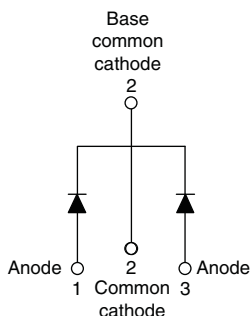


## High Performance Schottky Rectifier, 2 x 30 A


**TO-220AB**


### 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
- AEC-Q101 qualified, meets JESD 201 class 2 whisker test
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available

### PRODUCT SUMMARY

Package	TO-220AB
$I_{F(AV)}$	2 x 30 A
$V_R$	150 V
$V_F$ at $I_F$	0.72 V
$I_{RM}$ max.	20 mA at 125 °C
$T_J$ max.	175 °C
Diode variation	Common cathode
$E_{AS}$	0.4 mJ

### DESCRIPTION

The 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	710	A
$V_F$	30 A <sub>pk</sub> , $T_J = 125$ °C (typical, per leg)	0.69	V
$T_J$	Range	-55 to +175	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-60CTQ150HN3	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 $T_C = 137$ °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	710	
		10 ms sine or 6 ms rect. pulse	270	
Non-repetitive avalanche energy per leg	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 0.9$ A, $L = 1$ mH	0.4	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	0.9	A

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	TYP	MAX.	UNITS
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	30 A	$T_J = 25\text{ }^{\circ}\text{C}$	0.83	V
		60 A		0.98	
		30 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.67	
		60 A		0.82	
Maximum reverse leakage current per leg See fig. 2	$I_{RM}$	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_R$	7	$\mu\text{A}$
		$T_J = 125\text{ }^{\circ}\text{C}$		7.2	mA
Typical junction capacitance per leg	$C_T$	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^{\circ}\text{C}$	-	650	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/ $\mu\text{s}$

**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	$T_J, T_{Stg}$		-55 to +175	$^{\circ}\text{C}$
Maximum thermal resistance, _____ per leg junction to case _____ per package	$R_{thJC}$	DC operation, see fig. 4	1.2	$^{\circ}\text{C/W}$
		DC operation	0.6	
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)	kgf · cm
			12 (10)	(lbf · in)
Marking device		Case style TO-220AB	60CTQ150H	

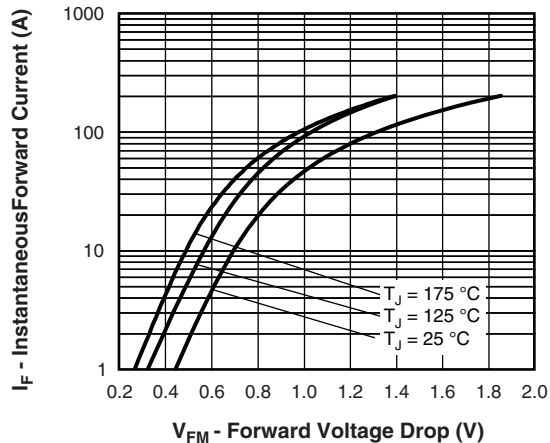


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

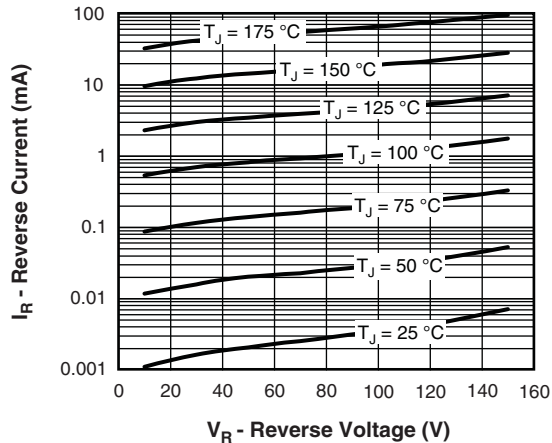


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

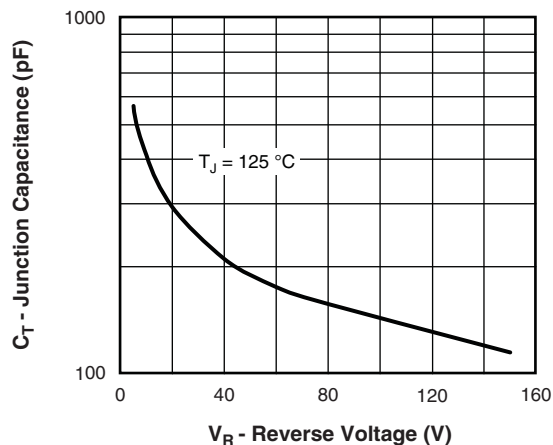
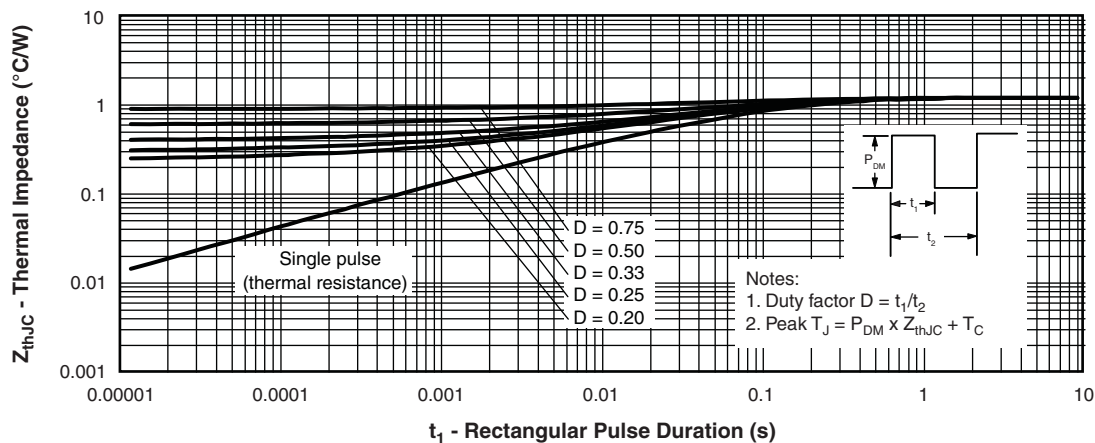


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)


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

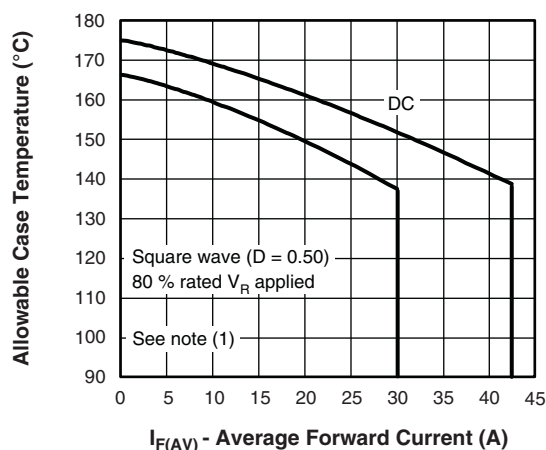


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

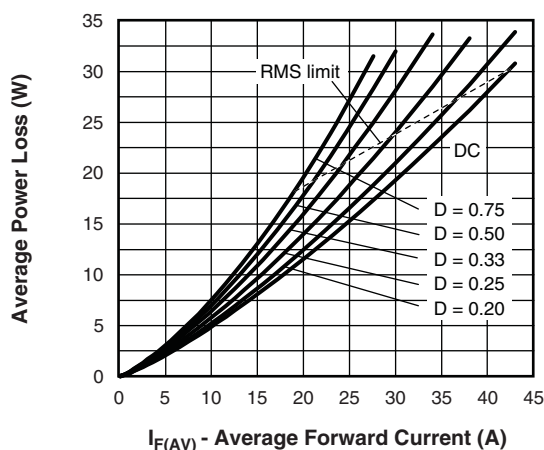


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

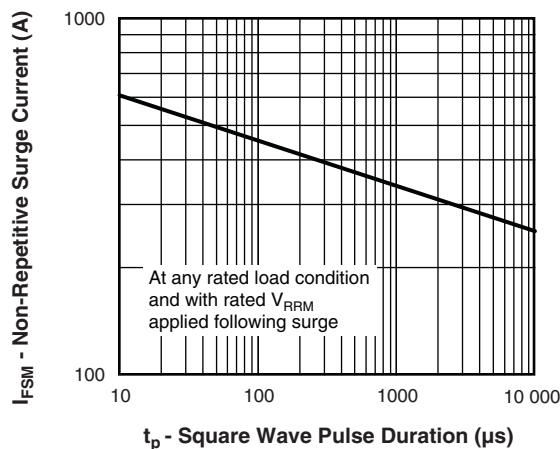


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

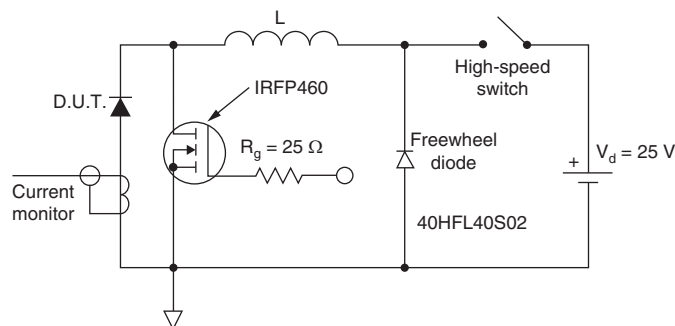


Fig. 8 - Unclamped Inductive Test Circuit

#### 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>T</b>	<b>Q</b>	<b>150</b>	<b>H</b>	<b>N3</b>
	①	②	③	④	⑤	⑥	⑦	⑧

- |          |                                                                                        |
|----------|----------------------------------------------------------------------------------------|
| <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>T = TO-220                                                                |
| <b>5</b> | - Schottky "Q" series                                                                  |
| <b>6</b> | - Voltage rating (150 = 150 V)                                                         |
| <b>7</b> | - H = AEC-Q101 qualified                                                               |
| <b>8</b> | - Environmental digit<br>N3 = halogen-free, RoHS-compliant, and totally lead (Pb)-free |

<b>ORDERING INFORMATION</b> (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-60CTQ150HN3	50	1000	Antistatic plastic tube

<b>LINKS TO RELATED DOCUMENTS</b>	
Dimensions	<a href="http://www.vishay.com/doc?95222">www.vishay.com/doc?95222</a>
Part marking information	<a href="http://www.vishay.com/doc?95028">www.vishay.com/doc?95028</a>





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