

CC06FA

Automotive grade fast-acting chip fuse



Product features

- AEC-Q200 qualified
- 0603 (1608 metric) compact design utilizes less board space
- Rapid interruption of excessive current
- Compatible with reflow and wave solder
- Rugged ceramic and glass construction
- Excellent environmental integrity
- One time positive disconnect
- High breaking capacity up to 63 V
- Moisture sensitivity level (MSL) :1

Applications

Automotive

- Battery management systems (BMS)
- Central body control module
- Doors, window lift and seat control
- Digital instrument cluster
- In-vehicle infotainment (IVI) and navigation
- Electric pumps, motor control and auxiliaries
- Powertrain control module (PCU)/engine control unit (ECU)
- Transmission control unit (TCU)

Agency information

- UL Recognized File: File E19180
- AEC-Q200 qualified



Environmental compliance



- Values less than 1 A are not lead free

Ordering

- Use ordering codes (see page 3 for details)

Packaging suffixes

- -TR (5,000 parts in paper tape on a 178 mm (7") reel)

Electrical characteristics

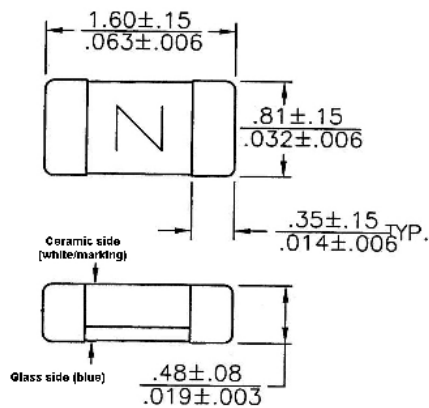
| Amp Rating | % of Amp Rating | Opening Time |
|----------------|-----------------|--------------------|
| 500 mA – 1.5 A | 100% | 4 hours minimum |
| 500 mA – 1.5 A | 200% | 60 seconds maximum |

Product specifications

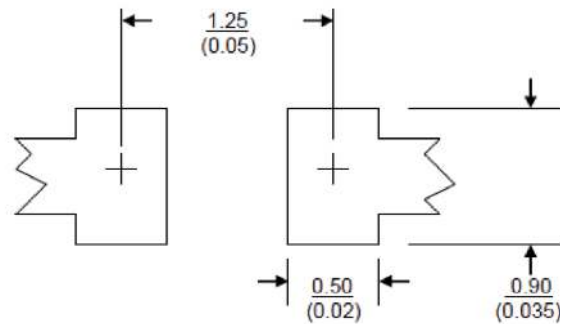
| Part Number ⁵ | Current rating (A) | Voltage rating (Vdc) | Interrupting rating ¹ (A) | Typical DC cold resistance ² (Ω) | Typical pre-arcing ³ I ² t (A ² s) | Typical voltage drop (V) | Part marking |
|--------------------------|--------------------|----------------------|--------------------------------------|--|---|--------------------------|--------------|
| CC06FA500mA | 0.5 | 63 | 50 | 1.025 | 0.0019 | 0.60 | F |
| CC06FA750mA | 0.75 | 63 | 50 | 0.510 | 0.003 | 0.50 | G |
| CC06FA1A | 1 | 63 | 50 | 0.150 | 0.007 | 0.211 | H |
| CC06FA1.25A | 1.25 | 63 | 50 | 0.132 | 0.008 | 0.201 | J |
| CC06FA1.5A | 1.5 | 63 | 50 | 0.086 | 0.0319 | 0.138 | K |

- DC interrupting rating measured at rated voltage, time constant less than 50 microseconds, battery source
- DC cold resistance measured at <10% of rated current
- Typical pre-arcing I²t measured with a battery bank at rated dc voltage, 10x-rated current, not to exceed IR, time constant of calibrated circuit less than 50 microsecond
- Typical voltage drop measured at rated current after temperature stabilizes
- Part Number Definition: CC06FAxxx-R
CC06FA = Product code and size
xxx - Ampere rating (mA or A)

Dimensions—mm in

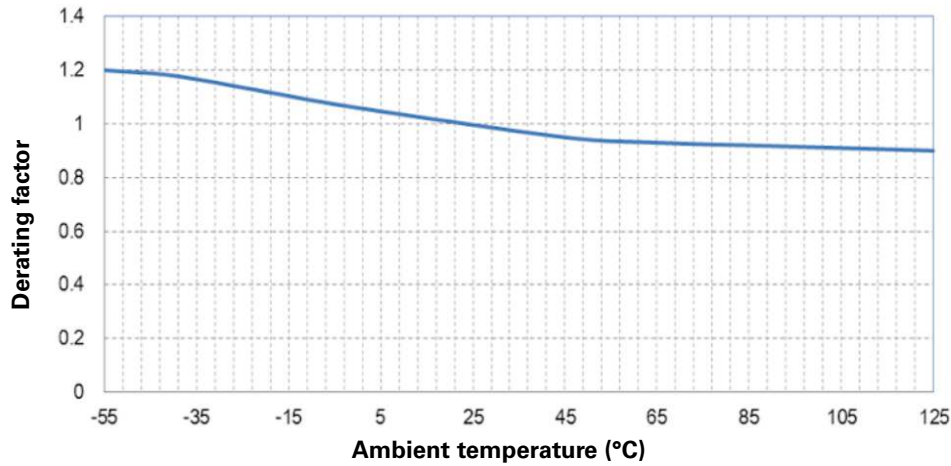


Recommended pad layout



Fuse to be installed with ceramic side up (white/markings)

Temperature derating curve



Environmental data

Operating temperature: -55 °C to +125 °C (with derating)

Storage temperature (component): -55 °C to +125 °C

Life test: MIL-STD-202, Method 108A, except circulating air environment at +125 °C ±2 °C, apply 60% rated current for 1000 hours

Load humidity test: MIL-STD-202, Method 103B except: environmental chamber 85%+2% relative humidity at +85 °C ±2 °C, 10% of rated dc current, at any voltage less than or equal to rated voltage for 1000 hours

Terminal strength test: Force of 1.8 kg for 60 seconds

Board flex test: Downward force is applied to cause a 2 mm deflection for 1 minute (no physical evidence of mechanical or physical damage, change in resistance < 5%)

Thermal shock test: MIL-STD-202, Method 107D, -55 °C to +125 °C, 200 cycles

Mechanical shock test: MIL-STD-202, Method 213 condition C, 100 g's half-sine for 6 seconds

High frequency vibration test: MIL-STD-202, Method 204, 5 g's for 20 minutes, 12 cycles each of 3 orientations, 10 to 2000 Hz

Resistance to solvents test: MIL-STD-202, Method 215A

High temperature exposure: 1000 hours at +125 °C unpowered

Resistance to solder heat: MIL-STD-202 Method 210 condition B

Solderability: ANSI/J-STD-002,
Dip and look test: Test B
Wetting balance test: Test F
Resistance to dissolution of metalization test: Test D

Ordering codes

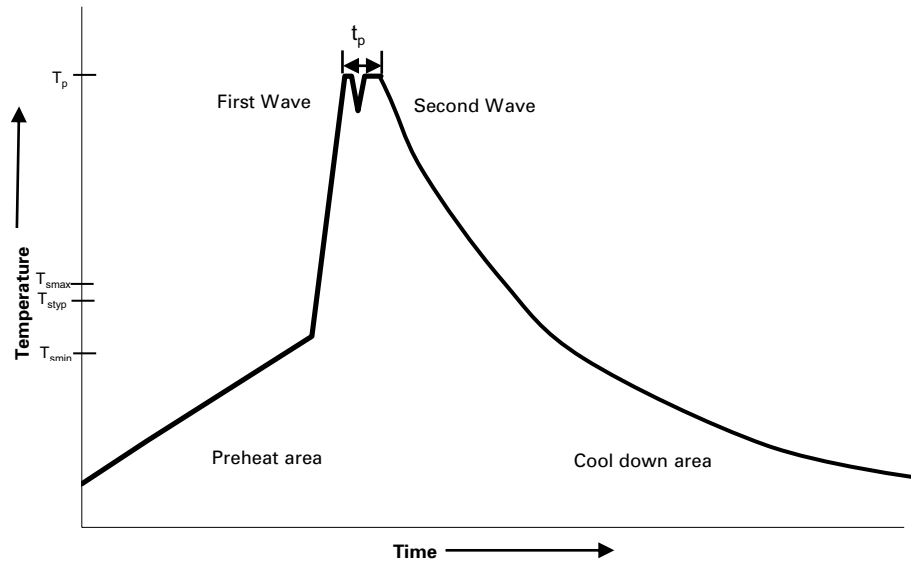
The ordering code is the part number replacing the “:” with a “-” plus adding the packaging suffix.

Packaging suffix

-TR (5,000 parts in paper tape on a 178 mm (7”) reel)

| Part Number | Ordering code |
|-------------|----------------|
| | -TR option |
| CC06FA500mA | CC06FA500mA-TR |
| CC06FA750mA | CC06FA750mA-TR |
| CC06FA1A | CC06FA1A-TR |
| CC06FA1.25A | CC06FA1-25A-TR |
| CC06FA1.5A | CC06FA1-5A-TR |

Wave solder profile



Reference EN 61760-1:2006

| Profile feature | Standard SnPb solder | Lead (Pb) free solder |
|-------------------------------------|---|---|
| Preheat | • Temperature min. (T_{smin}) | 100 °C |
| | • Temperature typ. (T_{styp}) | 120 °C |
| | • Temperature max. (T_{smax}) | 130 °C |
| | • Time (T_{smin} to T_{smax}) (t_s) | 70 seconds |
| Δ preheat to max Temperature | 150 °C max. | 150 °C max. |
| Peak temperature (T_p)* | 235 °C – 260 °C | 250 °C – 260 °C |
| Time at peak temperature (t_p) | 10 seconds max 5 seconds max each wave | 10 seconds max 5 seconds max each wave |
| Ramp-down rate | ~ 2 K/s min ~3.5 K/s typ ~5 K/s max | ~ 2 K/s min ~3.5 K/s typ ~5 K/s max |
| Time 25°C to 25°C | 4 minutes | 4 minutes |

Manual solder

+350 °C (4-5 seconds by soldering iron), generally manual/hand soldering is not recommended

Solder reflow profile

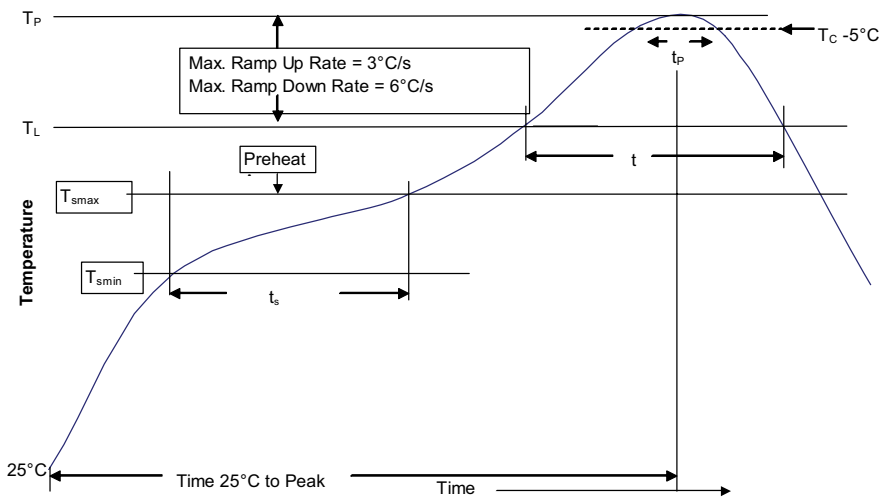


Table 1 - Standard SnPb solder (T_C)

| Package thickness | Volume mm^3 <350 | Volume mm^3 \geq 350 |
|-------------------|---------------------------|---------------------------------|
| <2.5 mm) | 235 °C | 220 °C |
| \geq 2.5 mm | 220 °C | 220 °C |

Table 2 - Lead (Pb) free solder (T_C)

| Package thickness | Volume mm^3 <350 | Volume mm^3 350 - 2000 | Volume mm^3 >2000 |
|-------------------|---------------------------|---------------------------------|----------------------------|
| <1.6 mm | 260 °C | 260 °C | 260 °C |
| 1.6 – 2.5 mm | 260 °C | 250 °C | 245 °C |
| >2.5 mm | 250 °C | 245 °C | 245 °C |

Reference J-STD-020

| Profile feature | Standard SnPb solder | Lead (Pb) free solder |
|---|----------------------|-----------------------|
| Preheat and soak | | |
| • Temperature min. (T_{smin}) | 100 °C | 150 °C |
| • Temperature max. (T_{smax}) | 150 °C | 200 °C |
| • Time (T_{smin} to T_{smax}) (t_s) | 60-120 seconds | 60-120 seconds |
| Ramp up rate T_L to T_p | 3 °C/ second max. | 3 °C/ second max. |
| Liquidous temperature (T_L) | 183 °C | 217 °C |
| Time (t_L) maintained above T_L | 60-150 seconds | 60-150 seconds |
| Peak package body temperature (T_p)* | Table 1 | Table 2 |
| Time (t_p)* within 5 °C of the specified classification temperature (T_C) | 20 seconds* | 30 seconds* |
| Ramp-down rate (T_p to T_L) | 6 °C/ second max. | 6 °C/ second max. |
| Time 25 °C to peak temperature | 6 minutes max. | 8 minutes max. |

* Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

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