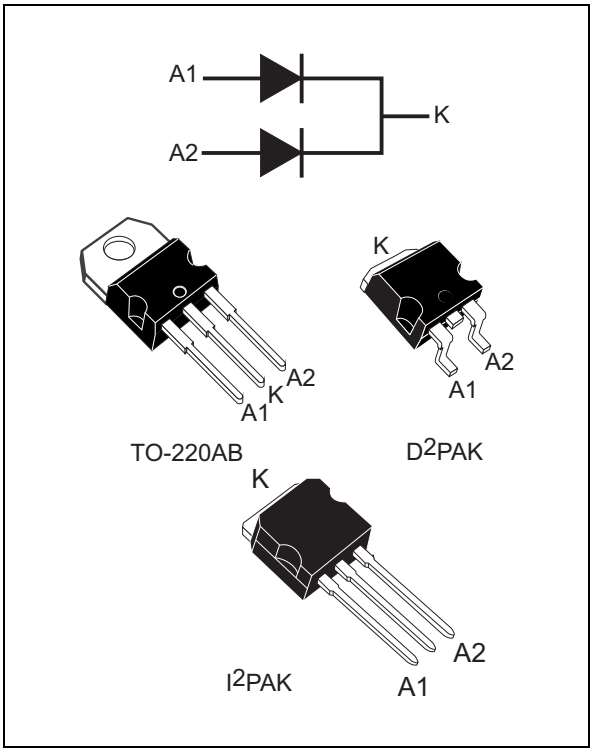
# FERD30M45C

## Field effect rectifier

**Datasheet - production data**




## Description

This dual center tap field effect rectifier provides stable leakage current over the full range of reverse voltage and low forward voltage drop.

Packaged in TO-220AB, I²PAK or D$^2$PAK, this device is intended to be used in solar bypass junction boxes and in switch mode power supplies.

**Table 1. Device summary**

| Symbol | Value |
|---|---|
| $I_{F(AV)}$ | 2 x 15 A |
| $V_{RRM}$ | 45 V |
| $T_{j\ (max)}$ | +175 °C (up to 200 °C forward mode only on D²PAK) |
| $V_F$(typ) | 0.35 V |

## Features

- Advanced rectifier proprietary process
- Stable leakage current over reverse voltage
- Reduce leakage current
- Low forward voltage drop
- High frequency operation

# 1 Characteristics

**Table 2. Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified)**

| Symbol | Parameter | | | Value | Unit |
|---|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | | 45 | V |
| $I_{F(RMS)}$ | Forward rms current | | | 30 | A |
| $I_{F(AV)}$ | Average forward current, δ = 0.5 | $T_c$ = 155 °C | Per diode | 15 | A |
| | | $T_c$ = 155 °C | Per device | 30 | |
| $I_{FSM}$ | Surge non repetitive forward current | $t_p$ = 10 ms sinusoidal | | 250 | A |
| $T_{stg}$ | Storage temperature range | | | -65 to + 175 | °C |
| $T_j$ | Maximum operating junction temperature | | | 175 | °C |
| $T_j$ | Maximum operating temperature on D²PAK (DC forward current without reverse bias, t = 1 hour)(1) | | | 200 | °C |

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink.

**Table 3. Thermal resistance**

| Symbol | Parameter | | Value (max) | Unit |
|---|---|---|---|---|
| $R_{th(j-c)}$ | Junction to case | Per diode | 1.6 | °C/W |
| | | Total | 1.05 | |
| $R_{th(c)}$ | Coupling | | 0.5 | |

When diodes 1 and 2 are used simultaneously:

$T_j$(diode 1) = P(diode1) x $R_{th(j-c)}$(per diode) + P(diode2) x $R_{th}$(c)

**Table 4. Static electrical characteristics (per diode)**

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$ (1) | Reverse leakage current | $T_j$ = 25 °C | $V_R = V_{RRM}$ | | | 600 | µA |
| | | $T_j$ = 125 °C | | | 25 | 50 | mA |
| $V_F$ (2) | Forward voltage drop | $T_j$ = 125 °C | $I_F$ = 7.5 A | | 0.305 | 0.350 | V |
| | | $T_j$ = 125 °C | $I_F$ = 10 A | | 0.350 | 0.395 | |
| | | $T_j$ = 25 °C | $I_F$ = 15 A | | 0.420 | 0.470 | |
| | | $T_j$ = 125 °C | | | 0.420 | 0.450 | |

1. Pulse test: $t_p$ = 5 ms, δ < 2%
2. Pulse test: $t_p$ = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:

$P = 0.27 \times I_{F(AV)} + 0.012\ I_F{}^2{}_{(RMS)}$

**Figure 1. Average forward power dissipation versus average forward current (per diode)**

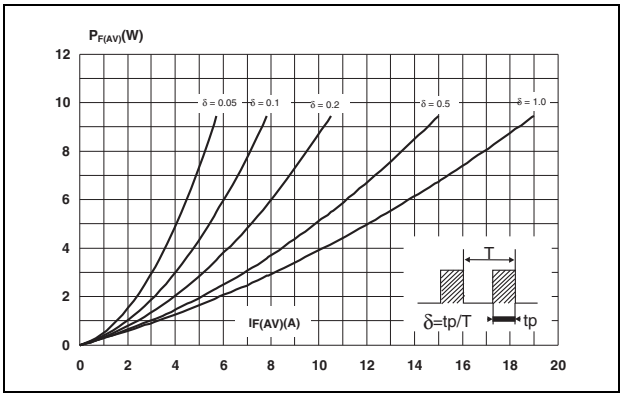



**Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)**

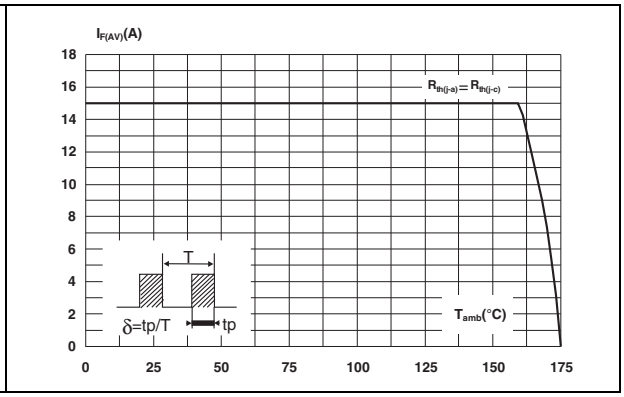



**Figure 3. Junction capacitance versus reverse voltage applied (typical values, per diode)**

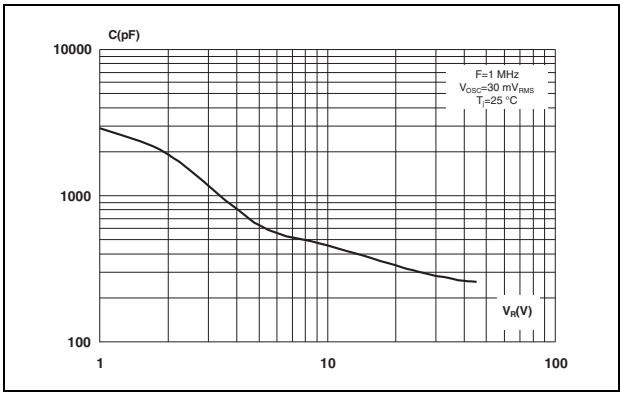



**Figure 4. Forward voltage drop versus forward current (per diode)**

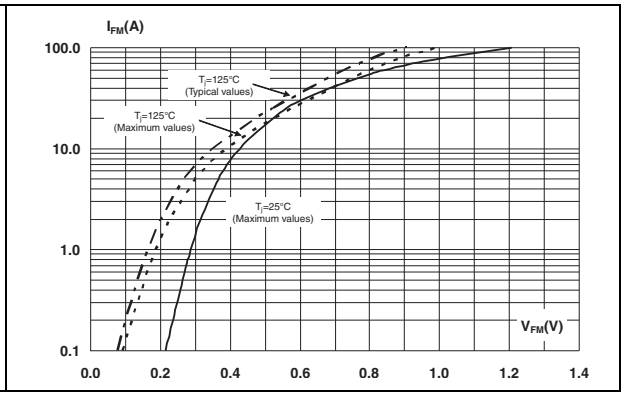


**Figure 5. Relative variation of thermal impedance junction to case versus pulse duration**

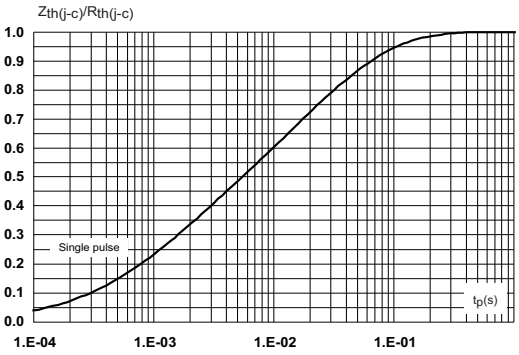
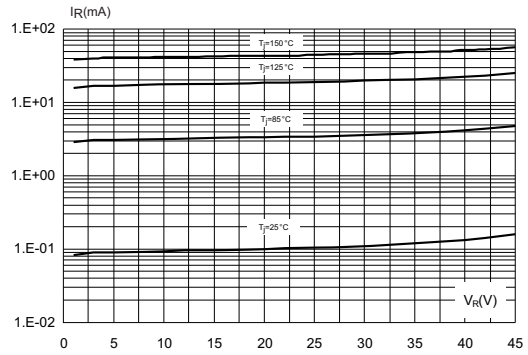



**Figure 6. Reverse leakage current versus reverse voltage applied (typical values, per diode)**



# 2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 to 1.0 N·m

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**Figure 7. D²PAK dimension definitions**

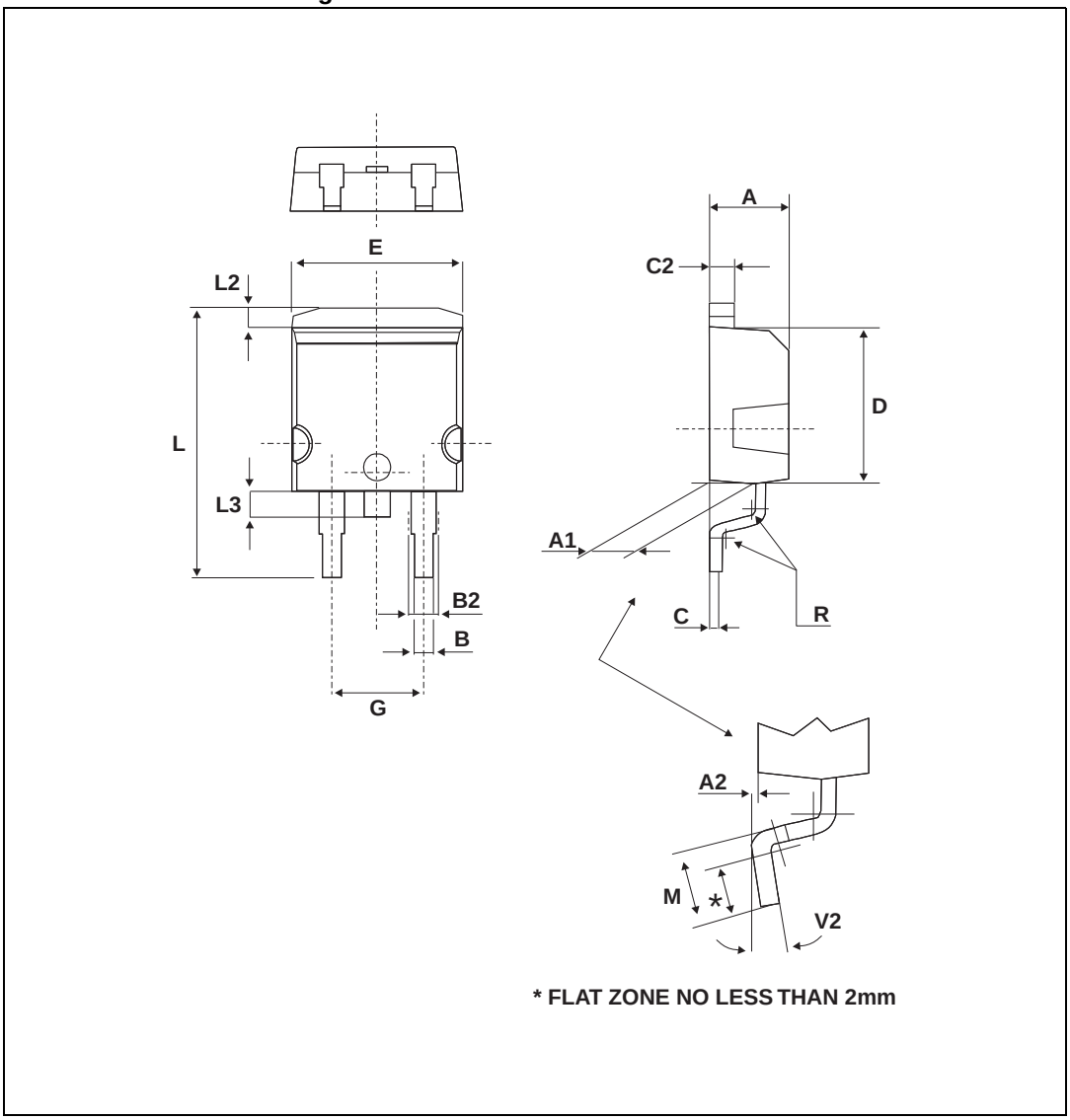

Table 5. $D^2PAK$ dimension values

| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| A1 | 2.49 | 2.69 | 0.098 | 0.106 |
| A2 | 0.03 | 0.23 | 0.001 | 0.009 |
| B | 0.70 | 0.93 | 0.027 | 0.037 |
| B2 | 1.14 | 1.70 | 0.045 | 0.067 |
| C | 0.45 | 0.60 | 0.017 | 0.024 |
| C2 | 1.23 | 1.36 | 0.048 | 0.054 |
| D | 8.95 | 9.35 | 0.352 | 0.368 |
| E | 10.00 | 10.40 | 0.393 | 0.409 |
| G | 4.88 | 5.28 | 0.192 | 0.208 |
| L | 15.00 | 15.85 | 0.590 | 0.624 |
| L2 | 1.27 | 1.40 | 0.050 | 0.055 |
| L3 | 1.40 | 1.75 | 0.055 | 0.069 |
| M | 2.40 | 3.20 | 0.094 | 0.126 |
| R | 0.40 typ. | | 0.016 typ. | |
| V2 | 0° | 8° | 0° | 8° |

Figure 8. Footprint (dimensions in mm)

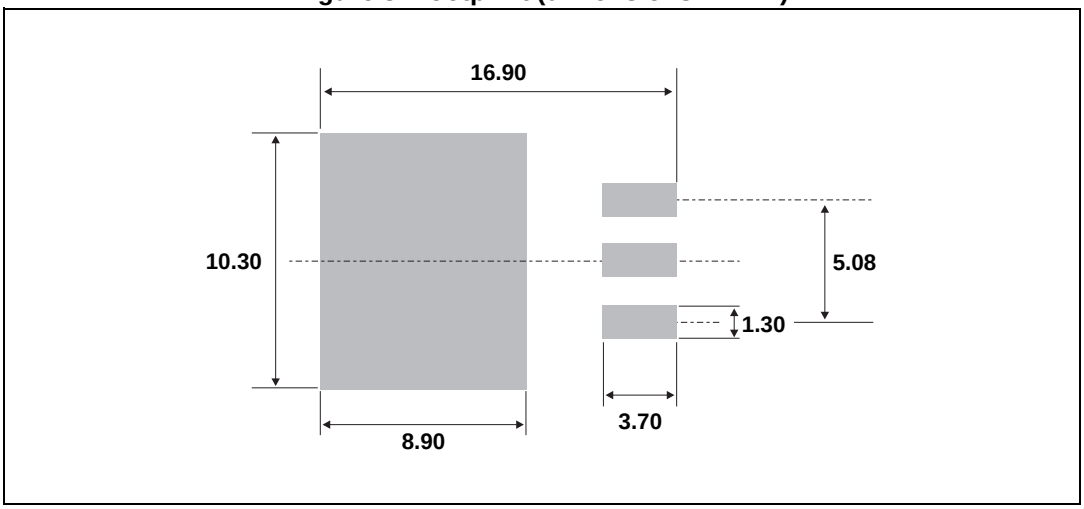

**Figure 9. TO-220AB dimension definitions**

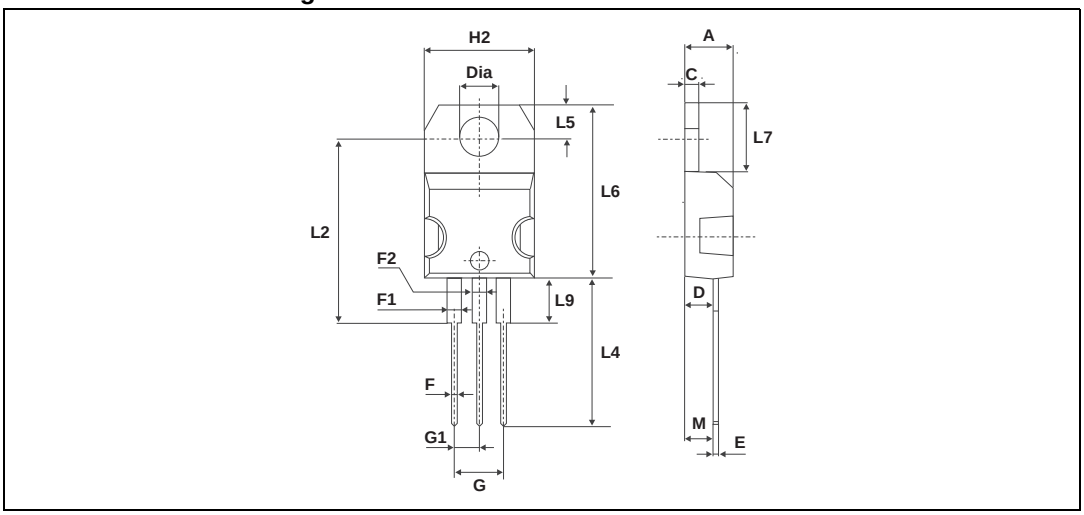


**Table 6. TO-220AB dimension values**

| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| C | 1.23 | 1.32 | 0.048 | 0.051 |
| D | 2.40 | 2.72 | 0.094 | 0.107 |
| E | 0.49 | 0.70 | 0.019 | 0.027 |
| F | 0.61 | 0.88 | 0.024 | 0.034 |
| F1 | 1.14 | 1.70 | 0.044 | 0.066 |
| F2 | 1.14 | 1.70 | 0.044 | 0.066 |
| G | 4.95 | 5.15 | 0.194 | 0.202 |
| G1 | 2.40 | 2.70 | 0.094 | 0.106 |
| H2 | 10 | 10.40 | 0.393 | 0.409 |
| L2 | 16.4 typ. | | 0.645 typ. | |
| L4 | 13 | 14 | 0.511 | 0.551 |
| L5 | 2.65 | 2.95 | 0.104 | 0.116 |
| L6 | 15.25 | 15.75 | 0.600 | 0.620 |
| L7 | 6.20 | 6.60 | 0.244 | 0.259 |
| L9 | 3.50 | 3.93 | 0.137 | 0.154 |
| M | 2.6 typ. | | 0.102 typ. | |
| Diam. | 3.75 | 3.85 | 0.147 | 0.151 |

Figure 10. I²PAK dimension definitions

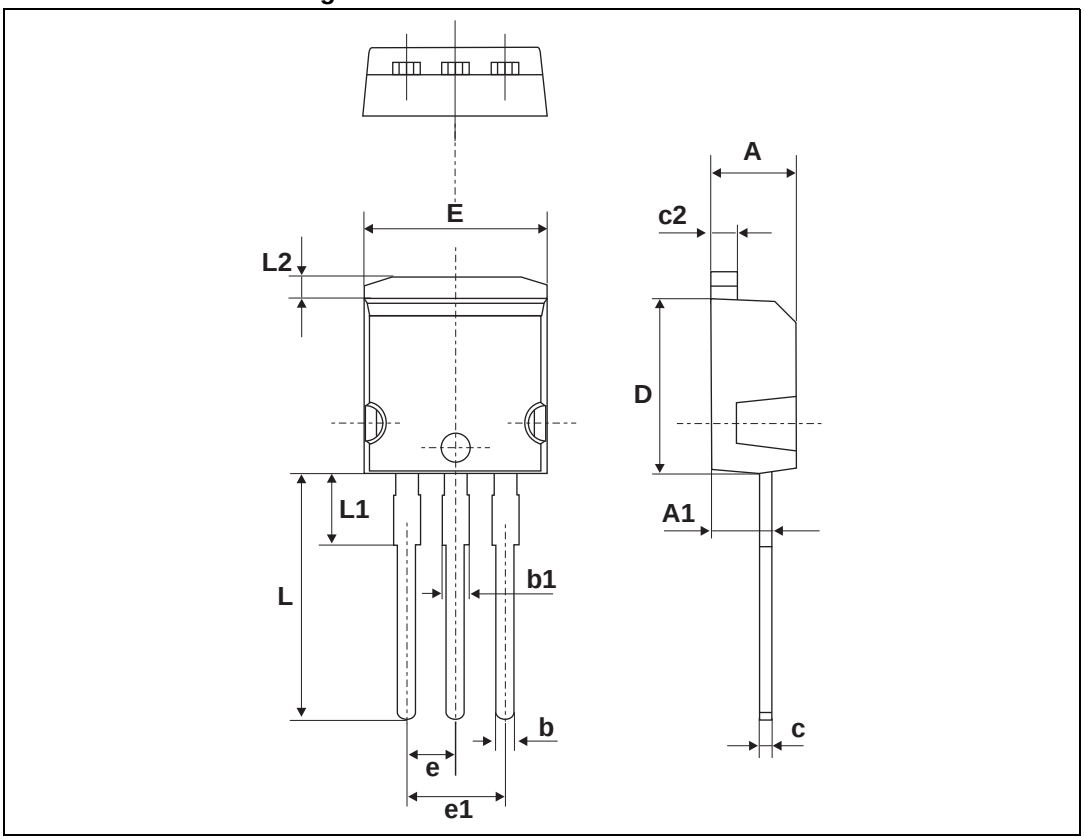


Table 7. I²PAK dimension values

| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| A1 | 2.40 | 2.72 | 0.094 | 0.107 |
| b | 0.61 | 0.88 | 0.024 | 0.035 |
| b1 | 1.14 | 1.70 | 0.044 | 0.067 |
| c | 0.49 | 0.70 | 0.019 | 0.028 |
| c2 | 1.23 | 1.32 | 0.048 | 0.052 |
| D | 8.95 | 9.35 | 0.352 | 0.368 |
| e | 2.40 | 2.70 | 0.094 | 0.106 |
| e1 | 4.95 | 5.15 | 0.195 | 0.203 |
| E | 10 | 10.40 | 0.394 | 0.409 |
| L | 13 | 14 | 0.512 | 0.551 |
| L1 | 3.50 | 3.93 | 0.138 | 0.155 |
| L2 | 1.27 | 1.40 | 0.050 | 0.055 |

# 3 Ordering information

**Table 8. Ordering information**

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| FERD30M45CT | FERD30M45CT | TO-220AB | 2.2 g | 50 | Tube |
| FERD30M45CG-TR | FERD30M45CG | $D^2PAK$ | 1.5 g | 1000 | Tape and reel |
| FERD30M45CR | FERD30M45CR | $I^2PAK$ | 1.4 g | 50 | Tube |

# 4 Revision history

**Table 9. Document revision history**

| Date | Revision | Changes |
|---|---|---|
| 12-Nov-2012 | 1 | Initial release. |
| 12-Nov-2013 | 2 | Updated title. |
| 11-Jul-2014 | 3 | Added $I^2PAK$ package. |

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