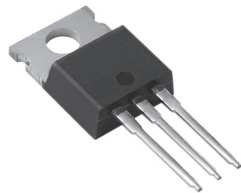
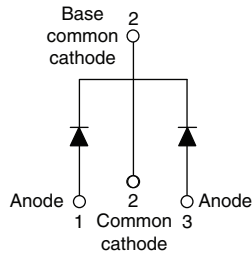




## High Performance Schottky Rectifier, 2 x 15 A



TO-220AB



## FEATURES

- 175 °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
- 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**

## PRODUCT SUMMARY

$I_{F(AV)}$	2 x 15 A
$V_R$	35 V, 40 V, 45 V
$V_F$ at $I_F$	0.56 V
$I_{RM}$ max.	15 mA at 125 °C
$T_J$ max.	175 °C
$E_{AS}$	27 mJ
Package	TO-220AC
Diode variation	Common cathode

## DESCRIPTION

The VS-30CTQ... 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 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	30	A
$V_{RRM}$	Range	35 to 45	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	1060	A
$V_F$	20 $A_{pk}$ , $T_J = 125$ °C (per leg)	0.56	V
$T_J$	Range	-55 to 175	°C

## VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-30CTQ035HN3	VS-30CTQ040HN3	VS-30CTQ045HN3	UNITS
Maximum DC reverse voltage	$V_R$	35	40	45	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 $T_C = 127$ °C, rectangular waveform	30	A
Maximum peak one cycle non-repetitive surge current See fig. 7	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	1060	
		10 ms sine or 6 ms rect. pulse	256	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 3.0$ A, $L = 4.40$ mH	20	mJ
Repetitive avalanche current	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	3.0	A



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	15 A	$T_J = 25\text{ }^\circ\text{C}$	0.62	V
		30 A		0.76	
		15 A	$T_J = 125\text{ }^\circ\text{C}$	0.56	
		30 A		0.70	
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	2	mA
		$T_J = 125\text{ }^\circ\text{C}$		15	
Maximum junction capacitance	$C_T$	$V_R = 5 V_{DC}$ , (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$		900	pF
Typical series inductance	$L_S$	Measured lead to lead 5 mm from package body		8.0	nH
Maximum voltage rate of change	dV/dt	Rated $V_R$		10 000	V/ $\mu$ s

Note

(1) Pulse width < 300  $\mu$ 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, junction to case per leg	$R_{thJC}$	DC operation See fig. 4	3.25	$^\circ\text{C/W}$
		DC operation	1.63	
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth and greased	0.50	
Approximate weight			2.0	g
			0.07	oz.
Mounting torque	minimum		6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style TO-220AB	30CTQ035H	
			30CTQ040H	
			30CTQ045H	

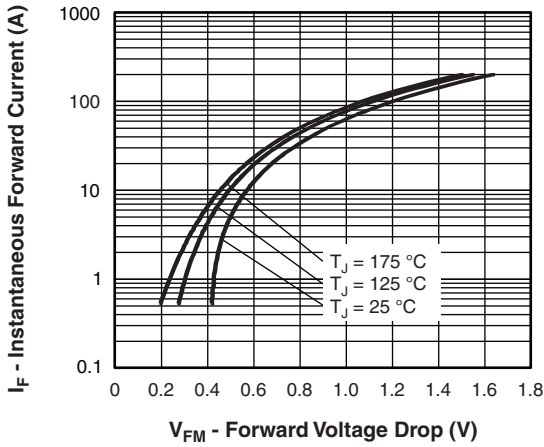


Fig. 1 - Maximum Forward Voltage Drop Characteristics

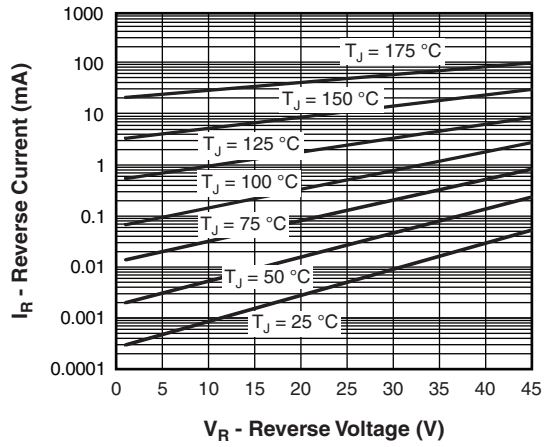


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

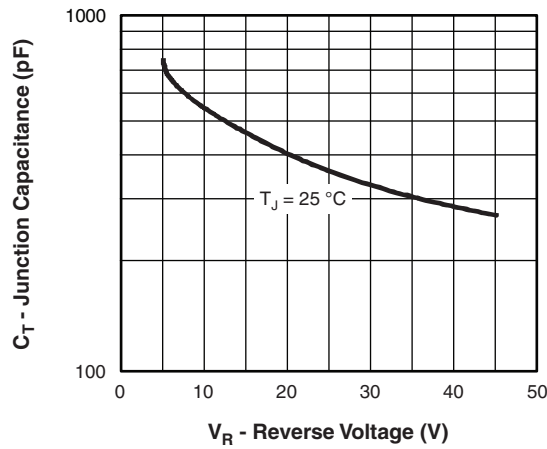


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

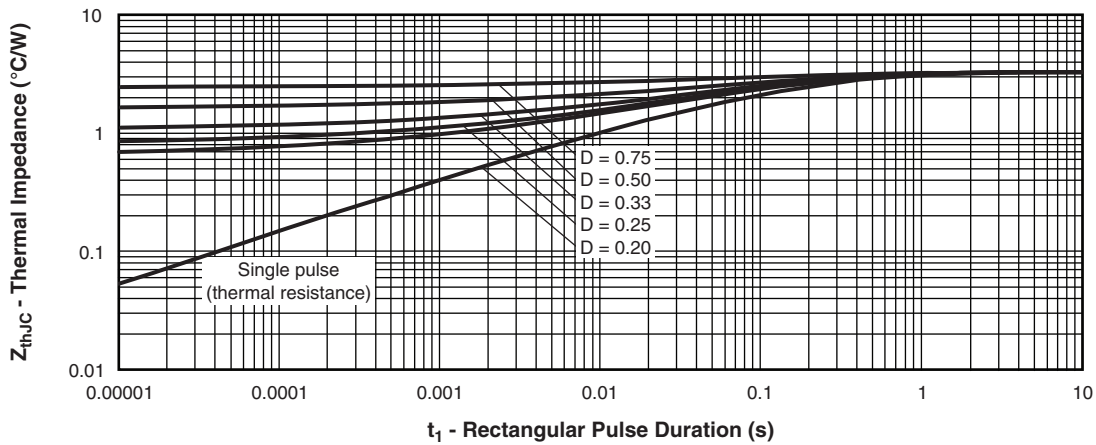


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

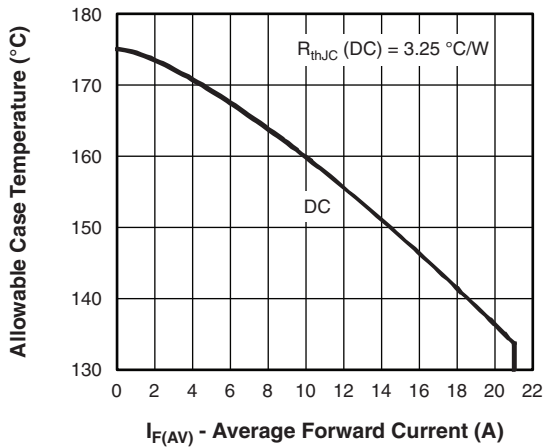


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

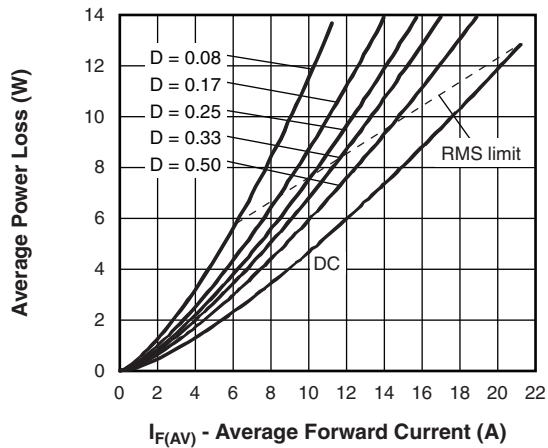


Fig. 6 - Forward Power Loss Characteristics

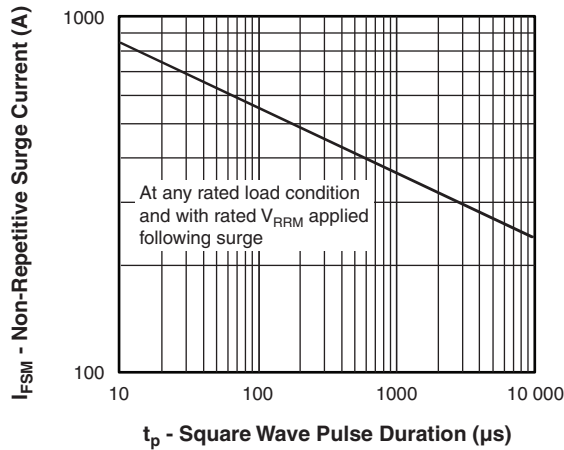


Fig. 7 - Maximum Non-Repetitive Surge Current

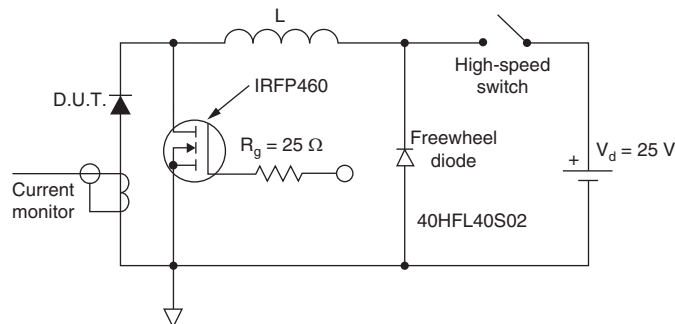
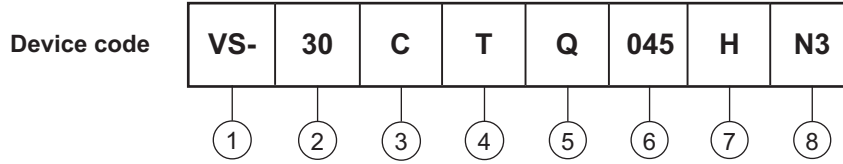


Fig. 8 - Unclamped Inductive Test Circuit



## ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (30 = 30 A)
- 3** - Circuit configuration:  
C = Common cathode
- 4** - Package:  
T = TO-220
- 5** - Schottky "Q" series
- 6** - Voltage ratings
 

035 = 35 V
040 = 40 V
045 = 45 V
- 7** - H = AEC-Q101 qualified
- 8** - 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-30CTQ035HN3	50	1000	Antistatic plastic tube
VS-30CTQ040HN3	50	1000	Antistatic plastic tube
VS-30CTQ045HN3	50	1000	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95222">www.vishay.com/doc?95222</a>
Part marking information	TO-220AB-N3 <a href="http://www.vishay.com/doc?95028">www.vishay.com/doc?95028</a>

### TO-220AB

**DIMENSIONS** in millimeters and inches



Conforms to JEDEC® outline TO-220AB

SYMBOL	MILLIMETERS		INCHES		NOTES	SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.			MIN.	MAX.	MIN.	MAX.	
A	4.25	4.65	0.167	0.183		D2	11.68	12.88	0.460	0.507	6
A1	1.14	1.40	0.045	0.055		E	10.11	10.51	0.398	0.414	3, 6
A2	2.56	2.92	0.101	0.115		E1	6.86	8.89	0.270	0.350	6
b	0.69	1.01	0.027	0.040		E2	-	0.76	-	0.030	7
b1	0.38	0.97	0.015	0.038	4	e	2.41	2.67	0.095	0.105	
b2	1.20	1.73	0.047	0.068		e1	4.88	5.28	0.192	0.208	
b3	1.14	1.73	0.045	0.068	4	H1	5.84	6.86	0.230	0.270	6, 7
c	0.36	0.61	0.014	0.024		L	13.52	14.02	0.532	0.552	
c1	0.36	0.56	0.014	0.022	4	L1	3.32	3.82	0.131	0.150	2
D	14.85	15.25	0.585	0.600	3	∅ P	3.54	3.73	0.139	0.147	
D1	8.38	9.02	0.330	0.355		Q	2.60	3.00	0.102	0.118	

**Notes**

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) Dimension D, D1 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) Dimension b1, b3 and c1 apply to base metal only
- (5) Controlling dimensions: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2 and E1
- (7) Dimensions E2 x H1 define a zone where stamping and singulation irregularities are allowed
- (8) Outline conforms to JEDEC® TO-220, except A2 (maximum) and D2 (minimum) where dimensions are derived from the actual package outline



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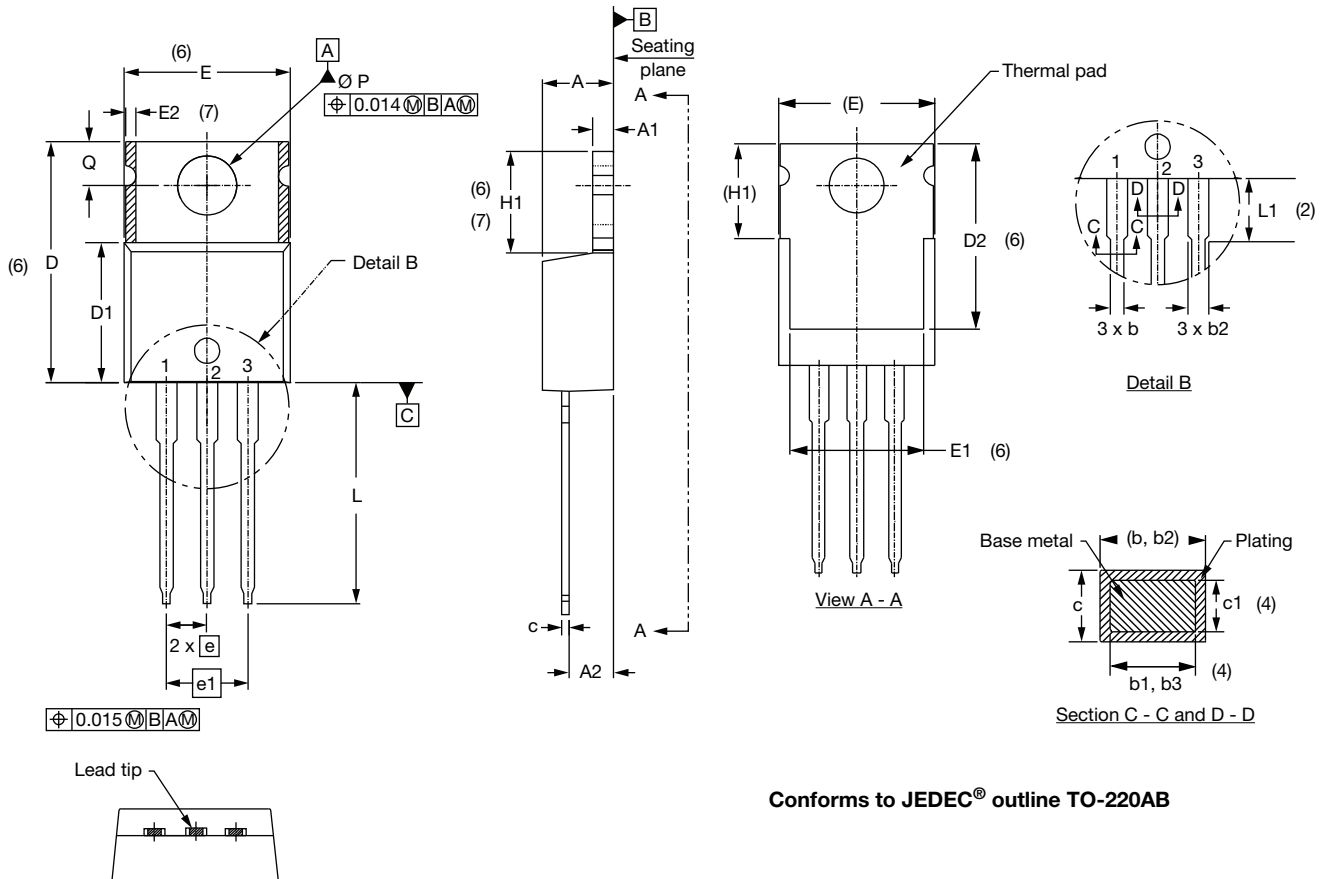
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### TO-220AB

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