imall

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from, Europe, America and south Asia, supplying obsolete and hard-to-find components to meet their specific needs.

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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832 Email & Skype: info@chipsmall.com Web: www.chipsmall.com Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



CS22-08io1M

=

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Ξ

800 V

1.27 V

16 A

 V_{RRM}

I _{tav}

VT

High Efficiency Thyristor

| Sing | e T | Γhy | ristor |
|------|-----|-----|--------|
| | | , | |

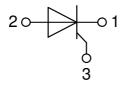
Part number

CS22-08io1M





Backside: isolated **E**72873



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: TO-220FP

- Isolation Voltage: 2500 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Base plate: Plastic overmolded tab
- Reduced weight

Terms Conditions of usage:

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact the sales office, which is responsible for you. Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you. Should you intend to use the product in aviation, in health or live endangering or life support applications, please notify. For any such application we urgently recommend

to perform joint risk and quality assessments;
the conclusion of quality agreements;

- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

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CS22-08io1M

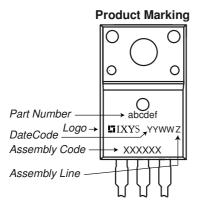
| Definition max. non-repetitive reverse/forwa max. repetitive reverse/forward bl | Conditions rd blocking voltage | $T_{vJ} = 25^{\circ}C$ | min. | typ. | max. | Unit |
|---|---|--|---|--|---|---|
| max. repetitive reverse/forward bl | rd blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | | |
| , | | | | | 900 | V |
| | 5 5 | $T_{VJ} = 25^{\circ}C$ | | | 800 | V |
| reverse current, drain current | V _{R/D} = 800 V | $T_{VJ} = 25^{\circ}C$ | | | 10 | μA |
| | V _{R/D} = 800 V | $T_{VJ} = 125^{\circ}C$ | | | 2 | mA |
| forward voltage drop | $I_{T} = 30 \text{ A}$ | $T_{VJ} = 25^{\circ}C$ | | | 1.30 | V |
| | $I_{T} = 60 \text{ A}$ | | | | 1.59 | V |
| | $I_{T} = 30 \text{ A}$ | $T_{VJ} = 125^{\circ}C$ | | | 1.27 | V |
| | I _T = 60 A | | | | 1.65 | V |
| average forward current | $T_c = 90^{\circ}C$ | T _{vJ} = 150°C | | | 16 | A |
| RMS forward current | 180° sine | | | | 25 | A |
| threshold voltage | | T _{v.1} = 150°C | | | 0.86 | V |
| slope resistance } for power lo | oss calculation only | | | | 13.2 | mΩ |
| thermal resistance iunction to cas | e | | | | 2.5 | K/W |
| , | | | | 0.50 | | K/W |
| total power dissipation | | $T_c = 25^{\circ}C$ | | | 50 | W |
| | t = 10 ms: (50 Hz), sine | | | | | A |
| | | | | | | A |
| | | | | | | A |
| | | | | | | A |
| value for fusing | | | | | | |
| value for fushing | | | | | | 1 |
| | | | | | | A ² s |
| | | | | | | A ² s |
| town at the second state of the second | | | | 10 | 315 | A ² s |
| | | | | 13 | | pF |
| max. gate power dissipation | | $I_c = 150$ °C | | | | W |
| | t _P = 300 μs | | | | | W |
| average gate power dissipation | | | | | 0.5 | W |
| critical rate of rise of current | $T_{v_J} = 125 ^{\circ}C; f = 50 \text{Hz}$ re | epetitive, $I_{T} = 90 \text{ A}$ | | | 150 | A/μs |
| | t_{P} = 200 µs; di_{G}/dt = 0.3 A/µs; - | | | | | |
| | $I_{G} = 0.3 \text{ A}; \text{ V } = \frac{2}{3} \text{ V}_{DRM}$ no | on-repet., $I_{T} = 30 \text{ A}$ | | | 500 | A/µs |
| critical rate of rise of voltage | $V = \frac{2}{3} V_{DRM}$ | $T_{vJ} = 125^{\circ}C$ | | | 500 | V/µs |
| | R _{GK} = ∞; method 1 (linear voltag | ge rise) | | | | |
| gate trigger voltage | $V_{D} = 6 V$ | $T_{VJ} = 25^{\circ}C$ | | | 1.3 | V |
| | | $T_{vJ} = -40 ^{\circ}\text{C}$ | | | 1.6 | V |
| gate trigger current | $V_D = 6 V$ | $T_{VJ} = 25^{\circ}C$ | | | 30 | mA |
| | | | | | 50 | mA |
| gate non-trigger voltage | $V_{D} = \frac{2}{3} V_{DRM}$ | | | | 0.2 | V |
| | | vo | | | 1 | mA |
| | t. = 10 μs | $T_{\rm vi} = 25^{\circ}C$ | | | | mA |
| <u> </u> | F | | | | 00 | |
| holding current | | | | | 60 | mA |
| ç | | | | | | i |
| gate controlled delay little | | | | | 2 | μs |
| turn off time | | | | 150 | | <u> </u> |
| | | | | 150 | | μs |
| | RMS forward current threshold voltage slope resistance for power loc thermal resistance junction to case thermal resistance case to heatsin total power dissipation max. forward surge current value for fusing junction capacitance max. gate power dissipation average gate power dissipation critical rate of rise of current gate trigger voltage | $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | $\begin{tabular}{ c c c c } \hline I_{T} &= & 30 \ A & & $T_{vJ} &= 125\ ^\circ C$ \\ I_{T} &= & 60 \ A & \\ \hline I_{T} &= & 60 \ A & \\ \hline I_{vJ} &= & 150\ ^\circ C$ \\ \hline RMS forward current & 180\ ^\circ sine & \\ \hline T_{vJ} &= & 150\ ^\circ C$ \\ \hline RMS forward current & 180\ ^\circ sine & \\ \hline T_{vJ} &= & 150\ ^\circ C$ \\ \hline Slope resistance {\ } lunction to case & \\ \hline thermal resistance case to heatsink & \\ \hline total power classipation & $T_C &= & 25\ ^\circ C$ \\ \hline max. forward surge current & $t &= & 10\ ms; (50\ Hz), sine & $T_{vJ} &= & 45\ ^\circ C$ \\ \hline max. forward surge current & $t &= & 10\ ms; (50\ Hz), sine & $T_{vJ} &= & 45\ ^\circ C$ \\ \hline t &= & 8,3\ ms; (60\ Hz), sine & $T_{vJ} &= & 45\ ^\circ C$ \\ \hline t &= & 8,3\ ms; (60\ Hz), sine & $T_{vJ} &= & 45\ ^\circ C$ \\ \hline t &= & 8,3\ ms; (60\ Hz), sine & $T_{vJ} &= & 45\ ^\circ C$ \\ \hline t &= & 8,3\ ms; (60\ Hz), sine & $T_{vJ} &= & 45\ ^\circ C$ \\ \hline t &= & 8,3\ ms; (60\ Hz), sine & $T_{vJ} &= & 45\ ^\circ C$ \\ \hline t &= & 8,3\ ms; (60\ Hz), sine & $T_{vJ} &= & 45\ ^\circ C$ \\ \hline t &= & 8,3\ ms; (60\ Hz), sine & $T_{vJ} &= & 150\ ^\circ C$ \\ \hline t &= & 8,3\ ms; (60\ Hz), sine & $T_{vJ} &= & 150\ ^\circ C$ \\ \hline t &= & 8,3\ ms; (60\ Hz), sine & $T_{vJ} &= & 150\ ^\circ C$ \\ \hline t &= & 8,3\ ms; (60\ Hz), sine & $T_{vJ} &= & 150\ ^\circ C$ \\ \hline t &= & 8,3\ ms; (60\ Hz), sine & $T_{vJ} &= & 25\ ^\circ C$ \\ \hline max. gate power dissipation & $t_{p} &= & 30\ \mu s$ \\ average gate power dissipation & $t_{p} &= & 30\ \mu s$ \\ average gate power dissipation & $t_{p} &= & 30\ \mu s$ \\ average gate power dissipation & $t_{vJ} &= & 125\ ^\circ C$ \\ \hline T_{vJ} &= & & 125\ ^\circ C$ \\ \hline T_{vJ} &= & & 40\ ^\circ C$ \\ \hline gate trigger voltage & $V_{D} &= 6\ V$ \\ \hline T_{vJ} &= & & 25\ ^\circ C$ \\ \hline gate non-trigger voltage & $V_{D} &= & $V_{D}\ M$ \\ \hline f &= & & 0.3\ A; \ M_{vJ} &= & & $T_{vJ} &= & 25\ ^\circ C$ \\ \hline gate non-trigger voltage & $V_{D} &= & $V_{D}\ M$ \\ \hline holding current & $V_{D} &= & 6\ V$ \\ \hline T_{vJ} &= & & & $T_{vJ} &= & 25\ ^\circ C$ \\ \hline gate non-trigger voltage & $V_{D} &= & $V_{D}\ M$ \\ \hline holding current & $V_{D} &= & 6\ V$ \\ \hline T_{vJ} &= & & & $T_{vJ} &= & 25\ ^\circ C$ \\ \hline gate controlled\ delay time & V_{D} | $ \frac{1}{1_{7} = 30 \text{ A}}{1_{7} = 60 \text{ A}} $ $ \frac{1}{1_{7} = 90^{\circ}\text{C}} $ $ \frac{1}{1_{7} = 150^{\circ}\text{C}} $ $ \frac{1}{100^{\circ} \text{ sine}} $ $ \frac{1}{100^{\circ} \text{ sine}}$ | $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$ | $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ |

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CS22-08io1M

| Package TO-220FP | | | | Ratings | | | | |
|-----------------------------|------------------------------|-----------------------------------|-----------------------------|---------|------|------|------|------|
| Symbol | Definition | Conditions | | | min. | typ. | max. | Unit |
| I _{RMS} | RMS current | per terminal | | | | | 35 | Α |
| T _{vj} | virtual junction temperature | | | | -55 | | 150 | °C |
| T _{op} | operation temperature | | | | -55 | | 125 | °C |
| T _{stg} | storage temperature | | | | -55 | | 150 | °C |
| Weight | | | | | | 2 | | g |
| M _D | mounting torque | | | | 0.4 | | 0.6 | Nm |
| F _c | mounting force with clip | | | | 20 | | 60 | Ν |
| d _{Spp/App} | creenade distance on surface | e striking distance through air | terminal to terminal | 1.6 | 1.0 | | | mm |
| d _{Spb/Apb} | creepage distance on surrace | e striking distance through an | terminal to backside 2.5 | | 2.5 | | | mm |
| V | isolation voltage | t = 1 second | | | 2500 | | | V |
| | | t = 1 minute | 50/60 Hz, RMS; liso∟ ≤ 1 mA | | 2100 | | | V |



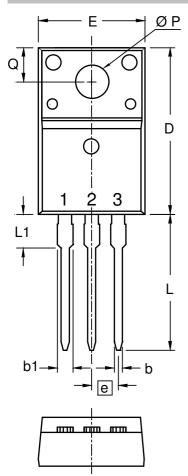
| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | CS22-08io1M | CS22-08io1M | Tube | 50 | 500475 |

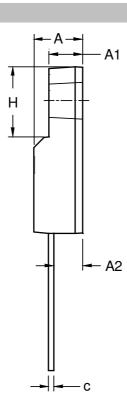
| Similar Part | Package | Voltage class |
|--------------|--------------------------------------|---------------|
| CS22-12io1M | TO-220ABFP (3) | 1200 |
| CMA30E1600PN | TO-220ABFP (3) | 1600 |
| CLA30E1200PB | TO-220AB (3) | 1200 |
| CLA30E1200PD | TO-263AB (D2Pak) (2) | 1200 |
| CLA30E1200FC | TO-265AB (D2Fak) (2) TO-247AD (3) | 1200 |
| | () | |
| CMA30E1600PB | TO-220AB (3) | 1600 |
| CMA30E1600PZ | TO-263AB (D2Pak) (2HV) | 1600 |

| Equivalent Circuits for Simulation | | | * on die level | $T_{vJ} = 150 \ ^{\circ}C$ |
|------------------------------------|--------------------|-----------|----------------|----------------------------|
| | | Thyristor | | |
| V _{0 max} | threshold voltage | 0.86 | | V |
| $\mathbf{R}_{0 \max}$ | slope resistance * | 10.1 | | mΩ |

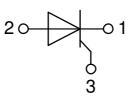
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Outlines TO-220FP





| Dire | Millimeters | | Inches | | |
|------|-------------|-------|-----------|-------|--|
| Dim. | min | max | min | max | |
| Α | 4.50 | 4.90 | 0.177 | 0.193 | |
| A1 | 2.34 | 2.74 | 0.092 | 0.108 | |
| A2 | 2.56 | 2.96 | 0.101 | 0.117 | |
| b | 0.70 | 0.90 | 0.028 | 0.035 | |
| С | 0.45 | 0.60 | 0.018 | 0.024 | |
| D | 15.67 | 16.07 | 0.617 | 0.633 | |
| Е | 9.96 | 10.36 | 0.392 | 0.408 | |
| е | 2.54 | BSC | 0.100 BSC | | |
| Н | 6.48 | 6.88 | 0.255 | 0.271 | |
| L | 12.68 | 13.28 | 0.499 | 0.523 | |
| L1 | 3.03 | 3.43 | 0.119 | 0.135 | |
| ØΡ | 3.08 | 3.28 | 0.121 | 0.129 | |
| Q | 3.20 | 3.40 | 0.126 | 0.134 | |



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_{vJ} = 125°C

4 5 6 7 8 10

100

20150827b

1000

l²t

[A²s]

100

30

1

 $V_{\rm R} = 0$ V

 $T_{VJ} = 45^{\circ}C$

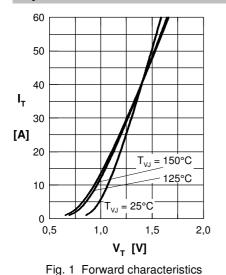
2

3

Fig. 3 I²t versus time (1-10 s)

t [ms]

Thyristor



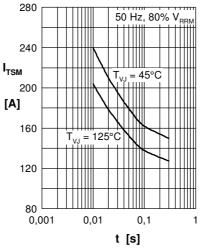
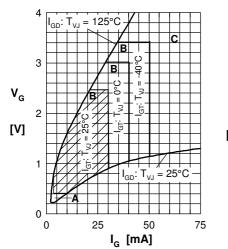


Fig. 2 Surge overload current I_{TSM} : crest value, t: duration



24 dc =

20

12

P_(AV)

[W]

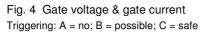
0.5

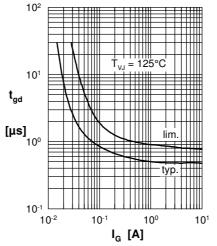
0.4

0.33

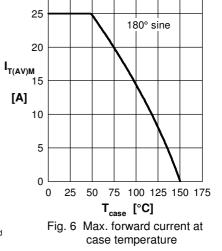
0.17 16

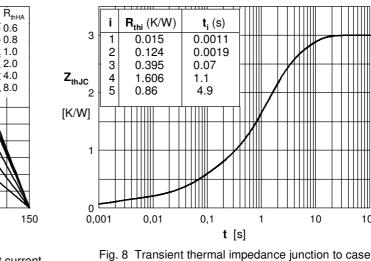
0.08

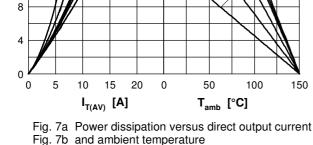












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