

International
IR Rectifier

20CTQ150
 20CTQ150S
 20CTQ150-1

SCHOTTKY RECTIFIER

20 Amp

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	20	A
V_{RRM}	150	V
I_{FSM} @ $t_p = 5 \mu s$ sine	1030	A
V_F @ 10 Apk, $T_J = 125^\circ C$ (per leg)	0.66	V
T_J range	-55 to 175	$^\circ C$

Description/ Features

This center tap Schottky ectifier 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		
20CTQ150  Base Common Cathode 1 2 3 Anode Common Cathode Anode TO-220AB	20CTQ150S  Base Common Cathode 1 2 3 Anode Common Cathode Anode D²PAK	20CTQ150-1  Base Common Cathode 1 2 3 Anode Common Cathode Anode TO-262

Voltage Ratings

Parameters	20CTQ150 20CTQ150S 20CTQ150-1
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) Current * See Fig. 5 (Per Device)	10 20	A	50% duty cycle @ $T_C = 154^\circ\text{C}$, rectangular wave form
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	1030 180	A	5 μs Sine or 3 μs Rect. pulse 10ms Sine or 6ms Rect. pulse
E_{AS} Non-Repetitive Avalanche Energy (Per Leg)	2.45	mJ	Following any rated load condition and with rated V_{RRM} applied $T_J = 25^\circ\text{C}$, $I_{AS} = 0.7$ Amps, $L = 10$ mH
I_{AR} Repetitive Avalanche Current (Per Leg)	0.7	A	Current decaying linearly to zero in 1 μsec Frequency limited by T_J max. $V_A = 1.5 \times V_R$ typical

Electrical Specifications

Parameters	Typ.	Max.	Units	Conditions
V_{FM} Max. Forward Voltage Drop (1) (Per Leg) * See Fig. 1	0.80	0.88	V	@ 10A $T_J = 25^\circ\text{C}$
	0.90	1.0	V	@ 20A
	0.63	0.66	V	@ 10A $T_J = 125^\circ\text{C}$
	0.73	0.77	V	@ 20A
I_{RM} Max. Reverse Leakage Current (Per Leg) * See Fig. 2	3.0	25	μA	$T_J = 25^\circ\text{C}$
	2.7	5.0	mA	$T_J = 125^\circ\text{C}$ $V_R = \text{rated } V_R$
C_T Typical Junction Capacitance (Per Leg)	-	280	pF	$V_R = 5V_{DC}$ (test signal range 100kHz to 1Mhz) @ 25°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	-	10000	V/ μs	(Rated V_R)

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

Thermal-Mechanical Specifications

Parameters		Values	Units	Conditions
T _J	Max. Junction Temperature Range	-55 to 175	°C	
T _{stg}	Max. Storage Temperature Range	-55 to 175	°C	
R _{thJC}	Max. Thermal Resistance Junction to Case (Per Leg)	2.0	°C/W	DC operation
R _{thJC}	Max. Thermal Resistance Junction to Case (Per Package)	1.0	°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)		
Marking Device		20CTQ150	Case style TO-220	
		20CTQ150S	Case style D ² -Pak	
		20CTQ150-1	Case style TO-262	

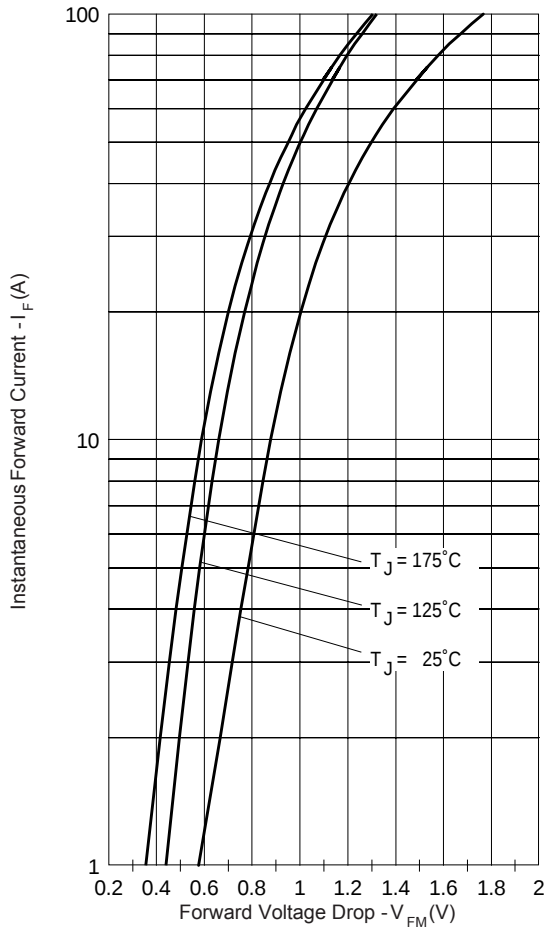


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

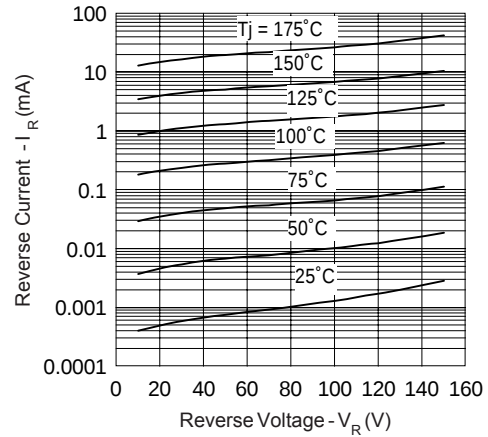


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

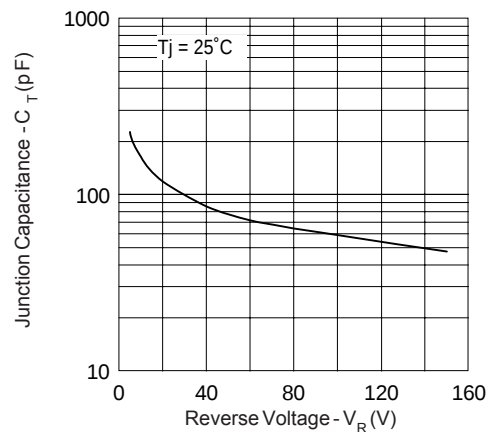


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

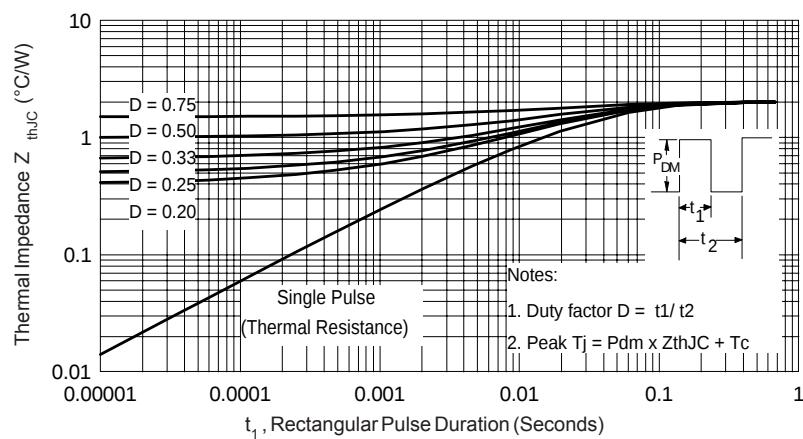


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

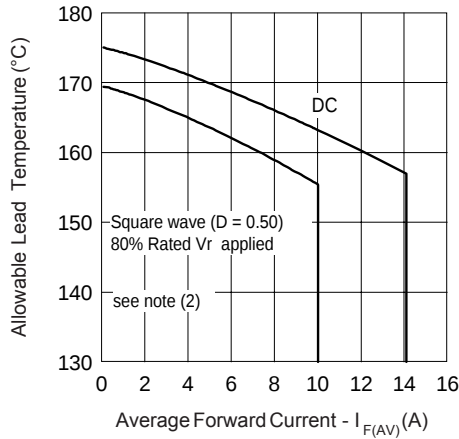


Fig. 5 - Maximum Average Forward Current Vs. Allowable Lead Temperature

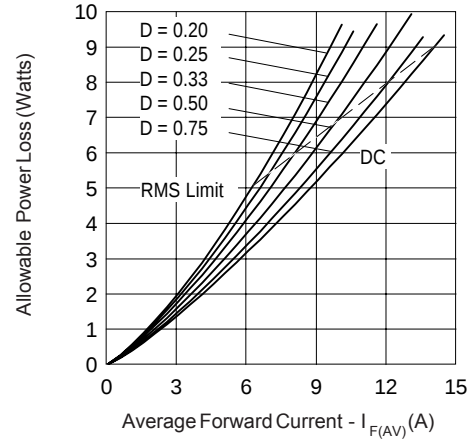


Fig. 6 - Maximum Average Forward Dissipation Vs. Average Forward Current

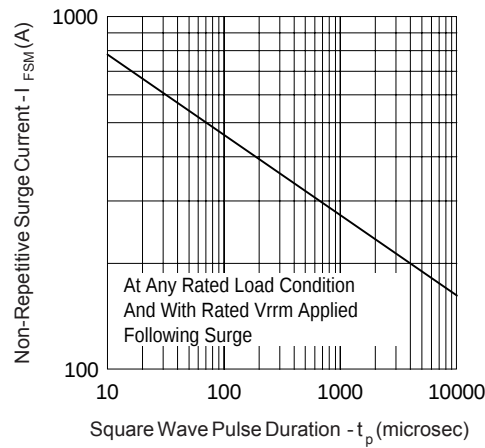


Fig. 7 - Maximum Peak Surge Forward Current Vs. Pulse Duration

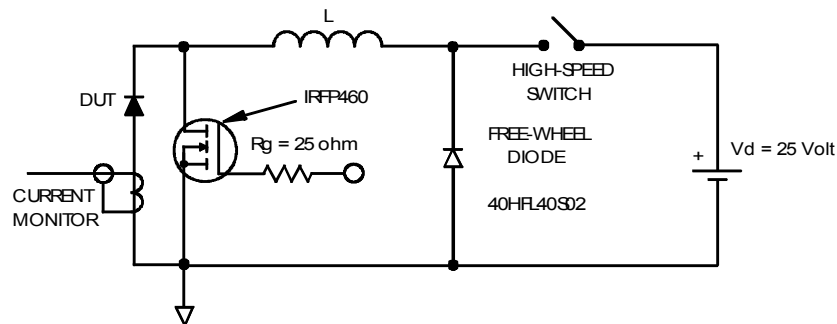
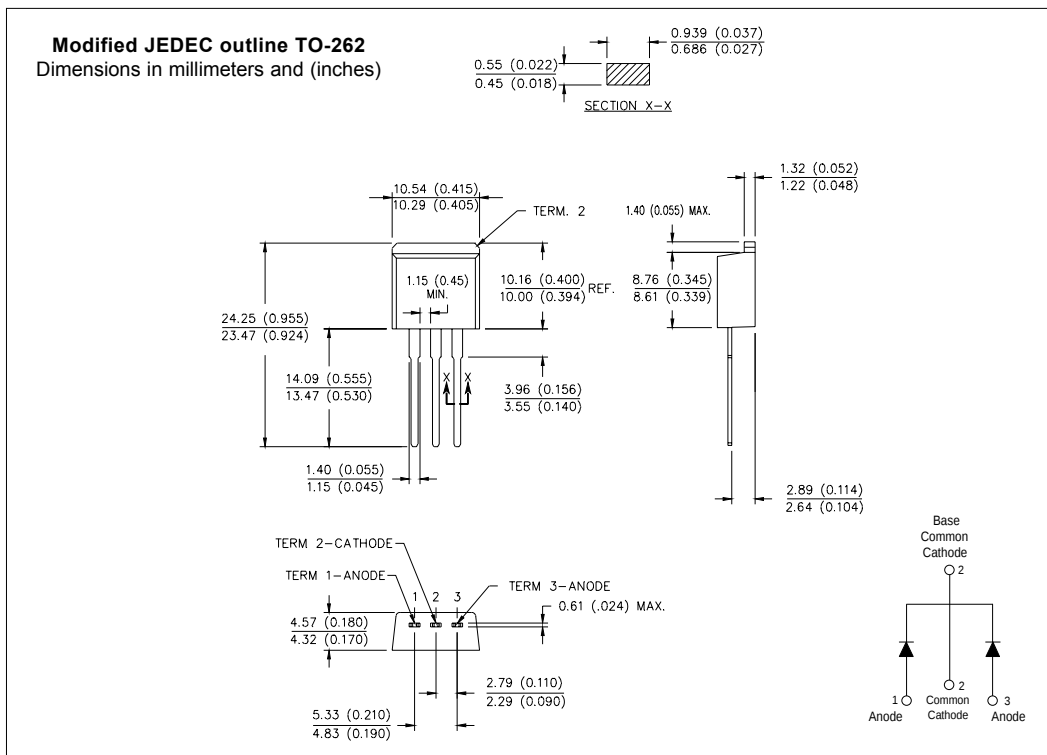
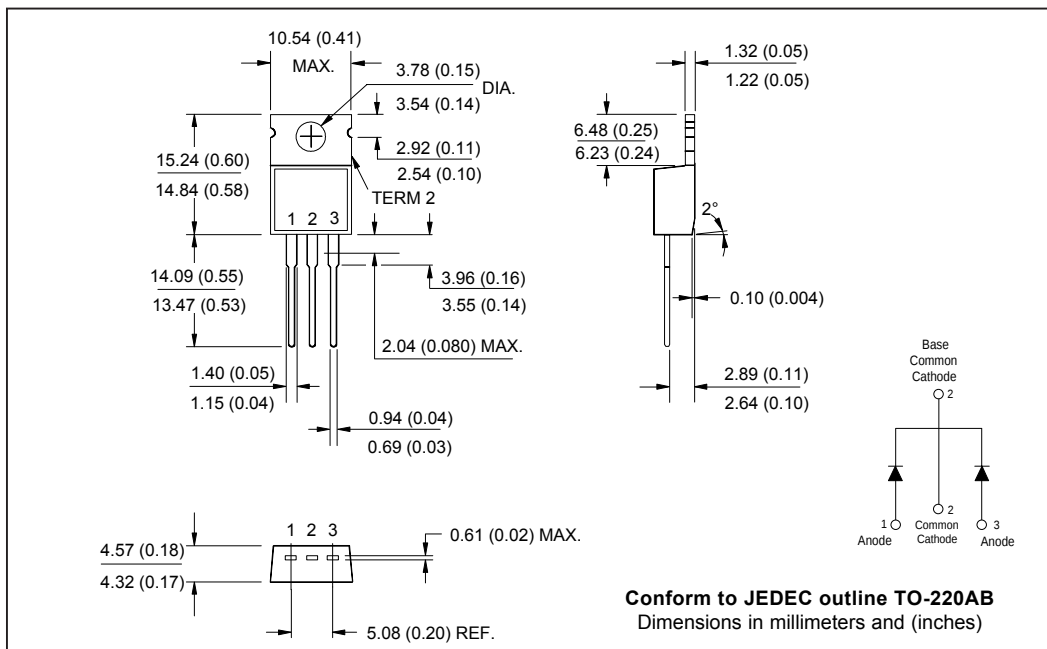


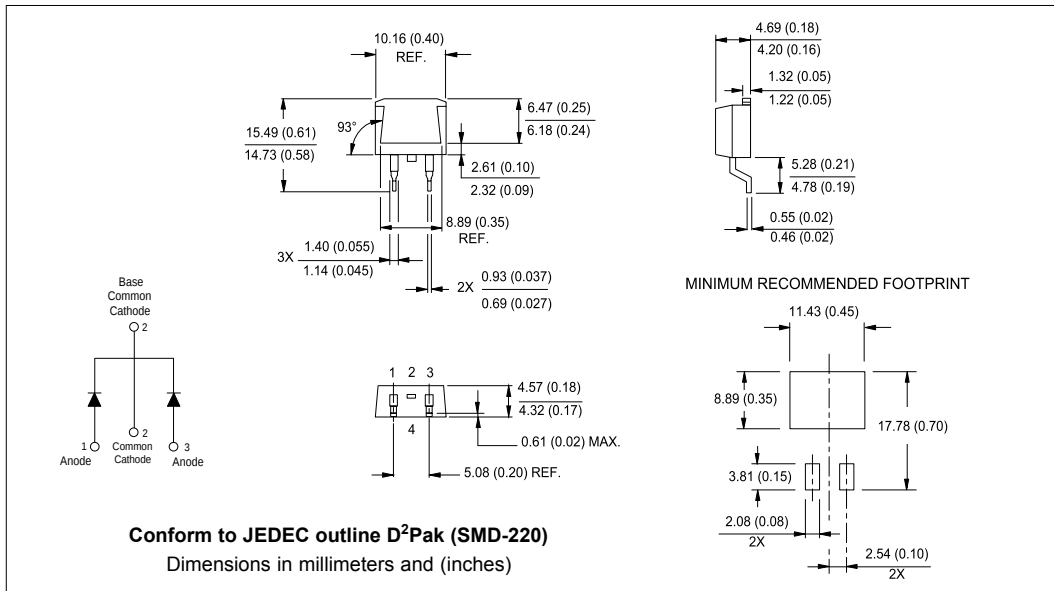
Fig. 8 - Unclamped Inductive Test Circuit

- (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 = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1} = 80\% \text{ rated } V_R$

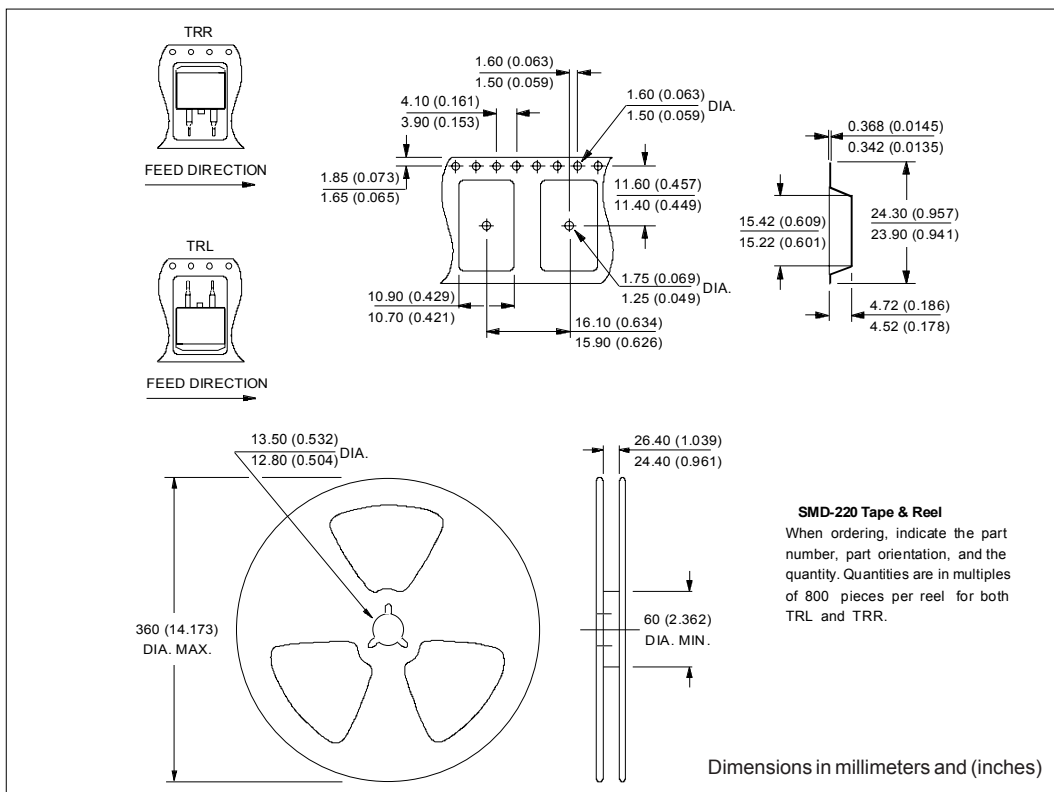
Outline Table



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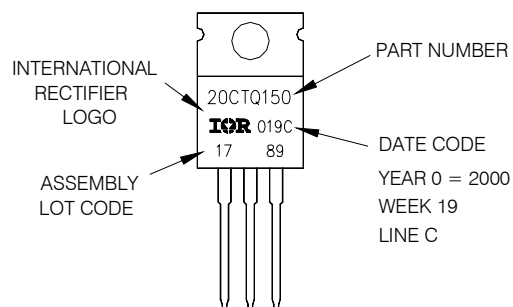
Tape & Reel Information



Part Marking Information

EXAMPLE: THIS IS A 20CTQ150
LOT CODE 1789
ASSEMBLED ON WW 19, 2000
IN THE ASSEMBLY LINE "C"

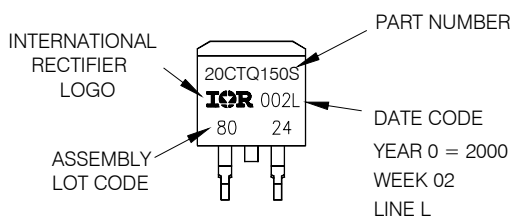
TO-220



DATE CODE
YEAR 0 = 2000
WEEK 19
LINE C

EXAMPLE: THIS IS A 20CTQ150S
LOT CODE 8024
ASSEMBLED ON WW 02, 2000
IN THE ASSEMBLY LINE "L"

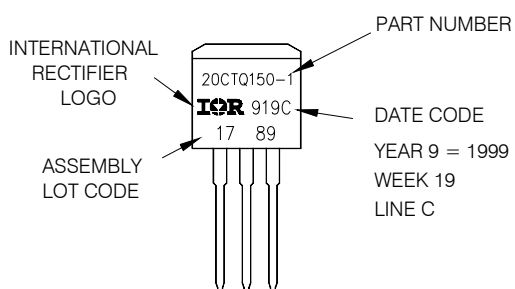
D²PAK



DATE CODE
YEAR 0 = 2000
WEEK 02
LINE L

EXAMPLE: THIS IS A 20CTQ150-1
LOT CODE 1789
ASSEMBLED ON WW 19, 1999
IN THE ASSEMBLY LINE "C"

TO-262



DATE CODE
YEAR 9 = 1999
WEEK 19
LINE C

Ordering Information Table

Device Code							
20	C	T	Q	150	S	TRL	-
1	2	3	4	5	6	7	8
1	-	Current Rating (20 = 20A)					
2	-	C = Common Cathode					
3	-	T = TO-220					
4	-	Q = Schottky Q Series					
5	-	Voltage Rating (150 = 150V)					
6	-	• none = TO-220AB • -1 = TO-262 • S = D²Pak					
7	-	• none = Tube (50 pieces) • TRL = Tape & Reel (Left Oriented - for D²Pak only) • TRR = Tape & Reel (Right Oriented - for D²Pak only)					
8	-	• none = Standard Production • PbF = Lead-Free					

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