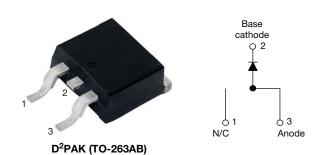


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High Performance Schottky Rectifier, 10 A



PRIMARY CHARACTERISTICS							
I _{F(AV)}	10 A						
V_{R}	35 V, 45 V						
V _F at I _F	0.49 V						
I _{RM} max.	15 mA at 125 °C						
T_J max.	175 °C						
E _{AS}	13 mJ						
Package	D ² PAK (TO-263AB)						
Circuit configuration	Single						

FEATURES

- 175 °C T_J operation
- Low forward voltage drop
- · High frequency operation



- High purity, high temperature epoxy FREE encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- 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 <u>www.vishay.com/doc?99912</u>

DESCRIPTION

The VS-10TQ...S-M3 Schottky rectifier series has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

MAJOR RATINGS AND CHARACTERISTICS									
SYMBOL	CHARACTERISTICS	VALUES	UNITS						
I _{F(AV)}	Rectangular waveform	10	Α						
V _{RRM}		35/45	V						
I _{FSM}	t _p = 5 μs sine	1050	Α						
V _F	10 A _{pk} , T _J = 125 °C	0.49	V						
TJ	Range	-55 to +175	°C						

VOLTAGE RATINGS								
PARAMETER	SYMBOL	VS-10TQ035S-M3	VS-10TQ045S-M3	UNITS				
Maximum DC reverse voltage	V_R	35	45	V				
Maximum working peak reverse voltage	V_{RWM}	33	45	V				

ABSOLUTE MAXIMUM RATINGS								
PARAMETER	SYMBOL	TEST CONDI	VALUES	UNITS				
Maximum average forward current See fig. 5	I _{F(AV)}	50 % duty cycle at T _C = 151 °C	10	А				
Maximum peak one cycle			1050					
non-repetitive surge current See fig. 7	I _{FSM}	10 ms sine or 6 ms rect. pulse	load condition and with rated V _{RRM} applied	280	А			
Non-repetitive avalanche energy	E _{AS}	T _J = 25 °C, I _{AS} = 2 A, L = 6.5 mH		13	mJ			
Repetitive avalanche current	I _{AR}	Current decaying linearly to zer Frequency limited by T _J maxim	2	А				



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ELECTRICAL SPECIFICATIONS							
PARAMETER	SYMBOL	TEST C	TEST CONDITIONS				
		10 A	T _{.1} = 25 °C	0.57			
Maximum forward voltage drop	V _{FM} ⁽¹⁾	20 A	1J = 25 C	0.67	V		
See fig. 1	V _{FM} (')	10 A	T _J = 125 °C	0.49			
		20 A	1J = 123 O	0.61			
Maximum reverse leakage current	I _{RM} ⁽¹⁾	T _J = 25 °C	V_{R} = Rated V_{R}	2	mA		
See fig. 2		T _J = 125 °C	v _R = nateu v _R	15	IIIA		
Maximum junction capacitance	C _T	V _R = 5 V _{DC} (test signal r	900	pF			
Typical series inductance	L _S	Measured lead to lead	8.0	nH			
Maximum voltage rate of change	dV/dt	Rated V _R	10 000	V/µs			

Note

 $^{^{(1)}\,}$ Pulse width < 300 µs, duty cycle < 2 %

PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Maximum junction and storage temperature range		T _J , T _{Stg}		-55 to 175	°C	
Maximum thermal resistance, junction to case		R _{thJC}	DC operation See fig. 4	2.0	°C/W	
Typical thermal resistance, case to heatsink		R _{thCS}	Mounting surface, smooth and greased	0.50		
Ai				2	g	
Approximate weight				0.07	OZ.	
minimum				6 (5)	kgf · cm	
Mounting torque	maximum			12 (10)	(lbf ⋅ in)	
Marking device			Case style D ² PAK (TO-263AB)	10TQ 10TQ		

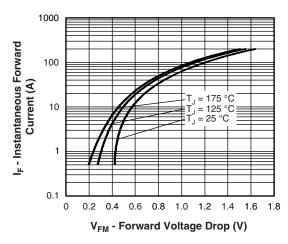


Fig. 1 - Maximum Forward Voltage Drop Characteristics

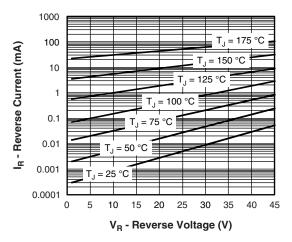


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

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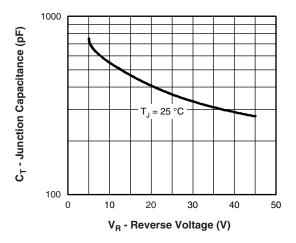


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

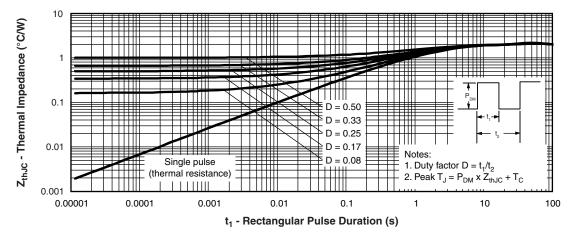


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

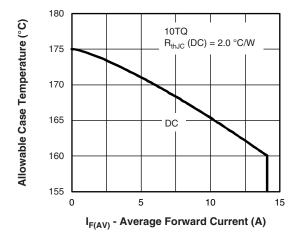


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

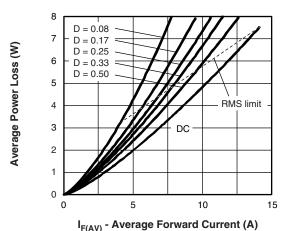
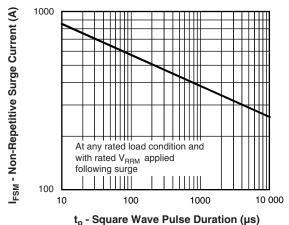


Fig. 6 - Forward Power Loss Characteristics

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tp equals trave t also baration (po)

Fig. 7 - Maximum Non-Repetitive Surge Current

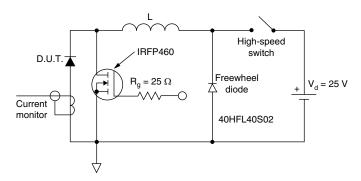
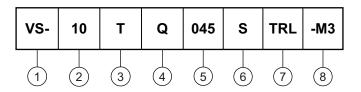


Fig. 8 - Unclamped Inductive Test Circuit

ORDERING INFORMATION TABLE





- 1 Vishay Semiconductors product
- 2 Current rating (10 A)
- Circuit configuration: T = TO-220
- Schottky "Q" series
- 5 Voltage ratings 035 = 35 V 045 = 45 V
- **6** $S = D^2PAK (TO-263AB)$
- 7 • None = tube
 - TRL = tape and reel (left oriented)
 - TRR = tape and reel (right oriented)
- M3 = halogen-free, RoHS-compliant and termination lead (Pb)-free



VS-10TQ035S-M3, VS-10TQ045S-M3

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ORDERING INFORMATION									
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION						
VS-10TQ035S-M3	50	1000	Antistatic plastic tubes						
VS-10TQ035STRR-M3	800	800	13" diameter reel						
VS-10TQ035STRL-M3	800	800	13" diameter reel						
VS-10TQ045S-M3	50	1000	Antistatic plastic tubes						
VS-10TQ045STRR-M3	800	800	13" diameter reel						
VS-10TQ045STRL-M3	800	800	13" diameter reel						

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



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D²PAK

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES	NOTES	SYMBOL	MILLIM	ETERS	INC	HES	NOTES
STIVIBUL	MIN.	MAX.	MIN.	MAX.	NOIES	NOTES	STWIDOL	MIN.	MAX.	MIN.	MAX.	NOTES
Α	4.06	4.83	0.160	0.190			D1	6.86	8.00	0.270	0.315	3
A1	0.00	0.254	0.000	0.010			Е	9.65	10.67	0.380	0.420	2, 3
b	0.51	0.99	0.020	0.039			E1	7.90	8.80	0.311	0.346	3
b1	0.51	0.89	0.020	0.035	4		е	2.54	BSC	0.100) BSC	
b2	1.14	1.78	0.045	0.070			Н	14.61	15.88	0.575	0.625	
b3	1.14	1.73	0.045	0.068	4		L	1.78	2.79	0.070	0.110	
С	0.38	0.74	0.015	0.029			L1	-	1.65	-	0.066	3
c1	0.38	0.58	0.015	0.023	4		L2	1.27	1.78	0.050	0.070	
c2	1.14	1.65	0.045	0.065			L3	0.25	BSC	0.010	BSC	
D	8.51	9.65	0.335	0.380	2		L4	4.78	5.28	0.188	0.208	

Notes

- (1) Dimensioning and tolerancing per ASME Y14.5 M-1994
- (2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Datum A and B to be determined at datum plane H
- (6) Controlling dimension: inch
- (7) Outline conforms to JEDEC® outline TO-263AB



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