# EGFM201 THRU EGFM205

## List

List........................................ 1
Package outline........................................ 2
Features........................................ 2
Mechanical data........................................ 2
Maximum ratings and Electrical characteristics ........................................ 2
Rating and characteristic curves........................................ 3
Pinning information........................................ 4
Marking........................................ 4
Suggested solder pad layout........................................ 4
Packing information........................................ 5
Reel packing........................................ 6
Suggested thermal profiles for soldering processes........................................ 6
High reliability test capabilities........................................ 7

# EGFM201 THRU EGFM205

## 2.0A Surface Mount Efficient Fast Rectifiers 50V-600V

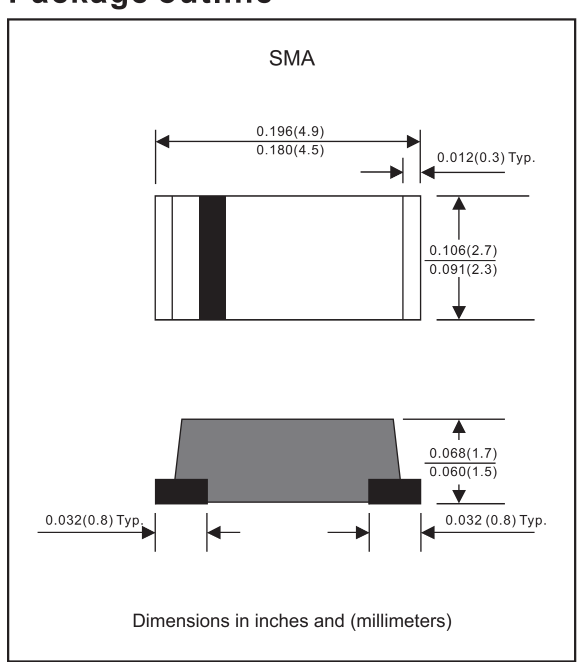
## Features

- Batch process design, excellent power dissipation offers better reverse leakage current and thermal resistance
- Low profile surface mounted application in order to optimize board space
- High current & surge capability
- Low forward dropdown voltage
- Glass passivated chip junction
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen free parts, ex. EGFM201-H

## Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SMA
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.05 gram

## Package outline




## Maximum ratings (AT $T_A$=25°C unless otherwise noted)

| PARAMETER | SYMBOLS | EGFM201 | EGFM202 | EGFM203 | EGFM204 | EGFM205 | UNIT |
|---|---|---|---|---|---|---|---|
| Maximum repetitive peak reverse voltage | $V_{RRM}$ | 50 | 100 | 200 | 400 | 600 | V |
| Maximum RMS voltage | $V_{RMS}$ | 35 | 70 | 140 | 280 | 420 | V |
| Maximum continuous reverse voltage | $V_R$ | 50 | 100 | 200 | 400 | 600 | V |
| Maximum average forward rectified current | $I_O$ | 2.0 | | | | | A |
| Non-repetitive peak forward surge current 8.3ms single half sine-wave | $I_{FSM}$ | 50 | | | | | A |
| Typical junction capacitance (Note 1) | $C_J$ | 25 | | | | | pF |
| Operating junction temperature range | $T_J$ | -55 to +150 | | | | | °C |
| Storage temperature range | $T_{STG}$ | -65 to +175 | | | | | °C |

## Electrical characteristics (AT $T_A$=25°C unless otherwise noted)

| PARAMETER | SYMBOLS | EGFM201 | EGFM202 | EGFM203 | EGFM204 | EGFM205 | UNIT |
|---|---|---|---|---|---|---|---|
| Maximum instantaneous forward voltage at $I_F$=2.0A | $V_F$ | 0.875 | | | 1.25 | 1.75 | V |
| Maximum reverse leakage current $T_J$=25°C<br>at rated $V_R$ $T_J$=125°C | $I_R$ | 5.0<br>100 | | | | | μA<br>μA |
| Maximum reverse recovery time (Note 2) | $t_{rr}$ | 25 | | | | | ns |

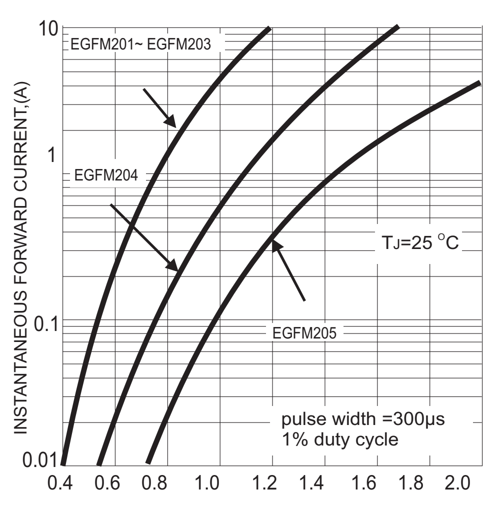
## Thermal characteristics

| PARAMETER | SYMBOLS | EGFM201 | EGFM202 | EGFM203 | EGFM204 | EGFM205 | UNIT |
|---|---|---|---|---|---|---|---|
| Typical thermal resistance junction to ambient (Note 3)<br>Typical thermal resistance junction to case (Note 3) | $R_{\theta JA}$<br>$R_{\theta JC}$ | 38<br>22 | | | | | °C/W<br>°C/W |

Notes 1:Measured at 1 MHz and applied reverse voltage of 4.0 VDC
2:Reverse recovery time test condition, IF=0.5A, IR=1.0A, IRR=0.25A
3: Mounted on FR-4 PCB copper, minimum recommended pad layout

## Rating and characteristic curves (EGFM201 THRU EGFM205)

FIG.1-TYPICAL FORWARD CHARACTERISTICS




FORWARD VOLTAGE,(V)

FIG.2-TYPICAL FORWARD CURRENT DERATING CURVE

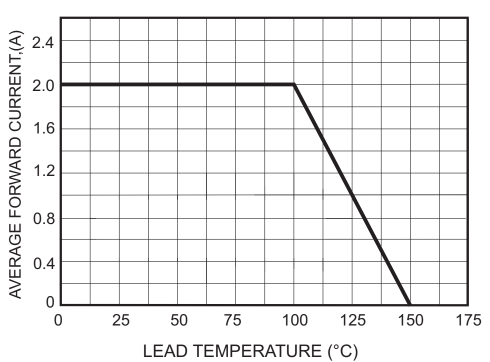
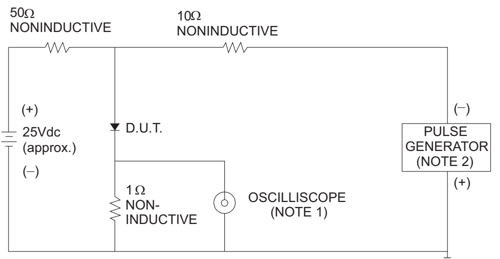
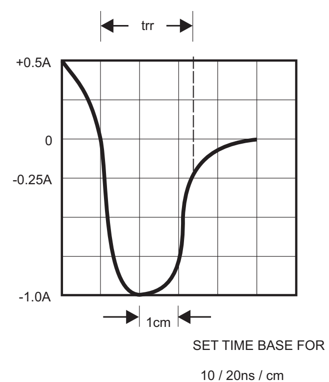



FIG.3- TEST CIRCUIT DIAGRAM AND REVERSE RECOVERY TIME CHARACTERISTICS




NOTES: 1. Rise Time= 7ns max., Input Impedance= 1 megohm.22pF.

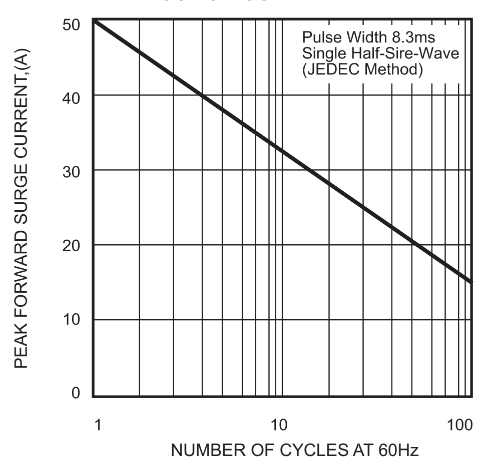
2. Rise Time= 10ns max., Source Impedance= 50 ohms.




SET TIME BASE FOR

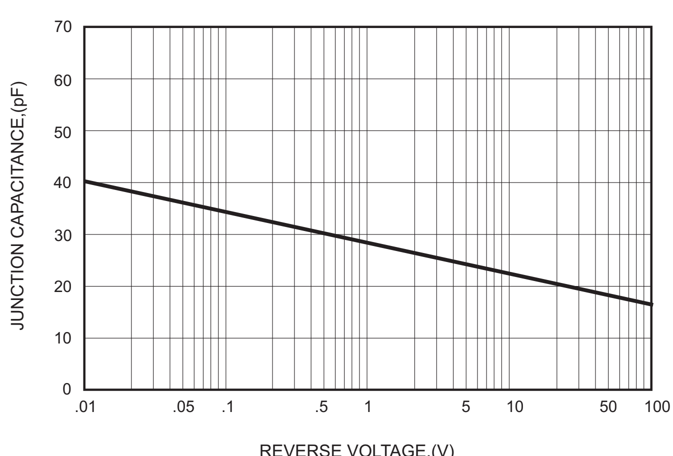
10 / 20ns / cm

FIG.4-MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT




NUMBER OF CYCLES AT 60Hz

FIG.5-TYPICAL JUNCTION CAPACITANCE




REVERSE VOLTAGE,(V)


Formosa MS
http://www.formosams.com/
TEL:886-2-22696661
FAX:886-2-22696141






| Document ID | Issued Date | Revised Date | Revision | Page. |
| --- | --- | --- | --- | --- |
| DS-121523 | 2009/02/10 | 2010/05/10 | D | 7 |

# EGFM201 THRU EGFM205

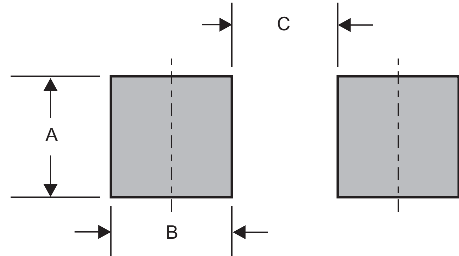
## Pinning information

| Pin | Simplified outline | Symbol |
|---|---|---|
| Pin1 cathode<br>Pin2 anode | 1 2 | 1 2 |

## Marking

| Type number | Marking code |
|---|---|
| EGFM201 | E21 |
| EGFM202 | E22 |
| EGFM203 | E23 |
| EGFM204 | E24 |
| EGFM205 | E25 |

## Suggested solder pad layout

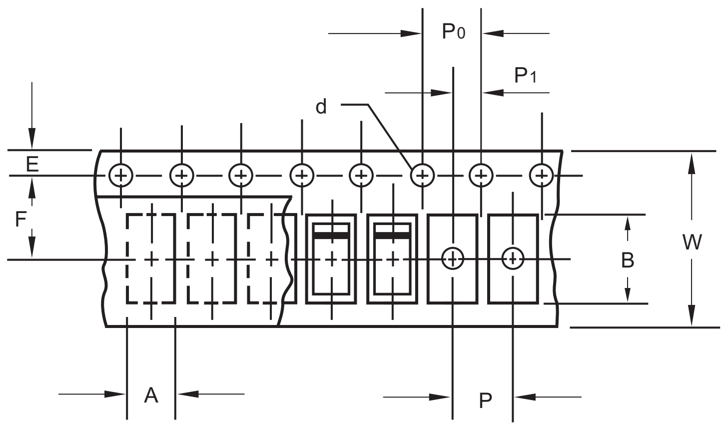


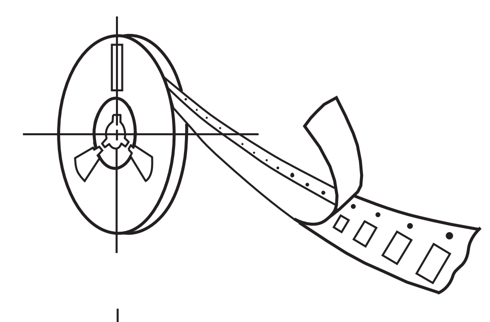

Dimensions in inches and (millimeters)

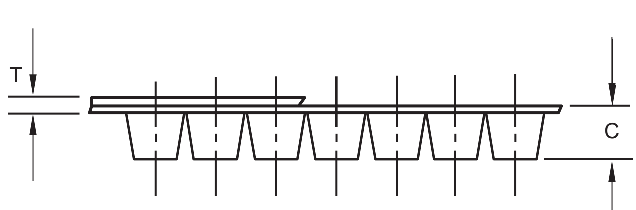
| PACKAGE | A | B | C |
|---|---|---|---|
| SMA | 0.110 (2.80) | 0.063 (1.60) | 0.087 (2.20) |

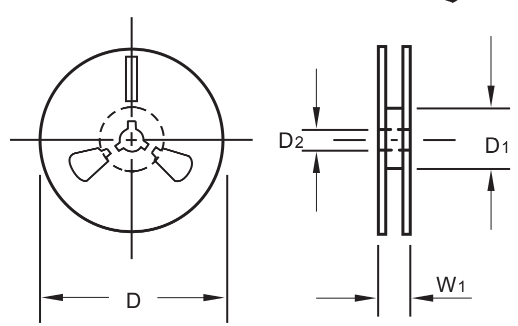
# EGFM201 THRU EGFM205

## Packing information






unit:mm

| Item | Symbol | Tolerance | SMA |
|---|---|---|---|
| Carrier width | A | 0.1 | 2.80 |
| Carrier length | B | 0.1 | 5.00 |
| Carrier depth | C | 0.1 | 1.90 |
| Sprocket hole | d | 0.1 | 1.50 |
| 13" Reel outside diameter | D | 2.0 | 330.00 |
| 13" Reel inner diameter | $D_1$ | min | 50.00 |
| 7" Reel outside diameter | D | 2.0 | 178.00 |
| 7" Reel inner diameter | $D_1$ | min | 62.00 |
| Feed hole diameter | $D_2$ | 0.5 | 13.00 |
| Sprocket hole position | E | 0.1 | 1.75 |
| Punch hole position | F | 0.1 | 5.50 |
| Punch hole pitch | P | 0.1 | 4.00 |
| Sprocket hole pitch | $P_0$ | 0.1 | 4.00 |
| Embossment center | $P_1$ | 0.1 | 2.00 |
| Overall tape thickness | T | 0.1 | 0.23 |
| Tape width | W | 0.3 | 12.00 |
| Reel width | $W_1$ | 1.0 | 18.00 |

Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

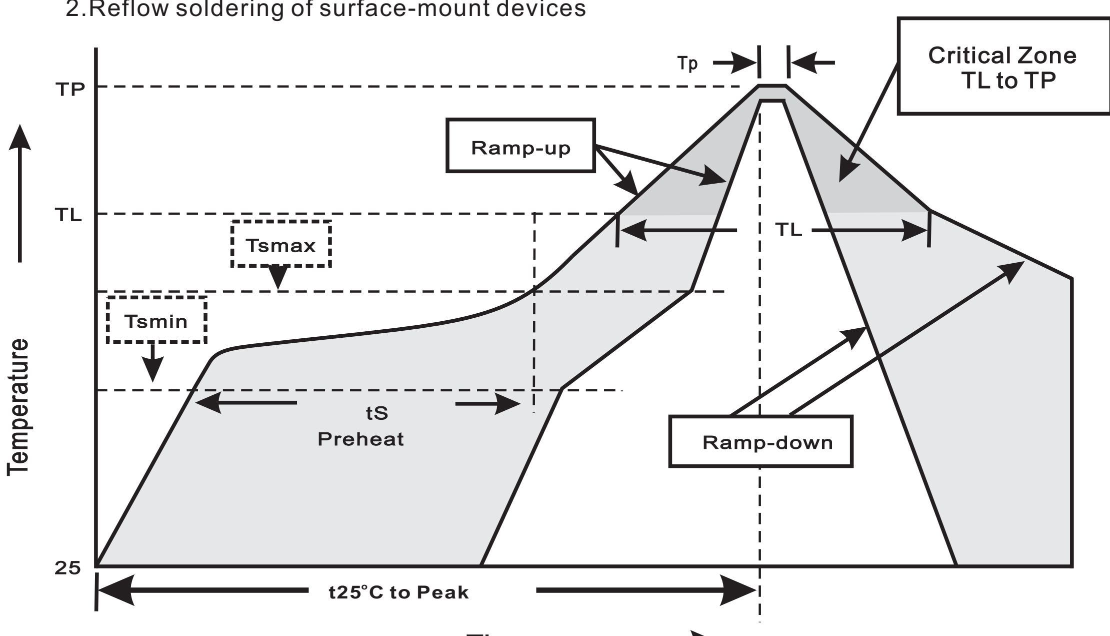
# EGFM201 THRU EGFM205

## Reel packing

| PACKAGE | REEL SIZE | REEL (pcs) | COMPONENT SPACING (m/m) | BOX (pcs) | INNER BOX (m/m) | REEL DIA, (m/m) | CARTON SIZE (m/m) | CARTON (pcs) | APPROX. GROSS WEIGHT (kg) |
|---|---|---|---|---|---|---|---|---|---|
| SMA | 7" | 2,000 | 4.0 | 20,000 | 183*155*183 | 178 | 382*356*392 | 160,000 | 16.0 |
| SMA | 13" | 7,500 | 4.0 | 15,000 | 335*335*38 | 330 | 350*330*360 | 120,000 | 14.5 |

## Suggested thermal profiles for soldering processes

1. Storage environment: Temperature=5°C~40°C Humidity=55%±25%
2. Reflow soldering of surface-mount devices




3. Reflow soldering

| Profile Feature | Soldering Condition |
|---|---|
| Average ramp-up rate($T_L$ to $T_P$) | <3°C/sec |
| Preheat<br>-Temperature Min(Tsmin)<br>-Temperature Max(Tsmax)<br>-Time(min to max)($t_s$) | <br>150°C<br>200°C<br>60~120sec |
| Tsmax to $T_L$<br>-Ramp-upRate | <br><3°C/sec |
| Time maintained above:<br>-Temperature($T_L$)<br>-Time($t_L$) | <br>217°C<br>60~260sec |
| Peak Temperature($T_P$) | 255°C-0/+5°C |
| Time within 5°C of actual Peak Temperature($t_P$) | 10~30sec |
| Ramp-down Rate | <6°C/sec |
| Time 25°C to Peak Temperature | <6minutes |

# EGFM201 THRU EGFM205

## High reliability test capabilities

| Item Test | Conditions | Reference |
|---|---|---|
| 1. Solder Resistance | at 260±5°C for 10±2sec. | MIL-STD-750D METHOD-2031 |
| 2. Solderability | at 245±5°C for 5 sec. | MIL-STD-202F METHOD-208 |
| 3. High Temperature Reverse Bias | $V_R$=80% rate at $T_J$=150°C for 168 hrs. | MIL-STD-750D METHOD-1038 |
| 4. Forward Operation Life | Rated average rectifier current at $T_A$=25°C for 500hrs. | MIL-STD-750D METHOD-1027 |
| 5. Intermittent Operation Life | $T_A$ = 25°C, $I_F$ = $I_O$<br>On state: power on for 5 min.<br>off state: power off for 5 min.<br>on and off for 500 cycles. | MIL-STD-750D METHOD-1036 |
| 6. Pressure Cooker | 15$P_{SIG}$ at $T_A$=121°C for 4 hrs. | JESD22-A102 |
| 7. Temperature Cycling | -55°C to +125°C dwelled for 30 min. and transferred for 5min. total 10 cycles. | MIL-STD-750D METHOD-1051 |
| 8. Forward Surge | 8.3ms single half sine-wave , one surge. | MIL-STD-750D METHOD-4066-2 |
| 9. Humidity | at $T_A$=85°C, RH=85% for 1000hrs. | MIL-STD-750D METHOD-1021 |
| 10. High Temperature Storage Life | at 175°C for 1000 hrs. | MIL-STD-750D METHOD-1031 |