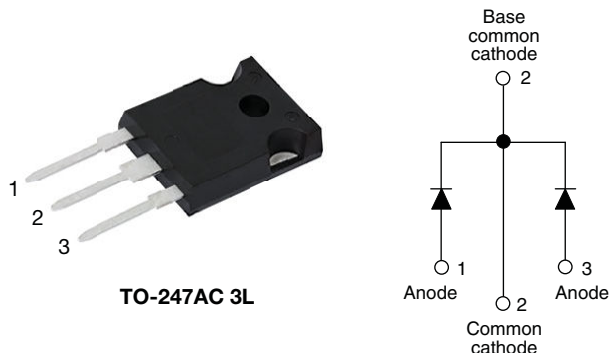


High Performance Schottky Rectifier, 2 x 20 A



FEATURES

- 150 °C T_J operation
- Very low forward voltage drop
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

PRIMARY CHARACTERISTICS

$I_{F(AV)}$	2 x 20 A
V_R	50 V to 60 V
V_F at I_F	0.49 V
I_{RM} max.	96 mA at 125 °C
T_J max.	150 °C
E_{AS}	18 mJ
Package	TO-247AC 3L
Circuit configuration	Common cathode

DESCRIPTION

The VS-40CPQ... center tap Schottky rectifier has been optimized for very low forward voltage drop with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150 °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	40	A
V_{RRM}		50/60	V
I_{FSM}	$t_p = 5 \mu s$ sine	3200	A
V_F	20 A _{pk} , $T_J = 125$ °C (per leg)	0.49	V
T_J		-55 to +150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-40CPQ050-N3	VS-40CPQ060-N3	UNITS
Maximum DC reverse voltage	V_R	50	60	V
Maximum working peak reverse voltage	V_{RWM}			

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 120$ °C, rectangular waveform	40	A
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	I_{FSM}	5 μs sine or 3 μs rect. pulse 10 ms sine or 6 ms rect. pulse	3200 320	A
Non-repetitive avalanche energy per leg	E_{AS}	$T_J = 25$ °C, $I_{AS} = 2$ A, $L = 9.0$ mH	18	mJ
Repetitive avalanche current per leg	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical	2	A

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	20 A	$T_J = 25\text{ }^{\circ}\text{C}$	0.53	V	
		40 A		0.68		
		20 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.49		0.64
		40 A				
Maximum reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_R$	1.7	mA	
		$T_J = 125\text{ }^{\circ}\text{C}$		96		
Maximum junction capacitance per leg	C_T	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^{\circ}\text{C}$		1600	pF	
Typical series inductance per leg	L_S	Measured lead to lead 5 mm from package body		7.5	nH	
Maximum voltage rate of change	dV/dt	Rated V_R		10 000	V/ μ s	

Note(1) Pulse width < 300 μ s, duty cycle < 2 %**THERMAL - MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T _J , T _{Stg}		-55 to 150	°C
Maximum thermal resistance, junction to case per leg	R _{thJC}	DC operation See fig. 4	1.25	°C/W
Maximum thermal resistance, junction to case per package		DC operation	0.63	
Typical thermal resistance, case to heatsink	R _{thCS}	Mounting surface, smooth and greased	0.24	
Approximate weight			6	g
			0.21	oz.
Mounting torque	minimum	Non-lubricated threads	6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style TO-247AC 3L	40CPQ050	
			40CPQ060	

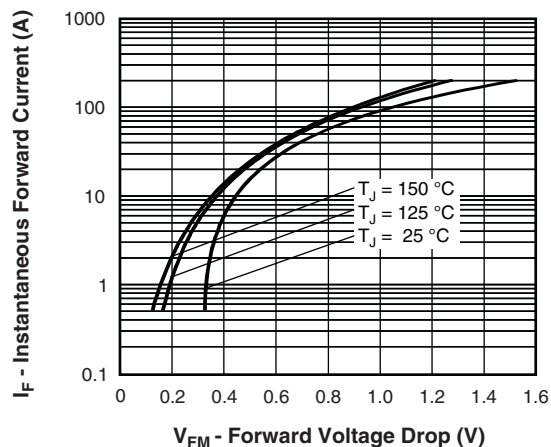


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

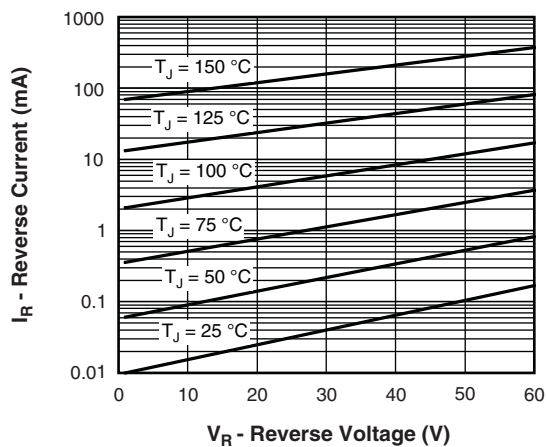


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

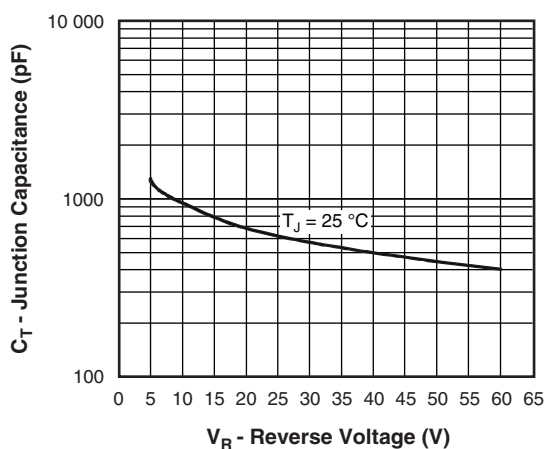
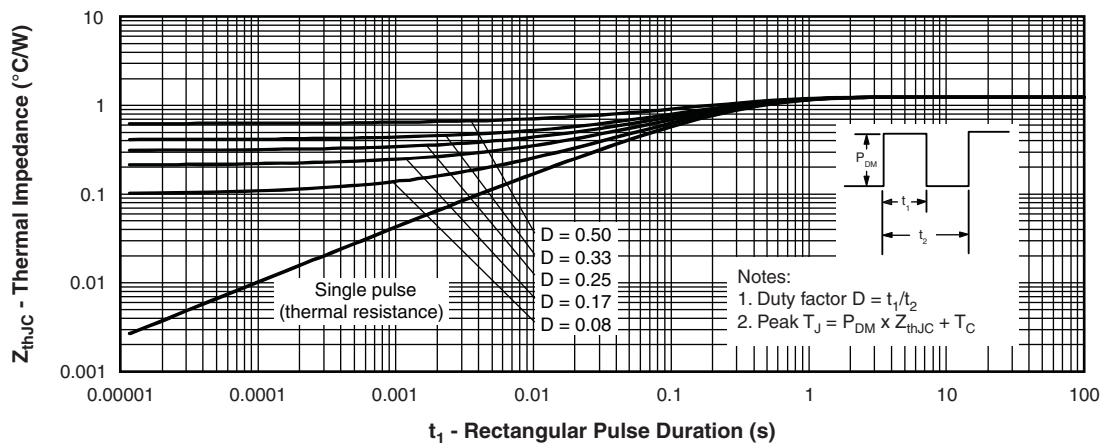


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

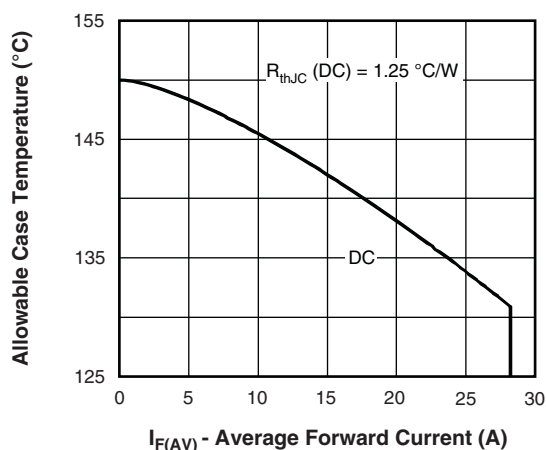


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

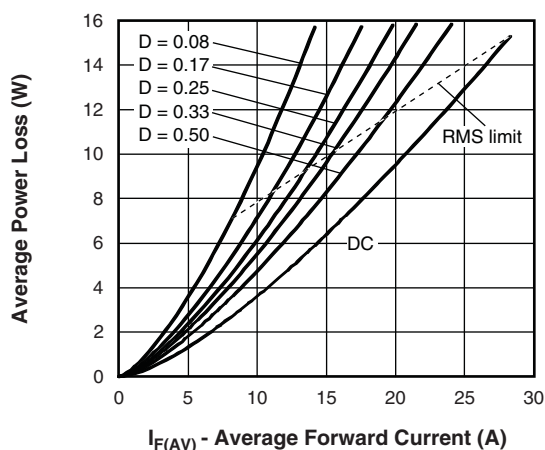


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

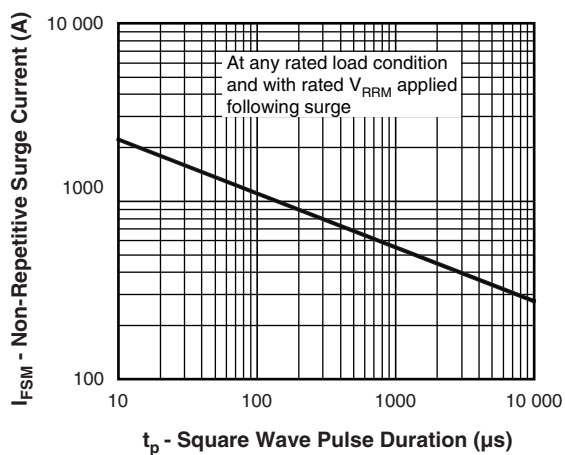


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

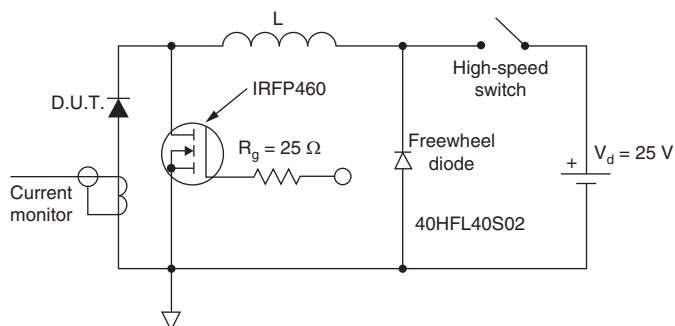


Fig. 8 - Unclamped Inductive Test Circuit

**ORDERING INFORMATION TABLE**

Device code	VS-	40	C	P	Q	060	-N3
	1	2	3	4	5	6	7
	1	-	Vishay Semiconductors product				
	2	-	Current rating (40 = 40 A)				
	3	-	Circuit configuration: C = common cathode				
	4	-	Package: P = TO-247				
	5	-	Schottky "Q" series				
	6	-	Voltage code				050 = 50 V 060 = 60 V
	7	-	Environmental digit				
			-N3 = halogen-free, RoHS-compliant, and totally lead (Pb)-free				

ORDERING INFORMATION (Example)

PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-40CPQ050-N3	25	500	Antistatic plastic tube
VS-40CPQ060-N3	25	500	Antistatic plastic tube

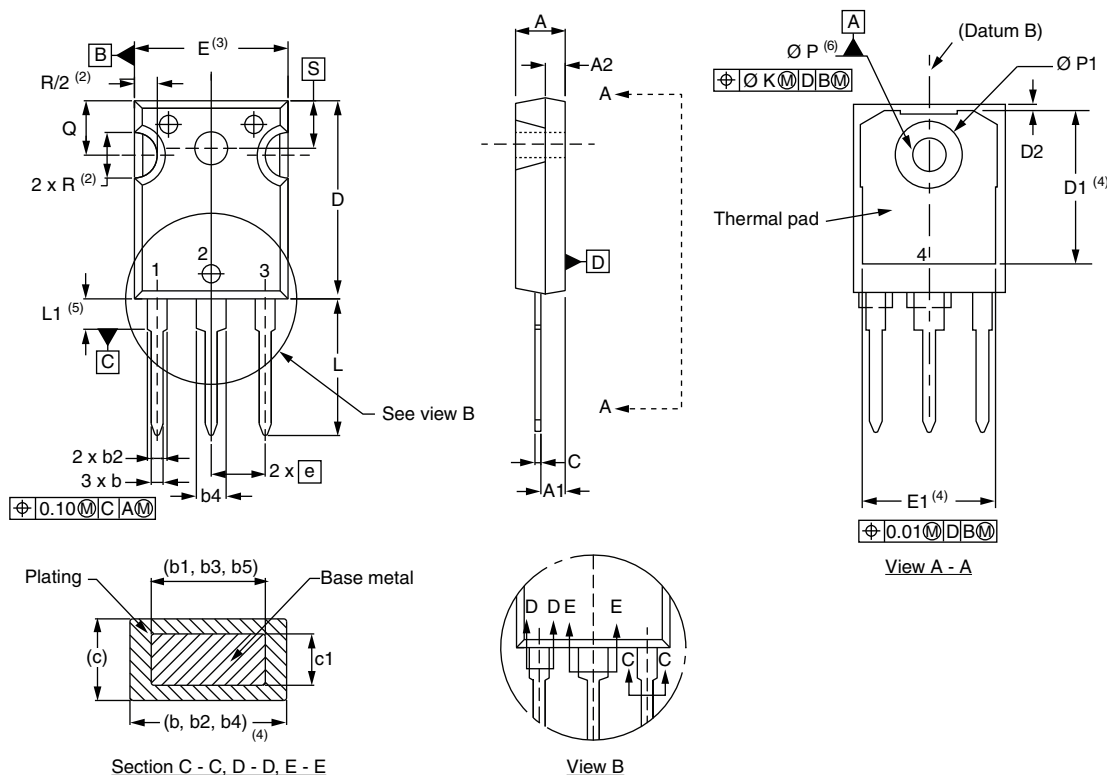
LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?96138
Part marking information	www.vishay.com/doc?95007



TO-247AC 3L

DIMENSIONS in millimeters and inches



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	1.17	1.37	0.046	0.054	
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	1.35	0.020	0.053	
E	15.29	15.87	0.602	0.625	3
E1	13.46	-	0.53	-	
e	5.46 BSC		0.215 BSC		
Ø K	0.254		0.010		
L	14.20	16.10	0.559	0.634	
L1	3.71	4.29	0.146	0.169	
Ø P	3.56	3.66	0.14	0.144	
Ø P1	-	7.39	-	0.291	
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. 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) 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 Q



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