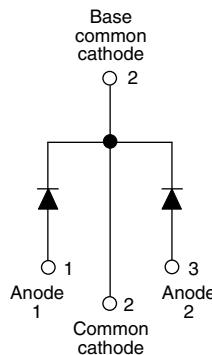
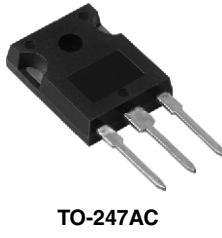


Schottky Rectifier, 2 x 30 A



RoHS
COMPLIANT
HALOGEN
FREE
Available

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
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified according to JEDEC-JESD47
- Halogen-free according to IEC 61249-2-21 definition (-N3 only)

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.

PRODUCT SUMMARY	
Package	TO-247AC
$I_{F(AV)}$	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
Diode variation	Common cathode
E_{AS}	0.5 mJ

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 Apk, $T_J = 125$ °C (per leg)	0.67	V	
T_J	Range	- 55 to 175	°C	

VOLTAGE RATINGS				
PARAMETER	SYMBOL	VS-60CPQ150PbF	VS-60CPQ150-N3	UNITS
Maximum DC reverse voltage	V_R	150	150	V
Maximum working peak reverse voltage	V_{RWM}			

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current per leg See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 151$ °C, rectangular waveform		30	A
Maximum peak one cycle non-repetitive surge current per leg See fig. 7		5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	2300	
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 μs 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	$V_{FM}^{(1)}$	30 A	$T_J = 25 \text{ }^\circ\text{C}$	0.80	0.83	V	
		60 A		0.93	0.99		
		30 A	$T_J = 125 \text{ }^\circ\text{C}$	0.64	0.67		
		60 A		0.74	0.77		
Maximum reverse leakage current per leg See fig. 2	I_{RM}	$T_J = 25 \text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	10	100	μA	
		$T_J = 125 \text{ }^\circ\text{C}$		12	25	mA	
Typical junction capacitance per leg	C_T	$V_R = 5 \text{ V}_{\text{DC}}$ (test signal range 100 kHz to 1 MHz) $25 \text{ }^\circ\text{C}$		-	820	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 μs , duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}			- 55 to 175	$^\circ\text{C}$
Maximum thermal resistance, junction to case per leg	R_{thJC}	DC operation See fig. 4		0.8	$^\circ\text{C/W}$
Maximum thermal resistance, junction to case per package		DC operation		0.4	
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased		0.25	
Approximate weight				6	g
				0.21	oz.
Mounting torque	minimum maximum			6 (5)	$\text{kgf} \cdot \text{cm}$
				12 (10)	(lbf · in)
Marking device		Case style TO-247AC (JEDEC)		60CPQ150	

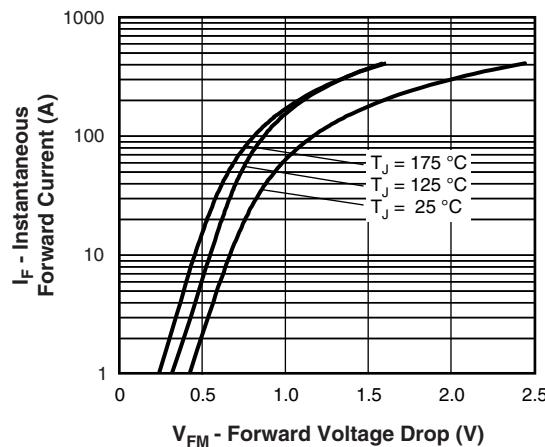


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

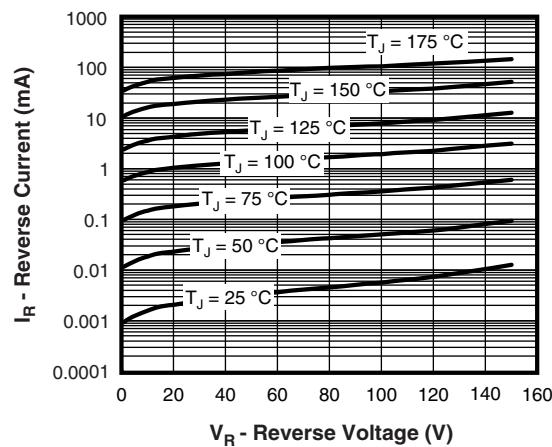


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

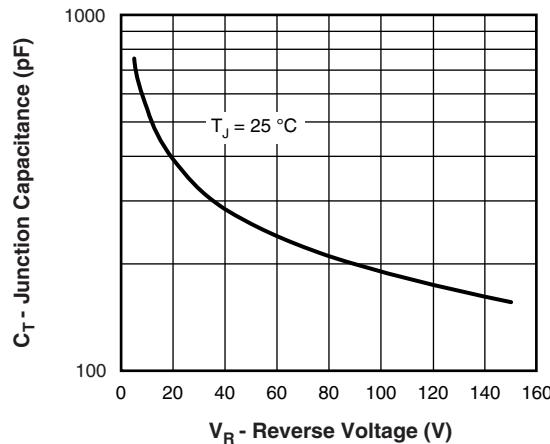


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

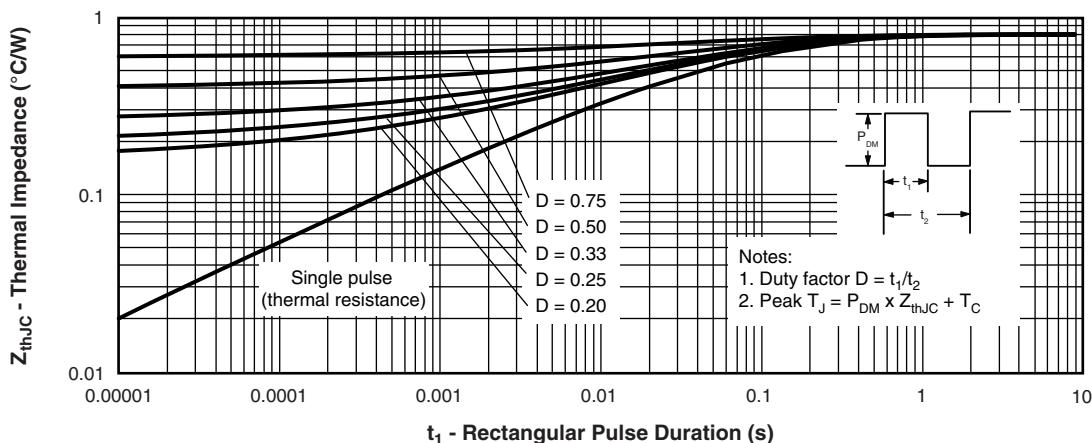


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

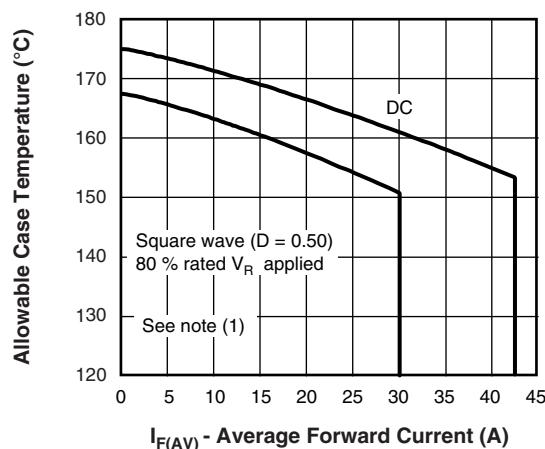


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

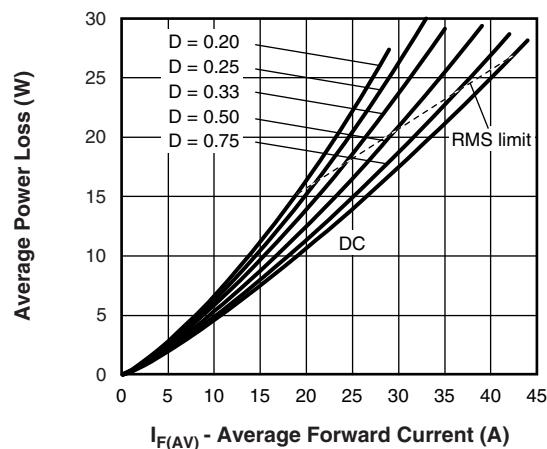


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

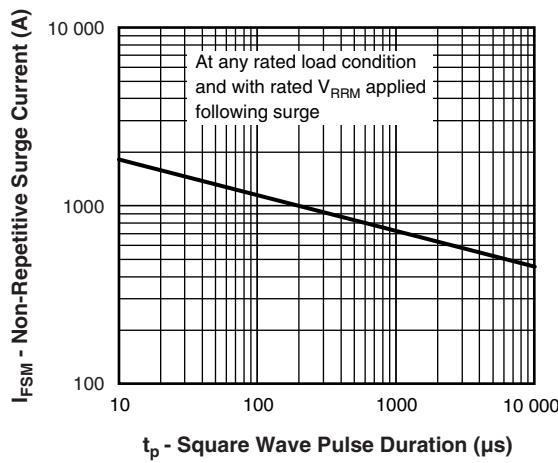


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

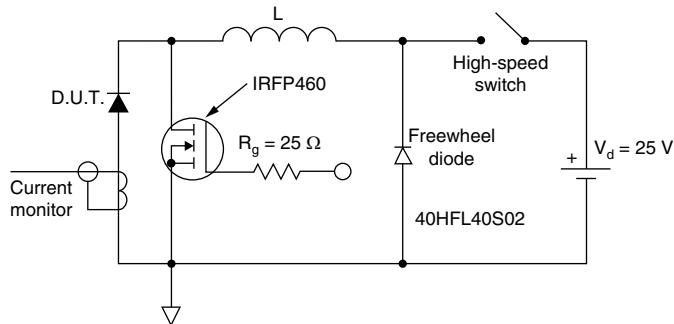


Fig. 8 - Unclamped Inductive Test Circuit

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 $P_d = \text{Forward power loss} = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D)$ (see fig. 6);
 $P_{dREV} = \text{Inverse power loss} = V_{R1} \times I_R (1 - D); I_R \text{ at } V_{R1} = 80\% \text{ rated } V_R$

ORDERING INFORMATION TABLE

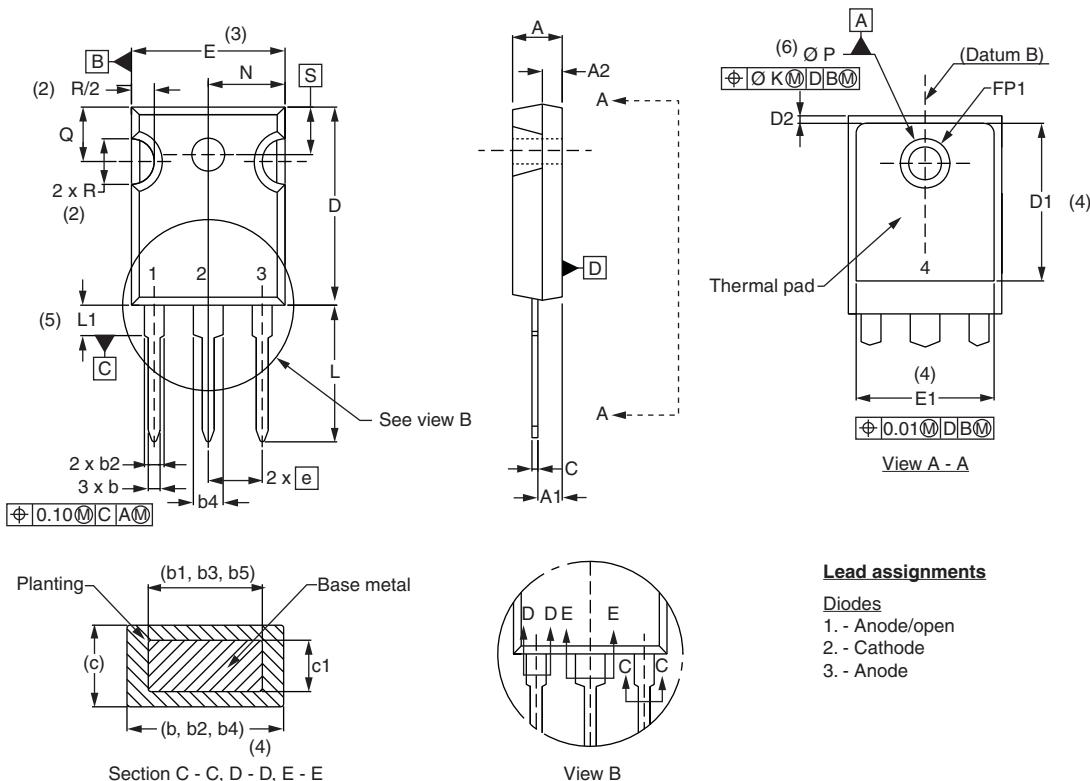
Device code	VS-	60	C	P	Q	150	PbF
	1	2	3	4	5	6	7

- 1** - Vishay Semiconductors product
- 2** - Current rating (60 = 60 A)
- 3** - Circuit configuration:
C = Common cathode
- 4** - Package:
P = TO-247
- 5** - Schottky "Q" series
- 6** - Voltage code (150 = 150 V)
- 7** - Environmental digit
 - PbF = Lead (Pb)-free and RoHS compliant
 - -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-60CPQ150PbF	25	500	Antistatic plastic tube
VS-60CPQ150-N3	25	500	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS		
Dimensions		www.vishay.com/doc?95223
Part marking information	TO-247AC PbF	www.vishay.com/doc?95226
	TO-247AC -N3	www.vishay.com/doc?95007

DIMENSIONS in millimeters and inches



Symbol	Millimeters		Inches		Notes		Symbol	Millimeters		Inches		Notes
	Min.	Max.	Min.	Max.				Min.	Max.	Min.	Max.	
A	4.65	5.31	0.183	0.209			D2	0.51	1.30	0.020	0.051	
A1	2.21	2.59	0.087	0.102			E	15.29	15.87	0.602	0.625	3
A2	1.50	2.49	0.059	0.098			E1	13.72	-	0.540	-	
b	0.99	1.40	0.039	0.055			e	5.46 BSC		0.215 BSC		
b1	0.99	1.35	0.039	0.053			FK	2.54		0.010		
b2	1.65	2.39	0.065	0.094			L	14.20	16.10	0.559	0.634	
b3	1.65	2.37	0.065	0.094			L1	3.71	4.29	0.146	0.169	
b4	2.59	3.43	0.102	0.135			N	7.62 BSC		0.3		
b5	2.59	3.38	0.102	0.133			ΦP	3.56	3.66	0.14	0.144	
c	0.38	0.86	0.015	0.034			ΦP1	-	6.98	-	0.275	
c1	0.38	0.76	0.015	0.030			Q	5.31	5.69	0.209	0.224	
D	19.71	20.70	0.776	0.815	3		R	4.52	5.49	1.78	0.216	
D1	13.08	-	0.515	-	4		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 c

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