typ. at  $V_{GE} = 15\text{ V}; T_J = 125^\circ\text{C}$ )  
S1, S2  $V_0 = 1.1\text{ V}; R_0 = 40\text{ m}\Omega$

Diodes (typ. at  $T_J = 125^\circ\text{C}$ )  
D1, D2  $V_0 = 1.3\text{ V}; R_0 = 28\text{ m}\Omega$

Dimensions in mm (1 mm = 0.0394")



A (8 : 1)



#### Notes:

- 1) potrusion may add 0.2 mm max. on each side
- 2) additional max. 0.05 mm per side by punching misalignment or overlap of dam bar or bending compression
- 3) DCB area 10 to 50  $\mu$ m convex;  
position of DCB area in relation to plastic rim:  $\pm 25$   $\mu$ m (measured 2 mm from Cu rim)
- 4) terminal plating: 0.2 - 1  $\mu$ m Ni + 10 - 25  $\mu$ m Sn (gal v.)  
cutting edges may be partially free of plating