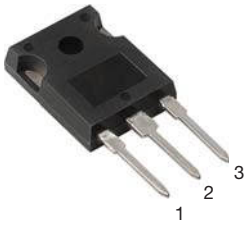
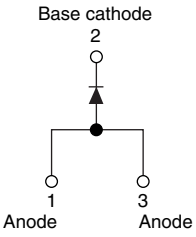
High Performance Schottky Rectifier, 65 A



TO-247AC



FEATURES

- 125 °C T_J operation (V_R < 5 V)
- Single diode configuration
- Optimized for OR-ing applications
- Ultralow forward voltage drop
- Guard ring for enhanced ruggedness and long term reliability
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Designed and qualified according to JEDEC-JESD47
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE Available

DESCRIPTION

The VS-65PQ015... Schottky rectifier module has been optimized for ultralow forward voltage drop specifically for the OR-ing of parallel power supplies. The proprietary barrier technology allows for reliable operation up to 125 °C junction temperature. Typical applications are in parallel switching power supplies, converters, reverse battery protection, and redundant power subsystems.

PRODUCT SUMMARY	
Package	TO-247AC
$I_{F(AV)}$	65 A
V_R	15 V
V_F at I_F	0.46 V
I_{RM} max.	870 mA at 100 °C
T_J max.	125 °C
Diode variation	Single die
E_{AS}	9 mJ

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	65	A
V_{RRM}		15	V
I_{FSM}	t_p = 5 µs sine	1500	A
V_F	65 A_{pk}, T_J = 125 °C	0.46	V
T_J	Range	- 55 to 125	°C

VOLTAGE RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS	VS-65PQ015PbF	VS-65PQ015-N3	UNITS
Maximum DC reverse voltage	V_R	T_J = 100 °C	15	15	V
		T_J = 125 °C	5	5	

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	50 % duty cycle at T_C = 83 °C, rectangular waveform		65	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	5 µs sine or 3 µs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	1500	
		10 ms sine or 6 ms rect. pulse		400	
Non-repetitive avalanche energy	E_{AS}	T_J = 25 °C, I_{AS} = 2 A, L = 4.5 mH		9	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by T_J maximum V_A = 1.5 x V_R typical		2	A

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Forward voltage drop	V_{FM} (1)	65 A	T_J = 25 °C	0.50	V
		130 A		0.71	
		65 A	T_J = 125 °C	0.46	
		130 A		0.76	
Reverse leakage current	I_{RM} (1)	T_J = 125 °C	V_R = 5 V	1.2	A
		T_J = 25 °C	V_R = Rated V_R	18	mA
		T_J = 100 °C		870	
Threshold voltage	$V_{F(TO)}$	T_J = T_J maximum		0.137	mV
Forward slope resistance	r_t			4.9	mΩ
Maximum junction capacitance	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °C		4300	pF
Typical series inductance	L_S	Measured lead to lead 5 mm from package body		8	nH
Maximum voltage rate of change	dV/dt	Rated V_R		10 000	V/µs

Note

(1) Pulse width < 300 µs, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction temperature range	T_J		- 55 to 125	°C
Maximum storage temperature range	T_{Stg}		- 55 to 150	
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	0.8	°C/W
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased	0.3	
Approximate weight			6	g
			0.21	oz.
Mounting torque minimum		Non-lubricated threads	6 (5)	kgf · cm (lbf · in)
Mounting torque maximum			12 (10)	
Marking device		Case style TO-247AC (JEDEC)	65PQ015	

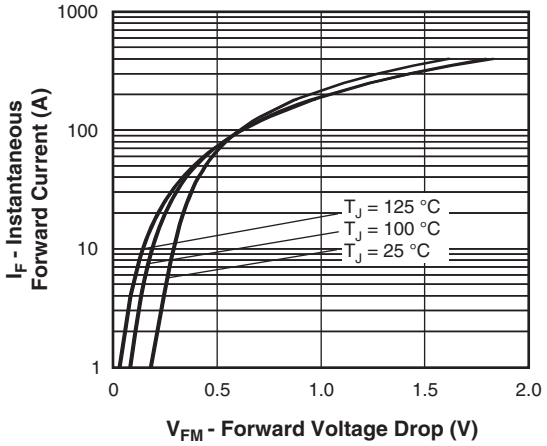


Fig. 1 - Maximum Forward Voltage Drop Characteristics

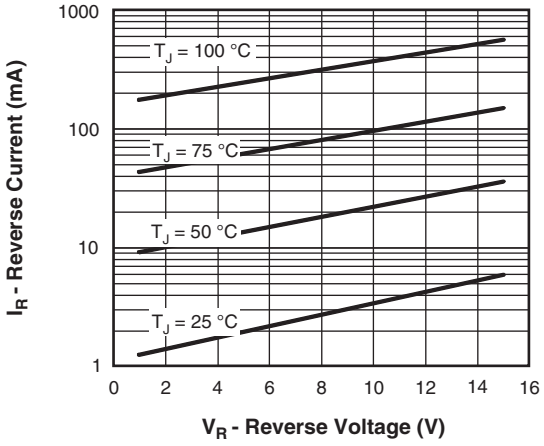


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

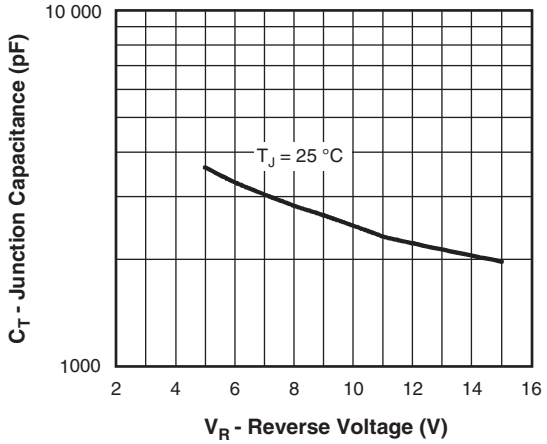


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

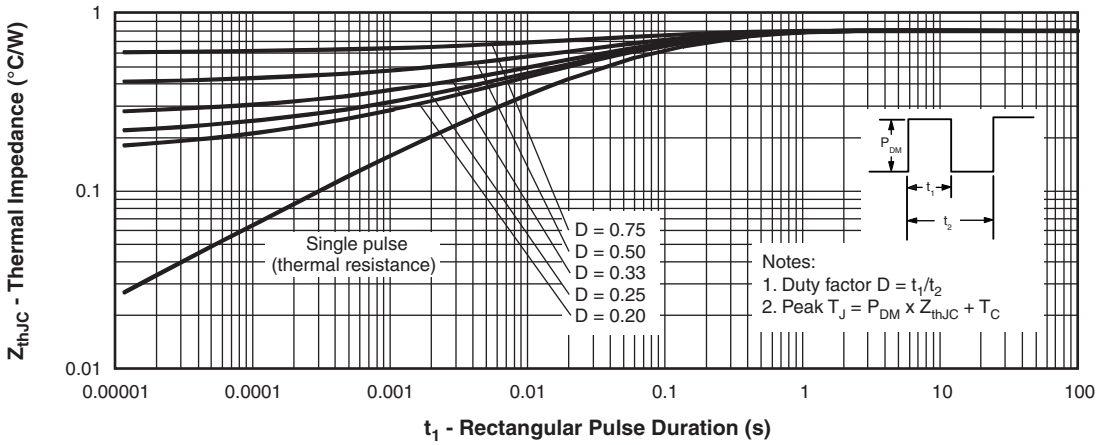


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

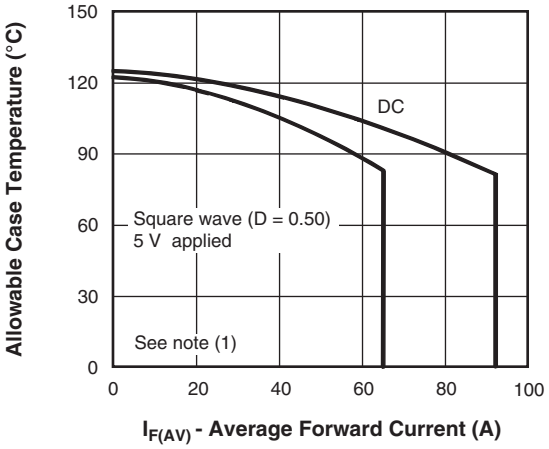


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

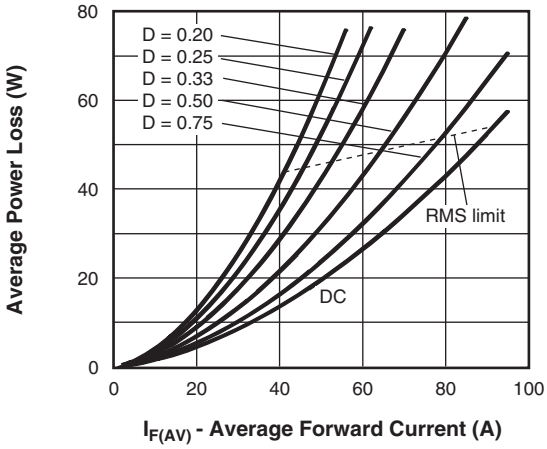


Fig. 6 - Forward Power Loss Characteristics

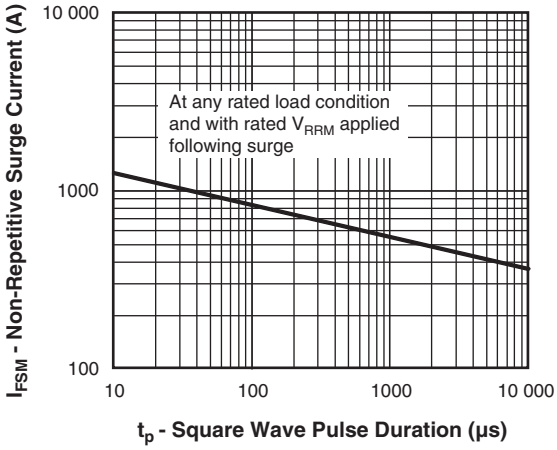


Fig. 7 - Maximum Non-Repetitive Surge Current

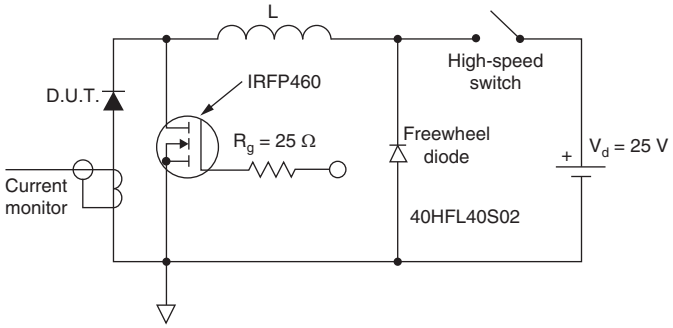


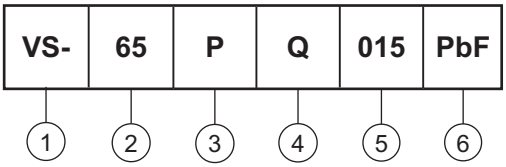
Fig. 8 - Unclamped Inductive Test Circuit

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6);
Pd_{REV} = Inverse power loss = $V_{R1} \times I_R$ (1 - D); I_R at V_{R1} = 5 V

ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - Current rating (65 = 65 A)

3 - Package:
P = TO-247

4 - Schottky “Q” series

5 - Voltage code (015 = 15 V)

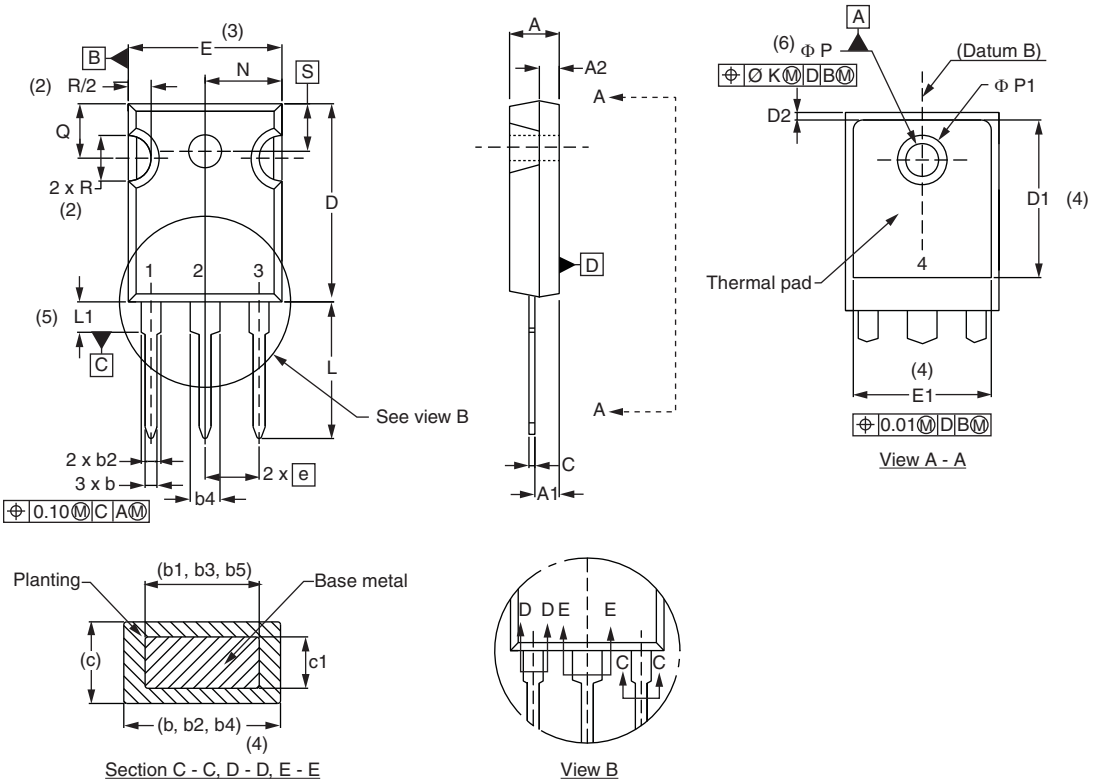
6 - Environmental digit
- PbF = Lead (Pb)-free and RoHS compliant
- -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	**QUANTITY PER T/R**	**MINIMUM ORDER QUANTITY**	**PACKAGING DESCRIPTION**
VS-65PQ015PbF	25	500	Antistatic plastic tube
VS-65PQ015-N3	25	500	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS		
Dimensions		www.vishay.com/doc?95542
Part marking information	TO-247AC modified PbF	www.vishay.com/doc?95226
	TO-247AC modified -N3	www.vishay.com/doc?95007
SPICE model		www.vishay.com/doc?95306

TO-247

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	2.33	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	
N	7.62 BSC		0.3		
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 c and Q

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