

# International **IR** Rectifier

**10CTQ150**  
**10CTQ150S**  
**10CTQ150-1**

**SCHOTTKY RECTIFIER**

**10 Amp**


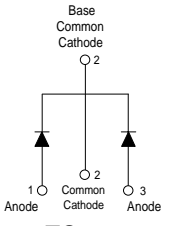

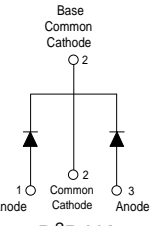

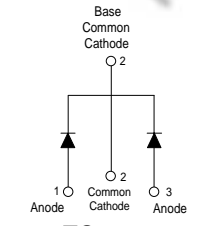
### Major Ratings and Characteristics

| 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° C junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- 175° 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  |   |   |
|--|---|---|
| <p><b>10CTQ150</b></p>  <p>Base<br/>Common<br/>Cathode</p>  <p>1 Anode 2 Common Cathode 3 Anode</p> <p><b>TO-220</b></p> | <p><b>10CTQ150S</b></p>  <p>Base<br/>Common<br/>Cathode</p>  <p>1 Anode 2 Common Cathode 3 Anode</p> <p><b>D<sup>2</sup>PAK</b></p> | <p><b>10CTQ150 -1</b></p>  <p>Base<br/>Common<br/>Cathode</p>  <p>1 Anode 2 Common Cathode 3 Anode</p> <p><b>TO-262</b></p> |

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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      | A     | 50% duty cycle @ $T_C = 155^\circ\text{C}$ , rectangular wave form   |
|  | 10     |       |  |
| $I_{FSM}$ Max. Peak One Cycle Non-Repetitive<br>Surge Current (Per Leg) * See Fig. 7 | 620    | A     | 5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse<br>10ms Sine or 6ms Rect. pulse                                      |
|  | 115    |       |  |
| $E_{AS}$ Non-Repetitive Avalanche Energy (Per Leg)                                   | 6.75   | mJ    | $T_J = 25^\circ\text{C}$ , $I_{AS} = 0.30$ Amps, $L = 150$ 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  |
|  | 1.10   | V                | @ 10A   |
|  | 0.73   | V                | @ 5A  |
|  | 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               | $T_J = 125^\circ\text{C}$   |
| $V_{F(TO)}$ Threshold Voltage                                    | 0.468  | V                | $T_J = T_J$ 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       | $^\circ\text{C}/\text{W}$ | DC operation                         |
| $R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Package)         | 1.75       | $^\circ\text{C}/\text{W}$ | DC operation                         |
| $R_{thCS}$ Typical Thermal Resistance, Case to Heatsink (only for TO-220) | 0.50       | $^\circ\text{C}/\text{W}$ | 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)                   |                                      |

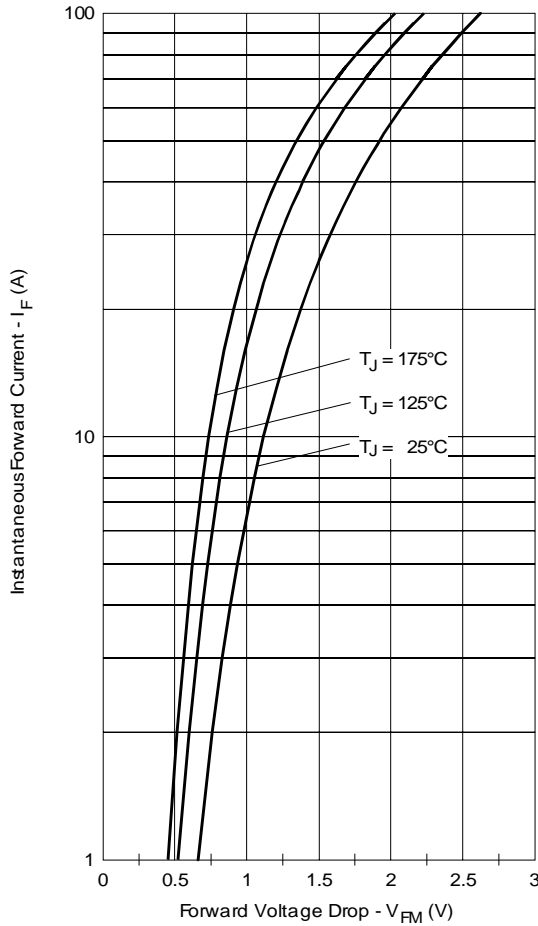


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

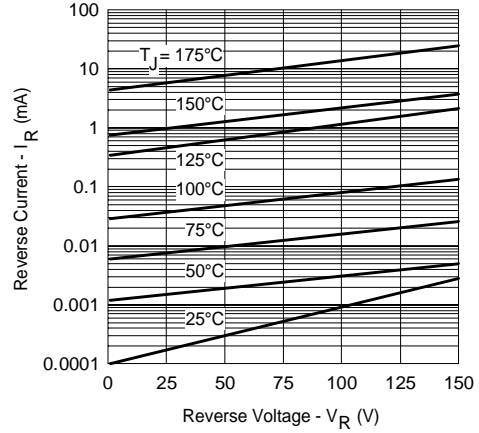


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

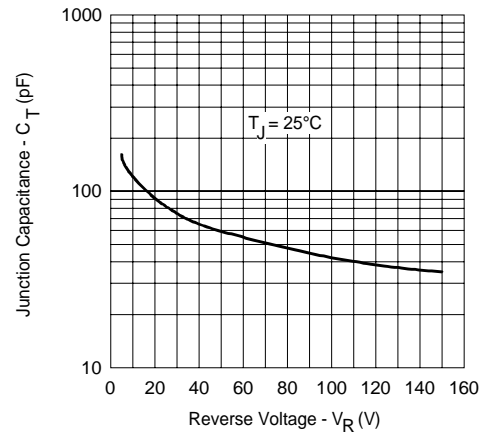


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

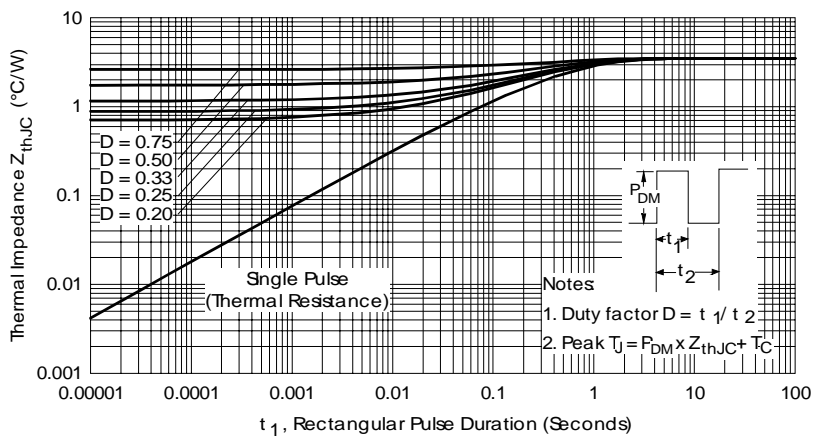


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

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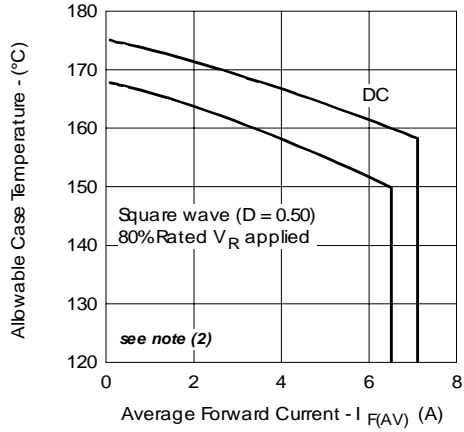


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

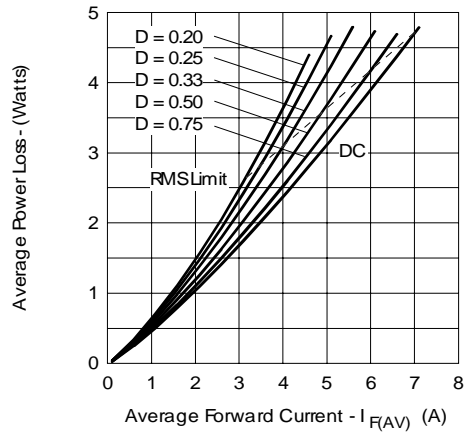


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

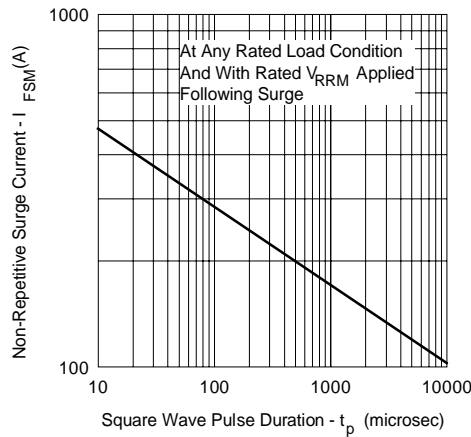


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

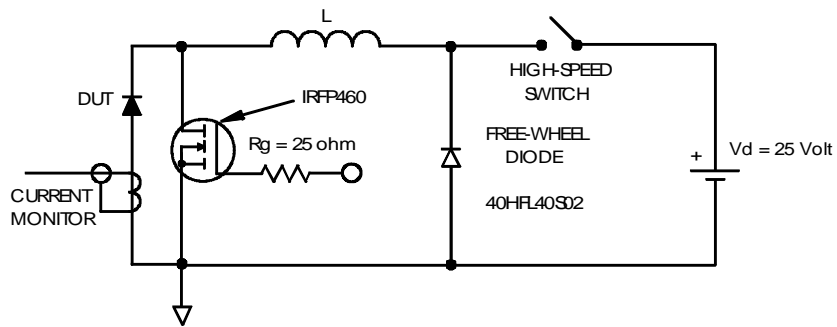


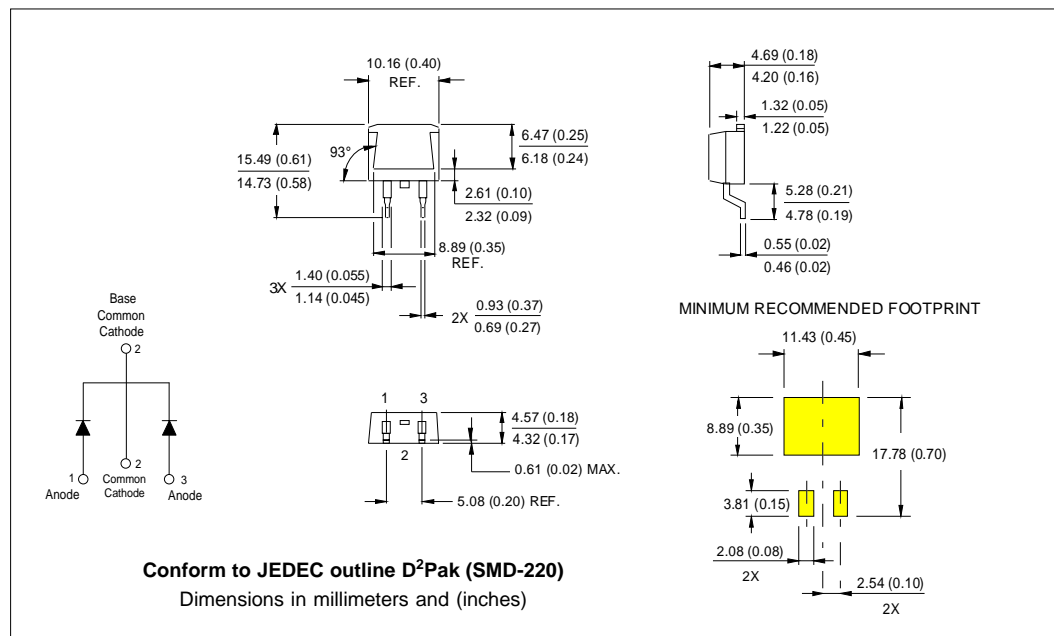
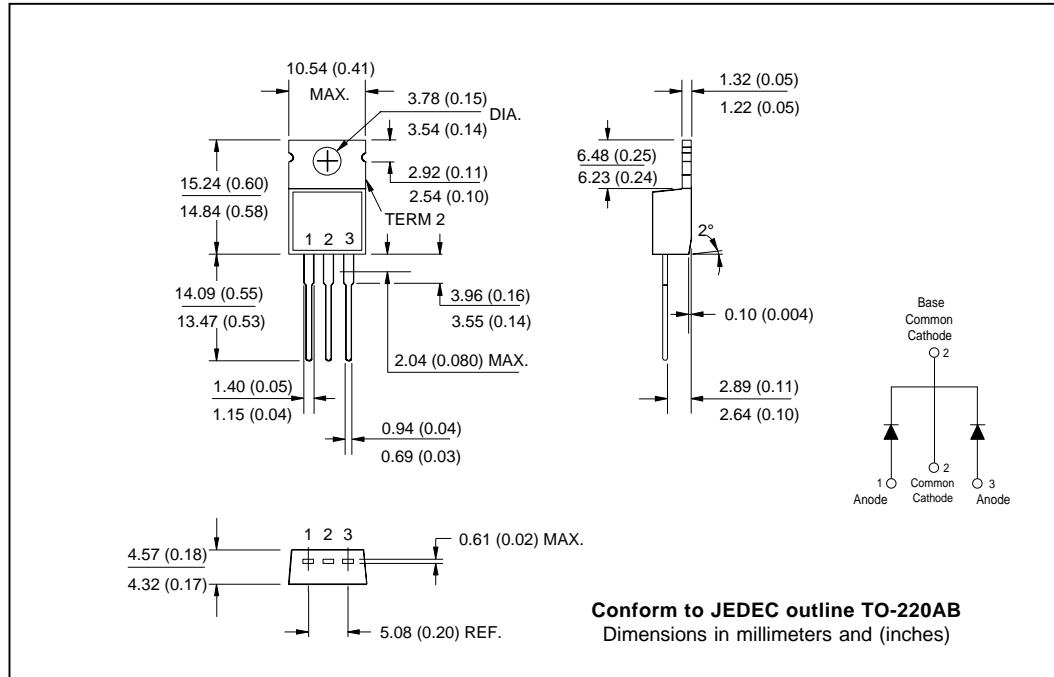
Fig. 8 - Unclamped Inductive Test Circuit

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

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

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

Outline Table

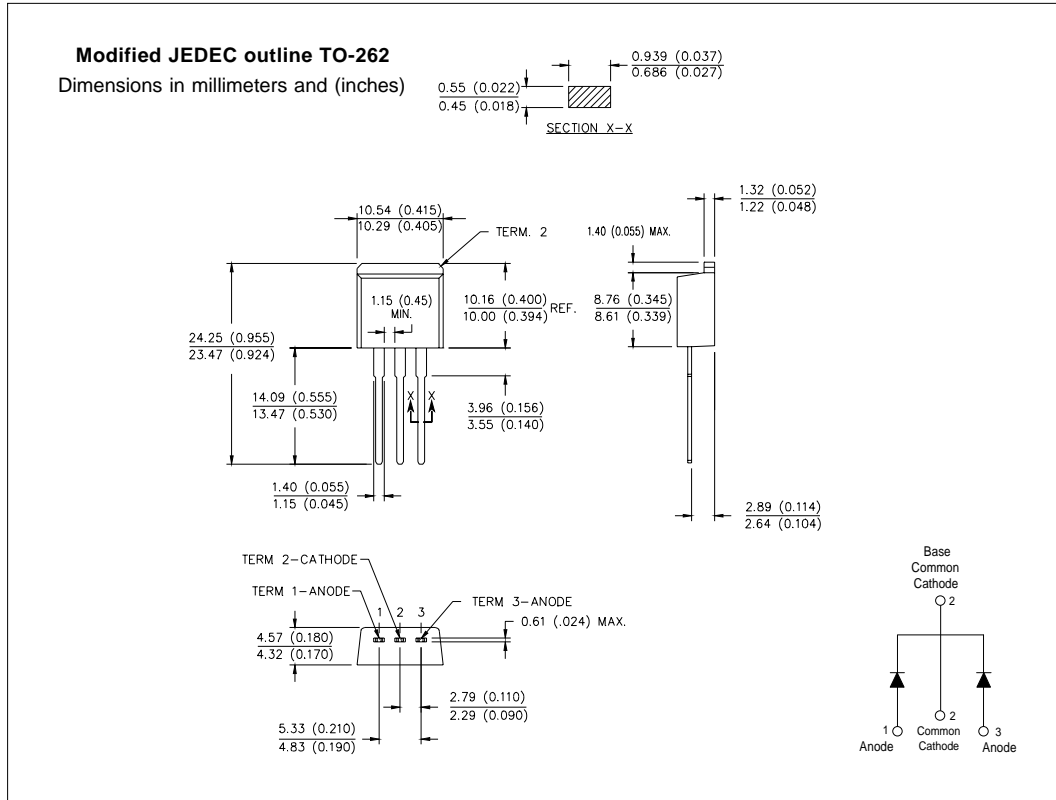


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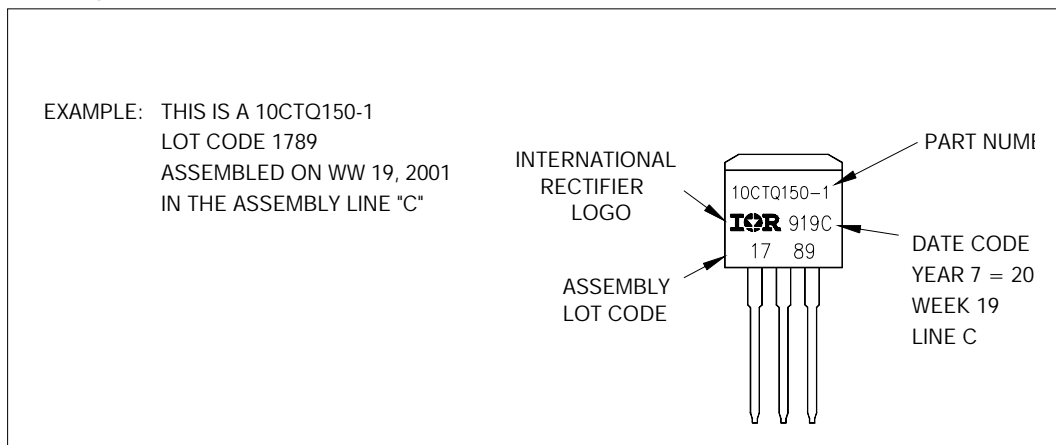
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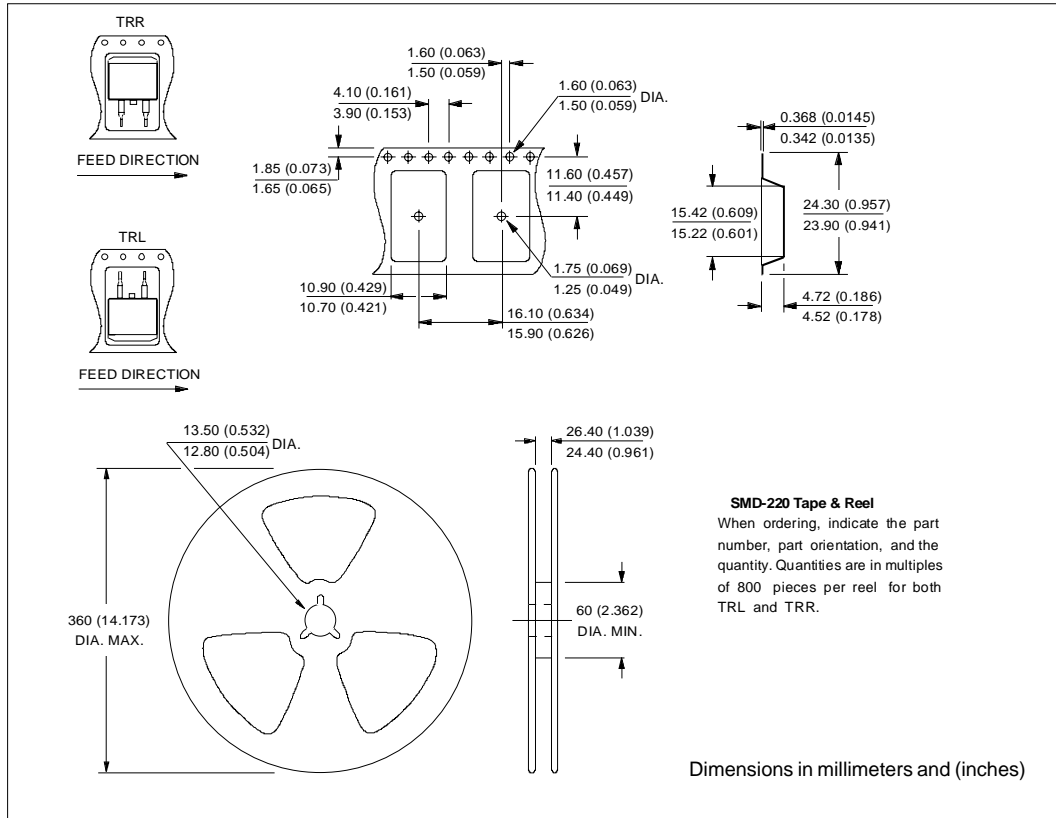
Outline Table



Marking Information



**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<br>S = D <sup>2</sup> Pak |   |     |    |

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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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