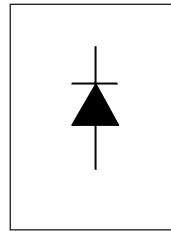


**FAST SOFT RECOVERY
 RECTIFIER DIODE**



$$V_F < 1.31V @ 20A$$

$$I_{FSM} = 355A$$

$$V_{RRM} 800 \text{ to } 1200V$$

Description/Features

The 20ETF..S fast soft recovery **QUIETIR** rectifier series has been optimized for combined short reverse recovery time and low forward voltage drop. The glass passivation ensures stable reliable operation in the most severe temperature and power cycling conditions.

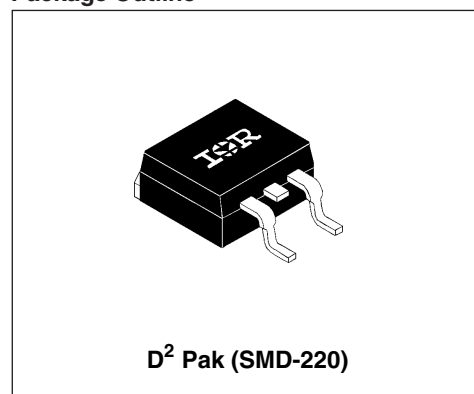
Typical applications are both:

- output rectification and freewheeling in inverters, choppers and converters
- and input rectifications where severe restrictions on conducted EMI should be met.

Major Ratings and Characteristics

| Characteristics | 20ETF..S | Units |
|---------------------------------|-------------|------------|
| $I_{F(AV)}$ Sinusoidal waveform | 20 | A |
| V_{RRM} range | 800 to 1200 | V |
| I_{FSM} | 355 | A |
| V_F @ 20A, $T_J=25^\circ C$ | 1.31 | V |
| t_{rr} @ 1A, 100A/ μs | 95 | ns |
| T_J range | -40 to 150 | $^\circ C$ |

Package Outline



Voltage Ratings

| Part Number | V_{RRM} , maximum peak reverse voltage V | V_{RSM} , maximum non repetitive peak reverse voltage V | I_{RRM} 150°C mA |
|-------------|---|--|--------------------------|
| 20ETF08S | 800 | 900 | 6 |
| 20ETF10S | 1000 | 1100 | |
| 20ETF12S | 1200 | 1300 | |

Absolute Maximum Ratings

| Parameters | 20ETF..S | Units | Conditions |
|--|----------|---------------|---|
| $I_{F(AV)}$ Max. Average Forward Current | 20 | A | @ $T_C = 97^\circ\text{C}$, 180° conduction half sine wave |
| I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current | 300 | A | 10ms Sine pulse, rated V_{RRM} applied |
| | 355 | | 10ms Sine pulse, no voltage reapplied |
| I^2t Max. I^2t for fusing | 450 | A^2s | 10ms Sine pulse, rated V_{RRM} applied |
| | 635 | | 10ms Sine pulse, no voltage reapplied |
| $I^2\sqrt{t}$ Max. $I^2\sqrt{t}$ for fusing | 6350 | $A^2\sqrt{s}$ | $t = 0.1$ to 10ms, no voltage reapplied |

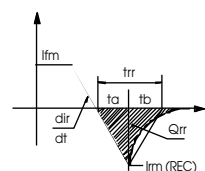
Electrical Specifications

| Parameters | 20ETF..S | Units | Conditions |
|---------------------------------------|----------|-----------|---------------------------------|
| V_{FM} Max. Forward Voltage Drop | 1.31 | V | @ 20A, $T_J = 25^\circ\text{C}$ |
| r_t Forward slope resistance | 11.88 | $m\Omega$ | $T_J = 150^\circ\text{C}$ |
| $V_{F(TO)}$ Threshold voltage | 0.93 | V | |
| I_{RM} Max. Reverse Leakage Current | 0.1 | mA | $T_J = 25^\circ\text{C}$ |
| | 6 | | $T_J = 150^\circ\text{C}$ |

$V_R = \text{rated } V_{RRM}$

Recovery Characteristics

| Parameters | 20ETF..S | Units | Conditions |
|-----------------------------------|----------|---------------|--|
| t_{rr} Reverse Recovery Time | 400 | ns | $I_F @ 20\text{Apk}$ @ 25A/ μs @ 25°C |
| I_{rr} Reverse Recovery Current | 6.1 | A | |
| Q_{rr} Reverse Recovery Charge | 1.7 | μC | @ 25°C |
| S Snap Factor t_b/t_a | 0.6 | typical | |



Thermal-Mechanical Specifications

| Parameters | 20ETF..S | Units | Conditions |
|---|------------------------------|--------|--------------|
| T _J Max. Junction Temperature Range | -40 to 150 | °C | |
| T _{stg} Max. Storage Temperature Range | -40 to 150 | °C | |
| R _{thJC} Max. Thermal Resistance Junction to Case | 0.9 | °C/W | DC operation |
| R _{thJA} Max. Thermal Resistance Junction to Ambient (PCB Mount)** | 62 | °C/W | |
| T _s Soldering Temperature | 240 | °C | |
| wt Approximate Weight | 2(0.07) | g(oz.) | |
| Case Style | D ² Pak (SMD-220) | | |

**When mounted on 1" square (650mm²) PCB of FR-4 or G-10 material 4oz (140µm) copper 40°C/W
 For recommended footprint and soldering techniques refer to application note #AN-994

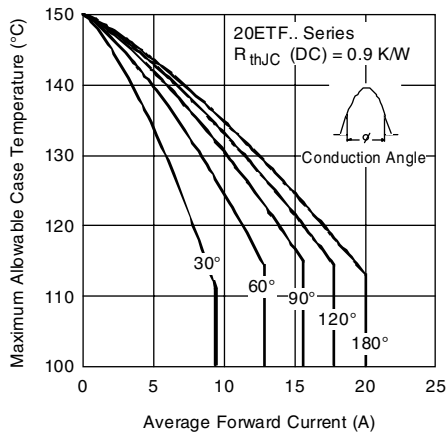


Fig. 1 - Current Rating Characteristics

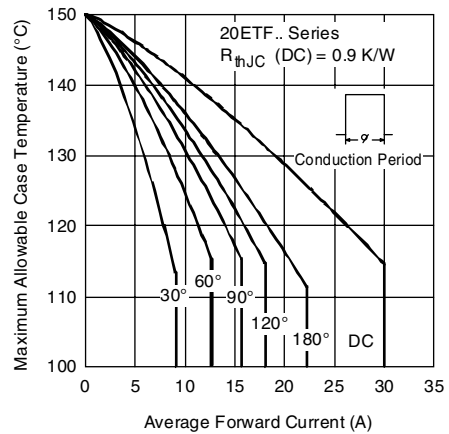


Fig. 2 - Current Rating Characteristics

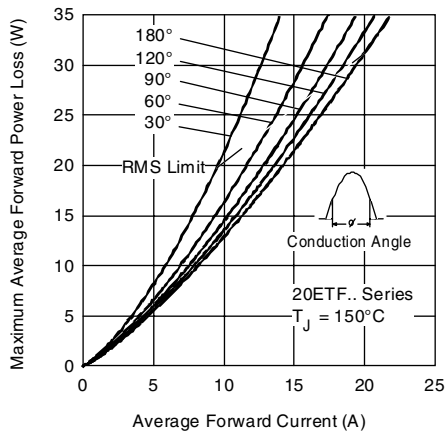


Fig. 3 - Forward Power Loss Characteristics

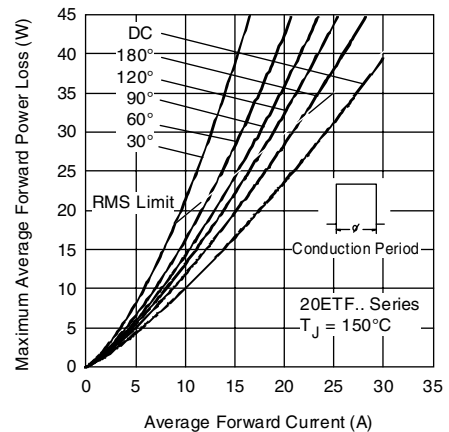


Fig. 4 - Forward Power Loss Characteristics

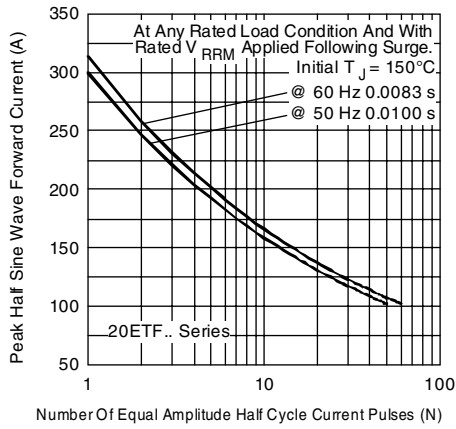


Fig. 5 - Maximum Non-Repetitive Surge Current

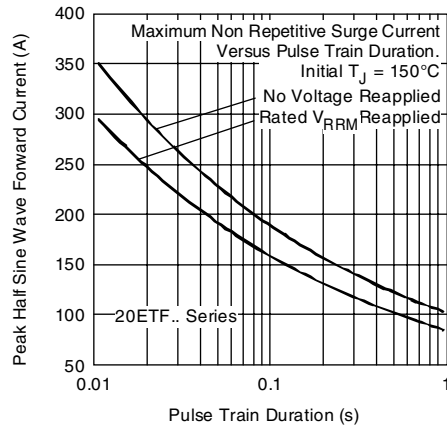


Fig. 6 - Maximum Non-Repetitive Surge Current

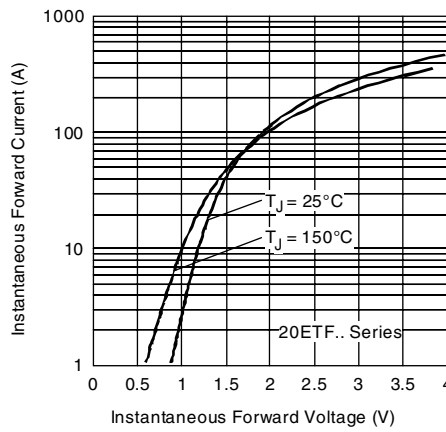


Fig. 7 - Forward Voltage Drop Characteristics

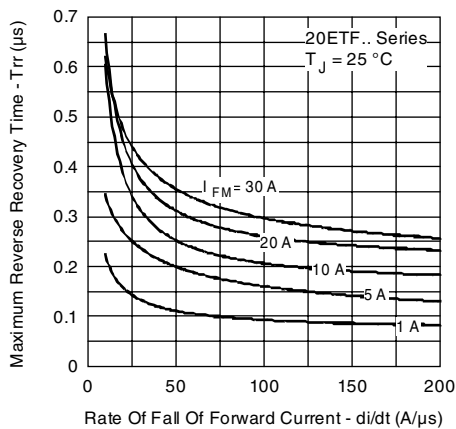


Fig. 8 - Recovery Time Characteristics, $T_J = 25^\circ\text{C}$

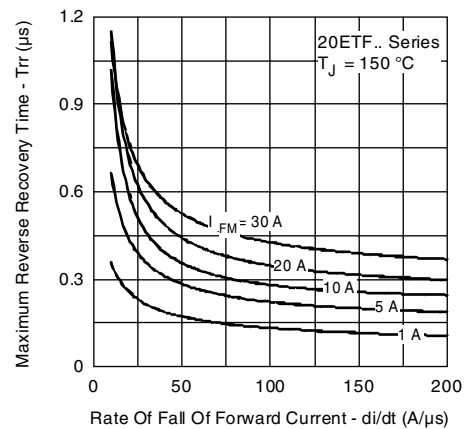


Fig. 9 - Recovery Time Characteristics, $T_J = 150^\circ\text{C}$

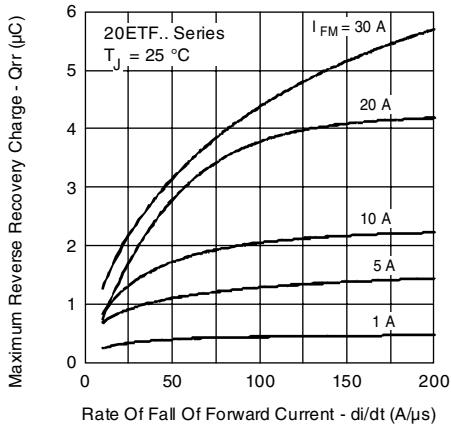


Fig. 10 - Recovery Charge Characteristics, $T_J = 25^\circ\text{C}$

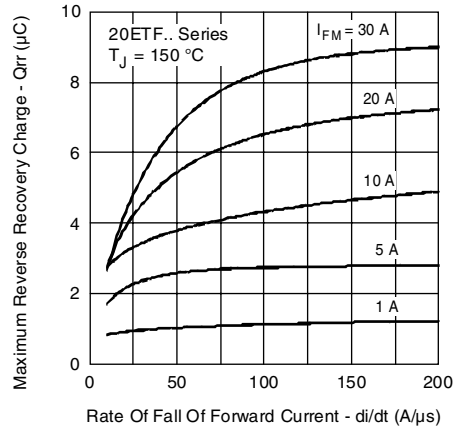


Fig. 11 - Recovery Charge Characteristics, $T_J = 150^\circ\text{C}$

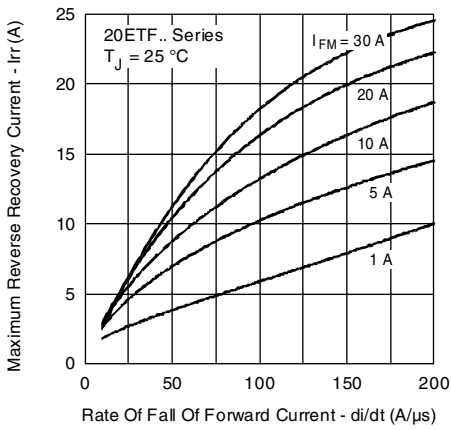


Fig. 12 - Recovery Current Characteristics, $T_J = 25^\circ\text{C}$

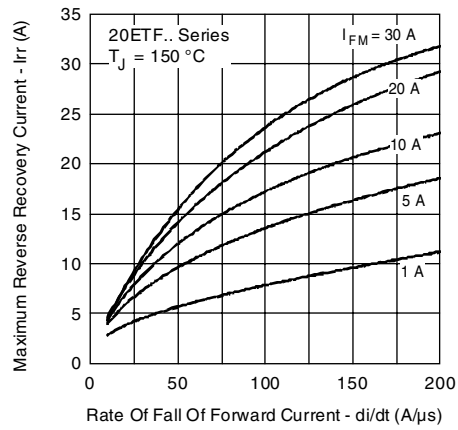


Fig. 13 - Recovery Current Characteristics, $T_J = 150^\circ\text{C}$

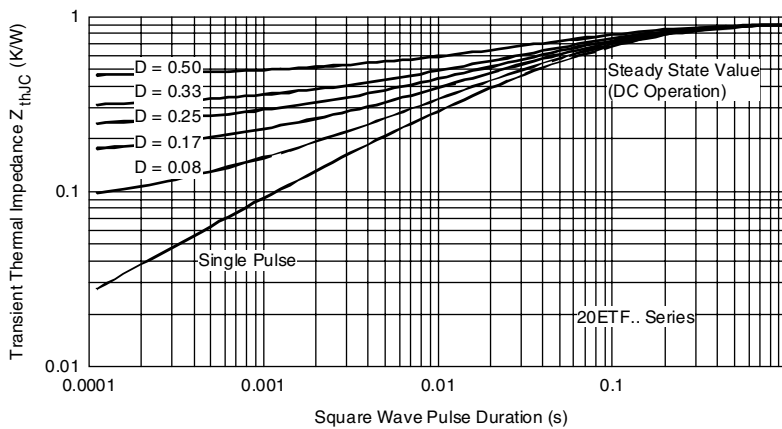


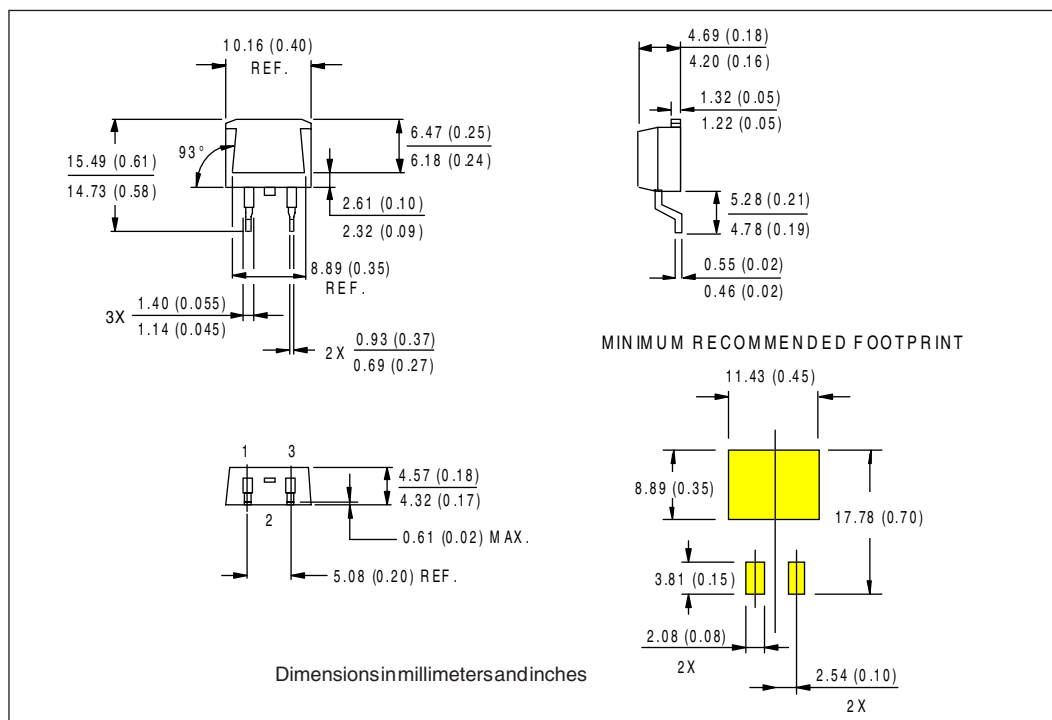
Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

Ordering Information Table

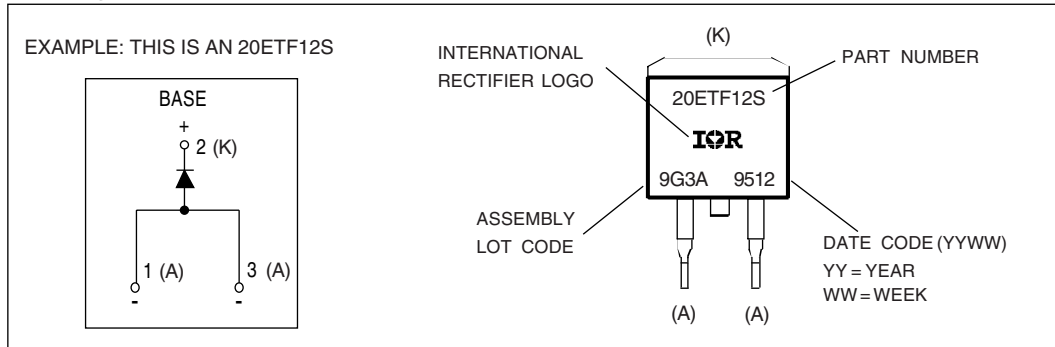
| Device Code | | | | | | |
|-------------|---|--|---|----|---|-----|
| 20 | E | T | F | 12 | S | TRL |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1 | - | Current Rating | | | | |
| 2 | - | Circuit Configuration: E = Single Diode | | | | |
| 3 | - | Package: T = TO-220AC | | | | |
| 4 | - | Type of Silicon: S = Standard Recovery Rectifier | | | | |
| 5 | - | Voltage code: Code x 100 = V_{RRM} | | | | |
| 6 | - | S = TO-220 D ² Pak (SMD-220) Version | | | | |
| 7 | - | Tape and Reel Option: | | | | |
| | | TRL = Left Reel | | | | |
| | | TRR = Right Orientation Reel | | | | |

| |
|------------|
| 08 = 800V |
| 10 = 1000V |
| 12 = 1200V |

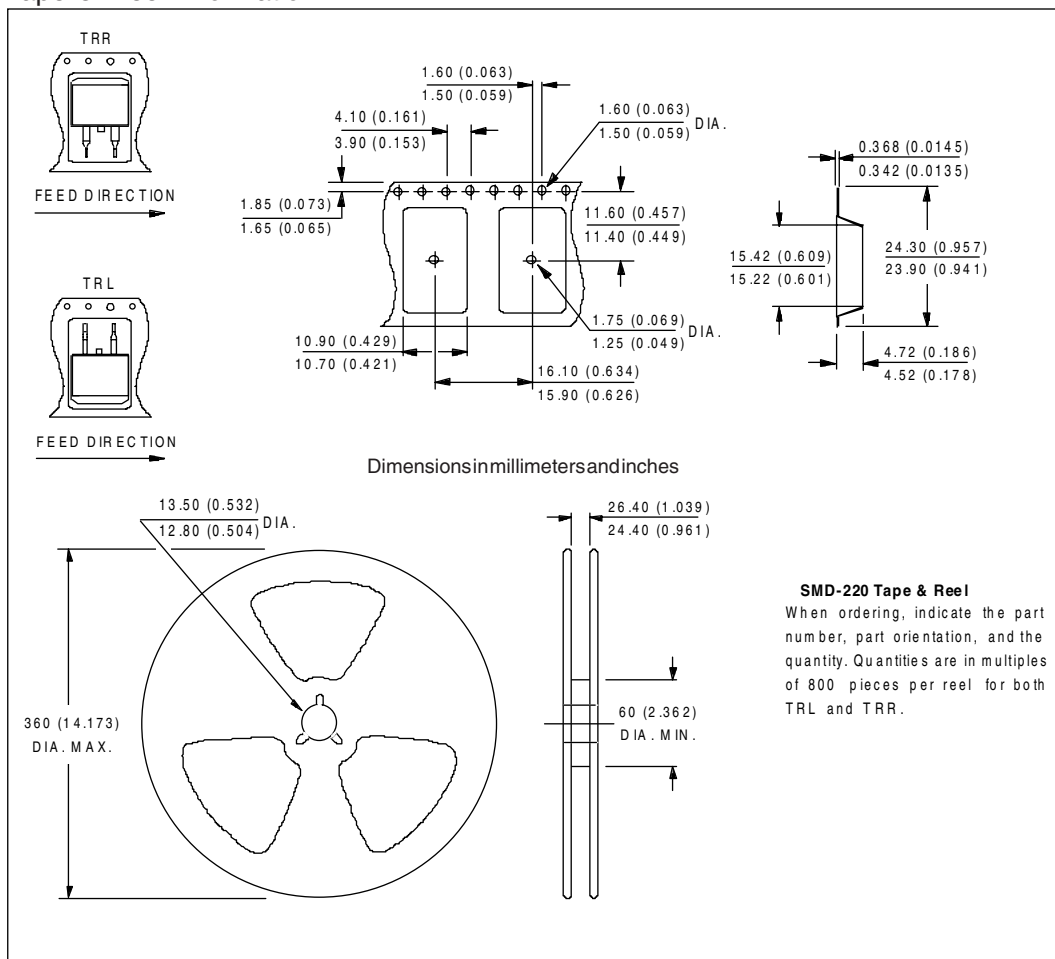
Outline Table



Marking Information



Tape & Reel Information



WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245 U.S.A Tel: (310) 322-3331 Fax: (310) 322-3332
EUROPEAN HEADQUARTERS: Hurst Green, Oxted, Surrey RH8 9BB, U.K. Tel: ++ 44 1883 732020 Fax: ++ 44 1883 733408
IR CANADA: 7231 Victoria Park Ave., Suite #201, Markham, Ontario L3R 2Z8 Tel: (905) 475 1897. Fax: (905) 475 8801
IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 6172 96590 Fax: ++ 49 6172 965933
IR ITALY: Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 11 4510111 Fax: ++ 39 11 4510220
IR FAR EAST: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo, Japan 171 Tel: 81 3 3983 0086 Fax: 81 3 3983 0642
IR SOUTHEAST ASIA: 315 Outram Road, # 10-02 Tan Boon Liat Building, SINGAPORE 0316. Tel: 65 221 8371. Fax: 65 221 8372.
<http://www.irf.com> Fax-On-Demand: +44 1883 733420 Data and specifications subject to change without notice 11/97