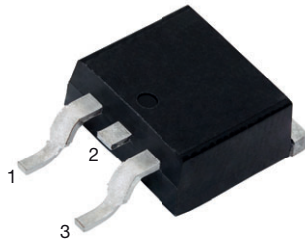
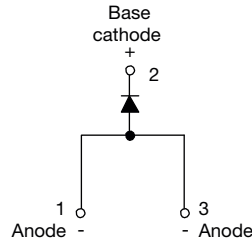




Surface Mount Fast Soft Recovery Rectifier Diode, 10 A



D²PAK (TO-263AB)



FEATURES

- Glass passivated pellet chip junction
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Output rectification and freewheeling in inverters, choppers and converters
- Input rectifications where severe restrictions on conducted EMI should be met

DESCRIPTION

The VS-10ETF..S-M3 fast soft recovery 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.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	10 A
V_R	200 V, 400 V, 600 V
V_F at I_F	1.2 V
I_{FSM}	140 A
t_{rr}	50 ns
T_J max.	150 °C
Snap factor	0.6
Package	D ² PAK (TO-263AB)
Circuit configuration	Single

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
V_{RRM}		200 to 600	V
$I_{F(AV)}$	Sinusoidal waveform	10	A
I_{FSM}		140	
t_{rr}	1 A, 100 A/μs	50	ns
V_F	10 A, $T_J = 25$ °C	1.2	V
T_J	Range	-40 to +150	°C

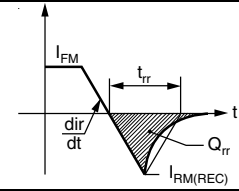
VOLTAGE RATINGS			
PART NUMBER	V_{RRM} , MAXIMUM PEAK REVERSE VOLTAGE V	V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM} AT 150 °C mA
VS-10ETF02S-M3	200	300	2.5
VS-10ETF04S-M3	400	500	
VS-10ETF06S-M3	600	700	

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 128$ °C, 180° conduction half sine wave	10	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	10 ms sine pulse, rated V_{RRM} applied	115	
		10 ms sine pulse, no voltage reapplied	140	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied	66	A ² s
		10 ms sine pulse, no voltage reapplied	94	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1$ ms to 10 ms, no voltage reapplied	940	A ² √s



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM}	10 A, $T_J = 25\text{ }^\circ\text{C}$		1.2	V
Forward slope resistance	r_t	$T_J = 150\text{ }^\circ\text{C}$		12.7	$m\Omega$
Threshold voltage	$V_{F(TO)}$			1.25	V
Maximum reverse leakage current	I_{RM}	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{rated } V_{RRM}$	0.1	mA
		$T_J = 150\text{ }^\circ\text{C}$		2.5	

RECOVERY CHARACTERISTICS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Reverse recovery time	t_{rr}	I_F at 10 A _{pk} 25 A/ μ s 25 $^\circ\text{C}$	200	ns
Reverse recovery current	I_{rr}		2.75	A
Reverse recovery charge	Q_{rr}		0.32	μC
Snap factor	S		0.6	



THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		-40 to +150	$^\circ\text{C}$
Maximum thermal resistance junction to case	R_{thJC}	DC operation	1.5	$^\circ\text{C/W}$
Maximum thermal resistance junction to ambient (PCB mount)	$R_{thJA}^{(1)}$		40	
Approximate weight			2	g
			0.07	oz.
Marking device		Case style D ² PAK (TO-263AB)	10ETF02S	
			10ETF04S	
			10ETF06S	

Note

(1) When mounted on 1" square (650 mm²) PCB of FR-4 or G-10 material 4 oz. (140 μ m) copper 40 $^\circ\text{C/W}$. For recommended footprint and soldering techniques refer to application note #AN-994

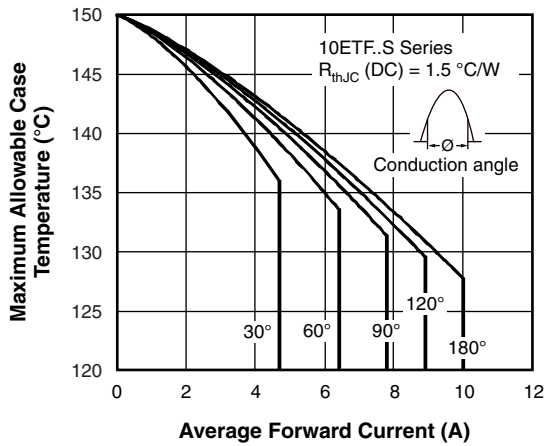


Fig. 1 - Current Rating Characteristics

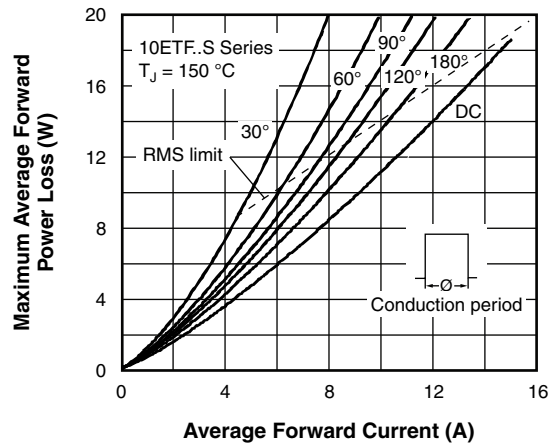


Fig. 4 - Forward Power Loss Characteristics

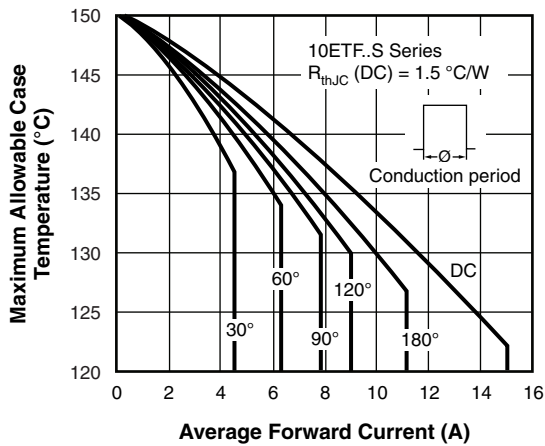


Fig. 2 - Current Rating Characteristics

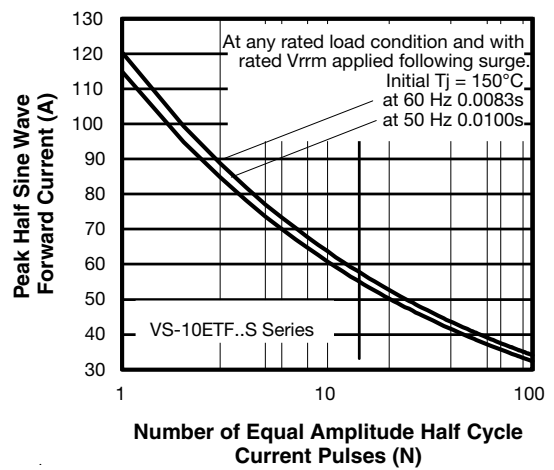


Fig. 5 - Maximum Non-Repetitive Surge Current

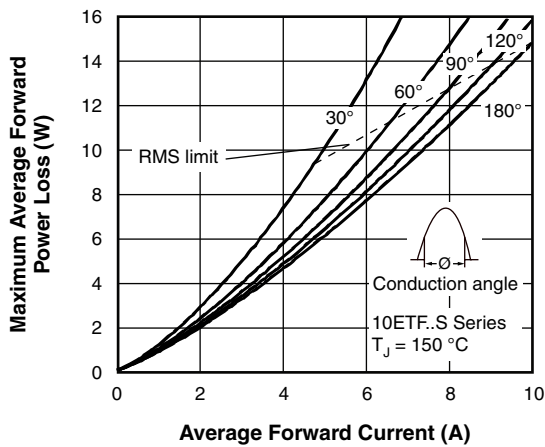


Fig. 3 - Forward Power Loss Characteristics

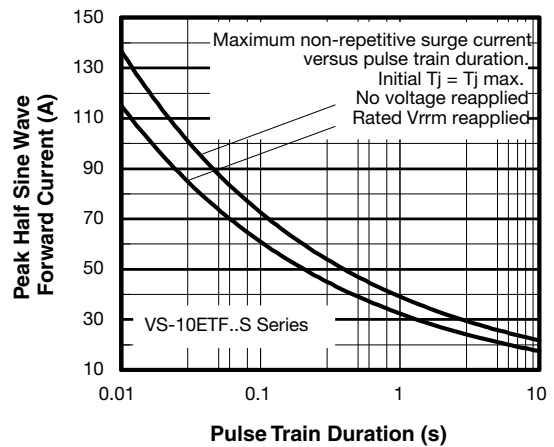


Fig. 6 - Maximum Non-Repetitive Surge Current

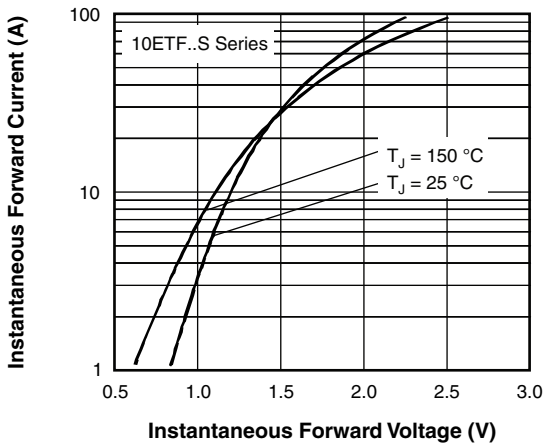


Fig. 7 - Forward Voltage Drop Characteristics

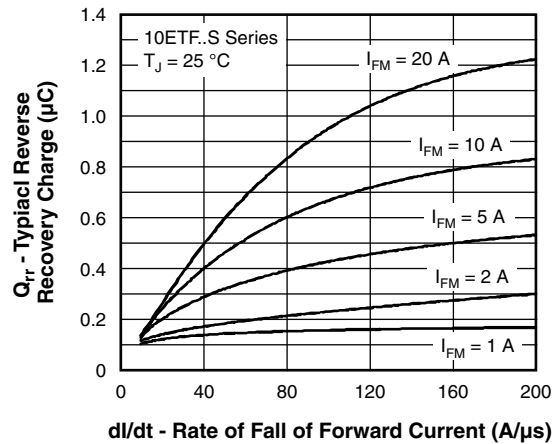


Fig. 10 - Recovery Charge Characteristics, $T_J = 25\text{ }^\circ\text{C}$

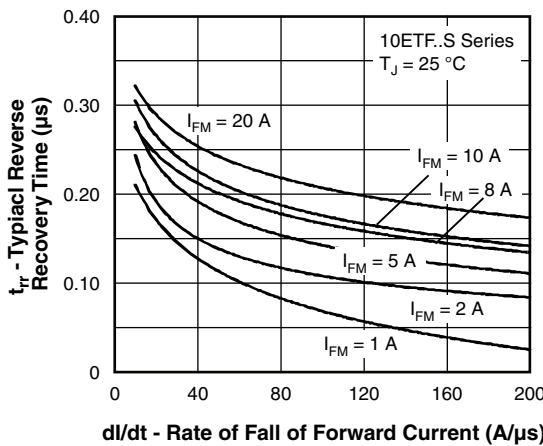


Fig. 8 - Recovery Time Characteristics, $T_J = 25\text{ }^\circ\text{C}$

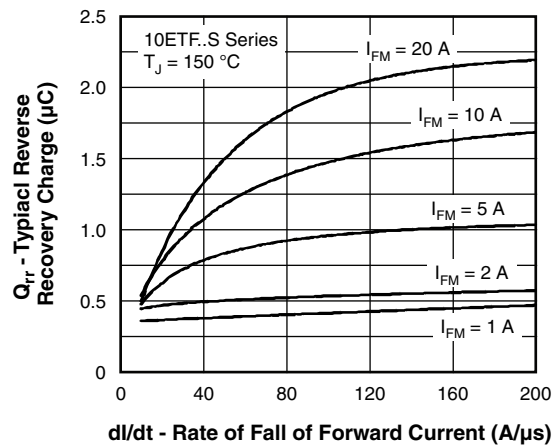


Fig. 11 - Recovery Charge Characteristics, $T_J = 150\text{ }^\circ\text{C}$

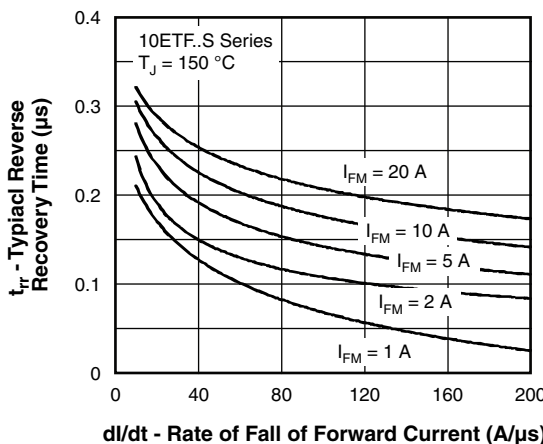


Fig. 9 - Recovery Time Characteristics, $T_J = 150\text{ }^\circ\text{C}$

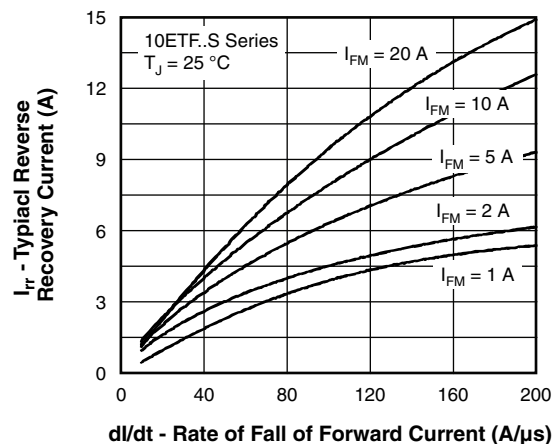


Fig. 12 - Recovery Current Characteristics, $T_J = 25\text{ }^\circ\text{C}$

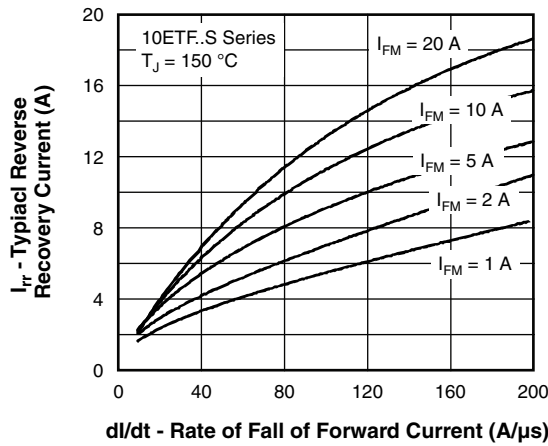


Fig. 13 - Recovery Current Characteristics, $T_J = 150\text{ }^\circ\text{C}$

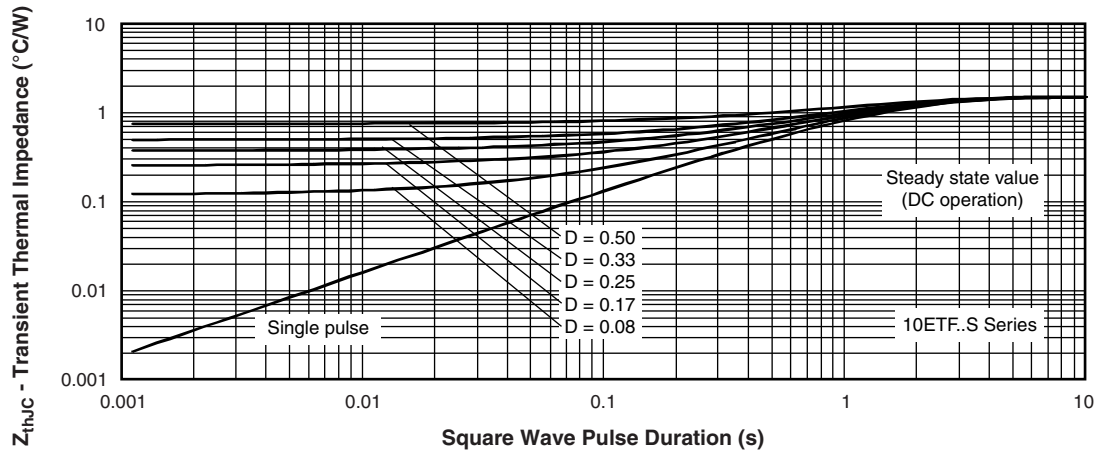
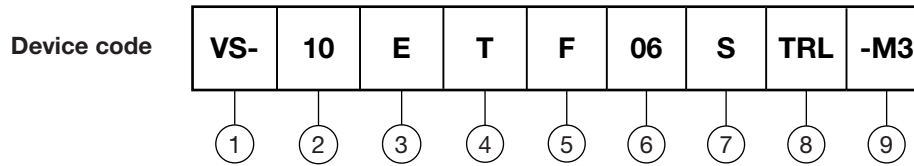


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (10 = 10 A)
- 3** - Circuit configuration:
E = single
- 4** - Package:
T = D²PAK (TO-263AB)
- 5** - Type of silicon:
F = fast soft recovery rectifier
- 6** - Voltage code x 100 = V_{RRM}

02 = 200 V
04 = 400 V
06 = 600 V
- 7** - S = surface mountable
- 8** -
 - None = tube
 - TRR = tape and reel (right oriented)
 - TRL = tape and reel (left oriented)
- 9** - -M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-10ETF02S-M3	50	1000	Antistatic plastic tubes
VS-10ETF02STRR-M3	800	800	13" diameter reel
VS-10ETF02STRL-M3	800	800	13" diameter reel
VS-10ETF04S-M3	50	1000	Antistatic plastic tubes
VS-10ETF04STRR-M3	800	800	13" diameter reel
VS-10ETF04STRL-M3	800	800	13" diameter reel
VS-10ETF06S-M3	50	1000	Antistatic plastic tubes
VS-10ETF06STRR-M3	800	800	13" diameter reel
VS-10ETF06STRL-M3	800	800	13" diameter reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96164
Part marking information	www.vishay.com/doc?95444
Packaging information	www.vishay.com/doc?96424



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