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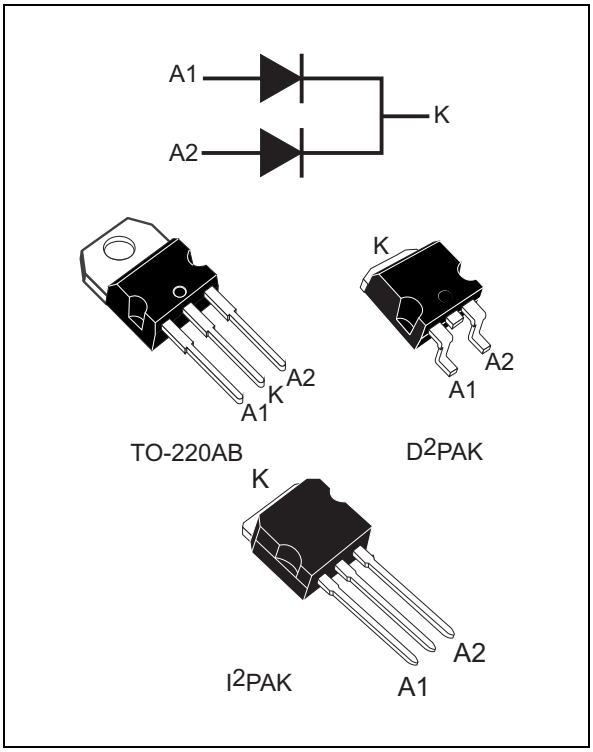
FERD30M45C

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 D²PAK, 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)

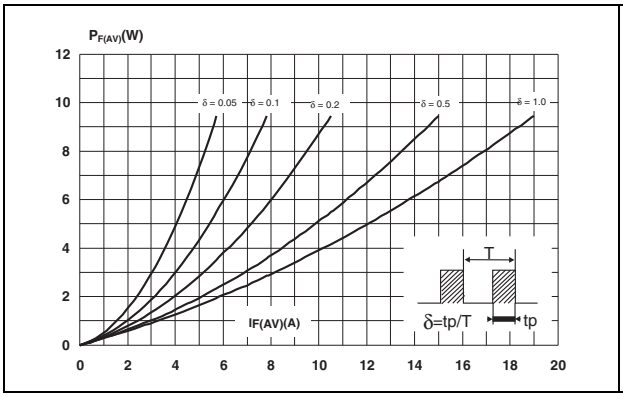


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

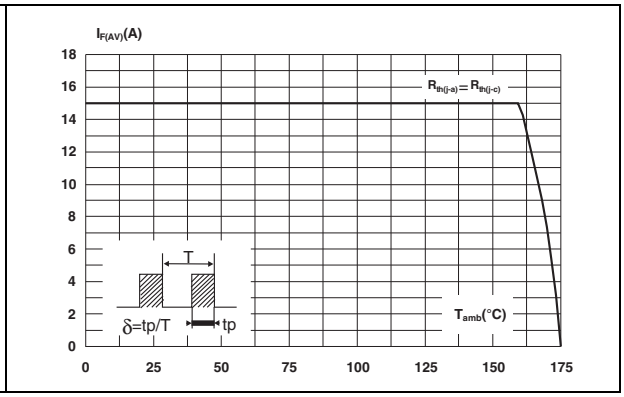


Figure 3. Junction capacitance versus reverse voltage applied (typical values, per diode)

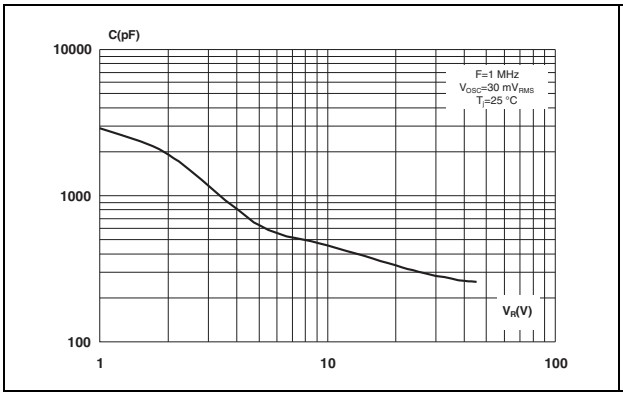


Figure 4. Forward voltage drop versus forward current (per diode)

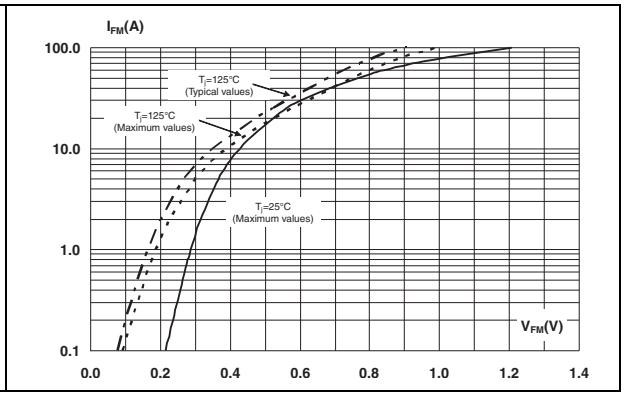


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration

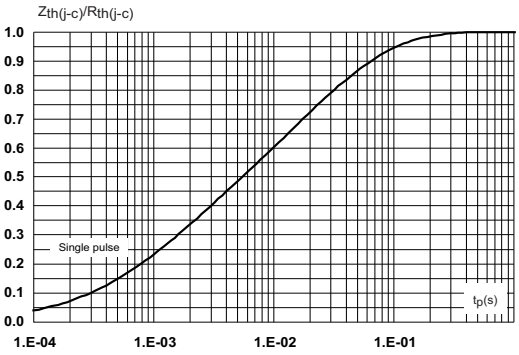
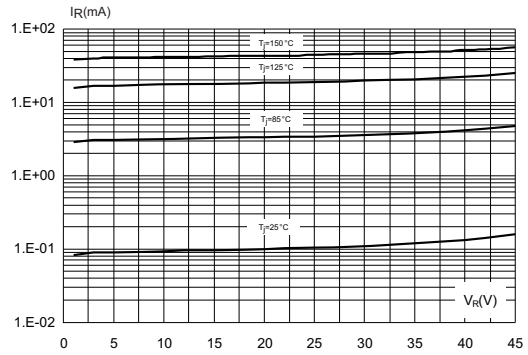


Figure 6. Reverse leakage current versus reverse voltage applied (typical values, per diode)



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

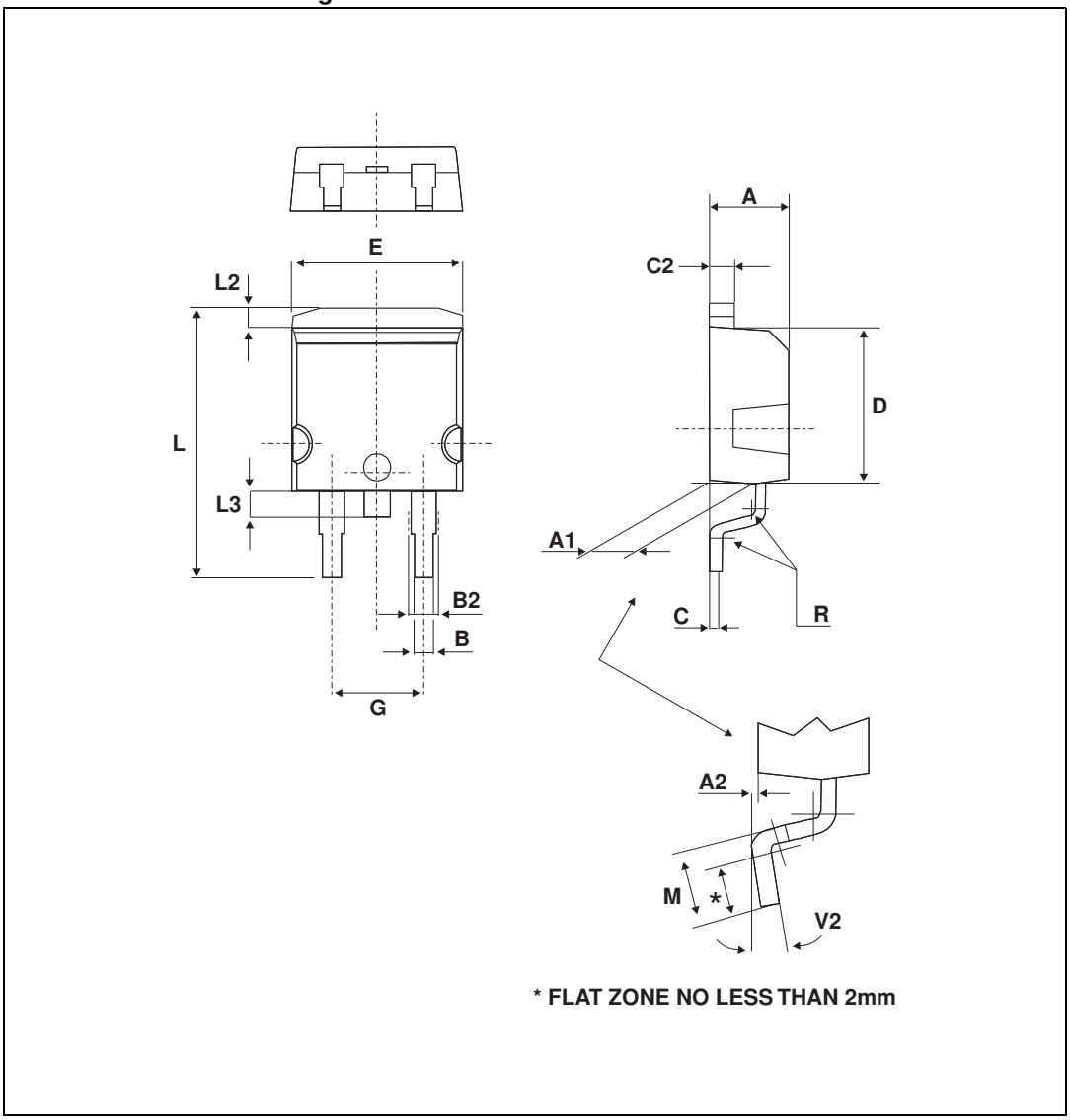

Table 5. D^{2}PAK dimension values

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)

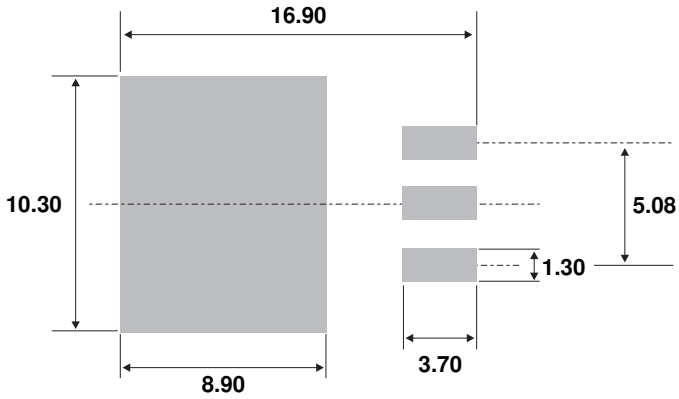

Figure 9. TO-220AB dimension definitions

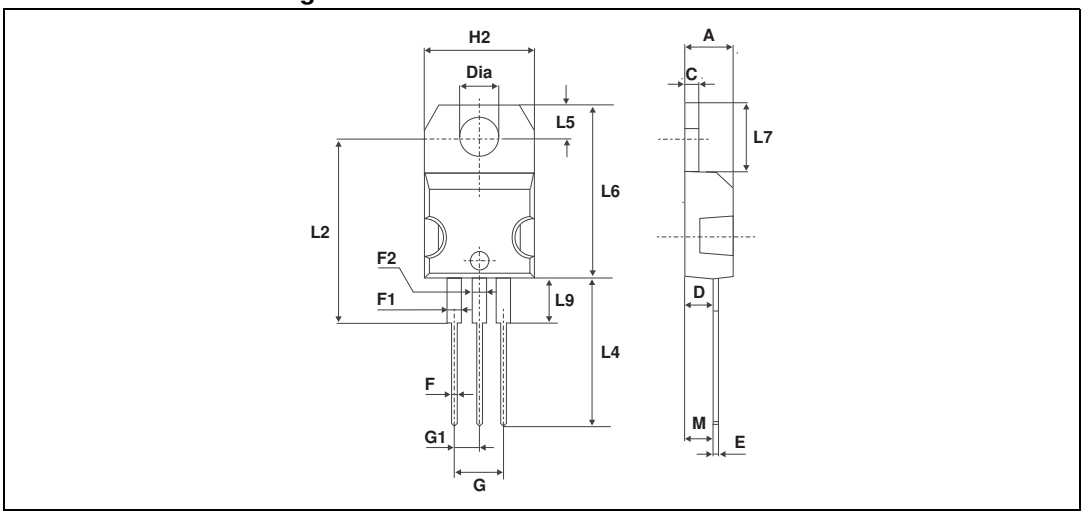

Table 6. TO-220AB dimension values

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

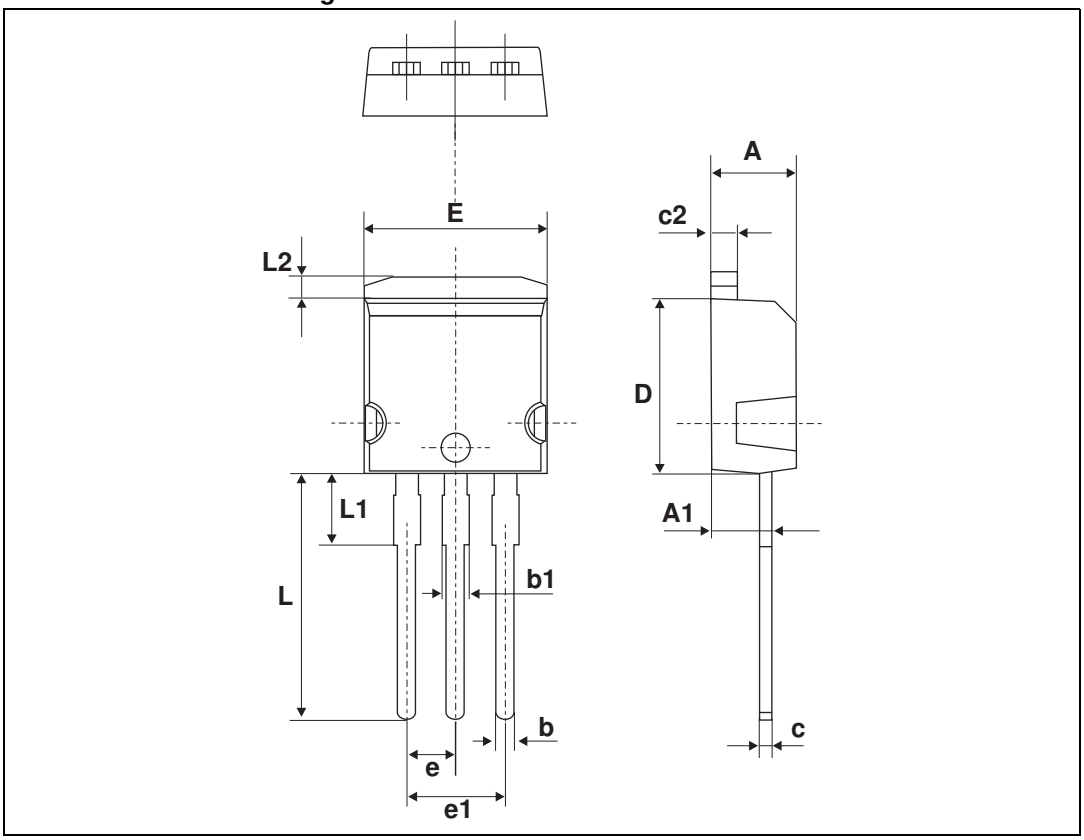

Table 7. I²PAK dimension values

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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