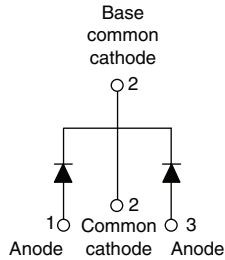


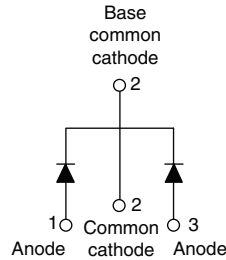
## Schottky Rectifier

**ICR**® 10CTQ150SPbF



**D<sup>2</sup>PAK**

10CTQ150-1PbF



**TO-262**

### FEATURES

- 175 °C T<sub>J</sub> operation
- Center tap configuration
- 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
- Lead (Pb)-free ("PbF" suffix)
- Designed for industrial level



**RoHS\***  
COMPLIANT

### DESCRIPTION

This center tap Schottky rectifier 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

I <sub>F(AV)</sub>	10 A
V <sub>R</sub>	150 V

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
I <sub>F(AV)</sub>	Rectangular waveform	10	A
V <sub>RRM</sub>		150	V
I <sub>FSM</sub>	at t <sub>p</sub> = 5 μs sine	620	A
V <sub>F</sub>	at 5 Apk, T <sub>J</sub> = 125 °C (per leg)	0.73	V
T <sub>J</sub>	Range	- 55 to 175	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	VALUE	UNITS
Maximum DC reverse voltage	V <sub>R</sub>	150	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 <sub>F(AV)</sub>	50 % duty cycle at T <sub>C</sub> = 155 °C, rectangular waveform	5	A
			10	
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	I <sub>FSM</sub>	5 μs sine or 3 μs rect. pulse	620	A
		10 ms sine or 6 ms rect. pulse	115	
Non-repetitive avalanche energy per leg	E <sub>AS</sub>	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 1 A, L = 10 mH	5	mJ
Repetitive avalanche current per leg	I <sub>AR</sub>	Current decaying linearly to zero in 1 μs Frequency limited by T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> typical	1	A

\* Pb containing terminations are not RoHS compliant, exemptions may apply

# 10CTQ150SPbF/10CTQ150-1PbF



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ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	at 5 A	$T_J = 25\text{ }^\circ\text{C}$	0.93	V
		at 10 A		1.10	
		at 5 A	$T_J = 125\text{ }^\circ\text{C}$	0.73	
		at 10 A		0.86	
Maximum reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	0.05	mA
		$T_J = 125\text{ }^\circ\text{C}$		7	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.468	V
Forward slope resistance	$r_t$			28	m $\Omega$
Maximum junction capacitance per leg	$C_T$	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 $^\circ\text{C}$		200	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	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, junction to case per leg	$R_{thJC}$	DC operation		3.50	$^\circ\text{C/W}$
Maximum thermal resistance, junction to case per package				1.75	
Typical thermal resistance, case to heatsink (only for TO-220)	$R_{thCS}$	Mounting surface, smooth and greased		0.50	
Approximate weight				2	g
				0.07	oz.
Mounting torque	minimum maximum			6 (5)	kg-cm (lbf · in)
				12 (10)	
Marking device		Case style D <sup>2</sup> PAK		10CTQ150S	
		Case style TO-262		10CTQ150-1	

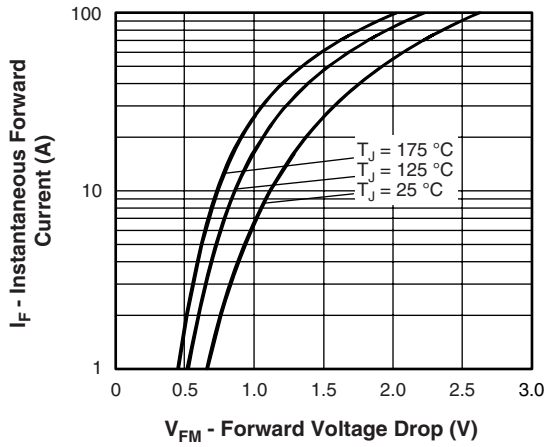


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

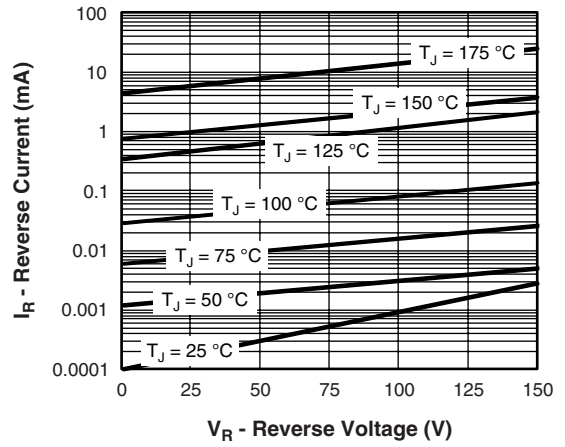


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

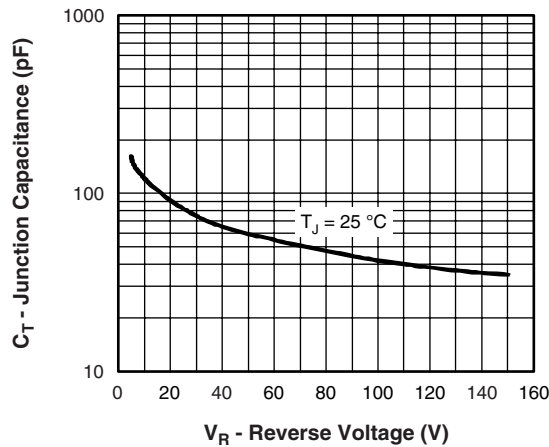


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

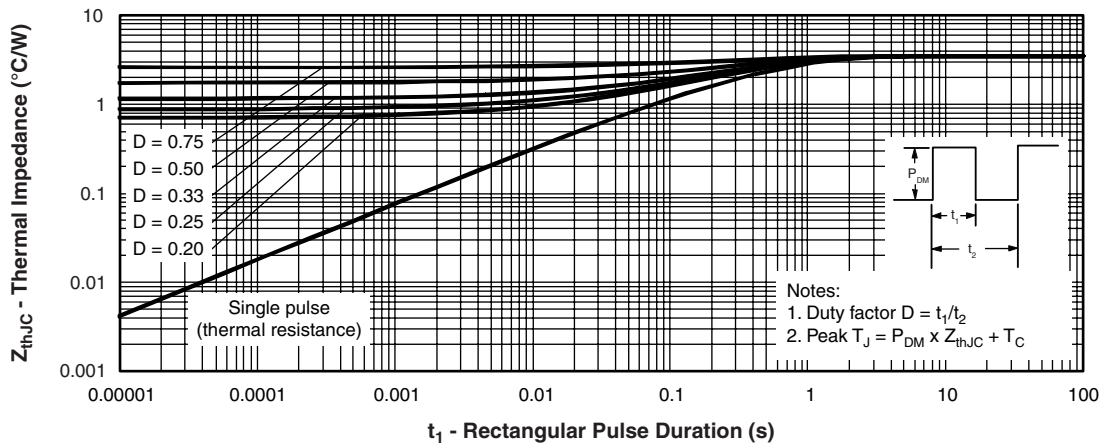


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

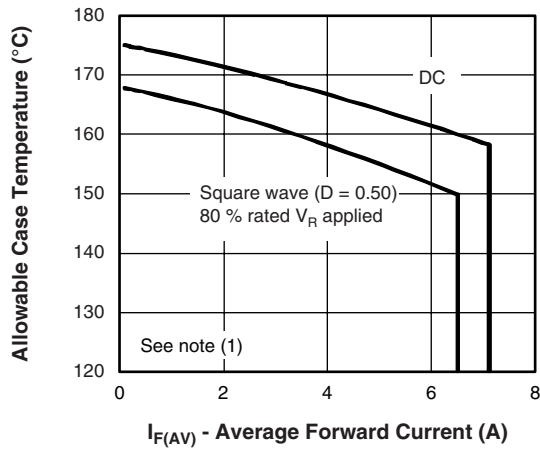


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

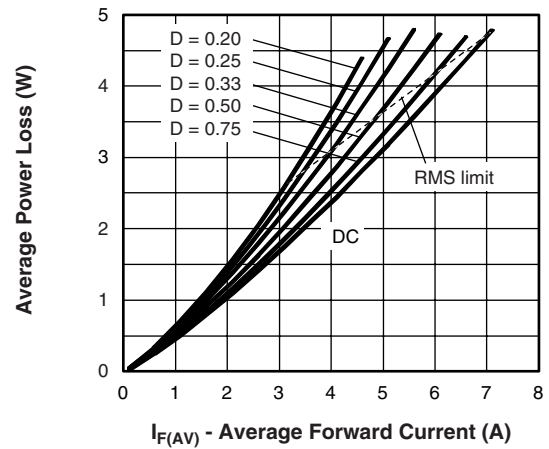


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

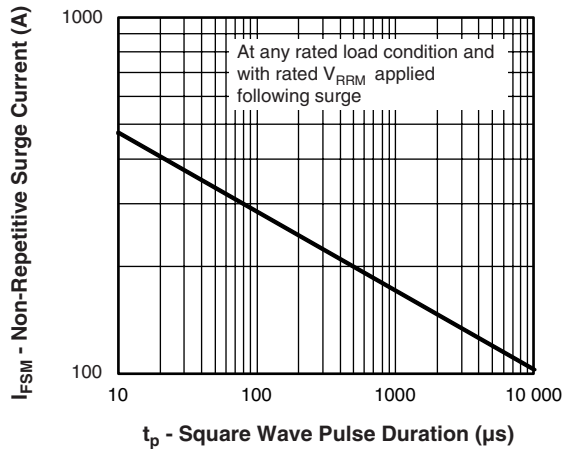


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

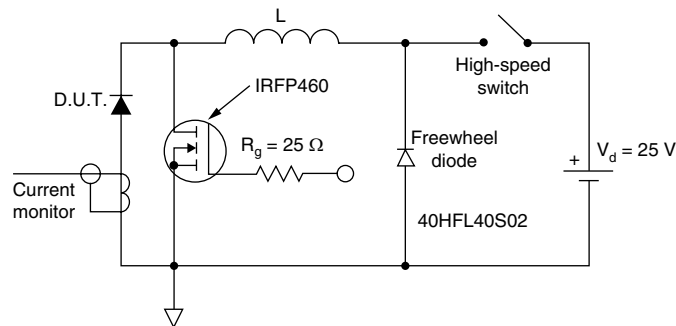


Fig. 8 - Unclamped Inductive Test Circuit

**Note**

- (1) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;
- $P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);
- $P_{d_{REV}}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 10\text{ V}$

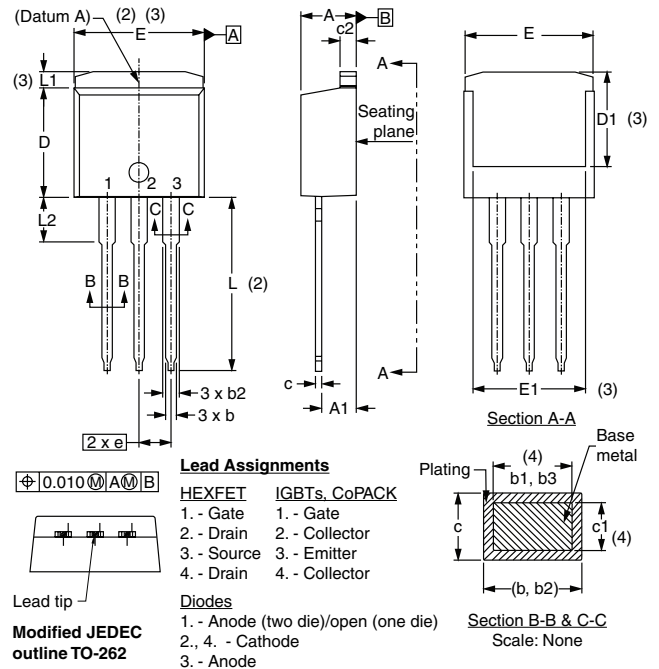
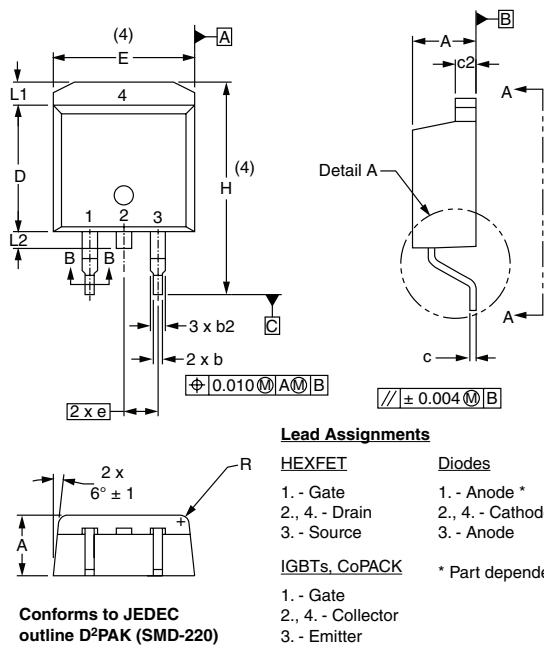


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## DIMENSIONS in millimeters (inches)



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	
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	-	0.270	-	3
E	9.65	10.67	0.380	0.420	2, 3
E1	6.22	-	0.245	-	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	-	0.065	
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	
m	17.78	-	0.700	-	
m1	8.89	-	0.350	-	
n	11.43	-	0.450	-	
o	2.08	-	0.082	-	
p	3.81	-	0.150	-	
R	0.51	0.71	0.020	0.028	
θ	90°	93°	90°	93°	

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	8.38	9.65	0.330	0.380	2
D1	6.86	-	0.270	-	3
E	9.65	10.67	0.380	0.420	2, 3
E1	6.22	-	0.245	-	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

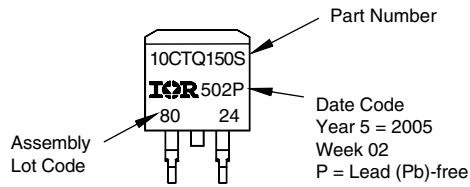
# 10CTQ150SPbF/10CTQ150-1PbF

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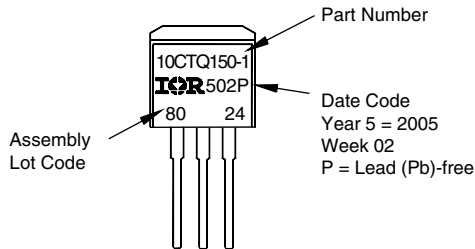
## PART MARKING INFORMATION



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

Example: This is a 10CTQ150S with  
Assembly Lot Code 8024,  
assembled on WW 02, 2005

Note: "P" in Assembly Line  
position indicates "lead (Pb)-free"



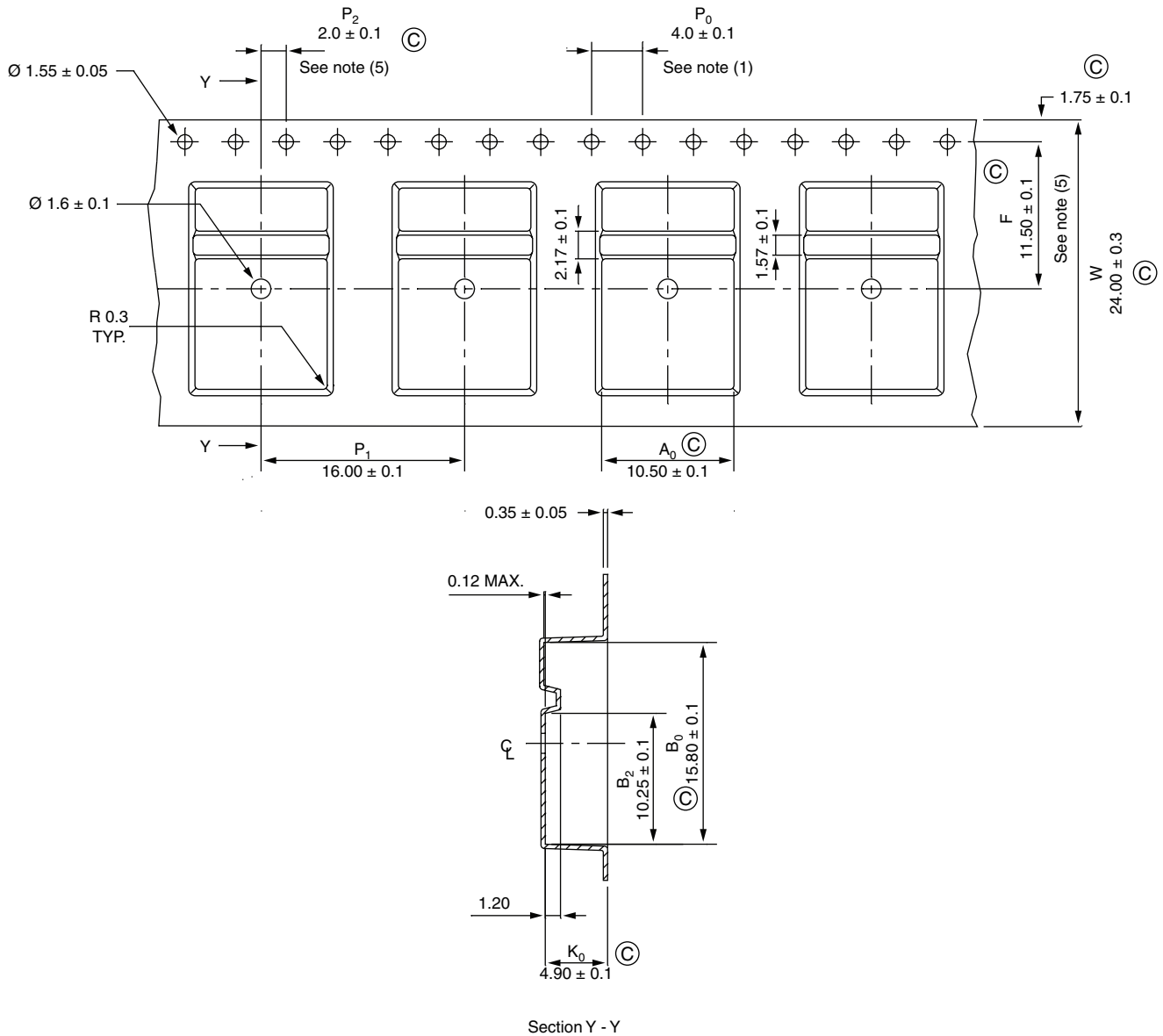
### TO-262

Example: This is a 10CTQ150-1 with  
Assembly Lot Code 8024  
assembled on WW 02, 2005

Note: "P" in Assembly Line  
position indicates "lead (Pb)-free"



### TAPE AND REEL INFORMATION in millimeters (inches)



#### Notes

- (1) 10 sprocket hole pitch cumulative tolerance  $\pm 0.02$
- (2) Camber not to exceed 1 mm to 10 mm
- (3) Material: conductive black styrenic alloy
- (4)  $K_0$  measured from a plane on the inside bottom of the pocket to the top surface of the carrier
- (5) Measured from centerline of sprocket hole to centerline of pocket
- (6) Vendor: (optional)
- (7) Must also meet requirements of EIA standard EIA-481A taping of surface mount components for automatic placement
- (8) Surface resistivity of molded material must measure less or equal to  $10^6 \Omega$  per square. Measured in accordance to procedure given in ASTM D-257 and ASTM D-991
- (9) Total length per reel must be 45 m
- (10)  $\text{C}$  critical

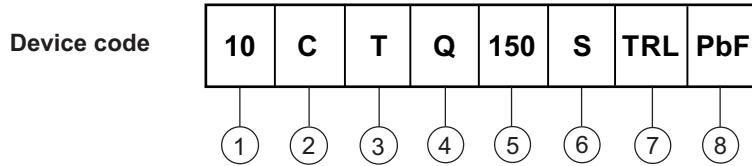
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## ORDERING INFORMATION TABLE



- 1** - Current rating (10 A)
- 2** - Circuit configuration  
C = Common cathode
- 3** - T = TO-220
- 4** - Schottky "Q" series
- 5** - Voltage rating (150 = 150 V)
- 6** -
  - S = D<sup>2</sup>PAK
  - -1 = TO-262
- 7** -
  - None = Tube (50 pieces)
  - TRL = Tape and reel (left oriented - for D<sup>2</sup>PAK only)
  - TRR = Tape and reel (right oriented - for D<sup>2</sup>PAK only)
- 8** -
  - None = Standard production
  - PbF = Lead (Pb)-free





## Notice

The products described herein were acquired by Vishay Intertechnology, Inc., as part of its acquisition of International Rectifier's Power Control Systems (PCS) business, which closed in April 2007. Specifications of the products displayed herein are pending review by Vishay and are subject to the terms and conditions shown below.

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