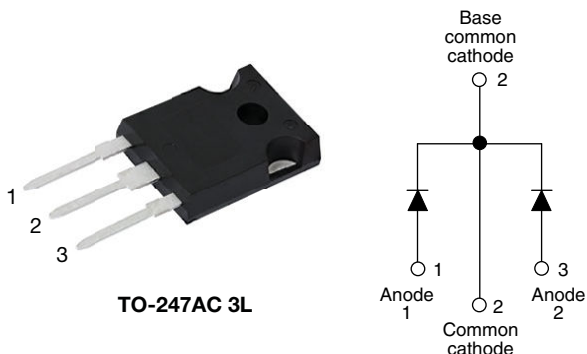


## High Performance Schottky Rectifier, 2 x 30 A



### FEATURES

- 175 °C  $T_J$  operation
- 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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
FREE

### PRIMARY CHARACTERISTICS

$I_{F(AV)}$	2 x 30 A
$V_R$	150 V
$V_F$ at $I_F$	0.67 V
$I_{RM}$ max.	25 mA at 125 °C
$T_J$ max.	175 °C
$E_{AS}$	0.5 mJ
Package	TO-247AC 3L
Circuit configuration	Common cathode

### DESCRIPTION

The VS-60CPQ150... center tap Schottky rectifier series has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175 °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	60	A
$V_{RRM}$		150	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	2300	A
$V_F$	30 A <sub>pk</sub> , $T_J = 125$ °C (per leg)	0.67	V
$T_J$	Range	-55 to +175	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-60CPQ150-N3	UNITS
Maximum DC reverse voltage	$V_R$	150	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 $T_C = 151$ °C, rectangular waveform	30	A
per leg			60	
Maximum peak one cycle non-repetitive surge current per leg, see fig. 7	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	2300	
		10 ms sine or 6 ms rect. pulse	510	
Non-repetitive avalanche energy per leg	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 1$ A, $L = 1$ mH	0.5	mJ
Repetitive avalanche current per leg	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	1	A

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Maximum forward voltage drop per leg See fig. 1	V <sub>FM</sub> <sup>(1)</sup>	30 A	T <sub>J</sub> = 25 °C	0.80	0.83	V
		60 A		0.93	0.99	
		30 A	T <sub>J</sub> = 125 °C	0.64	0.67	
		60 A		0.74	0.77	
Maximum reverse leakage current per leg See fig. 2	I <sub>RM</sub>	T <sub>J</sub> = 25 °C	V <sub>R</sub> = Rated V <sub>R</sub>	10	100	μA
		T <sub>J</sub> = 125 °C		12	25	mA
Typical junction capacitance per leg	C <sub>T</sub>	V <sub>R</sub> = 5 V <sub>DC</sub> (test signal range 100 kHz to 1 MHz) 25 °C		-	820	pF
Typical series inductance per leg	L <sub>S</sub>	Measured lead to lead 5 mm from package body		-	7.5	nH
Maximum voltage rate of change	dV/dt	Rated V <sub>R</sub>		-	10 000	V/μs

**Note**(1) Pulse width < 300  $\mu\text{s}$ , duty cycle < 2 %**THERMAL - MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T <sub>J</sub> , T <sub>Stg</sub>		-55 to 175	°C
Maximum thermal resistance, junction to case per leg	R <sub>thJC</sub>	DC operation See fig. 4	0.8	°C/W
Maximum thermal resistance, junction to case per package		DC operation	0.4	
Typical thermal resistance, case to heatsink	R <sub>thCS</sub>	Mounting surface, smooth and greased	0.25	
Approximate weight			6	g
			0.21	oz.
Mounting torque	minimum		6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style TO-247AC 3L	60CPQ150	

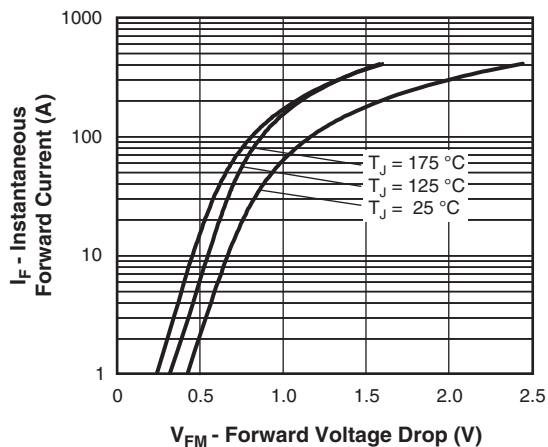


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

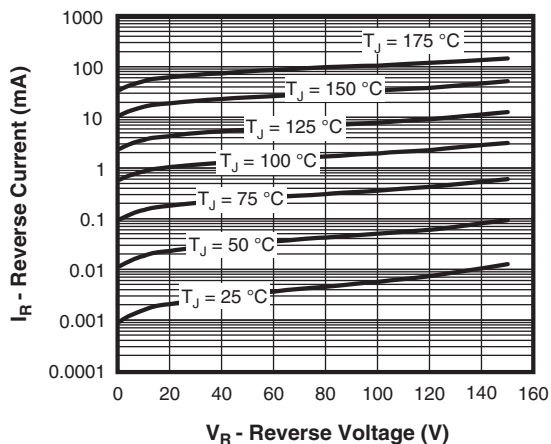


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

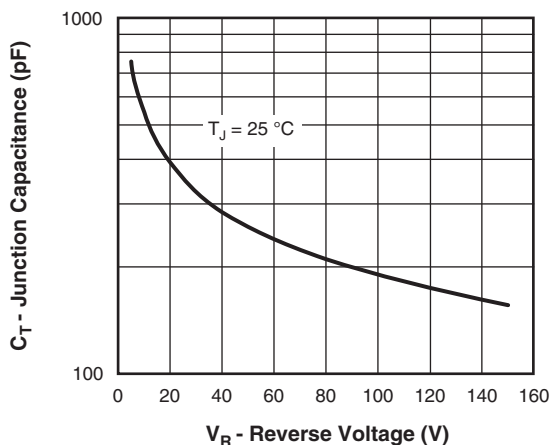


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

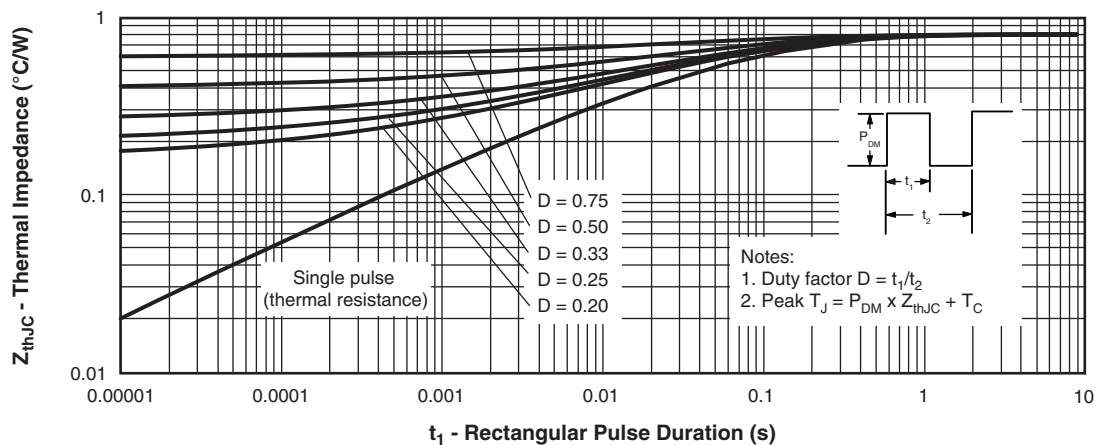


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

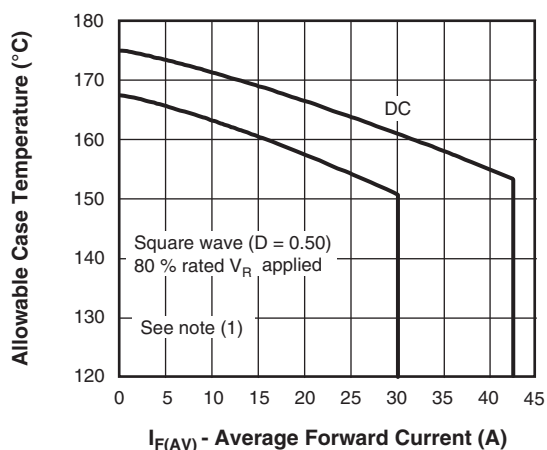


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

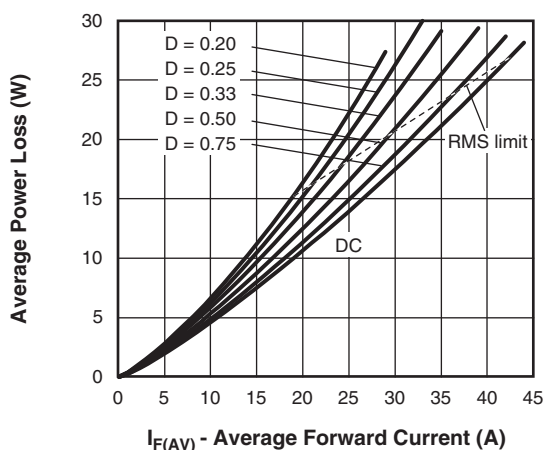


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

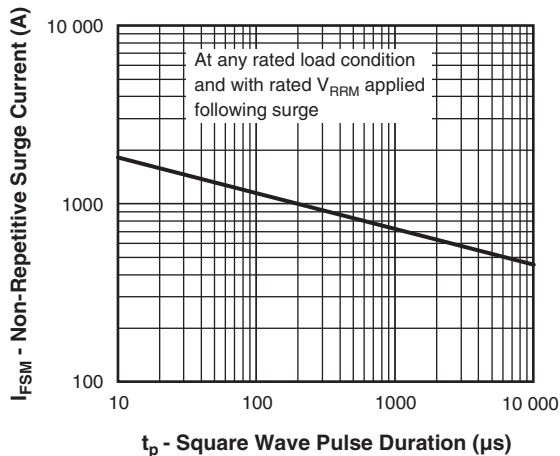


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

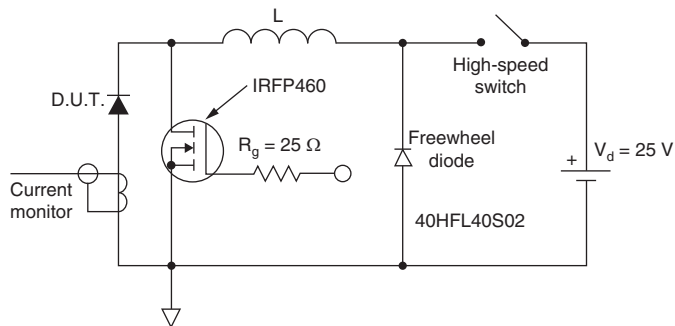


Fig. 8 - Unclamped Inductive Test Circuit

#### 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  $V_{R1} = 80\%$  rated  $V_R$



**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>60</b>	<b>C</b>	<b>P</b>	<b>Q</b>	<b>150</b>	<b>-N3</b>
	1	2	3	4	5	6	7

- |          |   |   |
|----------|---|---|
| <b>1</b> | - | Vishay Semiconductors product   |
| <b>2</b> | - | Current rating (60 = 60 A)  |
| <b>3</b> | - | Circuit configuration:<br>C = common cathode  |
| <b>4</b> | - | Package:<br>P = TO-247  |
| <b>5</b> | - | Schottky "Q" series   |
| <b>6</b> | - | Voltage code (150 = 150 V)  |
| <b>7</b> | - | Environmental digit<br>-N3 = halogen-free, RoHS-compliant, and totally lead (Pb)-free |

<b>ORDERING INFORMATION</b> (Example)			
<b>PREFERRED P/N</b>	<b>QUANTITY PER T/R</b>	<b>MINIMUM ORDER QUANTITY</b>	<b>PACKAGING DESCRIPTION</b>
VS-60CPQ150-N3	25	500	Antistatic plastic tube

<b>LINKS TO RELATED DOCUMENTS</b>	
Dimensions	<a href="http://www.vishay.com/doc?96138">www.vishay.com/doc?96138</a>
Part marking information	<a href="http://www.vishay.com/doc?95007">www.vishay.com/doc?95007</a>



## 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		
$\phi K$	0.254		0.010		
L	14.20	16.10	0.559	0.634	
L1	3.71	4.29	0.146	0.169	
$\phi P$	3.56	3.66	0.14	0.144	
$\phi P1$	-	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)  $\phi P$  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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