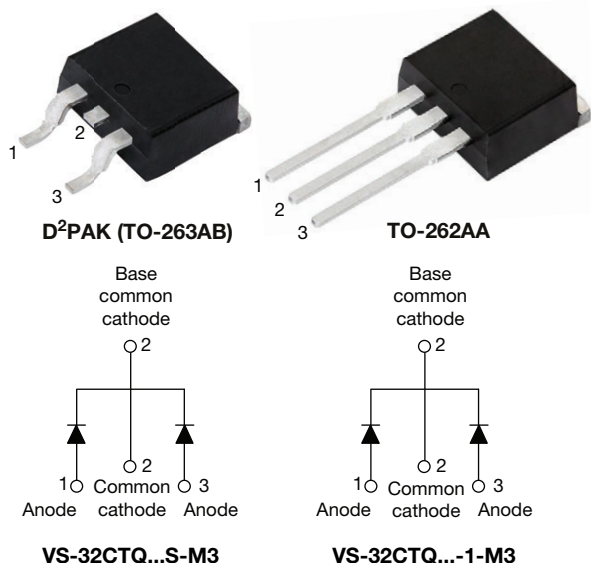


## High Performance Schottky Rectifier, 2 x 15 A



### FEATURES

- 150 °C T<sub>J</sub> 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
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- 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**

### DESCRIPTION

The VS-32CTQ... Schottky rectifier series has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

### PRIMARY CHARACTERISTICS

I <sub>F(AV)</sub>	2 x 15 A
V <sub>R</sub>	25 V, 30 V
V <sub>F</sub> at I <sub>F</sub>	0.40 V
I <sub>RM</sub> max.	97 mA at 125°C
T <sub>J</sub> max.	150 °C
E <sub>AS</sub>	13 mJ
Package	D <sup>2</sup> PAK (TO-263AB), TO-262AA
Circuit configuration	Common cathode

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
I <sub>F(AV)</sub>	Rectangular waveform	30	A
V <sub>R</sub>		25, 30	V
I <sub>FSM</sub>	t <sub>p</sub> = 5 μs sine	900	A
V <sub>F</sub>	15 A <sub>pk</sub> , T <sub>J</sub> = 125 °C	0.40	V
T <sub>J</sub>	Range	-55 to +150	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-32CTQ025S-M3 VS-32CTQ025-1-M3	VS-32CTQ030S-M3 VS-32CTQ030-1-M3	UNITS
Maximum DC reverse voltage	V <sub>R</sub>	25	30	V
Maximum working peak reverse voltage	V <sub>RWM</sub>			

**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 115\text{ }^{\circ}\text{C}$ , rectangular waveform	30	A
Maximum peak one cycle non-repetitive surge current See fig. 7	$I_{FSM}$	5 $\mu\text{s}$ sine or 3 $\mu\text{s}$ rect. pulse	900	
		10 ms sine or 6 ms rect. pulse	250	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25\text{ }^{\circ}\text{C}$ , $I_{AS} = 1.20\text{ A}$ , $L = 11.10\text{ mH}$	13	mJ
Repetitive avalanche current	$I_{AR}$	Current decaying linearly to zero in 1 $\mu\text{s}$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	3	A

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	15 A	0.49	V
		30 A	0.58	
		15 A	0.40	
		30 A	0.53	
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^{\circ}\text{C}$	1.75	mA
		$T_J = 125\text{ }^{\circ}\text{C}$	97	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J$ maximum	0.233	V
Forward slope resistance	$r_t$		9.09	$\text{m}\Omega$
Maximum junction capacitance per leg	$C_T$	$V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^{\circ}\text{C}$	1300	pF
Typical series inductance per leg	$L_S$	Measured lead to lead 5 mm from package body	8.0	nH
Maximum voltage rate of change	$dV/dt$	Rated $V_R$	10 000	$\text{V}/\mu\text{s}$

**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 +150	$^{\circ}\text{C}$
Maximum thermal resistance, junction to case per leg	$R_{thJC}$	DC operation See fig. 4	3.25	$^{\circ}\text{C}/\text{W}$
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth and greased	0.50	
Approximate weight			2	g
			0.07	oz.
Mounting torque	minimum		6 (5)	$\text{kgf} \cdot \text{cm}$ ( $\text{lbf} \cdot \text{in}$ )
	maximum		12 (10)	
Marking device		Case style D <sup>2</sup> PAK (TO-263AB)	32CTQ025S	
			32CTQ030S	
		Case style TO-262AA	32CTQ025-1	
			32CTQ030-1	

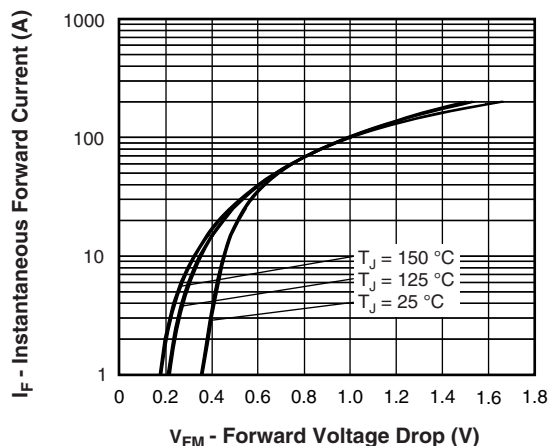


Fig. 1 - Maximum Forward Voltage Drop Characteristics

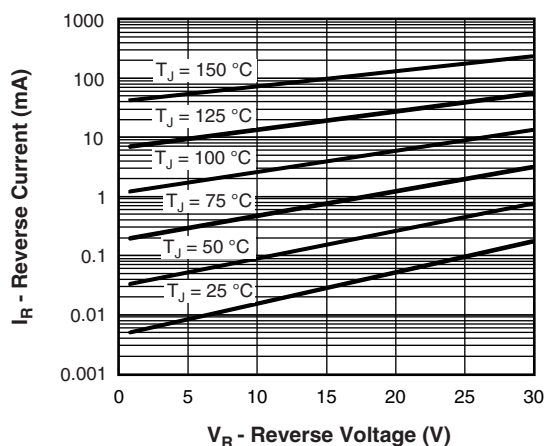


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

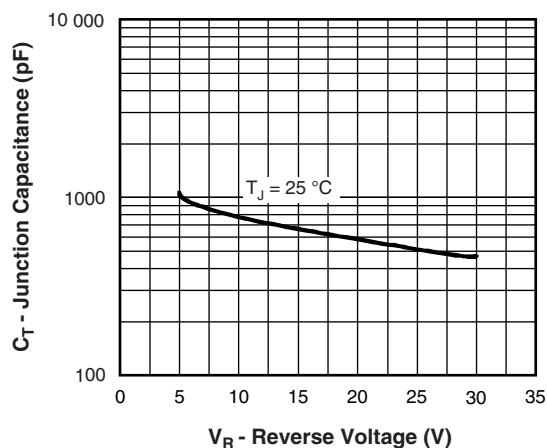
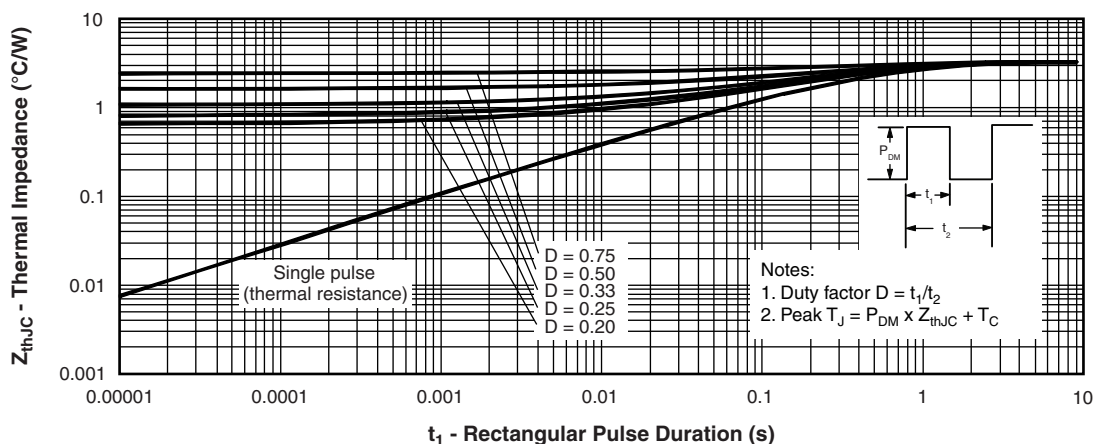


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

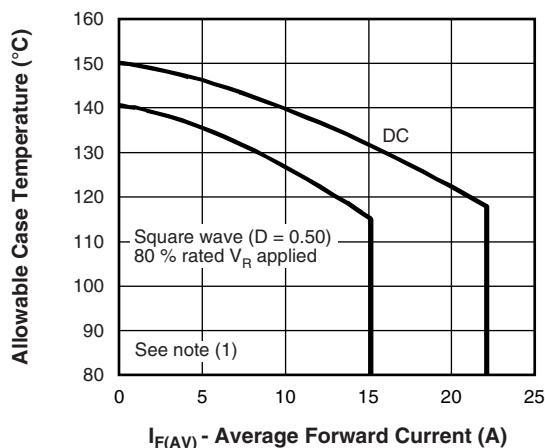


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

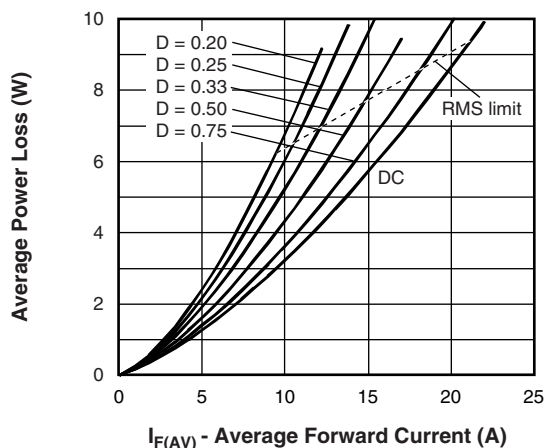


Fig. 6 - Forward Power Loss Characteristics

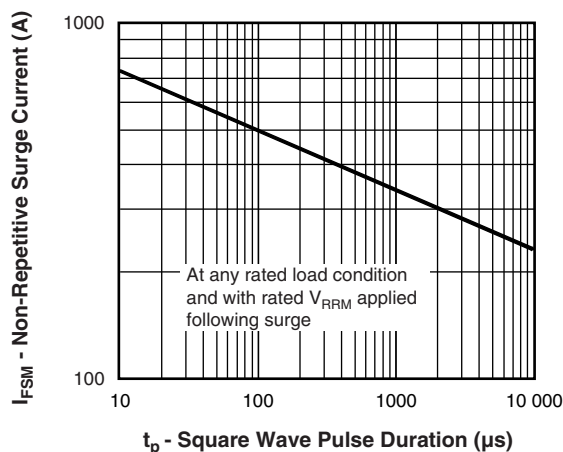


Fig. 7 - Maximum Non-Repetitive Surge Current

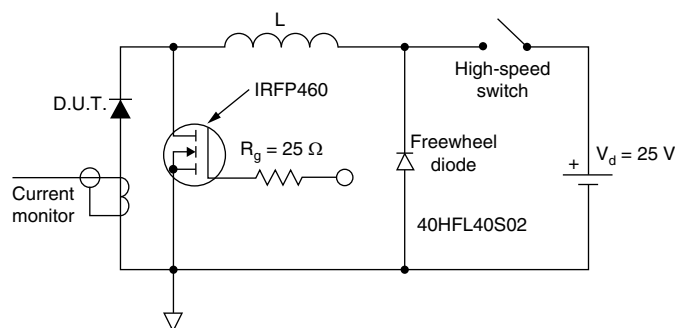


Fig. 8 - Unclamped Inductive Test Circuit

## Note

- (1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;  
 $P_d$  = 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>32</b>	<b>C</b>	<b>T</b>	<b>Q</b>	<b>030</b>	<b>S</b>	<b>TRL</b>	<b>-M3</b>
	①	②	③	④	⑤	⑥	⑦	⑧	⑨

- |          |   |   |
|----------|---|---|
| <b>1</b> | - | Vishay Semiconductors product   |
| <b>2</b> | - | Current rating (30 A)   |
| <b>3</b> | - | Circuit configuration: C = common cathode                                       |
| <b>4</b> | - | T = TO-220  |
| <b>5</b> | - | Schottky "Q" series   |
| <b>6</b> | - | Voltage ratings   |
| <b>7</b> | - | • S = D <sup>2</sup> PAK (TO-263AB)   |
|          |   | • -1 = TO-262AA   |
| <b>8</b> | - | • None = tube   |
|          |   | • TRL = tape and reel (left oriented - for D <sup>2</sup> PAK (TO-263AB) only)  |
|          |   | • TRR = tape and reel (right oriented - for D <sup>2</sup> PAK (TO-263AB) only) |
| <b>9</b> | - | -M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free              |

025 = 25 V
030 = 30 V

ORDERING INFORMATION			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-32CTQ025S-M3	50	1000	Antistatic plastic tubes
VS-32CTQ025STRR-M3	800	800	13" diameter reel
VS-32CTQ025STRL-M3	800	800	13" diameter reel
VS-32CTQ025-1-M3	50	1000	Antistatic plastic tubes
VS-32CTQ030S-M3	50	1000	Antistatic plastic tubes
VS-32CTQ030STRR-M3	800	800	13" diameter reel
VS-32CTQ030STRL-M3	800	800	13" diameter reel
VS-32CTQ030-1-M3	50	1000	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS		
Dimensions	D <sup>2</sup> PAK (TO-263AB)	<a href="http://www.vishay.com/doc?96164">www.vishay.com/doc?96164</a>
	TO-262AA	<a href="http://www.vishay.com/doc?96165">www.vishay.com/doc?96165</a>
Part marking information	D <sup>2</sup> PAK (TO-263AB)	<a href="http://www.vishay.com/doc?95444">www.vishay.com/doc?95444</a>
	TO-262AA	<a href="http://www.vishay.com/doc?95443">www.vishay.com/doc?95443</a>
Packaging information		<a href="http://www.vishay.com/doc?96424">www.vishay.com/doc?96424</a>



## D<sup>2</sup>PAK

### DIMENSIONS in millimeters and inches

Conforms to JEDEC® outline D<sup>2</sup>PAK (SMD-220)



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	0.00	0.254	0.000	0.010	
b	0.51	0.99	0.020	0.039	
b1	0.51	0.89	0.020	0.035	4
b2	1.14	1.78	0.045	0.070	
b3	1.14	1.73	0.045	0.068	4
c	0.38	0.74	0.015	0.029	
c1	0.38	0.58	0.015	0.023	4
c2	1.14	1.65	0.045	0.065	
D	8.51	9.65	0.335	0.380	2

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D1	6.86	8.00	0.270	0.315	3
E	9.65	10.67	0.380	0.420	2, 3
E1	7.90	8.80	0.311	0.346	3
e	2.54 BSC		0.100 BSC		
H	14.61	15.88	0.575	0.625	
L	1.78	2.79	0.070	0.110	
L1	-	1.65	-	0.066	3
L2	1.27	1.78	0.050	0.070	
L3	0.25 BSC		0.010 BSC		
L4	4.78	5.28	0.188	0.208	

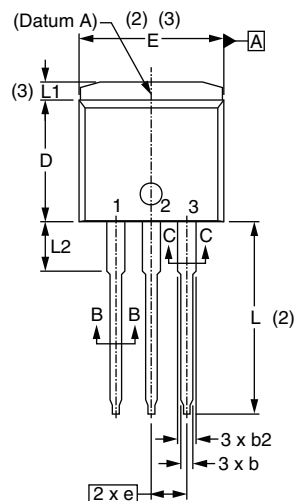
#### Notes

- (1) Dimensioning and tolerancing per ASME Y14.5 M-1994
- (2) 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 outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Datum A and B to be determined at datum plane H
- (6) Controlling dimension: inch
- (7) Outline conforms to JEDEC® outline TO-263AB

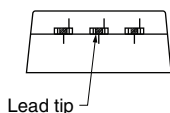
## TO-262

### DIMENSIONS in millimeters and inches

#### Modified JEDEC outline TO-262



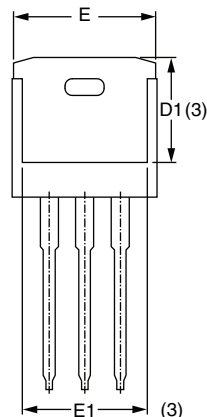
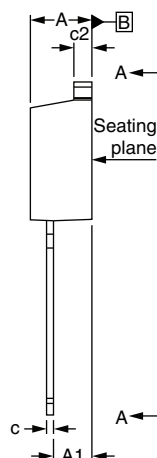
$\pm 0.010$  A A B



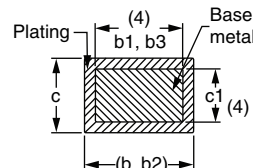
#### Lead assignments

##### Diodes

1. - Anode (two die)/open (one die)
2. - Cathode
3. - Anode



Section A - A



Section B - B and C - C

Scale: None

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	2.03	3.02	0.080	0.119	
b	0.51	0.99	0.020	0.039	
b1	0.51	0.89	0.020	0.035	4
b2	1.14	1.78	0.045	0.070	
b3	1.14	1.73	0.045	0.068	4
c	0.38	0.74	0.015	0.029	
c1	0.38	0.58	0.015	0.023	4
c2	1.14	1.65	0.045	0.065	
D	8.51	9.65	0.335	0.380	2
D1	6.86	8.00	0.270	0.315	3
E	9.65	10.67	0.380	0.420	2, 3
E1	7.90	8.80	0.311	0.346	3
e	2.54 BSC		0.100 BSC		
L	13.46	14.10	0.530	0.555	
L1	-	1.65	-	0.065	3
L2	3.56	3.71	0.140	0.146	

#### Notes

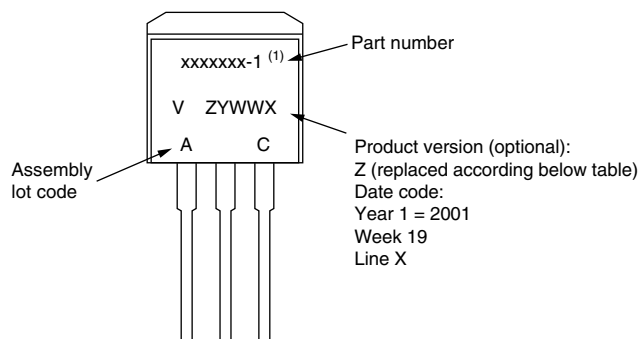
- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1

- (4) Dimension b1 and c1 apply to base metal only

- (5) Controlling dimension: inches

- (6) Outline conform to JEDEC TO-262 except A1 (maximum), b (minimum) and D1 (minimum) where dimensions derived the actual package outline

## TO-262



Example: This is a xxxxxx-1 <sup>(1)</sup> with assembly lot code AC, assembled on WW 19, 2001 in the assembly line "X"

### Note

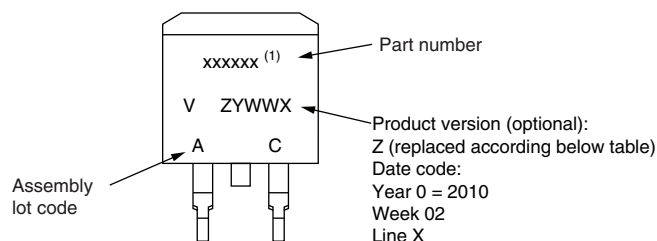
<sup>(1)</sup> If part number contain "H" as last digit, product is AEC-Q101 qualified

ENVIRONMENTAL NAMING CODE (Z)	PRODUCT DEFINITION
A	Termination lead (Pb)-free
B	Totally lead (Pb)-free
E	RoHS-compliant and termination lead (Pb)-free
F	RoHS-compliant and totally lead (Pb)-free
M	Halogen-free, RoHS-compliant and termination lead (Pb)-free
N	Halogen-free, RoHS-compliant and totally lead (Pb)-free
G	Green





## D<sup>2</sup>PAK



Example: This is a xxxxxx <sup>(1)</sup> with  
assembly lot code AC,  
assembled on WW 02, 2010

### Note

(1) If part number contain "H" as last digit, product is AEC-Q101 qualified

ENVIRONMENTAL NAMING CODE (Z)	PRODUCT DEFINITION
A	Termination lead (Pb)-free
B	Totally lead (Pb)-free
E	RoHS-compliant and termination lead (Pb)-free
F	RoHS-compliant and totally lead (Pb)-free
M	Halogen-free, RoHS-compliant, and termination lead (Pb)-free
N	Halogen-free, RoHS-compliant, and totally lead (Pb)-free
G	Green



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