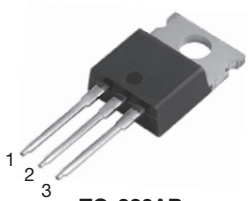
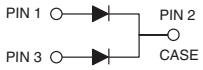
Dual High Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low V_F = 0.44 V at I_F = 5.0 A



TO-220AB



FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Solder bath temperature 275 °C maximum, 10 s per JESD 22-B106
- AEC-Q101 qualified available:
  - Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE Available

RoHS COMPLIANT

HALOGEN FREE

PRIMARY CHARACTERISTICS

$I_{F(AV)}$	2 x 20 A
V_{RRM}	120 V
I_{FSM}	250 A
V_F at I_F = 20 A (T_J = 125 °C)	0.63 V
T_J max.	175 °C
Package	TO-220AB
Circuit configuration	Common cathode

TYPICAL APPLICATIONS

For use in high frequency DC/DC converters, switching power supplies, freewheeling diodes, OR-ing diode, and reverse battery protection in commercial, industrial, and automotive application.

MECHANICAL DATA

Case: TO-220AB
Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant
Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
M3 suffix meets JESD 201 class 1A whisker test, HM3 suffix meets JESD 201 class 2 whisker test

Mounting torque: 10 in-lbs maximum

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)

PARAMETER		SYMBOL	VX40M120C	UNIT
Maximum repetitive peak reverse voltage		V_{RRM}	120	V
Maximum average forward rectified current (fig. 1)	per device	$I_{F(AV)}$	40	A
	per diode		20	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load		I_{FSM}	250	A
Operating junction temperature range		T_J (1)	-40 to +175	°C
Storage temperature range		T_{STG}	-40 to +175	

Note

(1) The heat generated must be less than the thermal conductivity from junction-to-ambient: $dP_D/dT_J < 1/R_{\theta JA}$

ELECTRICAL CHARACTERISTICS (T_J = 25 °C unless otherwise noted)						
PARAMETER	**TEST CONDITIONS**		**SYMBOL**	**TYP.**	**MAX.**	**UNIT**
Instantaneous forward voltage per diode	I_F = 5 A	T_J = 25 °C	V_F (1)	0.52	-	V
	I_F = 10 A			0.62	-	
	I_F = 20 A			0.78	0.84	
	I_F = 5 A	T_J = 125 °C		0.44	-	
	I_F = 10 A			0.53	-	
	I_F = 20 A			0.63	0.69	
Reverse current at rated V_R per diode	V_R = 90 V	T_J = 25 °C	I_R (2)	0.004	-	mA
		T_J = 125 °C		3.4	-	
	V_R = 120 V	T_J = 25 °C		-	0.55	
		T_J = 125 °C		6.5	20	
Typical junction capacitance	4.0 V, 1 MHz		C_J	2000	-	pF

Notes

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: Pulse width ≤ 5 ms

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)			
PARAMETER	**SYMBOL**	**VX40M120C**	**UNIT**
Typical thermal resistance per device	$R_{\theta JC}$ (1)	1	°C/W

Note

(1) Thermal resistance junction-to-case to follow JEDEC® 51-14 transient dual interface test method (TDIM)

ORDERING INFORMATION (Example)				
PREFERRED P/N	**UNIT WEIGHT (g)**	**PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
VX40M120C-M3/P	2.03	P	50/tube	Tube
VX40M120CHM3/P (1)	2.03	P	50/tube	Tube

Note

(1) AEC-Q101 qualified

RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

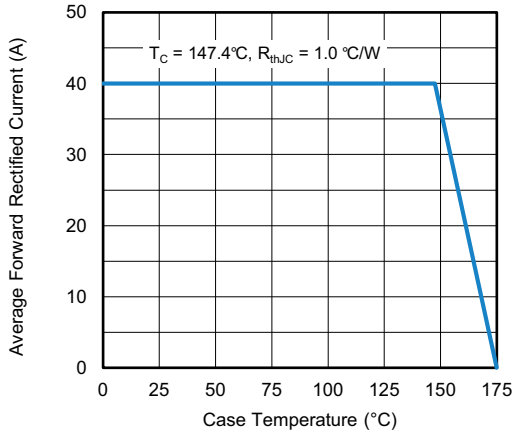


Fig. 1 - Maximum Forward Current Derating Curve

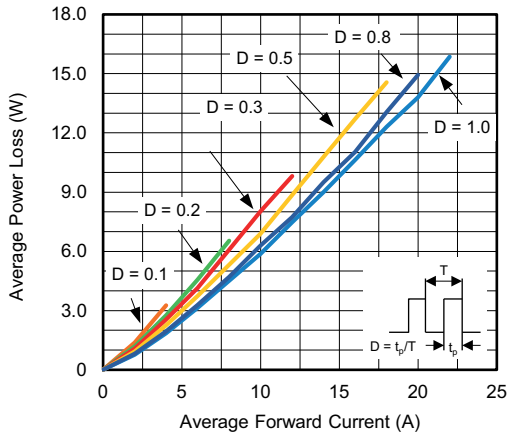


Fig. 2 - Average Power Loss Characteristics

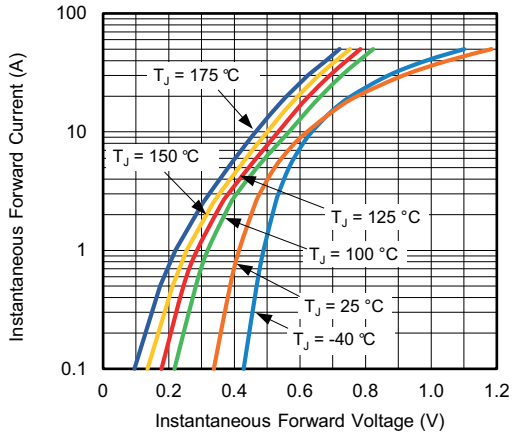


Fig. 3 - Typical Instantaneous Forward Characteristics

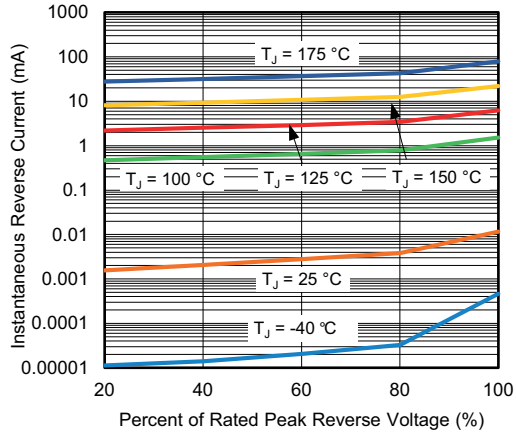


Fig. 4 - Typical Reverse Leakage Characteristics

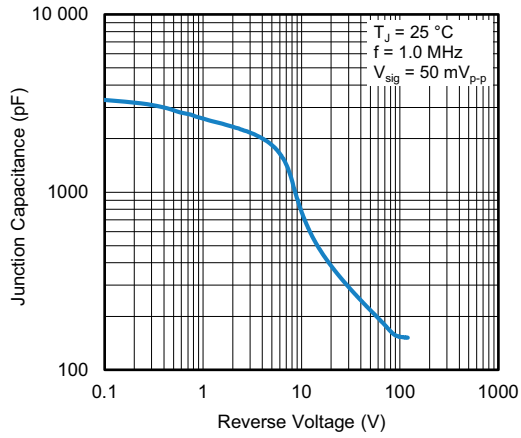


Fig. 5 - Typical Junction Capacitance

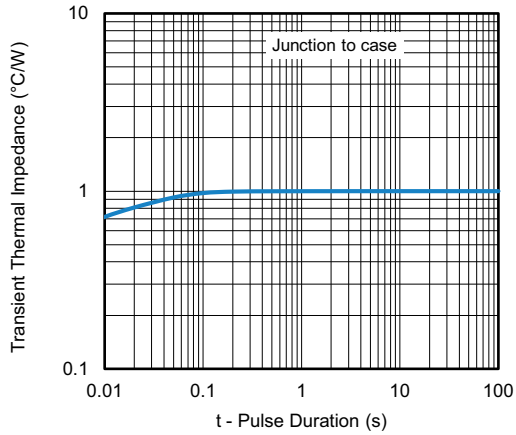
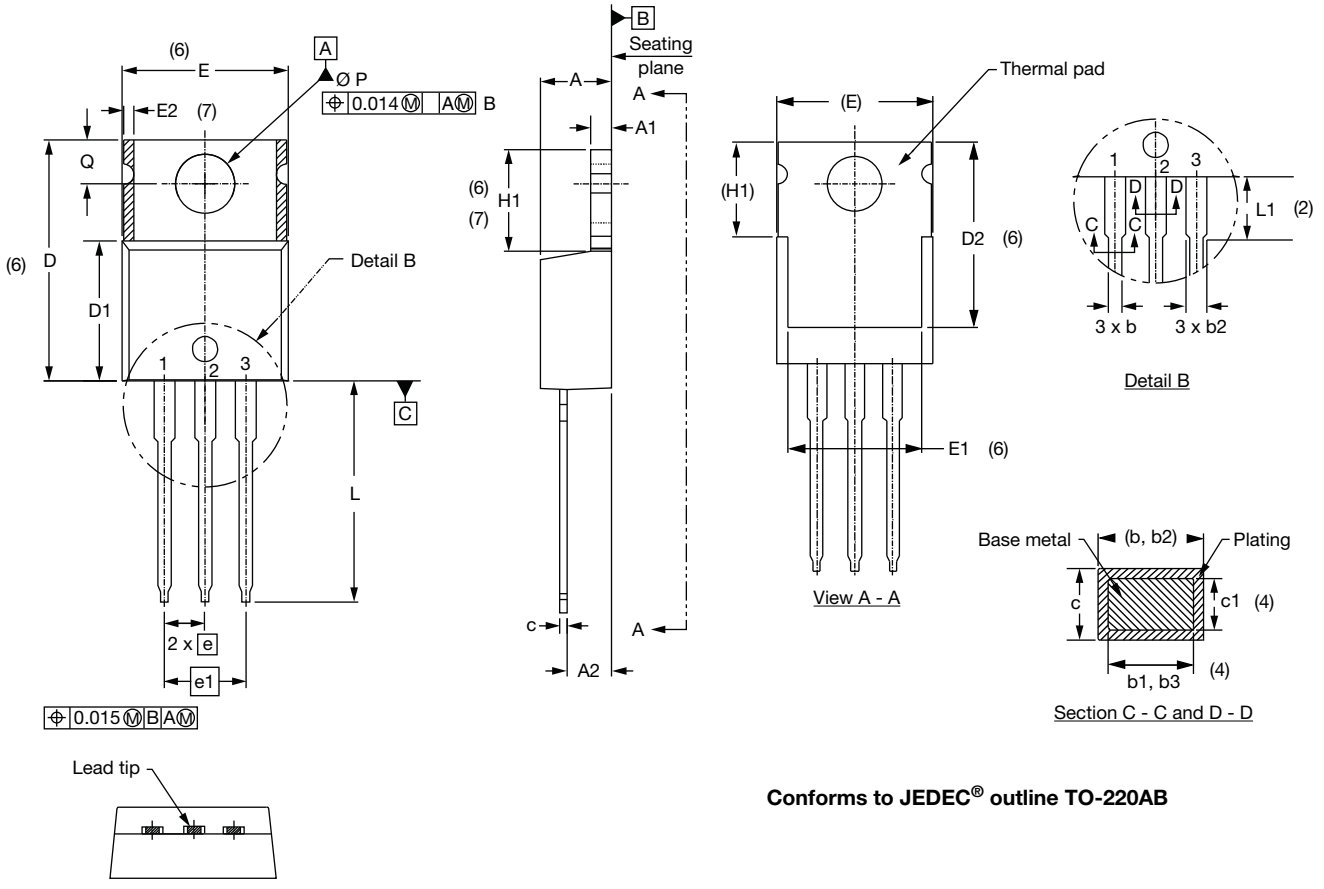


Fig. 6 - Typical Transient Thermal Impedance

DIMENSIONS in millimeters (inches) **TO-220AB**



Conforms to JEDEC® outline TO-220AB

SYMBOL	MILLIMETERS		INCHES		NOTES	SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.			MIN.	MAX.	MIN.	MAX.	
A	4.25	4.65	0.167	0.183		D2	11.68	12.88	0.460	0.507	6
A1	1.14	1.40	0.045	0.055		E	10.11	10.51	0.398	0.414	3, 6
A2	2.56	2.92	0.101	0.115		E1	6.86	8.89	0.270	0.350	6
b	0.69	1.01	0.027	0.040		E2	-	0.76	-	0.030	7
b1	0.38	0.97	0.015	0.038	4	e	2.41	2.67	0.095	0.105	
b2	1.20	1.73	0.047	0.068		e1	4.88	5.28	0.192	0.208	
b3	1.14	1.73	0.045	0.068	4	H1	5.84	6.86	0.230	0.270	6, 7
c	0.36	0.61	0.014	0.024		L	13.52	14.02	0.532	0.552	
c1	0.36	0.56	0.014	0.022	4	L1	3.32	3.82	0.131	0.150	2
D	14.85	15.25	0.585	0.600	3	Ø P	3.54	3.73	0.139	0.147	
D1	8.38	9.02	0.330	0.355		Q	2.60	3.00	0.102	0.118	

Notes

(1) Dimensioning and tolerancing as per ASME Y14.5M-1994
(2) Lead dimension and finish uncontrolled in L1
(3) Dimension D, D1 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 outermost extremes of the plastic body
(4) Dimension b1, b3 and c1 apply to base metal only
(5) Controlling dimensions: inches
(6) Thermal pad contour optional within dimensions E, H1, D2 and E1
(7) Dimensions E2 x H1 define a zone where stamping and singulation irregularities are allowed
(8) Outline conforms to JEDEC® TO-220, except A2 (maximum) and D2 (minimum) where dimensions are derived from the actual package outline

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