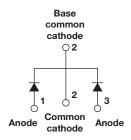


HEXFRED® Ultrafast Soft Recovery Diode, 2 x 8 A



D²PAK (TO-263AB)



PRIMARY CHARACTERISTICS								
I _{F(AV)}	2 x 8 A							
V_{R}	600 V							
V _F at I _F	1.4 V							
t _{rr} typ.	18 ns							
T _J max.	150 °C							
Package	D ² PAK (TO-263AB)							
Circuit configuration	Common cathode							

FEATURES

- Ultrafast and ultrasoft recovery
- Very low I_{RRM} and Q_{rr}
- · Specified at operating conditions
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C





RoHS

HALOGEN FREE

please see www.visitay.com/doc:

BENEFITS

- · Reduced RFI and EMI
- · Reduced power loss in diode and switching transistor
- Higher frequency operation
- Reduced snubbing
- · Reduced parts count

DESCRIPTION

VS-HFA16TA60CS is a state of the art center tap ultrafast recovery diode. Employing the latest in epitaxial construction and advanced processing techniques it features a superb combination of characteristics which result in performance which is unsurpassed by any rectifier previously available. With basic ratings of 600 V and 8 A per leg continuous current, the VS-HFA16TA60CS is especially well suited for use as the companion diode for IGBTs and MOSFETs. In addition to ultrafast recovery time, the HEXFRED® product line features extremely low values of peak recovery current (I_{RRM}) and does not exhibit any tendency to "snap-off" during the tb portion of recovery. The HEXFRED features combine to offer designers a rectifier with lower noise and significantly lower switching losses in both the diode and the switching transistor. These HEXFRED advantages can help to significantly reduce snubbing, component count and heatsink sizes. The HEXFRED VS-HFA16TA60CS is ideally suited for applications in power supplies and power conversion systems (such as inverters), motor drives, and many other similar applications where high speed, high efficiency is needed.

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Cathode to anode voltage	V_R		600	V	
Maximum continuous forward current per leg	ı	T _C = 100 °C	8		
per device	l _F	1 _C = 100 C	16	^	
Single pulse forward current	I _{FSM}		60	Α	
Maximum repetitive forward current	I _{FRM}		24		
Maximum navar dissination	В	T _C = 25 °C	36	W	
Maximum power dissipation	P_{D}	T _C = 100 °C	14] vv	
Operating junction and storage temperature range	T _J , T _{Stg}		-55 to +150	°C	



ELECTRICAL SPECIFICATIONS PER LEG (T _J = 25 °C unless otherwise specified)									
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS			
Cathode to anode breakdown voltage	V _{BR}	I _R = 100 μA	600	-	-				
Maximum forward voltage		I _F = 8.0 A		ı	1.4	1.7	V		
	V_{FM}	I _F = 16 A	See fig. 1	-	1.7	2.1			
		I _F = 8.0 A, T _J = 125 °C		-	1.4	1.7			
Maximum rayeraa laakaga aurrant	I _{RM}	V _R = V _R rated	See fig. 2	-	0.3	5.0			
Maximum reverse leakage current		$T_J = 125$ °C, $V_R = 0.8 \times V_R$ rated	See lig. 2	-	100	500	μA		
Junction capacitance	C _T	V _R = 200 V See fig. 3		-	10	25	pF		
Series inductance	L _S	Measured lead to lead 5 mm from package body		-	8.0	-	nH		

DYNAMIC RECOVERY CHARACTERISTICS PER LEG (T _J = 25 °C unless otherwise specified)									
PARAMETER	SYMBOL	TEST CO	NDITIONS	MIN.	TYP.	MAX.	UNITS		
	t _{rr}	$I_F = 1.0 \text{ A}, dI_F/dt = 200$	A/ μ s, $V_R = 30 \text{ V}$	-	18	-			
Reverse recovery time See fig. 5, 6 and 16	t _{rr1}	T _J = 25 °C		-	37	55	ns		
occ ng. 5, 6 and 16	t _{rr2}	T _J = 125 °C		-	55	90			
Peak recovery current	I _{RRM1}	T _J = 25 °C		-	3.5	5.0	A		
See fig. 7 and 8	I _{RRM2}	T _J = 125 °C	I _F = 8.0 A dI _F /dt = 200 A/µs	-	4.5	8.0			
Reverse recovery charge	Q _{rr1}	T _J = 25 °C	$V_{\rm R} = 200 \text{ V}$	-	65	138	nC		
See fig. 9 and 10	Q _{rr2}	T _J = 125 °C		=	124	360	iiC		
Peak rate of fall of recovery current during t _b , see fig. 11 & 12	dI _{(rec)M} /dt1	T _J = 25 °C		-	240	-	- A/μs		
	dI _{(rec)M} /dt2	T _J = 125 °C		-	210	-			

THERMAL - MECHANICAL SPECIFICATIONS									
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS			
Lead temperature	T _{lead}	0.063" from case (1.6 mm) for 10 s	-	-	300	°C			
Junction to case, single leg conducting	Б		-	-	3.5				
Junction to case, both legs conducting	- R _{thJC}		-	-	1.75	K/W			
Thermal resistance, junction to ambient	R _{thJA}	Typical socket mount	-	-	80				
Weight			-	2	-	g			
Weight			-	0.07	-	oz.			
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)			
Marking device		Case style D ² PAK (TO-263AB)	HFA16TA60CS						

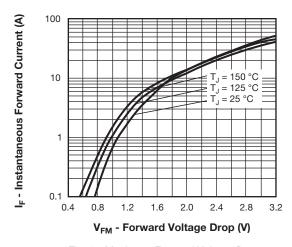


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current (Per Leg)

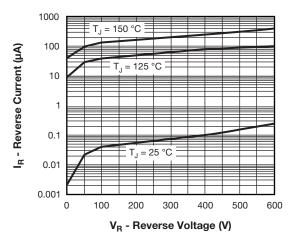


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Leg)

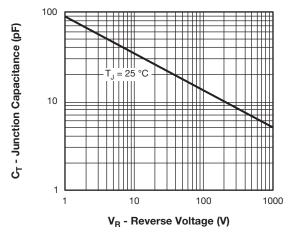


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

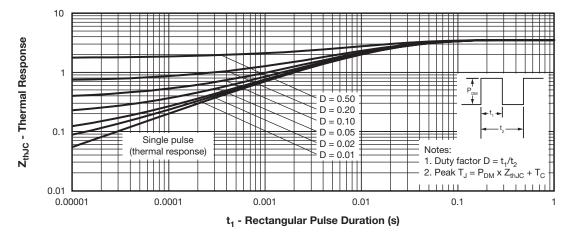


Fig. 4 - Maximum Thermal Impedance ZthJC Characteristics (Per Leg)

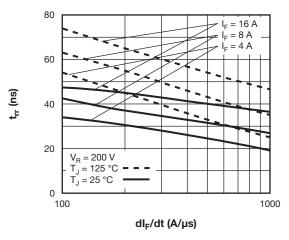


Fig. 5 - Typical Reverse Recovery Time vs. dl_E/dt (Per Leg)

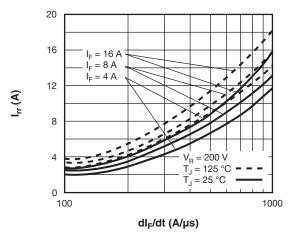


Fig. 6 - Typical Recovery Current vs. dl_F/dt (Per Leg)

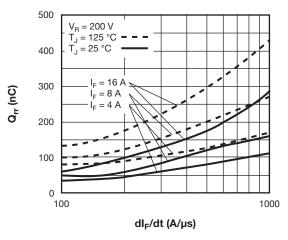


Fig. 7 - Typical Stored Charge vs. dl_E/dt (Per Leg)

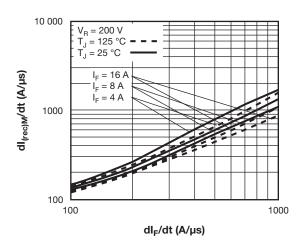
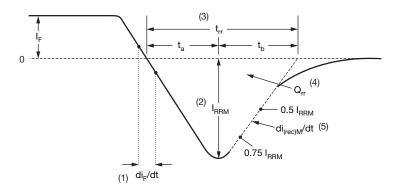


Fig. 8 - Typical dl_{(rec)M}/dt vs. dl_F/dt (Per Leg)



- (1) di_F/dt rate of change of current through zero crossing
- (2) I_{RRM} peak reverse recovery current
- (3) t_{rr} reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through 0.75 I_{RRM} and 0.50 I_{RRM} extrapolated to zero current.
- (4) $\mathbf{Q}_{\rm rr}$ area under curve defined by $\mathbf{t}_{\rm rr}$ and $\mathbf{I}_{\rm RRM}$

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

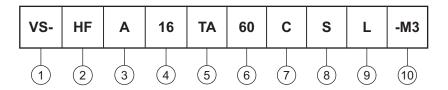
(5) $di_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - HEXFRED® family

Process designator: A = electron irradiated

4 - Current rating (16 = 16 A)

5 - Package outline (TA = TO-220, 3 leads)

6 - Voltage rating (60 = 600 V)

7 - Circuit configuration (C = common cathode)

8 - $S = D^2PAK (TO-263AB)$

9 - None = tube (50 pieces)

• L = tape and reel (left oriented)

• R = tape and reel (right oriented)

10 - Environmental digit:

-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-HFA16TA60CS-M3	50	1000	Antistatic plastic tube						
VS-HFA16TA60CSR-M3	800	800	13" diameter reel						
VS-HFA16TA60CSL-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						
SPICE model	www.vishay.com/doc?96596						



D²PAK

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES	NOTES	SYMBOL	MILLIM	ETERS	INC	HES	NOTES
STIVIBUL	MIN.	MAX.	MIN.	MAX.	NOIES	NOTES	STINIBUL	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			E	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		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: inches
- (7) Outline conforms to JEDEC® outline TO-263AB

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