

Thyristor

$$V_{RRM} = 1600 \text{ V}$$

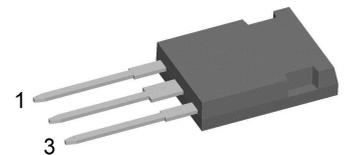
$$I_{TAV} = 45 \text{ A}$$

$$V_T = 1.37 \text{ V}$$

Single Thyristor

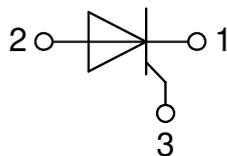
Part number

CS45-16io1R



Backside: isolated

 E72873



Features / Advantages:

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability

Applications:

- Line rectifying 50/60 Hz
- Softstart AC motor control
- DC Motor control
- Power converter
- AC power control
- Lighting and temperature control

Package: ISOPLUS247

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

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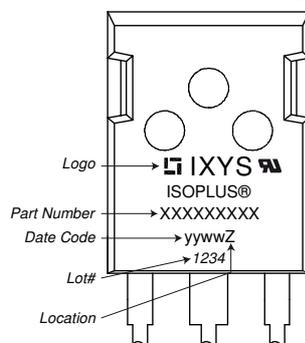


| Thyristor | | | Ratings | | | |
|----------------|--|---|-------------------------|------|------|-------------------|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| $V_{RSM/DSM}$ | max. non-repetitive reverse/forward blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 1700 | V |
| $V_{RRM/DRM}$ | max. repetitive reverse/forward blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 1600 | V |
| I_{RD} | reverse current, drain current | $V_{R/D} = 1600 V$ | $T_{VJ} = 25^{\circ}C$ | | 50 | μA |
| | | $V_{R/D} = 1600 V$ | $T_{VJ} = 125^{\circ}C$ | | 3 | mA |
| V_T | forward voltage drop | $I_T = 45 A$ | $T_{VJ} = 25^{\circ}C$ | | 1.36 | V |
| | | $I_T = 90 A$ | | | 1.73 | V |
| | | $I_T = 45 A$ | $T_{VJ} = 125^{\circ}C$ | | 1.37 | V |
| | | $I_T = 90 A$ | | | 1.85 | V |
| I_{TAV} | average forward current | $T_C = 90^{\circ}C$ | $T_{VJ} = 150^{\circ}C$ | | 45 | A |
| $I_{T(RMS)}$ | RMS forward current | 180° sine | | | 71 | A |
| V_{T0} | threshold voltage | } for power loss calculation only | $T_{VJ} = 150^{\circ}C$ | | 0.88 | V |
| r_T | slope resistance | | | | 11 | m Ω |
| R_{thJC} | thermal resistance junction to case | | | | 0.6 | K/W |
| R_{thCH} | thermal resistance case to heatsink | | | 0.3 | | K/W |
| P_{tot} | total power dissipation | | $T_C = 25^{\circ}C$ | | 208 | W |
| I_{TSM} | max. forward surge current | $t = 10 ms$; (50 Hz), sine | $T_{VJ} = 45^{\circ}C$ | | 520 | A |
| | | $t = 8,3 ms$; (60 Hz), sine | $V_R = 0 V$ | | 560 | A |
| | | $t = 10 ms$; (50 Hz), sine | $T_{VJ} = 150^{\circ}C$ | | 440 | A |
| | | $t = 8,3 ms$; (60 Hz), sine | $V_R = 0 V$ | | 475 | A |
| I^2t | value for fusing | $t = 10 ms$; (50 Hz), sine | $T_{VJ} = 45^{\circ}C$ | | 1.35 | kA ² s |
| | | $t = 8,3 ms$; (60 Hz), sine | $V_R = 0 V$ | | 1.31 | kA ² s |
| | | $t = 10 ms$; (50 Hz), sine | $T_{VJ} = 150^{\circ}C$ | | 970 | A ² s |
| | | $t = 8,3 ms$; (60 Hz), sine | $V_R = 0 V$ | | 940 | A ² s |
| C_J | junction capacitance | $V_R = 400 V$ $f = 1 MHz$ | $T_{VJ} = 25^{\circ}C$ | | 22 | pF |
| P_{GM} | max. gate power dissipation | $t_p = 30 \mu s$ | $T_C = 150^{\circ}C$ | | 10 | W |
| | | $t_p = 300 \mu s$ | | | 5 | W |
| P_{GAV} | average gate power dissipation | | | | 0.5 | W |
| $(di/dt)_{cr}$ | critical rate of rise of current | $T_{VJ} = 125^{\circ}C$; $f = 50 Hz$ repetitive, $I_T = 135 A$ | | | 150 | A/ μs |
| | | $t_p = 200 \mu s$; $di_G/dt = 0.3 A/\mu s$; $I_G = 0.3 A$; $V = \frac{2}{3} V_{DRM}$ non-repet., $I_T = 45 A$ | | | 500 | A/ μs |
| $(dv/dt)_{cr}$ | critical rate of rise of voltage | $V = \frac{2}{3} V_{DRM}$ $R_{GK} = \infty$; method 1 (linear voltage rise) | $T_{VJ} = 125^{\circ}C$ | | 1000 | V/ μs |
| V_{GT} | gate trigger voltage | $V_D = 6 V$ | $T_{VJ} = 25^{\circ}C$ | | 1.5 | V |
| | | | $T_{VJ} = -40^{\circ}C$ | | 1.6 | V |
| I_{GT} | gate trigger current | $V_D = 6 V$ | $T_{VJ} = 25^{\circ}C$ | | 80 | mA |
| | | | $T_{VJ} = -40^{\circ}C$ | | 200 | mA |
| V_{GD} | gate non-trigger voltage | $V_D = \frac{2}{3} V_{DRM}$ | $T_{VJ} = 125^{\circ}C$ | | 0.2 | V |
| I_{GD} | gate non-trigger current | | | | 10 | mA |
| I_L | latching current | $t_p = 10 \mu s$ | $T_{VJ} = 25^{\circ}C$ | | 150 | mA |
| | | $I_G = 0.3 A$; $di_G/dt = 0.3 A/\mu s$ | | | | |
| I_H | holding current | $V_D = 6 V$ $R_{GK} = \infty$ | $T_{VJ} = 25^{\circ}C$ | | 100 | mA |
| t_{gd} | gate controlled delay time | $V_D = \frac{1}{2} V_{DRM}$ | $T_{VJ} = 25^{\circ}C$ | | 2 | μs |
| | | $I_G = 0.3 A$; $di_G/dt = 0.3 A/\mu s$ | | | | |
| t_q | turn-off time | $V_R = 100 V$; $I_T = 45 A$; $V = \frac{2}{3} V_{DRM}$ $di/dt = 15 A/\mu s$ $dv/dt = 20 V/\mu s$ $t_p = 200 \mu s$ | $T_{VJ} = 125^{\circ}C$ | | 150 | μs |



| Package ISOPLUS247 | | Ratings | | | | |
|--------------------|--|----------------------|------|------|------|------|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| I_{RMS} | RMS current | per terminal | | | 70 | A |
| T_{VJ} | virtual junction temperature | | -40 | | 150 | °C |
| T_{op} | operation temperature | | -40 | | 125 | °C |
| T_{stg} | storage temperature | | -40 | | 150 | °C |
| Weight | | | | 6 | | g |
| F_C | mounting force with clip | | 20 | | 120 | N |
| $d_{Spp/ App}$ | creepage distance on surface / striking distance through air | terminal to terminal | 2.7 | | | mm |
| $d_{Spb/ Apb}$ | | terminal to backside | 4.1 | | | mm |
| V_{ISOL} | isolation voltage | t = 1 second | 3600 | | | V |
| | | t = 1 minute | 3000 | | | V |

Product Marking



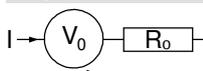
| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | CS45-16io1R | CS45-16io1R | Tube | 30 | 480312 |

| Similar Part | Package | Voltage class |
|--------------|--------------|---------------|
| CS45-08io1 | TO-247AD (3) | 800 |
| CS45-12io1 | TO-247AD (3) | 1200 |
| CS45-16io1 | TO-247AD (3) | 1600 |

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 150^{\circ}C$

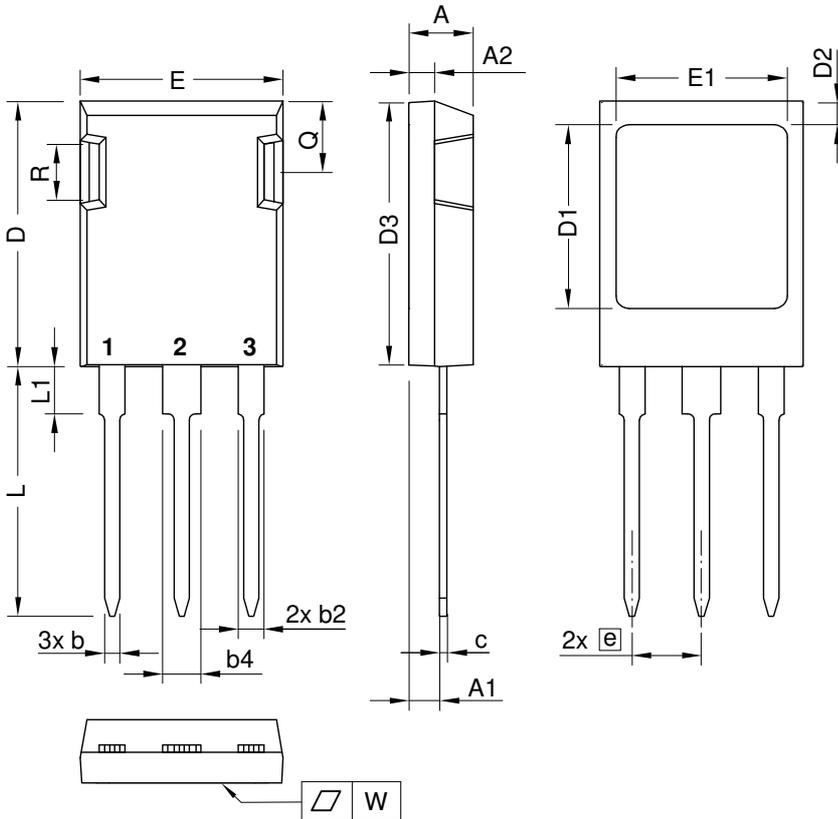


Thyristor

| | | | |
|--------------|--------------------|------|----|
| $V_{0 \max}$ | threshold voltage | 0.88 | V |
| $R_{0 \max}$ | slope resistance * | 8.5 | mΩ |



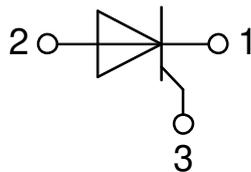
Outlines ISOPLUS247



| Dim. | Millimeter | | Inches | |
|------|------------|-------|-----------|-------|
| | min | max | min | max |
| A | 4.83 | 5.21 | 0.190 | 0.205 |
| A1 | 2.29 | 2.54 | 0.090 | 0.100 |
| A2 | 1.91 | 2.16 | 0.075 | 0.085 |
| b | 1.14 | 1.40 | 0.045 | 0.055 |
| b2 | 1.91 | 2.20 | 0.075 | 0.087 |
| b4 | 2.92 | 3.24 | 0.115 | 0.128 |
| c | 0.61 | 0.83 | 0.024 | 0.033 |
| D | 20.80 | 21.34 | 0.819 | 0.840 |
| D1 | 15.75 | 16.26 | 0.620 | 0.640 |
| D2 | 1.65 | 2.15 | 0.065 | 0.085 |
| D3 | 20.30 | 20.70 | 0.799 | 0.815 |
| E | 15.75 | 16.13 | 0.620 | 0.635 |
| E1 | 13.21 | 13.72 | 0.520 | 0.540 |
| e | 5.45 BSC | | 0.215 BSC | |
| L | 19.81 | 20.60 | 0.780 | 0.811 |
| L1 | 3.81 | 4.38 | 0.150 | 0.172 |
| Q | 5.59 | 6.20 | 0.220 | 0.244 |
| R | 4.25 | 5.50 | 0.167 | 0.217 |
| W | - | 0.10 | - | 0.004 |

Die konvexe Form des Substrates ist typ. < 0.04 mm über der Kunststoffoberfläche der Bauteilunterseite
The convex bow of substrate is typ. < 0.04 mm over plastic surface level of device bottom side

Die Gehäuseabmessungen entsprechen dem Typ TO-247 AD gemäß JEDEC außer Schraubloch und L_{max}.
This drawing will meet all dimensions requirement of JEDEC outline TO-247 AD except screw hole and except L_{max}.



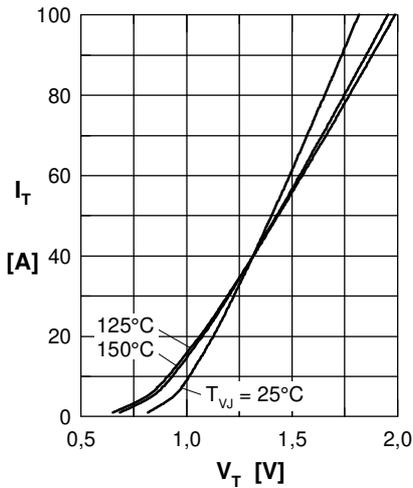
Thyristor


Fig. 1 Forward characteristics

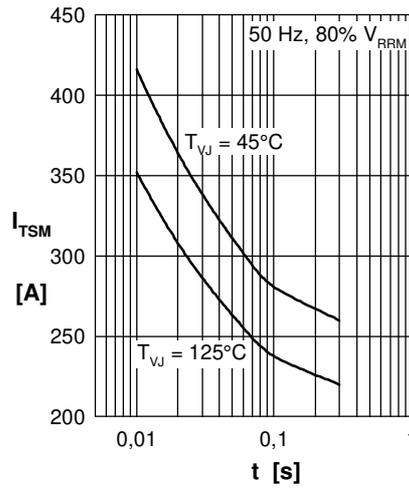


Fig. 2 Surge overload current

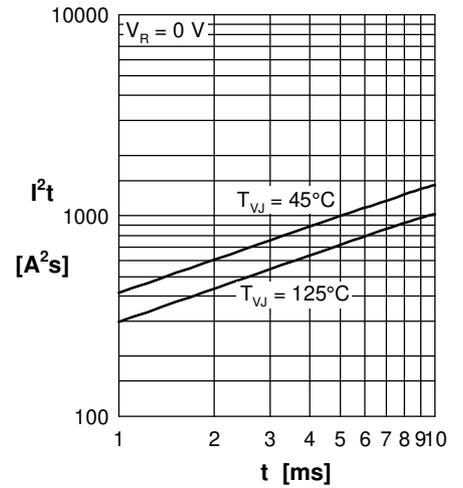
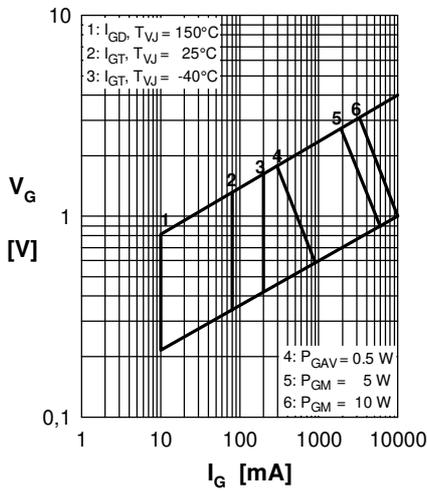

 Fig. 3 I^2t versus time (1-10 ms)


Fig. 4 Gate trigger characteristics

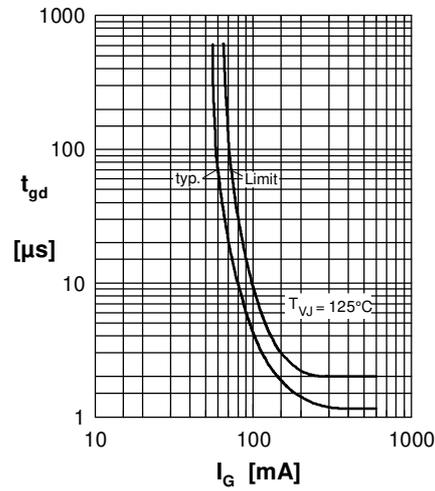


Fig. 5 Gate controlled delay time

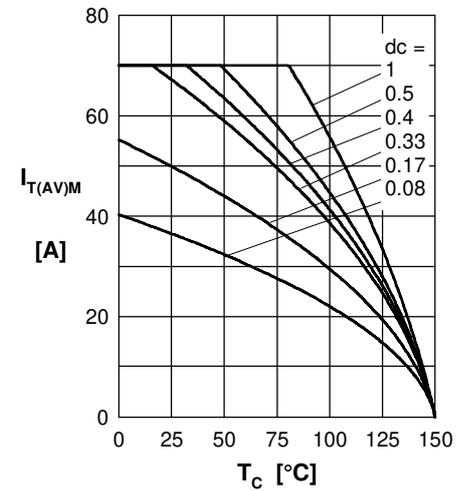


Fig. 6 Max. forward current at case temperature

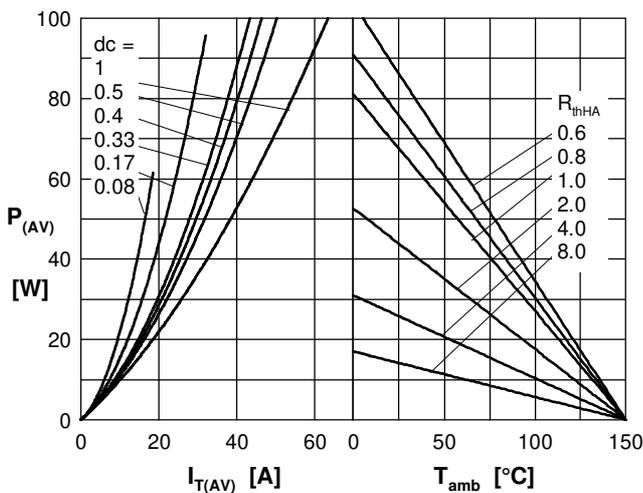
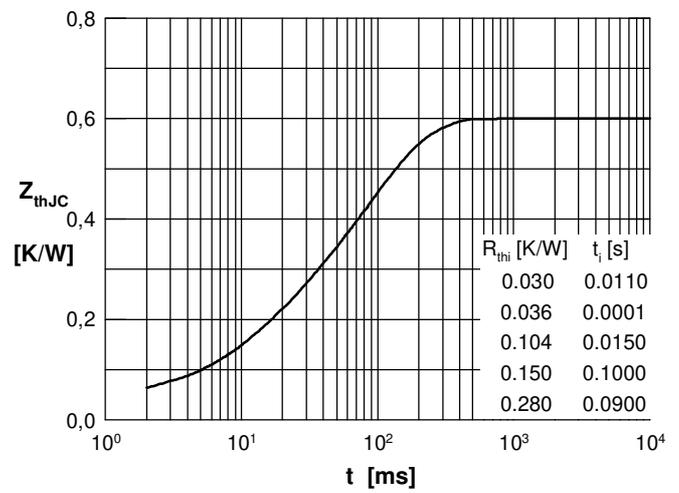

 Fig. 7a Power dissipation versus direct output current
 Fig. 7b and ambient temperature


Fig. 8 Transient thermal impedance junction to case



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

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- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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