

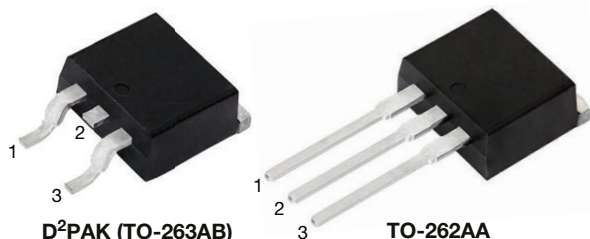
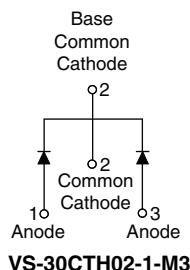
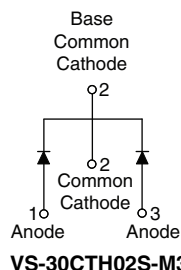


THE DATASHEET OF VS-30CTH02S-M3

Hyperfast Rectifier, 30 A FRED Pt®



RoHS
COMPLIANT
HALOGEN
FREE


D²PAK (TO-263AB)
TO-262AA


FEATURES

- Hyperfast recovery time
- Low forward voltage drop
- Low leakage current
- 175 °C operating junction temperature
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

DESCRIPTION / APPLICATIONS

Vishay Semiconductors 200 V series are the state of the art hyperfast recovery rectifiers designed with optimized performance of forward voltage drop and hyperfast recovery time.

The planar structure and the platinum doped life time control, guarantee the best overall performance, ruggedness and reliability characteristics. These devices are intended for use in the output rectification stage of SMPS, UPS, DC/DC converters as well as freewheeling diode in low voltage inverters and chopper motor drives.

Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

PRIMARY CHARACTERISTICS

$I_{F(AV)}$	2 x 15 A
V_R	200 V
V_F at I_F	0.78 V
t_{rr} typ.	30 ns
T_J max.	175 °C
Package	D ² PAK (TO-263AB), TO-262AA
Circuit configuration	Common cathode

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Peak repetitive reverse voltage	V_{RRM}		200	V
Average rectified forward current	$I_{F(AV)}$	$T_C = 159\text{ °C}$	15	A
			30	
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	$I_R = 100\text{ }\mu\text{A}$	200	-	-	V
Forward voltage	V_F	$I_F = 15\text{ A}$	-	0.92	1.05	V
		$I_F = 15\text{ A}, T_J = 125\text{ °C}$	-	0.78	0.85	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	-	10	μA
		$T_J = 125\text{ °C}, V_R = V_R$ rated	-	5	300	
Junction capacitance	C_T	$V_R = 200\text{ V}$	-	57	-	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	8	-	nH



DYNAMIC RECOVERY CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t_{rr}	$I_F = 1\text{ A}$, $dI_F/dt = 50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	-	35	ns
		$I_F = 1\text{ A}$, $dI_F/dt = 100\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	-	30	
		$T_J = 25^\circ\text{C}$	-	26	-	
		$T_J = 125^\circ\text{C}$	-	40	-	
Peak recovery current	I_{RRM}	$T_J = 25^\circ\text{C}$	-	2.8	-	A
		$T_J = 125^\circ\text{C}$	-	6.0	-	
Reverse recovery charge	Q_{rr}	$T_J = 25^\circ\text{C}$	-	37	-	nC
		$T_J = 125^\circ\text{C}$	-	120	-	

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}	-65	-	175	$^\circ\text{C}$
Thermal resistance, junction to case per diode	R_{thJC}	-	-	1.1	$^\circ\text{C}/\text{W}$
Weight		-	2.0	-	g
		-	0.07	-	oz.
Mounting torque		6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style D ² PAK (TO-263AB)		30CTH02S	
		Case style TO-262		30CTH02-1	

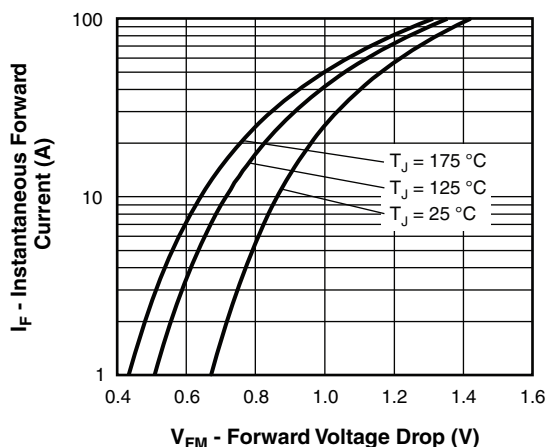


Fig. 1 - Maximum Forward Voltage Drop Characteristics

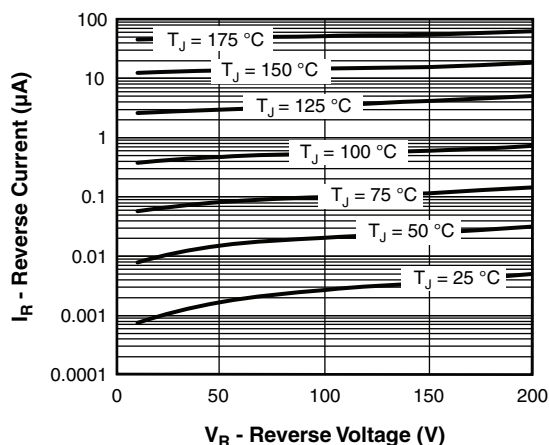


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

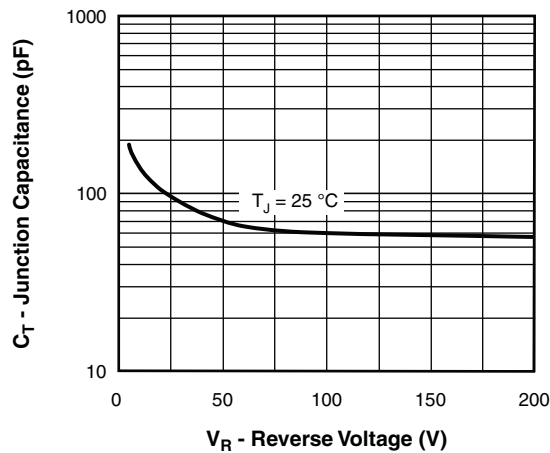


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

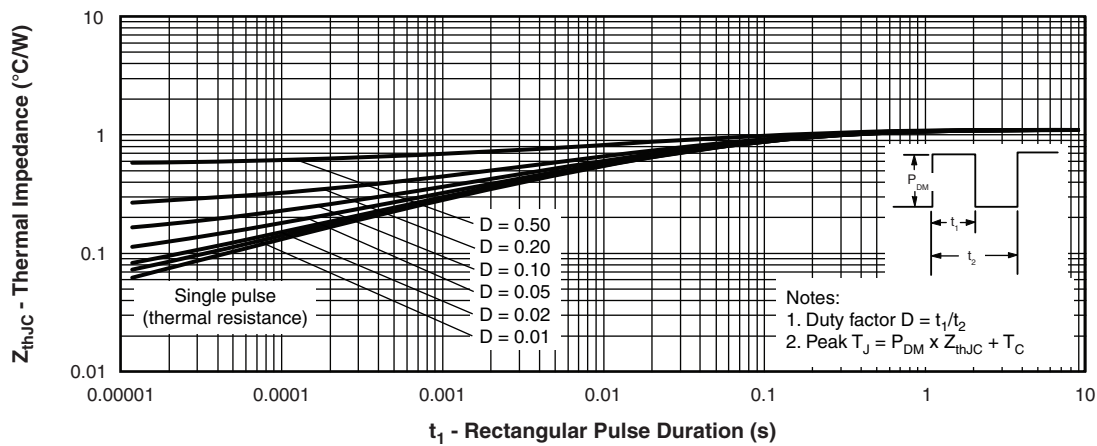
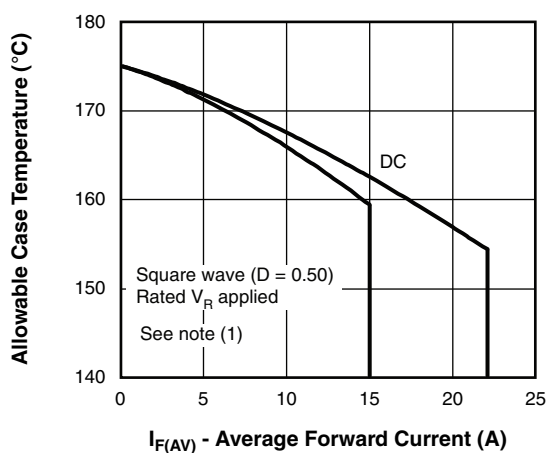

Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics


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

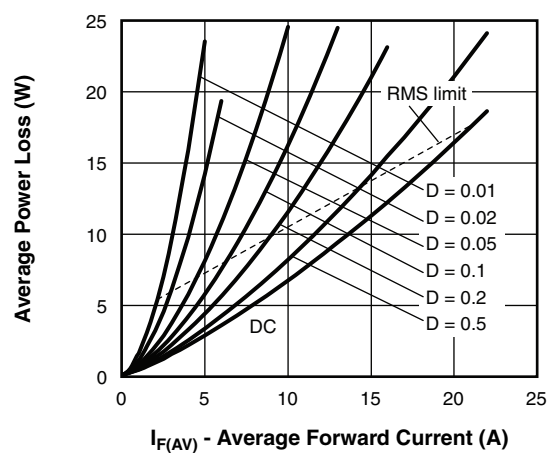
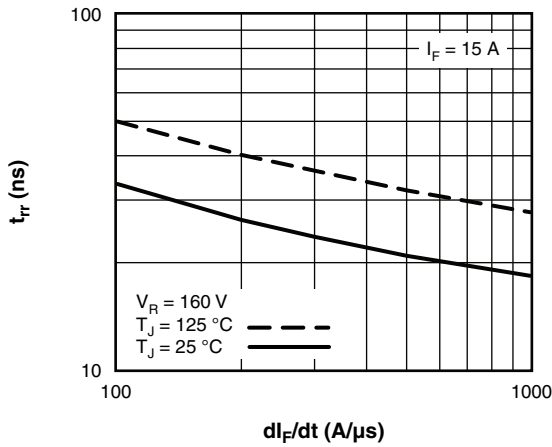
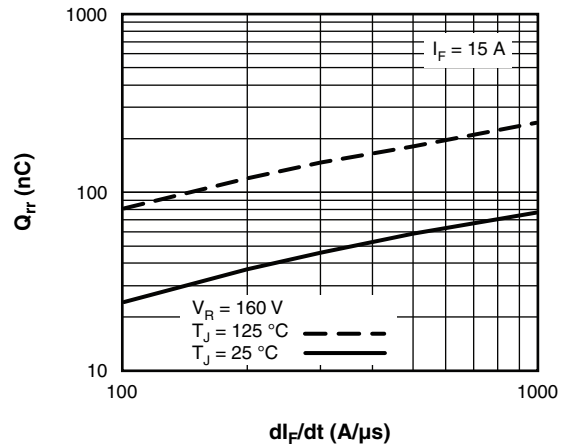


Fig. 6 - Forward Power Loss Characteristics


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

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

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 P_d = forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 P_{dREV} = inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = rated V_R

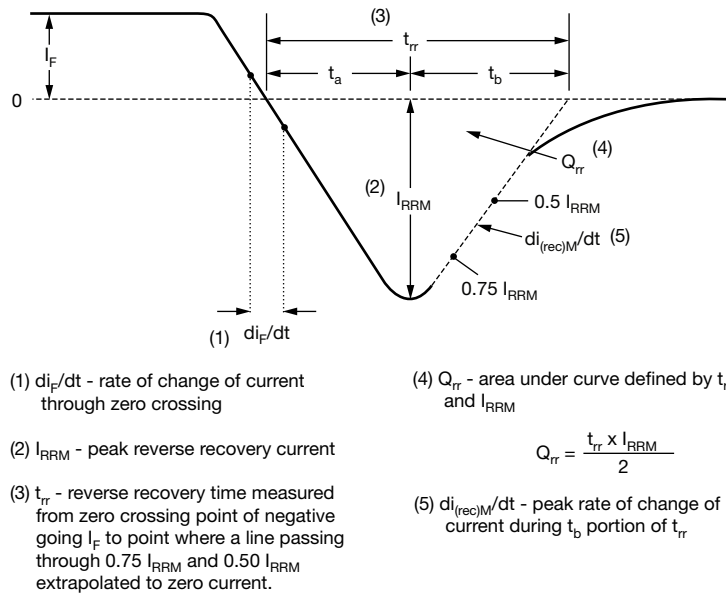


Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code	VS-	30	C	T	H	02	S	TRL	-M3
	1	2	3	4	5	6	7	8	9

- | | | |
|----------|---|--|
| 1 | - | Vishay Semiconductors product |
| 2 | - | Current rating (30 A) |
| 3 | - | C = common cathode |
| 4 | - | T = TO-220, D ² PAK (TO-263AB) |
| 5 | - | H = hyperfast rectifier |
| 6 | - | Voltage rating (02 = 200 V) |
| 7 | - | • S = D ² PAK (TO-263AB)
• -1 = TO-262AA |
| 8 | - | • None = tube (50 pieces)
• TRL = tape and reel (left oriented, for D ² PAK (TO-263AB) package)
• TRR = tape and reel (right oriented, for D ² PAK (TO-263AB) package) |
| 9 | - | Environmental digit:
-M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free |

ORDERING INFORMATION (Example)

PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION
VS-30CTH02S-M3	50	Antistatic plastic tubes
VS-30CTH02STRL-M3	800	13" diameter plastic tape and reel
VS-30CTH02STRR-M3	800	13" diameter plastic tape and reel
VS-30CTH02-1-M3	50	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS

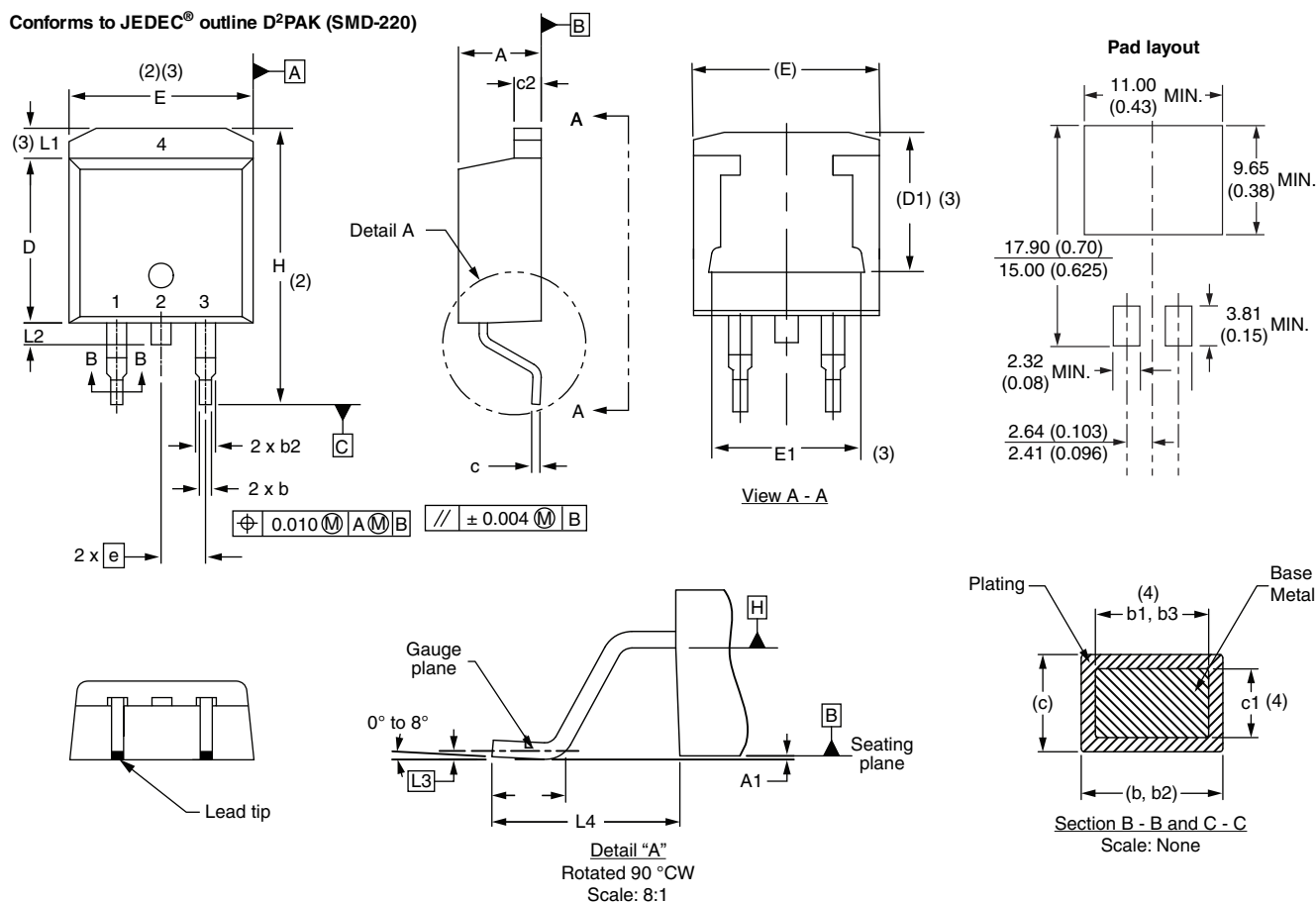
Dimensions	D ² PAK (TO-263AB)	www.vishay.com/doc?96164
	TO-262AA	www.vishay.com/doc?96165
Part marking information	D ² PAK (TO-263AB)	www.vishay.com/doc?95444
	TO-262AA	www.vishay.com/doc?95443
Packaging information		www.vishay.com/doc?96424



D²PAK

DIMENSIONS in millimeters and inches

Conforms to JEDEC® outline D²PAK (SMD-220)



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	0.00	0.254	0.000	0.010	
b	0.51	0.99	0.020	0.039	
b1	0.51	0.89	0.020	0.035	4
b2	1.14	1.78	0.045	0.070	
b3	1.14	1.73	0.045	0.068	4
c	0.38	0.74	0.015	0.029	
c1	0.38	0.58	0.015	0.023	4
c2	1.14	1.65	0.045	0.065	
D	8.51	9.65	0.335	0.380	2

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D1	6.86	8.00	0.270	0.315	3
E	9.65	10.67	0.380	0.420	2, 3
E1	7.90	8.80	0.311	0.346	3
e	2.54 BSC		0.100 BSC		
H	14.61	15.88	0.575	0.625	
L	1.78	2.79	0.070	0.110	
L1	-	1.65	-	0.066	3
L2	1.27	1.78	0.050	0.070	
L3	0.25 BSC		0.010 BSC		
L4	4.78	5.28	0.188	0.208	

Notes

- Dimensioning and tolerancing per ASME Y14.5 M-1994
- 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
- Thermal pad contour optional within dimension E, L1, D1 and E1
- Dimension b1 and c1 apply to base metal only
- Datum A and B to be determined at datum plane H
- Controlling dimension: inches
- Outline conforms to JEDEC® outline TO-263AB



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