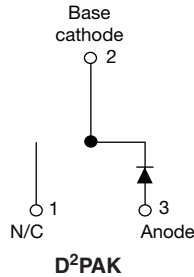


Ultrafast Rectifier, 30 A FRED Pt®



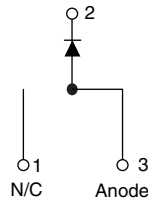
VS-ETU3006S-M3



D²PAK



VS-ETU3006-1-M3



TO-262

FEATURES

- Low forward voltage drop
- Ultrafast recovery time
- 175 °C operating junction temperature
- Low leakage current
- Compliant to RoHS Directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition
- Designed and qualified according to JEDEC-JESD47



RoHS
COMPLIANT
HALOGEN
FREE

DESCRIPTION/APPLICATIONS

Ultralow V_F , soft-switching ultrafast rectifiers optimized for Discontinuous (Critical) Mode (DCM) Power Factor Correction (PFC).

The minimized conduction loss, optimized stored charge and low recovery current minimized the switching losses and reduce over dissipation in the switching element and snubbers.

The device is also intended for use as a freewheeling diode in power supplies and other power switching applications.

APPLICATIONS

AC/DC SMPS 70 W to 400 W
e.g. laptop and printer AC adaptors, desktop PC, TV and monitor, games units, and DVD AC/DC power supplies.

PRODUCT SUMMARY

Package	TO-263AB (D ² PAK), TO-262AA
$I_{F(AV)}$	30A
V_R	600 V
V_F at I_F	2 V
t_{rr} (typ.)	30 ns
T_J max.	175 °C
Diode variation	Single die

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Repetitive peak reverse voltage	V_{RRM}		600	V
Average rectified forward current	$I_{F(AV)}$	$T_C = 113\text{ °C}$	30	A
Non-repetitive peak surge current	I_{FSM}	$T_C = 25\text{ °C}$	200	
Operating junction and storage temperatures	T_J, T_{Stg}		- 65 to 175	°C

ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ °C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	V_{BR}, V_R	$I_R = 100\ \mu\text{A}$	600	-	-	V
Forward voltage	V_F	$I_F = 70\ \text{A}$ $I_F = 30\ \text{A}, T_J = 150\text{ °C}$	-	1.4 1.15	2.0 1.35	
Reverse leakage current	I_R	$V_R = V_R$ rated $T_J = 150\text{ °C}, V_R = V_R$ rated	-	0.02 30	30 250	μA
Junction capacitance	C_T	$V_R = 600\ \text{V}$	-	20	-	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	8.0	-	nH

VS-ETU3006S-M3, VS-ETU3006-1-M3



Vishay Semiconductors Ultrafast Rectifier, 30 A FRED Pt®

DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25\text{ °C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Reverse recovery time	t_{rr}	$I_F = 1\text{ A}$, $di_F/dt = 50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	30	45	ns	
		$T_J = 25\text{ °C}$	-	45	-		
		$T_J = 125\text{ °C}$	-	100	-		
Peak recovery current	I_{RRM}	$I_F = 30\text{ A}$ $di_F/dt = 200\text{ A}/\mu\text{s}$ $V_R = 200\text{ V}$	$T_J = 25\text{ °C}$	-	5.6	-	A
			$T_J = 125\text{ °C}$	-	10	-	
Reverse recovery charge	Q_{rr}	$T_J = 25\text{ °C}$	$T_J = 25\text{ °C}$	-	127	-	nC
			$T_J = 125\text{ °C}$	-	580	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J , T_{Stg}		- 65	-	175	°C
Thermal resistance, junction to case	R_{thJC}		-	0.95	1.4	°C/W
Thermal resistance, junction to ambient	R_{thJA}	Typical socket mount	-	-	70	
Thermal resistance, case to heatsink	R_{thCS}	Mounting surface, flat, smooth and greased	-	0.5	-	
Weight			-	2.0	-	g
			-	0.07	-	oz.
Mounting torque			6 (5)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style D ² PAK modified	ETU3006S			
		Case style TO-262	ETU3006-1			

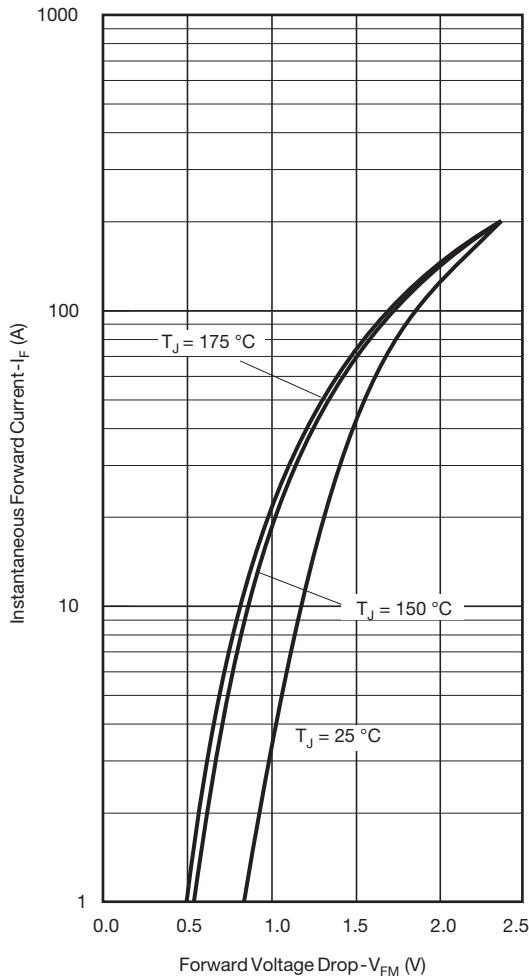


Fig. 1 - Typical Forward Voltage Drop Characteristics

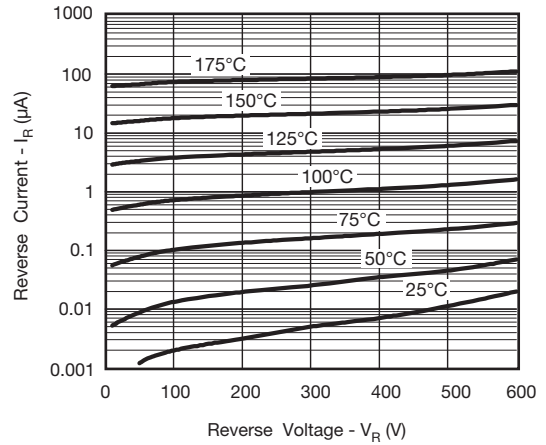


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

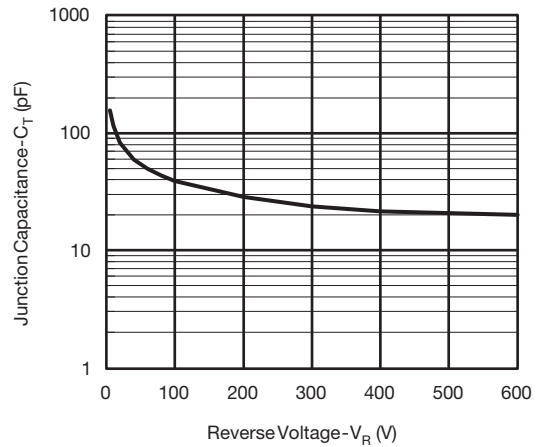


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

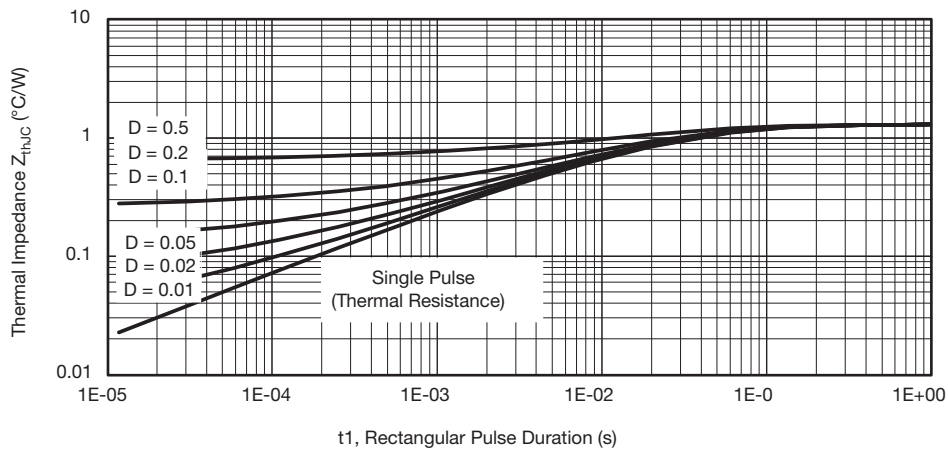


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

VS-ETU3006S-M3, VS-ETU3006-1-M3



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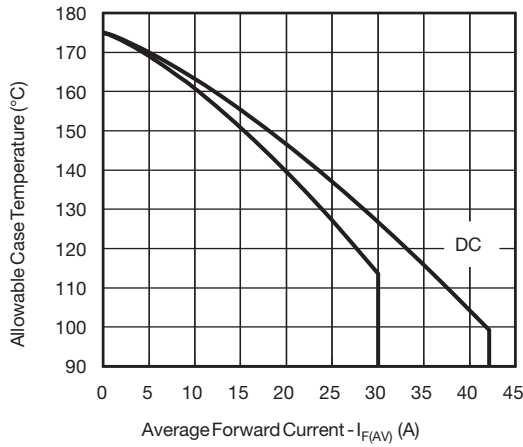


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

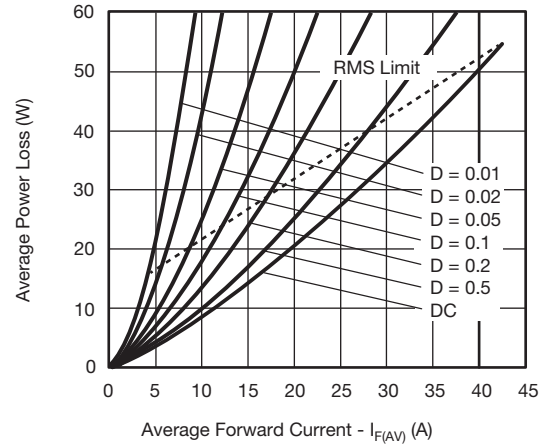


Fig. 6 - Forward Power Loss Characteristics

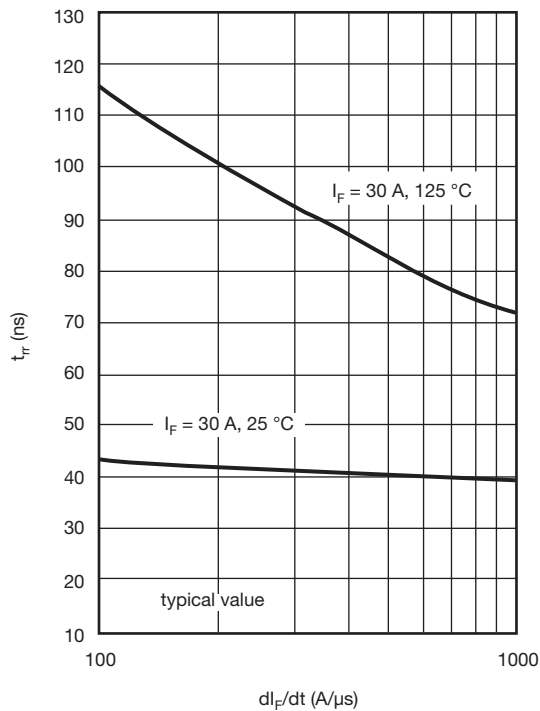


Fig. 7 - Typical Reverse Recovery vs. di_F/dt

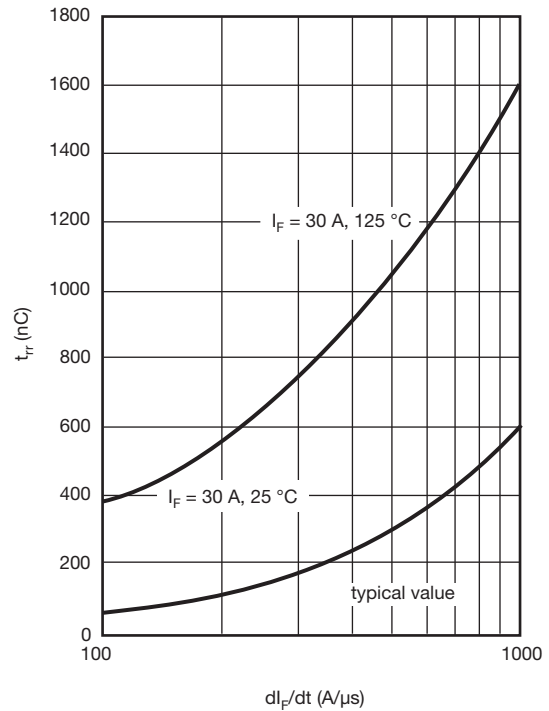


Fig. 8 - Typical Stored Charge vs. di_F/dt

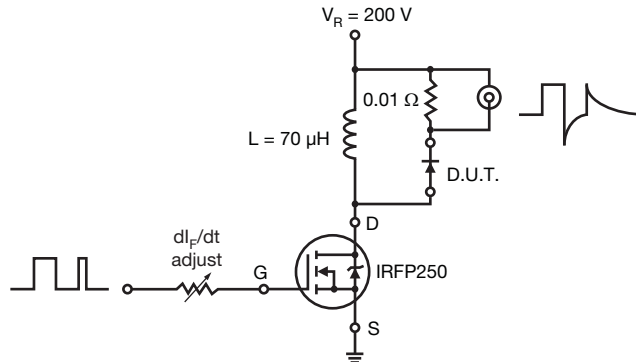


Fig. 9 - Reverse Recovery Parameter Test Circuit

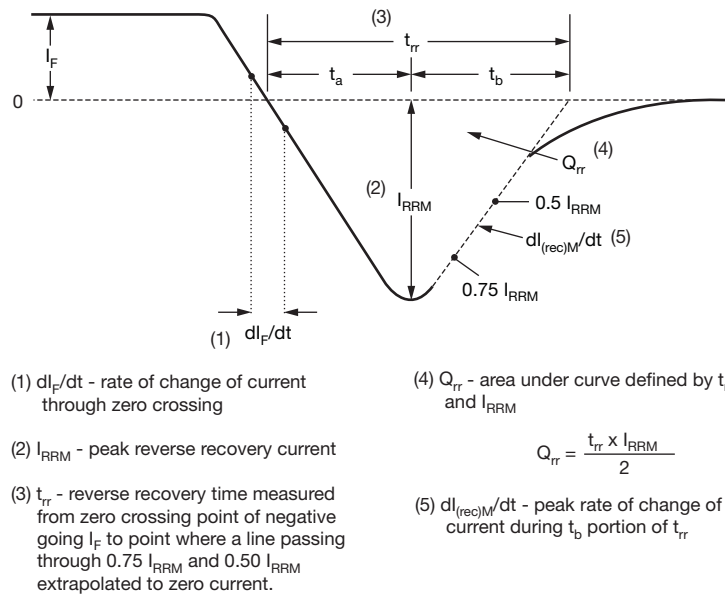


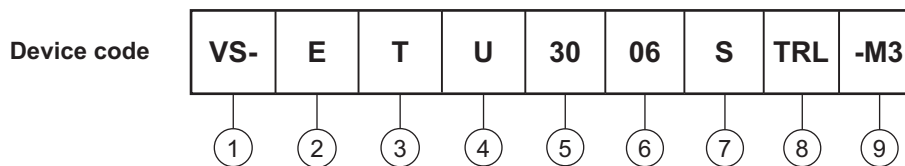
Fig. 10 - Reverse Recovery Waveform and Definitions

VS-ETU3006S-M3, VS-ETU3006-1-M3

Vishay Semiconductors Ultrafast Rectifier, 30 A FRED Pt®



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Circuit configuration
E = Single diode
- 3** - T = TO-220
- 4** - U = Ultrafast recovery time
- 5** - Current code (30 = 30 A)
- 6** - Voltage code (06 = 600 V)
- 7** - • S = D²PAK
• -1 = TO-262
- 8** - • None = Tube (50 pieces)
• TRL = Tape and reel (left oriented, for D²PAK package)
• TRR = Tape and reel (right oriented, for D²PAK package)
- 9** - -M3 = Halogen-free, RoHS compliant and terminations lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-ETU3006S-M3	50	1000	Antistatic plastic tube
VS-ETU3006-1-M3	50	1000	Antistatic plastic tube
VS-ETU3006STRR-M3	800	800	13" diameter reel
VS-ETU3006STRL-M3	800	800	13" diameter reel

LINKS TO RELATED DOCUMENTS		
Dimensions	TO-263AB (D ² PAK)	www.vishay.com/doc?95046
	TO-262AA	www.vishay.com/doc?95419
Part marking information	TO-263AB (D ² PAK)	www.vishay.com/doc?95444
	TO-262AA	www.vishay.com/doc?95443
Packaging information	TO-263AB (D ² PAK)	www.vishay.com/doc?95032



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