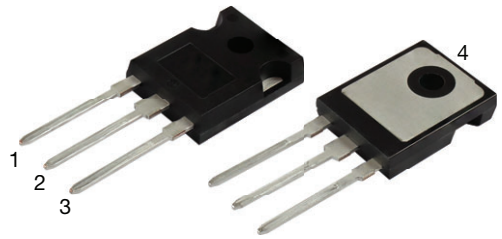
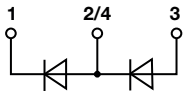
Phase Leg High Voltage Standard Rectifier



TO-247AD 3L



FEATURES

- Oxide planar chip junction
- Low forward conduction
- High surge current capability
- High avalanche capability
- High junction temperature capability
- 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

TYPICAL APPLICATIONS

OBC for EV/HEV, single or three phase bridge rectification, industrial inverter power

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 45 A
V_{RRM}	1200 V
I_{FSM}	480 A
V_F at I_F = 45 A (T_J = 125 °C)	1.14
E_{AS}	20 mJ
T_J max.	175 °C
Package	TO-247AD 3L
Circuit configuration	Phase leg

MECHANICAL DATA

Case: TO-247AD 3L

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

Polarity: as marked

Mounting torque: 10 in-lbs maximum

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

PARAMETER	SYMBOL	SEP4512	UNIT
Maximum repetitive peak reverse voltage	V_{RRM}	1200	V
Maximum average forward rectified current, per device	$I_{F(AV)}$ (1)	45	A
Peak forward surge current 10 ms single half sine-wave	I_{FSM}	480	A
Typical Non-repetitive Avalanche energy at I_{AS} = 1 A, T_J = 25 °C	E_{AS}	20	mJ
Operating junction and storage temperature range	T_J, T_{STG} (2)	-55 to +175	°C

Notes

(1) With heatsink

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

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ELECTRICAL CHARACTERISTICS (T_J = 25 °C unless otherwise noted)						
PARAMETER	**TEST CONDITIONS**		**SYMBOL**	**TYP.**	**MAX.**	**UNIT**
Instantaneous forward voltage per diode	I_F = 22.5 A	T_J = 25 °C	V_F (1)	1.05	-	V
	I_F = 45 A			1.19	1.26	
	I_F = 22.5 A	T_J = 125 °C		0.95	-	
	I_F = 45 A			1.14	-	
		T_J = 150 °C		-	1.23	
Reverse current at rated V_R per diode	V_R = rated V_R	T_J = 25 °C	I_R (2)	-	10	µA
		T_J = 125 °C		40	-	
		T_J = 150 °C		-	1	mA
Typical junction capacitance	400 V, 1 MHz		C_J	27	-	pF

Notes

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

(2) Pulse test: Pulse width ≤ 40 ms

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)			
PARAMETER	**SYMBOL**	**SEP4512**	**UNIT**
Typical thermal resistance per device	$R_{\theta JA}$ (1)(2)	32	°C/W
Typical thermal resistance per device	$R_{\theta JM}$ (3)	0.5	°C/W

Notes

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

(2) Thermal resistance junction to ambient to follow JEDEC® 51-2A, device mounted on FR4 PCB, 2 oz., standard footprint

(3) Thermal resistance junction-to-mount 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**
SEP4512-M3/P	5.78	P	25/tube	Tube
SEP4512HM3/P (1)	5.78	P	25/tube	Tube

Note

(1) AEC-Q101 qualified

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

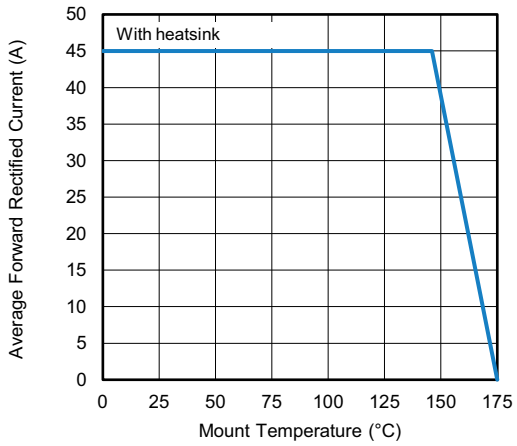

Fig. 1 - Maximum Forward Current Derating Curve

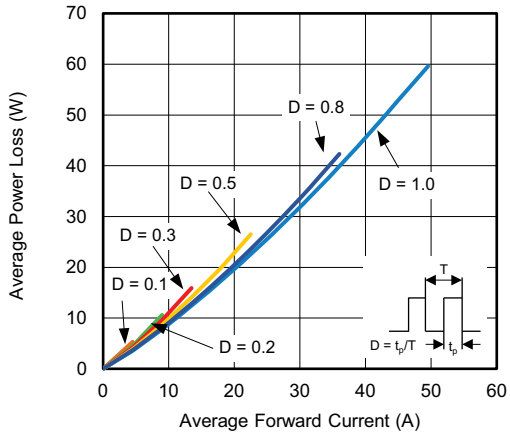

Fig. 2 - Average Power Loss Characteristics

Fig. 3 - Typical Instantaneous Forward Characteristics

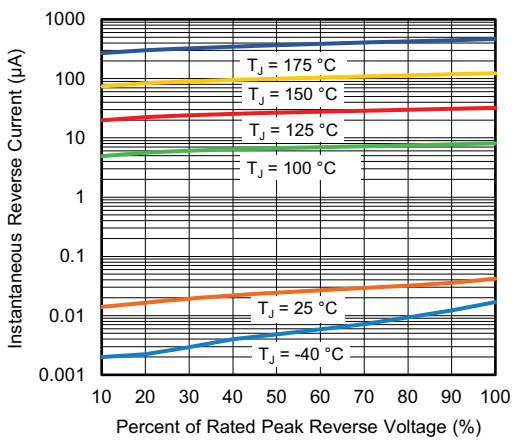

Fig. 4 - Typical Reverse Characteristics

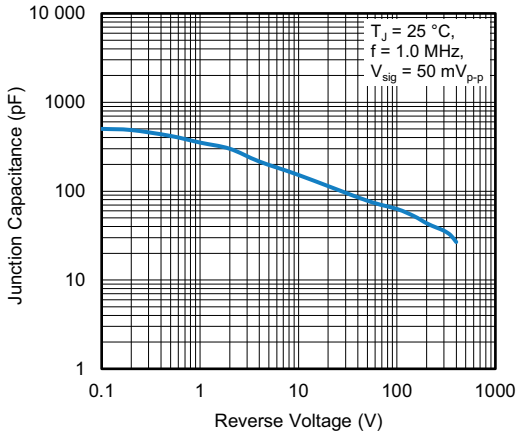

Fig. 5 - Typical Junction Capacitance

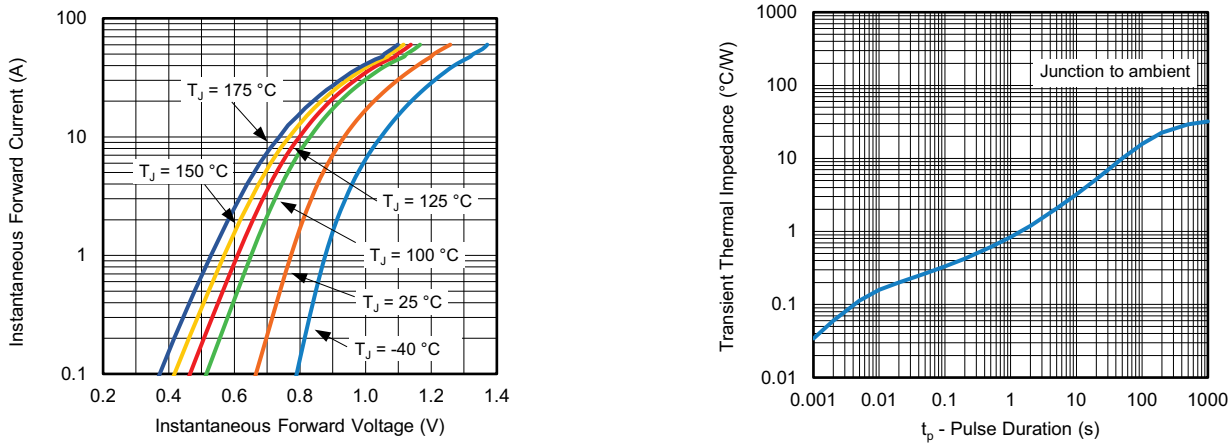

Fig. 6 - Typical Transient Thermal Impedance

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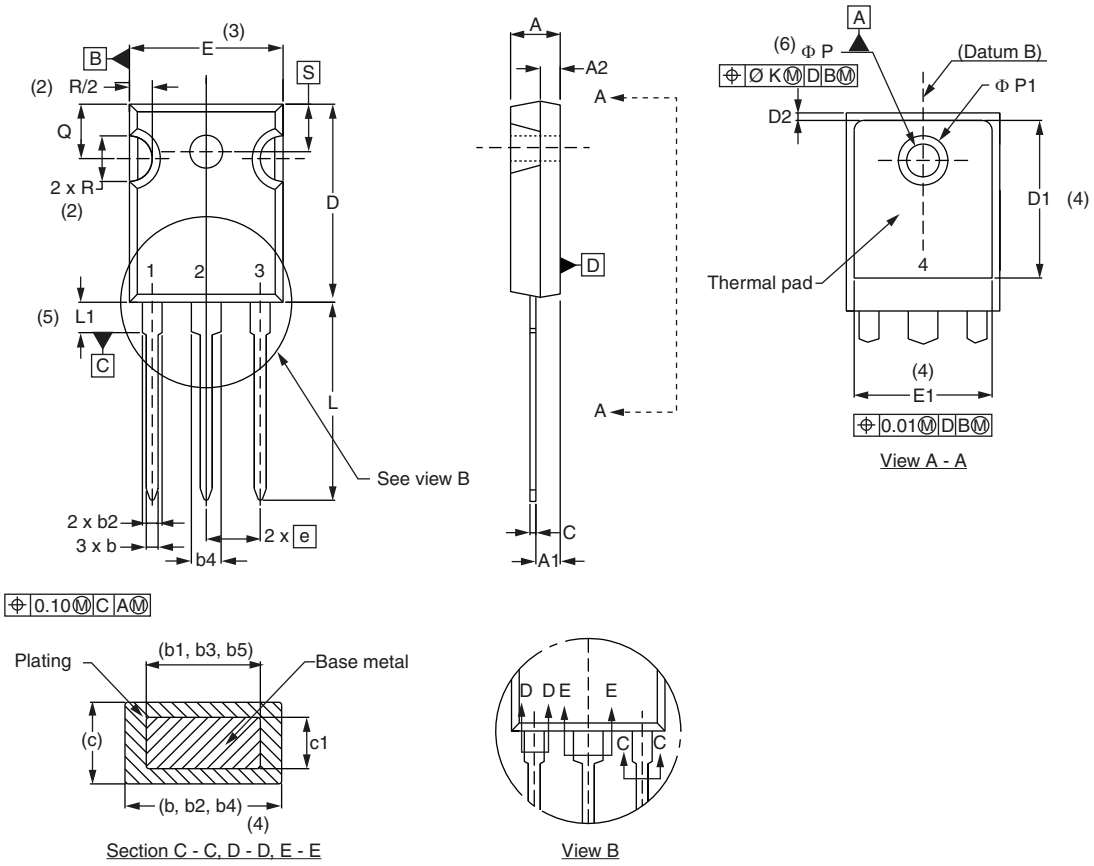
PACKAGE OUTLINE DIMENSIONS in millimeters (inches) TO-247AD 3L



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.65	5.31	0.183	0.209	
A1	2.21	2.59	0.087	0.102	
A2	1.50	2.49	0.059	0.098	
b	0.99	1.40	0.039	0.055	
b1	0.99	1.35	0.039	0.053	
b2	1.65	2.39	0.065	0.094	
b3	1.65	2.34	0.065	0.092	
b4	2.59	3.43	0.102	0.135	
b5	2.59	3.38	0.102	0.133	
c	0.38	0.89	0.015	0.035	
c1	0.38	0.84	0.015	0.033	
D	19.71	20.70	0.776	0.815	3
D1	13.08	-	0.515	-	4

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D2	0.51	1.30	0.020	0.051	
E	15.29	15.87	0.602	0.625	3
E1	13.46	-	0.53	-	
e	5.46 BSC		0.215 BSC		
¬ K	0.254		0.010		
L	19.81	20.32	0.780	0.800	
L1	3.71	4.29	0.146	0.169	
¬ P	3.56	3.66	0.14	0.144	
¬ P1	-	6.98	-	0.275	
Q	5.31	5.69	0.209	0.224	
R	4.52	5.49	0.178	0.216	
S	5.51 BSC		0.217 BSC		

Notes

(1) Dimensioning and tolerancing per ASME Y14.5M-1994
(2) Contour of slot optional
(3) Dimension D and E do not include mold flash. These dimensions are measured at the outermost extremes of the plastic body
(4) Thermal pad contour optional with dimensions D1 and E1
(5) Lead finish uncontrolled in L1
(6) Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
(7) Outline conforms to JEDEC® outline TO-247 with exception of dimension A min., D, E min., Q min., S, and note 4

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