PD-20540 rev. E 10/99

International
IOR Rectifier

47CTQ020
47CTQ020S
47CTQ020-1

SCHOTTKY RECTIFIER

40 Amp

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	40	A
V_{RRM}	20	V
I_{FSM} @ tp = 5 µs sine	1000	A
V_F @20 Apk, T_J = 125 °C	0.34	V
T_J	-55 to 150	°C

Description/Features

This center tap Schottky rectifier has been optimized for ultra low forward voltage drop specifically for 3.3V output power supplies. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in parallel switching power supplies, converters, reverse battery protection, and redundant power subsystems.

- 150 °C T_J operation
- Center tap configuration
- Optimized for 3.3V application
- Ultra low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance

Case Styles

47CTQ020	47CTQ020S	47CTQ020-1
		
TO-220	D^2PAK	TO-262

Voltage Ratings

	Part number		47CTQ020, ..020S, ..020-1
V_R	Max. DC Reverse Voltage (V)	@ 125° C	20
V_R	Max. DC Reverse Voltage (V)	@ 150° C	10

Absolute Maximum Ratings

	Parameters	47CTQ	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward (Per Device)	40	A	50% duty cycle @ T_C = 135°C, rectangular wave form	
	Current (Per Leg)	20			
I_{FSM}	Max. Peak One Cycle Non-Repetitive	1000	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated Vrrm applied
	Surge Current (Per Leg)	250		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)	18	mJ	T_J = 25 °C, I_{AS} = 3 Amps, L = 3 mH	
I_{AR}	Repetitive Avalanche Current (Per Leg)	3	A	Current decaying linearly to zero in 1 µsec Frequency limited by T_J max. V_A = 1.5 x V_R typical	

Electrical Specifications

	Parameters	47CTQ	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop	0.45	V	@ 20A	T_J = 25 °C
	(Per Leg) (1)	0.51	V	@ 40A	
		0.34	V	@ 20A	T_J = 125 °C
		0.44	V	@ 40A	
		0.31	V	@ 20A	T_J = 150 °C
		0.42	V	@ 40A	
I_{RM}	Max. Reverse Leakage Current	3	mA	T_J = 25 °C	V_R = rated V_R
	(Per Leg) (1)	310	mA	T_J = 125 °C	
		60	mA	T_J = 125 °C	V_R = 5V
		45	mA	T_J = 125 °C	V_R = 3.3V
		306	mA	T_J = 150 °C	V_R = 10V
$V_{F(TO)}$	Threshold Voltage	0.188	V	T_J = T_J max.	
r_t	Forward Slope Resistance	5.9	mΩ		
C_T	Max. Junction Capacitance (Per Leg)	3000	pF	V_R = 5V_{DC}, (test signal range 100Khz to 1Mhz) 25°C	
L_S	Typical Series Inductance (Per Leg)	5.5	nH	Measured lead to lead 5mm from package body	
dv/dt	Max. Voltage Rate of Change (Rated V_R)	10,000	V/ µs		

(1) Pulse Width < 300µs, Duty Cycle <2%

Thermal-Mechanical Specifications

	Parameters		47CTQ	Units	Conditions
T_J	Max. Junction Temperature Range		-55 to 150	°C	
T_{stg}	Max. Storage Temperature Range		-55 to 150	°C	
R_{thJC}	Max. Thermal Resistance Junction to Case (Per Leg)		1.5	°C/W	DC operation
R_{thJC}	Max. Thermal Resistance Junction to Case (Per Package)		0.75	°C/W	DC operation
R_{thCS}	Typical Thermal Resistance, Case to Heatsink		0.50	°C/W	Mounting surface, smooth and greased (only for TO-220)
wt	Approximate Weight		2 (0.07)	g (oz.)	
T	Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)	
		Max.	12 (10)		

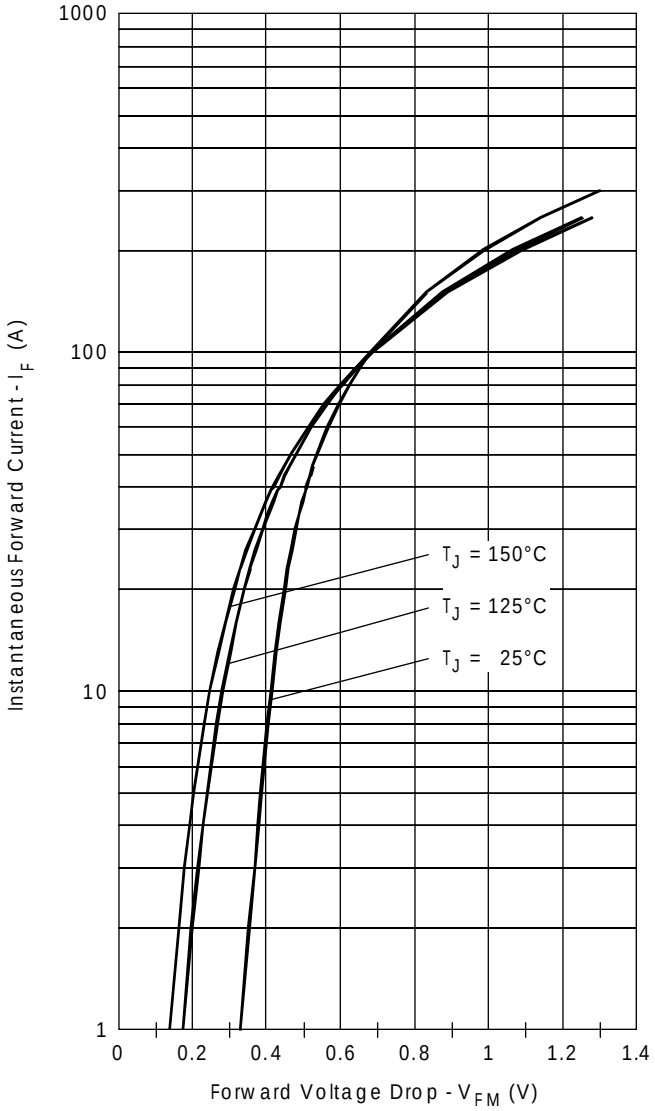


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

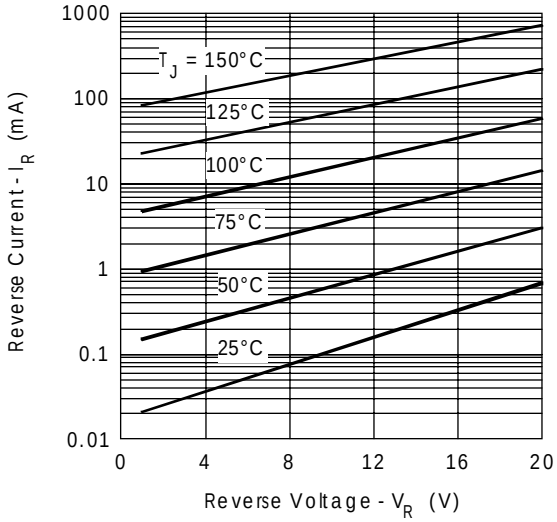


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

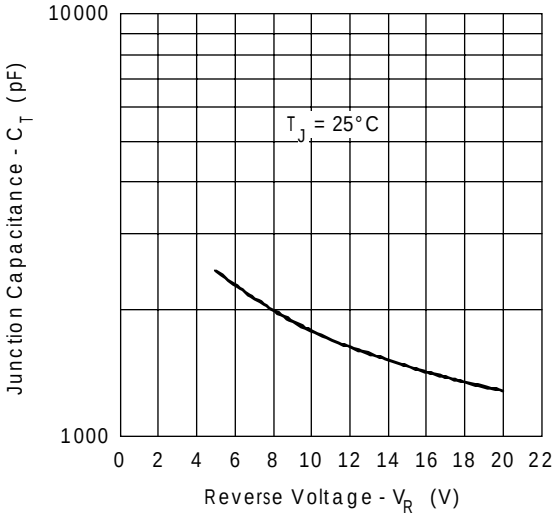


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

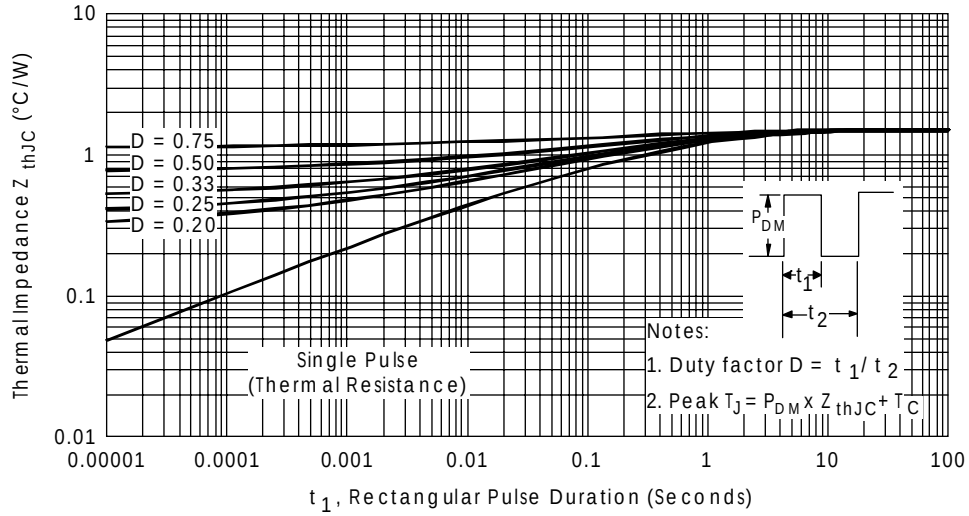


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

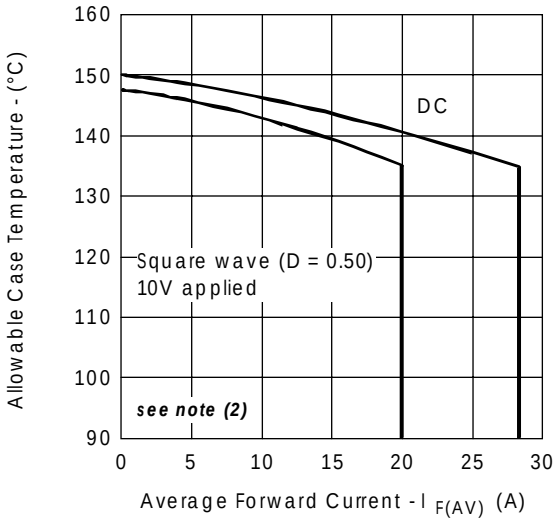


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

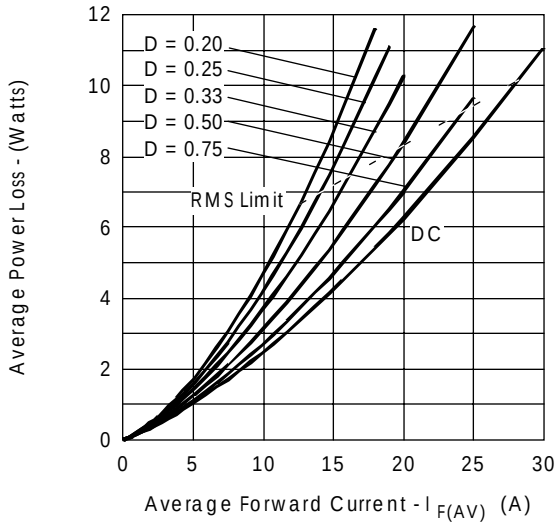


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

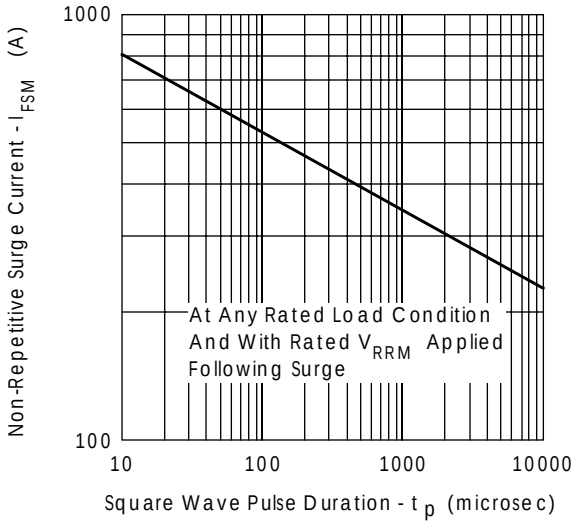


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

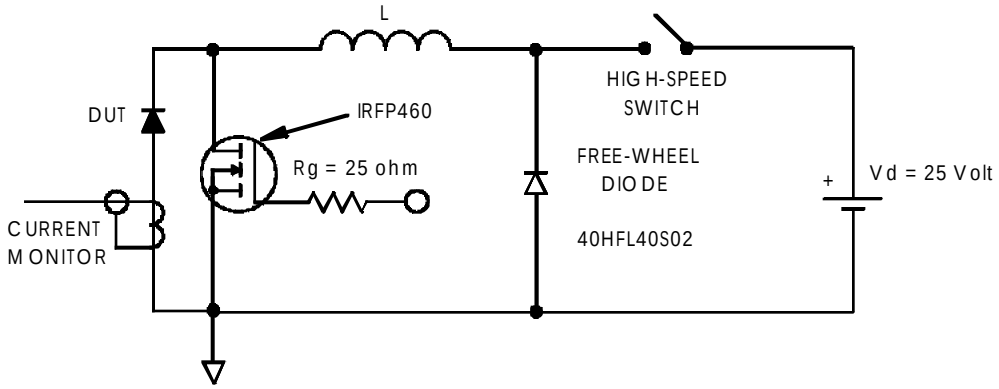
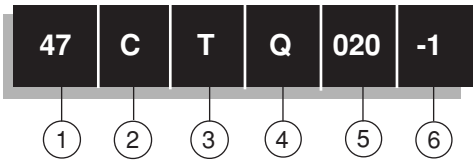


Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);
Pd_{REV} = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1} = 10$ V

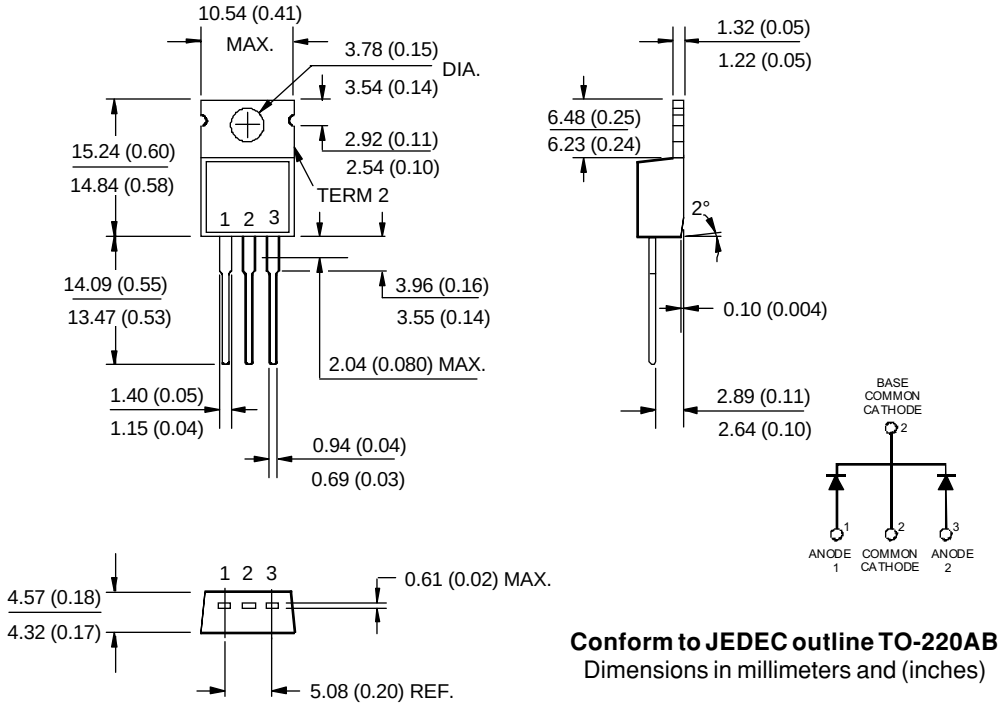
Ordering Information Table

Device Code



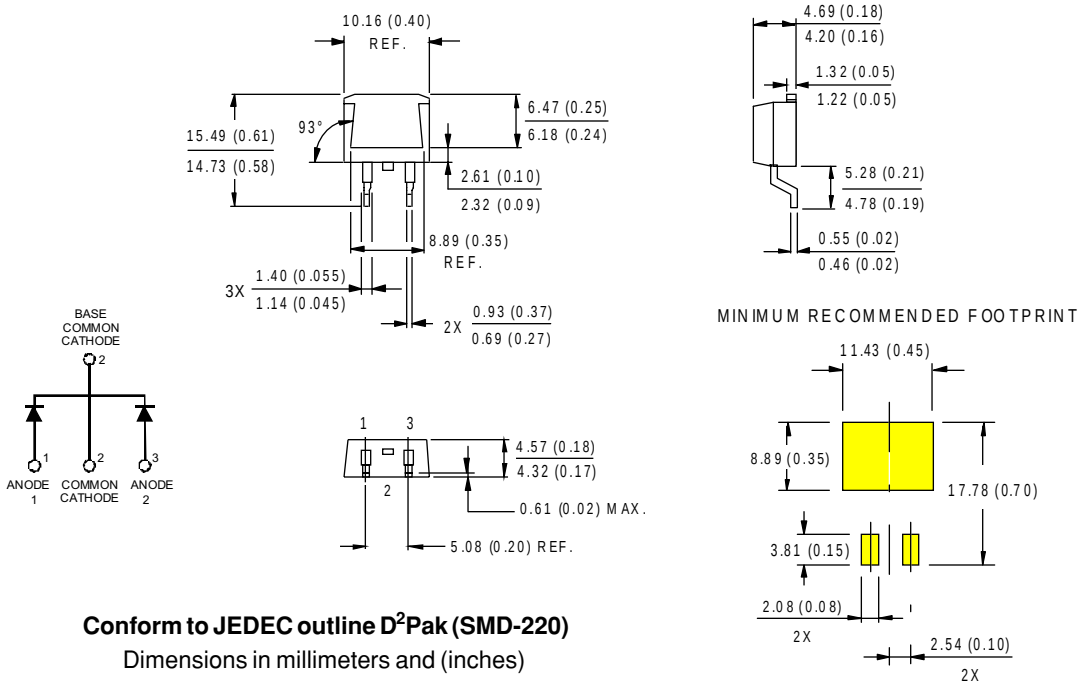
1	-	Essential Part Number
2	-	C = Common Cathode
3	-	T = TO-220
4	-	Q = Schottky Q Series
5	-	Voltage Rating 020 = 20V
6	-	-1 = TO-262
		S = D^2Pak

Outline Table



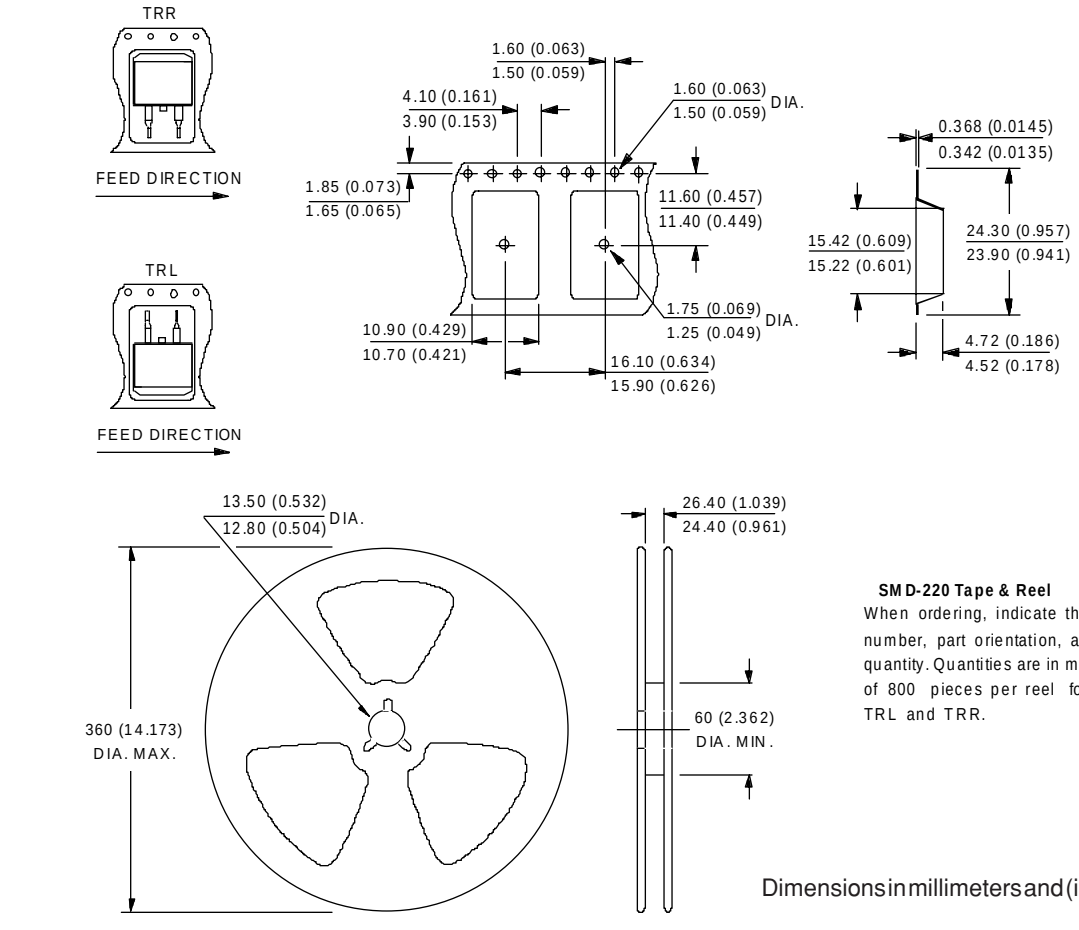
Conform to JEDEC outline TO-220AB
Dimensions in millimeters and (inches)

Outline Table



Conform to JEDEC outline D^2Pak (SMD-220)
Dimensions in millimeters and (inches)

Tape & Reel Information

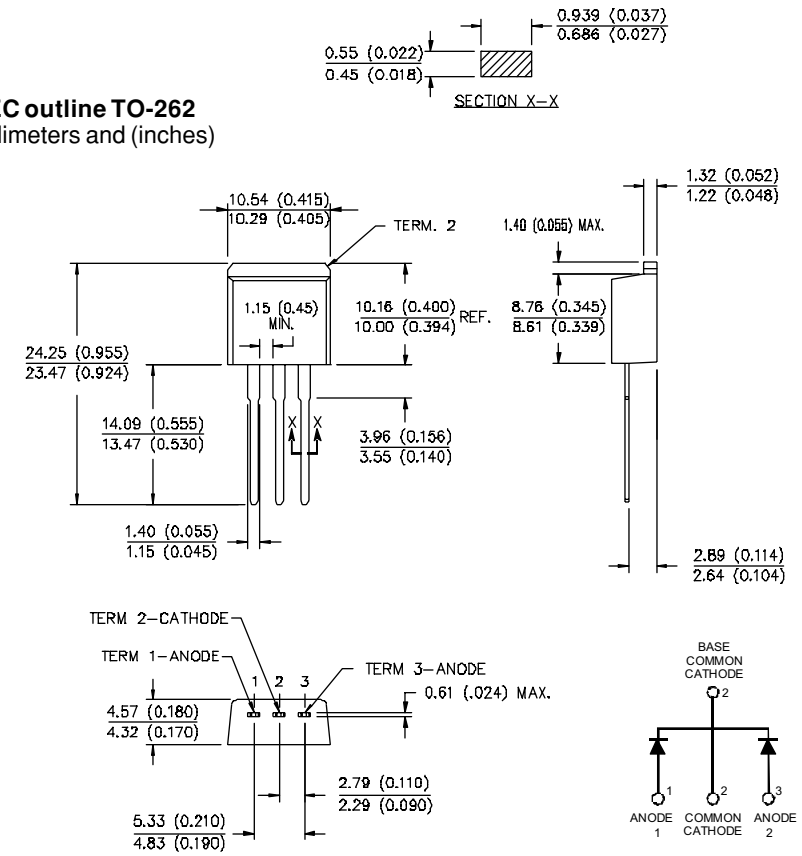


SMD-220 Tape & Reel
When ordering, indicate the part number, part orientation, and the quantity. Quantities are in multiples of 800 pieces per reel for both TRL and TRR.

Dimensions in millimeters and (inches)

Outline Table

Modified JEDEC outline TO-262
Dimensions in millimeters and (inches)



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IR SOUTHEAST ASIA: 1 Kim Seng Promenade, Great World City West Tower,13-11, Singapore 237994. Tel: ++ 65 838 4630.
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