

International  
**IR** Rectifier

10CTQ150  
 10CTQ150S  
 10CTQ150-1

SCHOTTKY RECTIFIER

10 Amp

#### Major Ratings and Characteristics

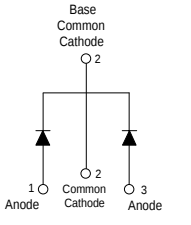
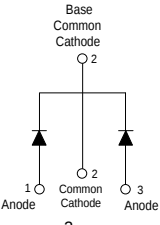
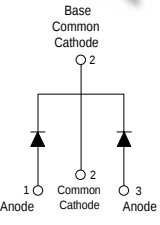
| Characteristics                              | Values     | Units      |
|----------------------------------------------|------------|------------|
| $I_{F(AV)}$ Rectangular waveform             | 10         | A          |
| $V_{RRM}$                                    | 150        | V          |
| $I_{FSM}$ @ $t_p = 5 \mu s$ sine             | 620        | A          |
| $V_F$ @ 5 Apk, $T_J = 125^\circ C$ (per leg) | 0.73       | V          |
| $T_J$ range                                  | -55 to 175 | $^\circ C$ |

#### Description/ Features

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  $175^\circ C$  junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- $175^\circ C$   $T_J$  operation
- Center tap configuration
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

#### Case Styles

| 10CTQ150                                                                                                                                                                             | 10CTQ150S                                                                                                                                                                                        | 10CTQ150 -1                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br><br>TO-220 | <br><br>D <sup>2</sup> PAK | <br><br>TO-262 |

## Voltage Ratings

| Parameters                                      | 10CTQ150<br>10CTQ150S<br>10CTQ150-1 |
|-------------------------------------------------|-------------------------------------|
| $V_R$ Max. DC Reverse Voltage (V)               | 150                                 |
| $V_{RWM}$ Max. Working Peak Reverse Voltage (V) |                                     |

## Absolute Maximum Ratings

| Parameters                                                                           | Values     | Units | Conditions                                                                                                                                                 |
|--------------------------------------------------------------------------------------|------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_{F(AV)}$ Max. Average Forward (Per Leg)<br>Current * See Fig. 5 (Per Device)      | 5<br>10    | A     | 50% duty cycle @ $T_C = 155^\circ\text{C}$ , rectangular wave form                                                                                         |
| $I_{FSM}$ Max. Peak One Cycle Non-Repetitive<br>Surge Current (Per Leg) * See Fig. 7 | 620<br>115 | A     | 5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse<br>10ms Sine or 6ms Rect. pulse<br>Following any rated load condition and with rated $V_{RRM}$ applied |
| $E_{AS}$ Non-Repetitive Avalanche Energy (Per Leg)                                   | 6.75       | mJ    | $T_J = 25^\circ\text{C}$ , $I_{AS} = 0.30\text{ Amps}$ , $L = 150\text{ mH}$                                                                               |
| $I_{AR}$ Repetitive Avalanche Current (Per Leg)                                      | 0.30       | A     | Current decaying linearly to zero in 1 $\mu\text{sec}$<br>Frequency limited by $T_J$ max. $V_A = 1.5 \times V_R$ typical                                   |

## Electrical Specifications

| Parameters                                                       | Values | Units            | Conditions                                                              |
|------------------------------------------------------------------|--------|------------------|-------------------------------------------------------------------------|
| $V_{FM}$ Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)    | 0.93   | V                | @ 5A<br>$T_J = 25^\circ\text{C}$                                        |
|                                                                  | 1.10   | V                | @ 10A                                                                   |
|                                                                  | 0.73   | V                | @ 5A<br>$T_J = 125^\circ\text{C}$                                       |
|                                                                  | 0.86   | V                | @ 10A                                                                   |
| $I_{RM}$ Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1) | 0.05   | mA               | $T_J = 25^\circ\text{C}$                                                |
|                                                                  | 7      | mA               | $T_J = 125^\circ\text{C}$<br>$V_R = \text{rated } V_R$                  |
| $V_{F(TO)}$ Threshold Voltage                                    | 0.468  | V                | $T_J = T_J \text{ max.}$                                                |
| $r_t$ Forward Slope Resistance                                   | 28     | m $\Omega$       |                                                                         |
| $C_T$ Max. Junction Capacitance (Per Leg)                        | 200    | pF               | $V_R = 5V_{DC}$ , (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$ |
| $L_S$ Typical Series Inductance (Per Leg)                        | 8.0    | nH               | Measured lead to lead 5mm from package body                             |
| $dv/dt$ Max. Voltage Rate of Change (Rated $V_R$ )               | 10000  | V/ $\mu\text{s}$ |                                                                         |

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle < 2%

## Thermal-Mechanical Specifications

| Parameters                                                                | Values     | Units              | Conditions                           |
|---------------------------------------------------------------------------|------------|--------------------|--------------------------------------|
| $T_J$ Max. Junction Temperature Range                                     | -55 to 175 | $^\circ\text{C}$   |                                      |
| $T_{stg}$ Max. Storage Temperature Range                                  | -55 to 175 | $^\circ\text{C}$   |                                      |
| $R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Leg)             | 3.50       | $^\circ\text{C/W}$ | DC operation                         |
| $R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Package)         | 1.75       | $^\circ\text{C/W}$ | DC operation                         |
| $R_{thCS}$ Typical Thermal Resistance, Case to Heatsink (only for TO-220) | 0.50       | $^\circ\text{C/W}$ | Mounting surface, smooth and greased |
| wt Approximate Weight                                                     | 2 (0.07)   | g (oz.)            |                                      |
| T Mounting Torque                                                         | Min.       | 6 (5)              | Kg-cm<br>(lbf-in)                    |
|                                                                           | Max.       | 12 (10)            |                                      |

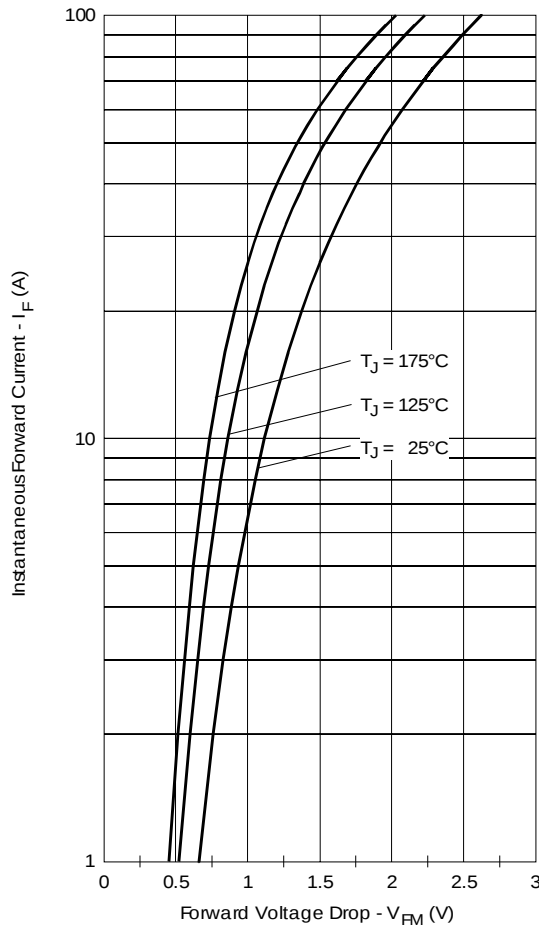


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

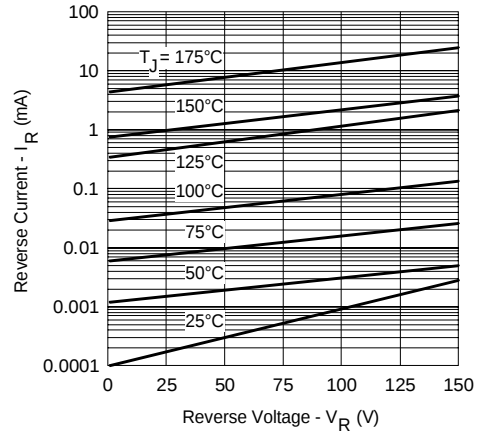


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

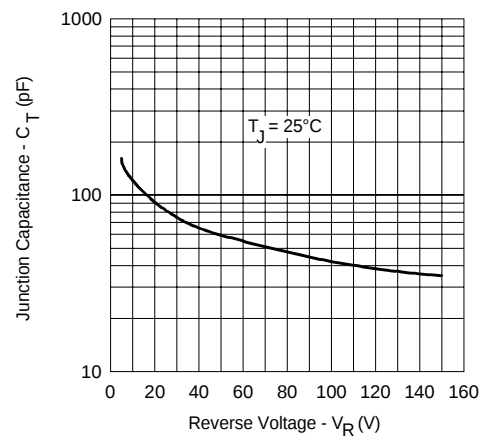


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

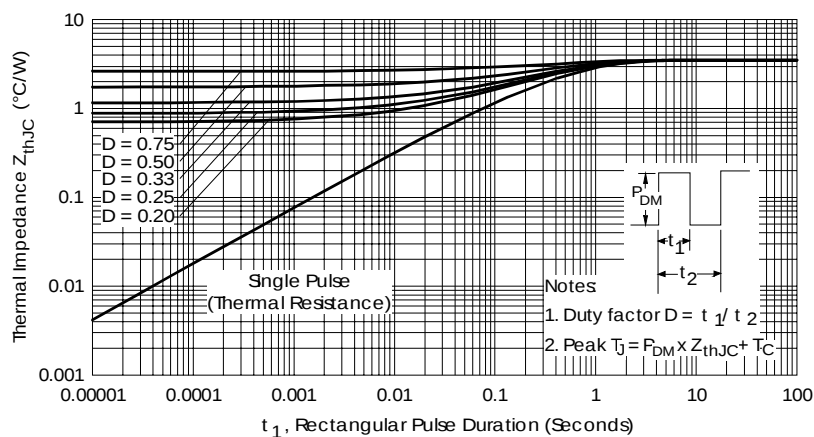


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

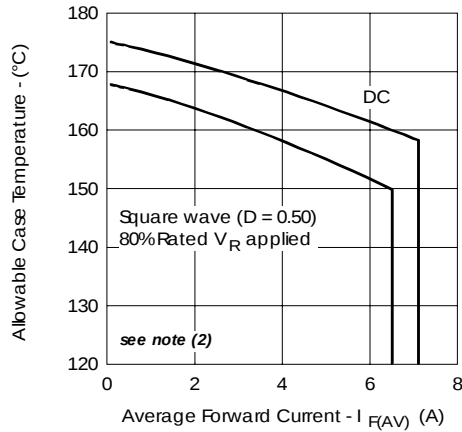


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

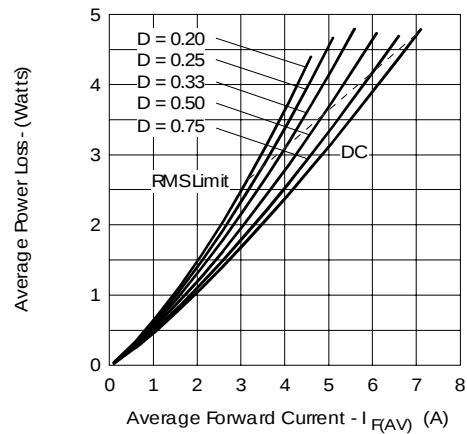


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

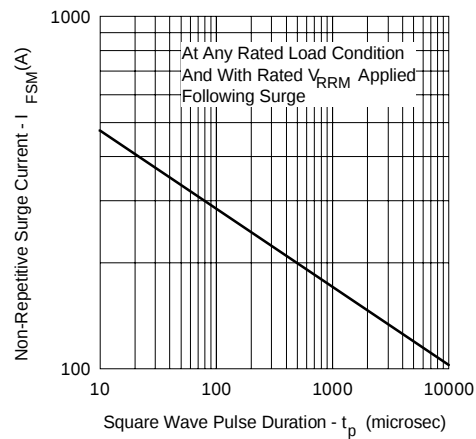


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

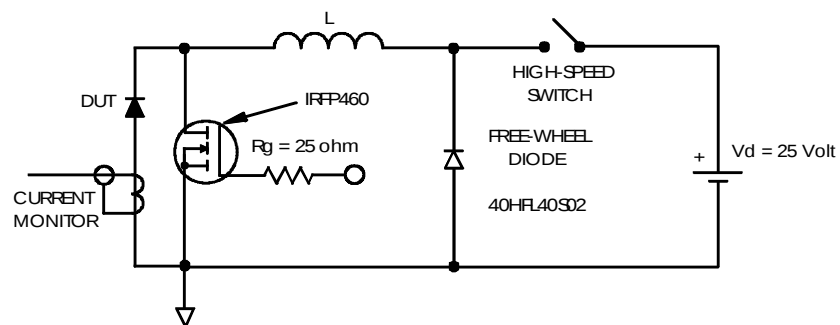


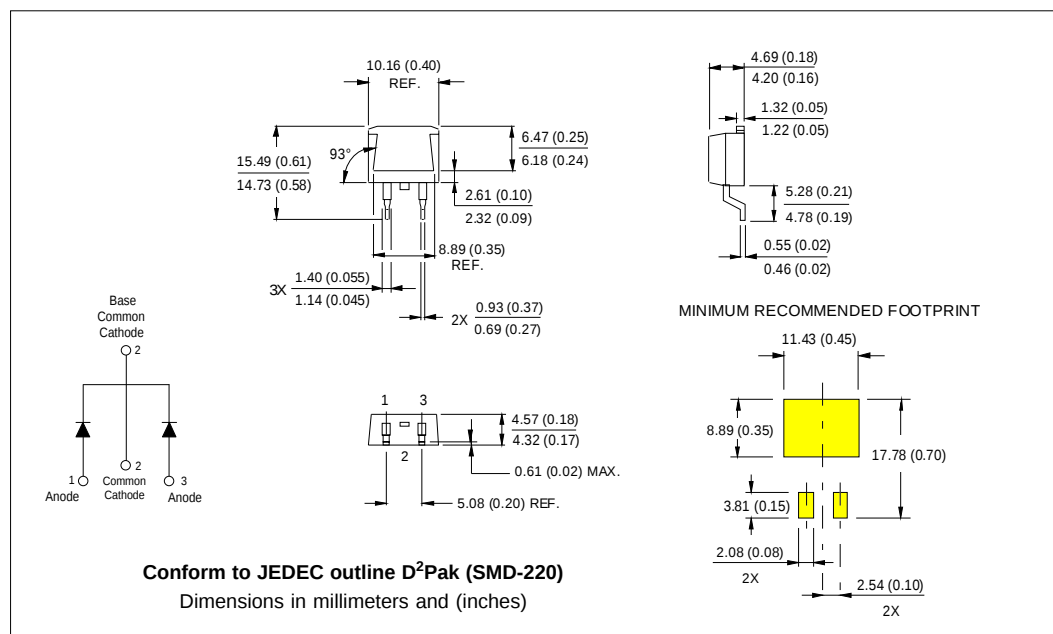
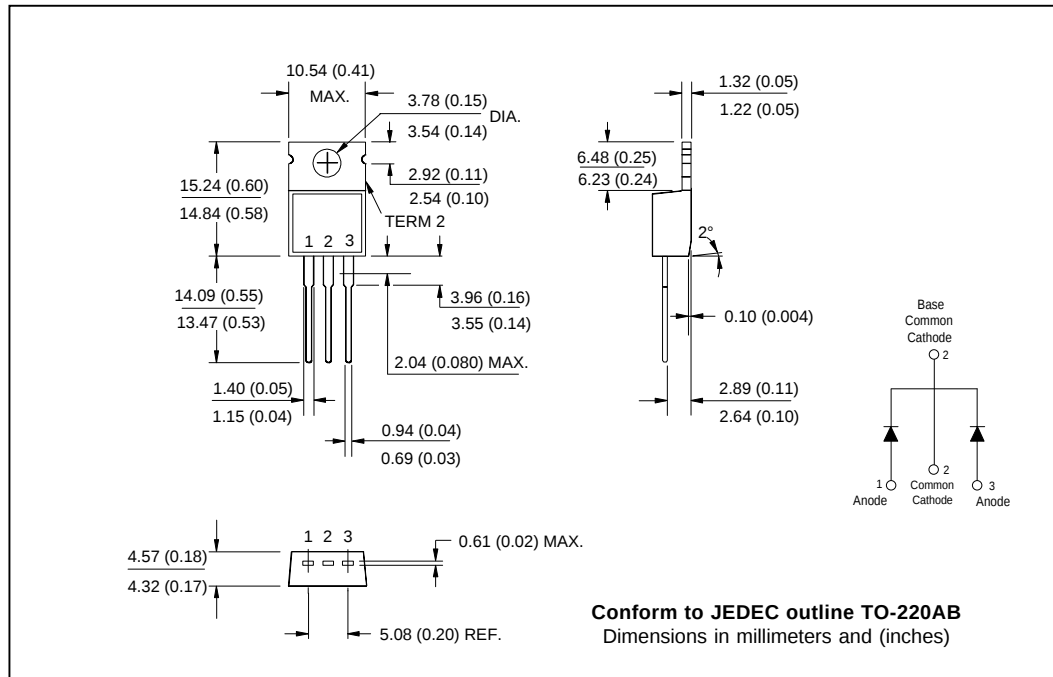
Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used:  $T_c = T_j - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;

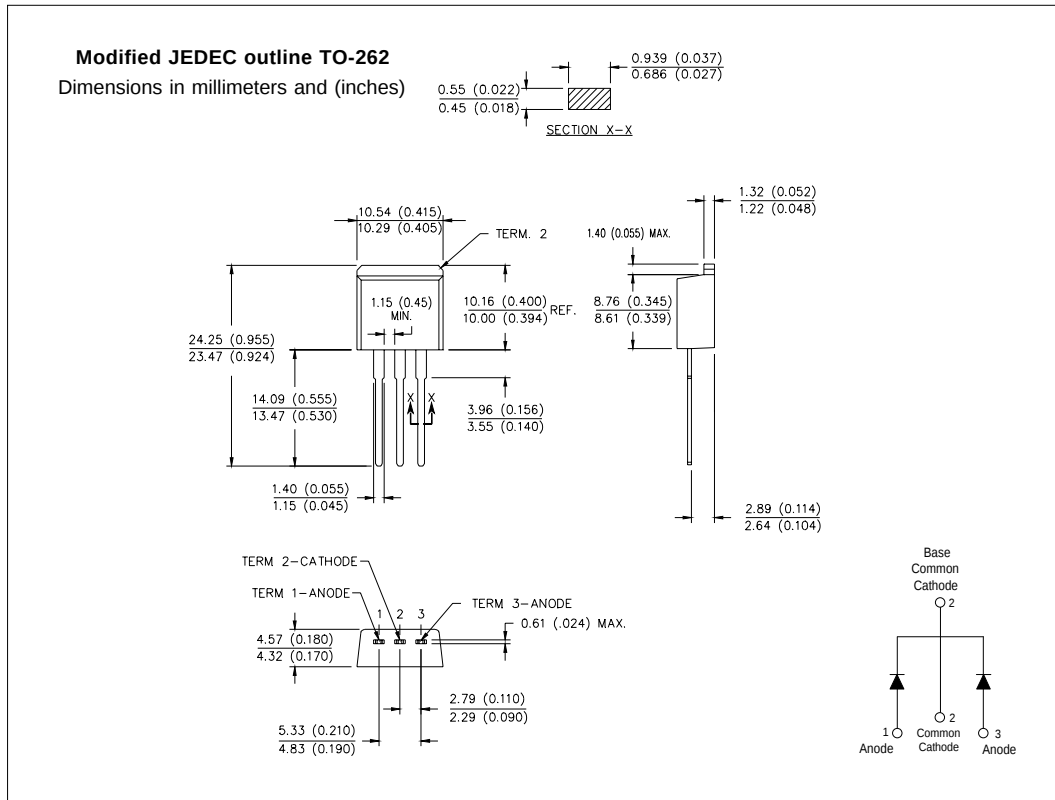
$P_d$  = Forward Power Loss =  $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (see Fig. 6);

$P_{d_{REV}}$  = Inverse Power Loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R @ V_{R1} = 10V$

Outline Table

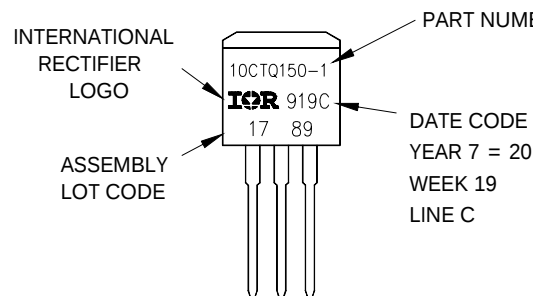


## Outline Table

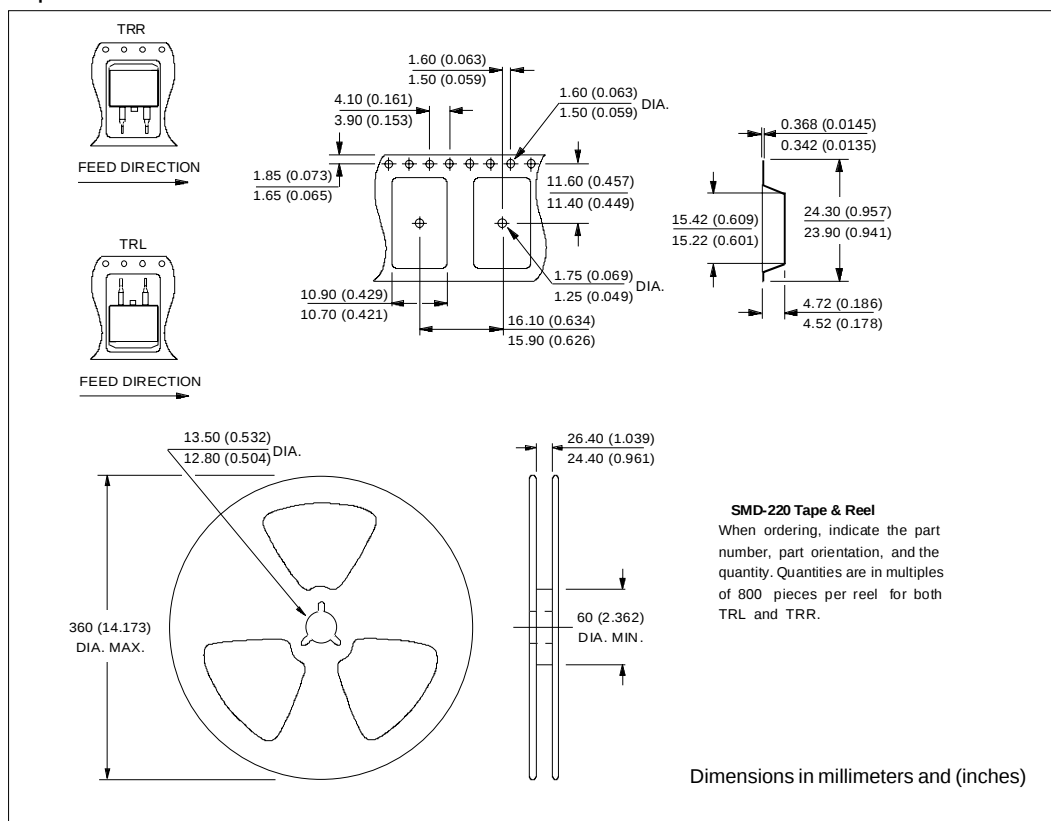


## Marking Information

EXAMPLE: THIS IS A 10CTQ150-1  
LOT CODE 1789  
ASSEMBLED ON WW 19, 2001  
IN THE ASSEMBLY LINE "C"



## Tape & Reel Information



## Ordering Information Table

| Device Code |                             |   |   |     |    |
|-------------|-----------------------------|---|---|-----|----|
| 10          | C                           | T | Q | 150 | -1 |
| ①           | ②                           | ③ | ④ | ⑤   | ⑥  |
| 1           | - Essential Part Number     |   |   |     |    |
| 2           | - C = Common Cathode        |   |   |     |    |
| 3           | - T = TO-220                |   |   |     |    |
| 4           | - Q = Schottky Q Series     |   |   |     |    |
| 5           | - Voltage Rating 150 = 150V |   |   |     |    |
| 6           | - 1 = TO-262                |   |   |     |    |
|             | S = D <sup>2</sup> Pak      |   |   |     |    |

10CTQ150, 10CTQ150S, 10CTQ150-1

Bulletin PD-2.291 rev. C 03/03

International  
**IOR** Rectifier

Data and specifications subject to change without notice.  
This product has been designed and qualified for Industrial Level.  
Qualification Standards can be found on IR's Web site.

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