

# International IOR Rectifier

## 16CTQ... 16CTQ...S 16CTQ...-1

### SCHOTTKY RECTIFIER

16 Amp

$$I_{F(AV)} = 15\text{Amp}$$

$$V_R = 60/ 100\text{V}$$

#### Major Ratings and Characteristics

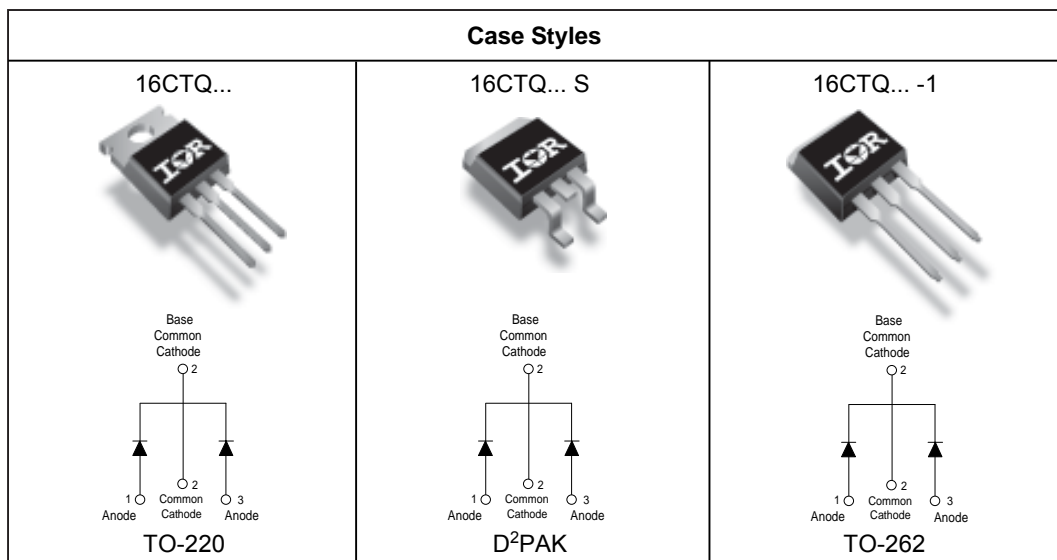
Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	16	A
$V_{RRM}$	60 / 100	V
$I_{FSM}$ @ tp = 5 $\mu$ s sine	850	A
$V_F$ @ 8 Apk, $T_J = 125^\circ\text{C}$ (per leg)	0.58	V
$T_J$ range	-55 to 175	$^\circ\text{C}$

#### Description/ Features

This center tap Schottky rectifier series 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



## Voltage Ratings

Parameters	16CTQ060 16CTQ060S 16CTQ060-1	16CTQ80 16CTQ80S 16CTQ80-1	16CTQ100 16CTQ100S 16CTQ100-1
$V_R$ Max. DC Reverse Voltage (V)	60	80	100
$V_{RWM}$ 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)	8 16	A	50% duty cycle @ $T_C = 148^\circ\text{C}$ , rectangular wave form
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	850 275	A	5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse 10ms Sine or 6ms Rect. pulse Following any rated load condition and with rated $V_{RWM}$ applied
$E_{AS}$ Non-Repetitive Avalanche Energy (Per Leg)	7.50	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 0.50$ Amps, $L = 60$ mH
$I_{AR}$ Repetitive Avalanche Current (Per Leg)	0.50	A	Current decaying linearly to zero in 1 $\mu\text{sec}$ 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)	0.72 0.88 0.58 0.69	V	@ 8A @ 16A @ 8A @ 16A $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$
$I_{RM}$ Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	0.55 7.0	mA	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ $V_R = \text{rated } V_R$
$V_{F(TO)}$ Threshold Voltage	0.415	V	$T_J = T_J \text{ max}$
$r_t$ Forward Slope Resistance	11.07	m $\Omega$	
$C_T$ Max. Junction Capacitance (Per Leg)	500	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)	3.25	$^\circ\text{C/W}$	DC operation
$R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Package)	1.63	$^\circ\text{C/W}$	DC operation
$R_{thCS}$ Typical Thermal Resistance, Case to Heatsink	0.50	$^\circ\text{C/W}$	Mounting surface, smooth and greased (only for TO-220)
wt Approximate Weight	2 (0.07)	g (oz.)	
T Mounting Torque	Min. 6 (5) Max. 12 (10)	Kg-cm (lbf-in)	

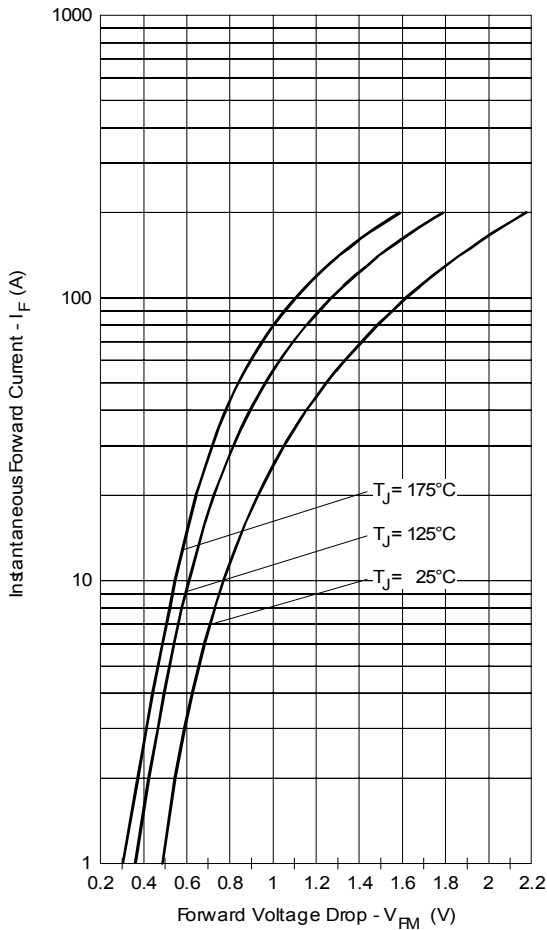


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

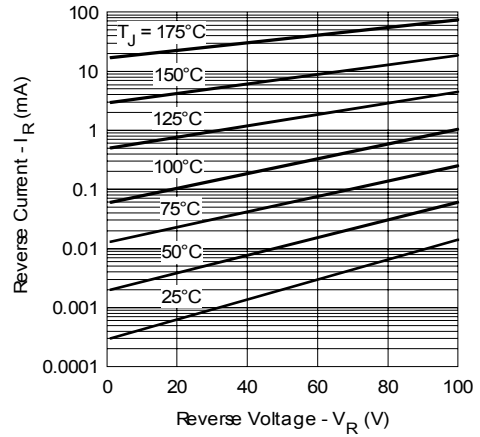


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

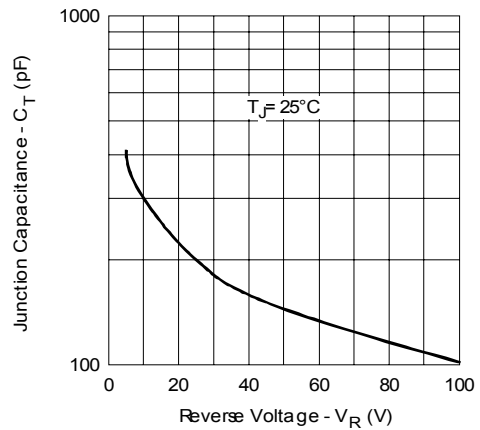


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

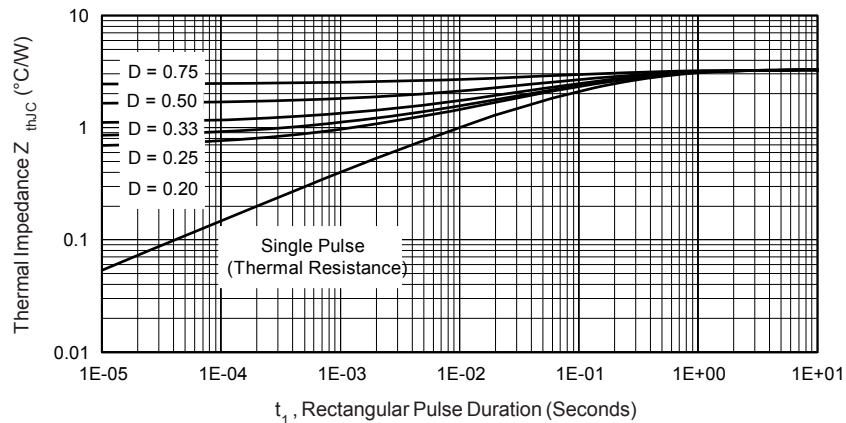


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

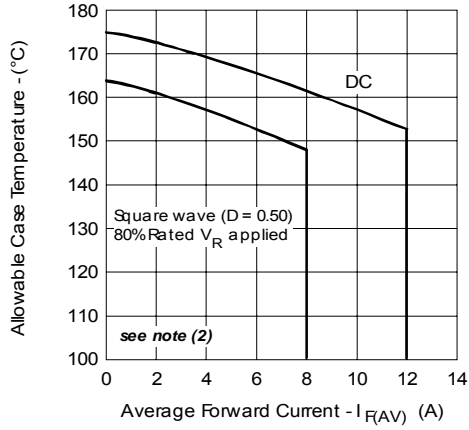


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

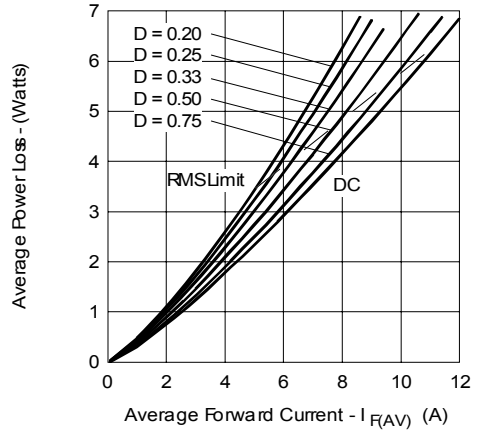


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

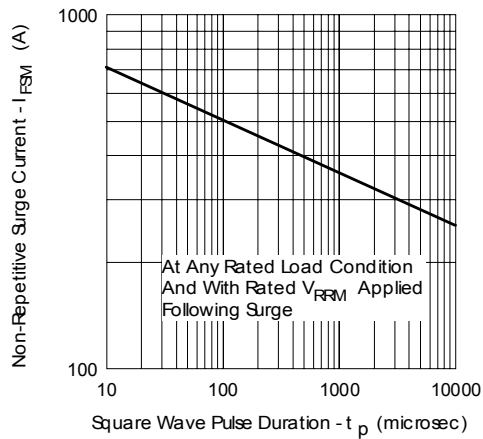


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

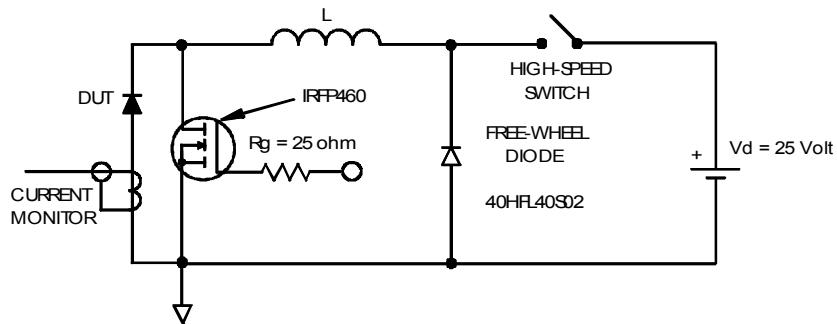


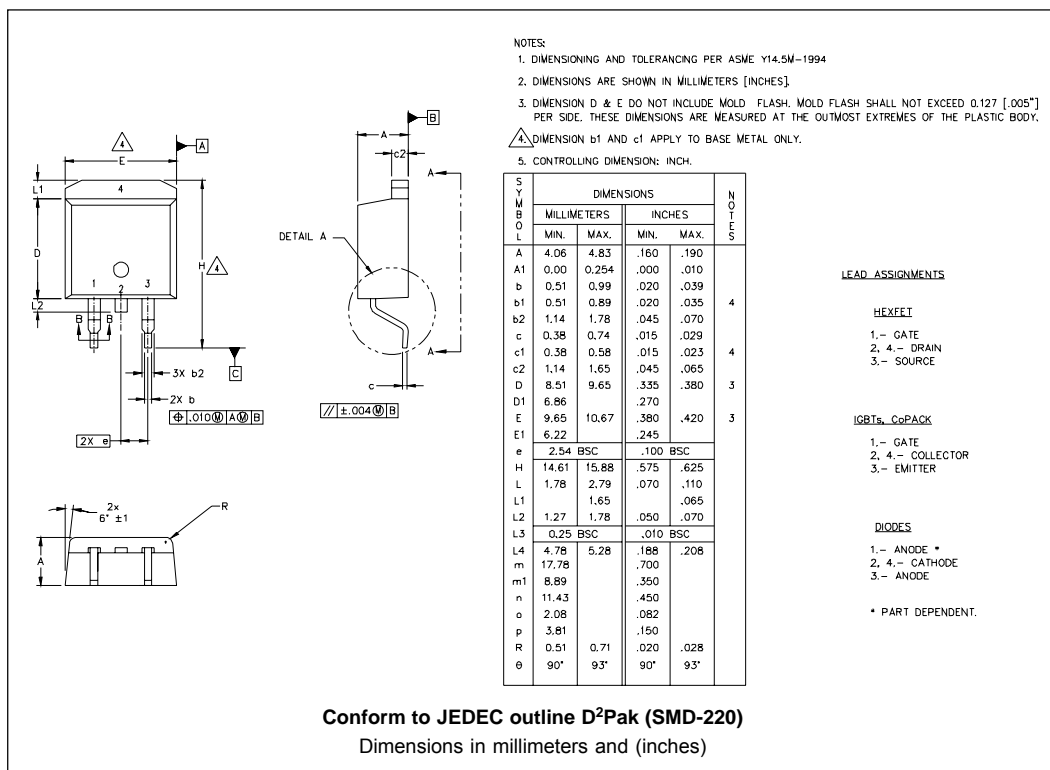
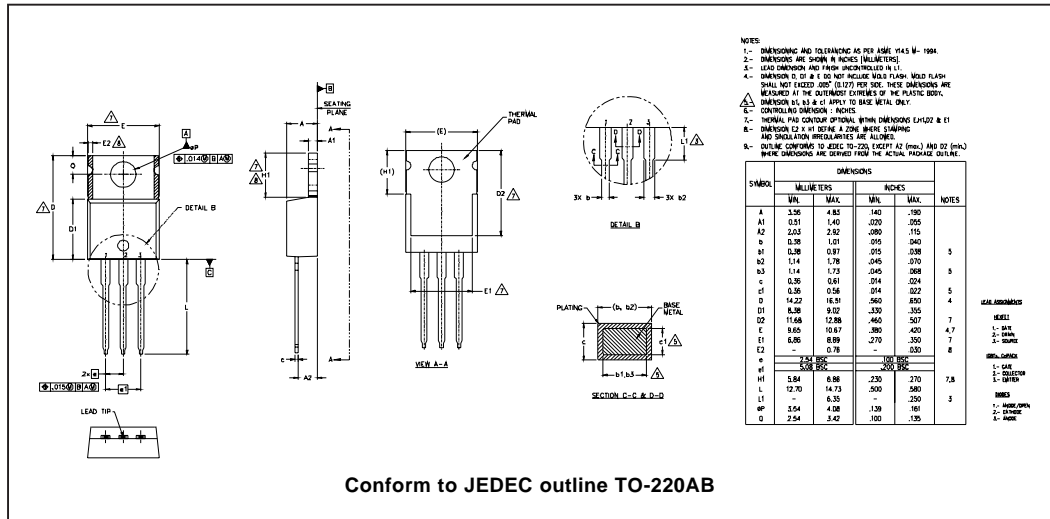
Fig. 8 - Unclamped Inductive Test Circuit

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

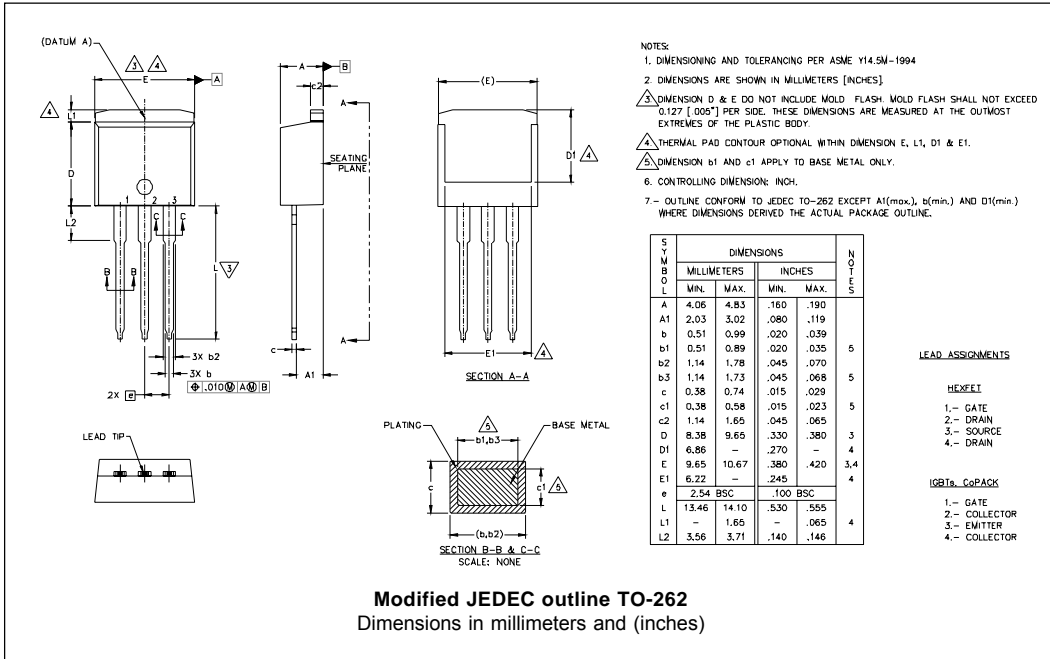
$Pd$  = Forward Power Loss =  $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (see Fig. 6);

$Pd_{REV}$  = Inverse Power Loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R @ V_{R1} = 80\%$  rated  $V_R$  applied

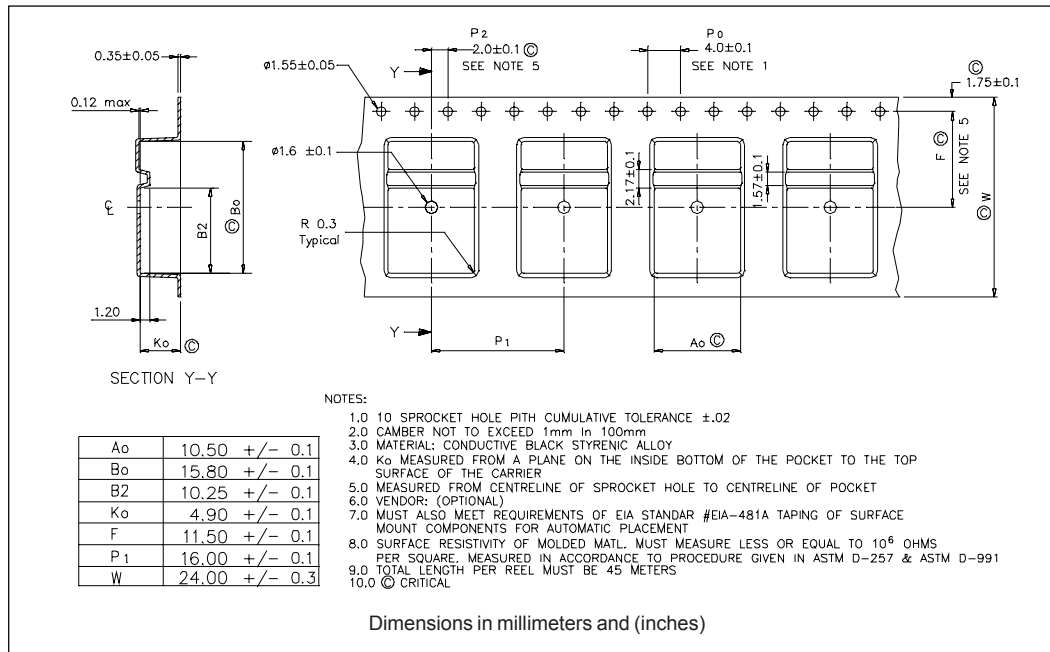
Outline Table



Outline Table



Tape & Reel Information



Part Marking Information

<p>TO-220</p>	<p>EXAMPLE: THIS IS A 16CTQ100          LOT CODE 1789          ASSEMBLED ON WW 19, 2000          IN THE ASSEMBLY LINE "C"</p>		<p>PART NUMBER          DATE CODE          YEAR 0 = 2000          WEEK 19          LINE C</p>
<p>D<sup>2</sup>PAK</p>	<p>EXAMPLE: THIS IS A 16CTQ100S          LOT CODE 8024          ASSEMBLED ON WW 02, 2003          IN ASSEMBLY LINE "C"</p>		<p>PART NUMBER          DATE CODE          YEAR 3 = 2003          WEEK 02          LINE C</p>
<p>TO-262</p>	<p>EXAMPLE: THIS IS A 16CTQ100-1          LOT CODE 1789          ASSEMBLED ON WW 19, 2002          IN ASSEMBLY LINE "C"</p>		<p>PART NUMBER          DATE CODE          YEAR 2 = 2002          WEEK 19          LINE C</p>

Ordering Information Table

Device Code							
16	C	T	Q	100	S	TRL	-
①	②	③	④	⑤	⑥	⑦	⑧
<b>1</b>	-	Current Rating (16A)					
<b>2</b>	-	Circuit Configuration					
		C = Common Cathode					
<b>3</b>	-	T = TO-220					
<b>4</b>	-	Schottky "Q" Series					
<b>5</b>	-	Voltage Ratings					
<b>6</b>	-	• S = D <sup>2</sup> Pak					
		• -1= TO-262					
<b>7</b>	-	• none = Tube (50 pieces)					
		• TRL = Tape & Reel (Left Oriented - for D <sup>2</sup> Pak only)					
		• TRR = Tape & Reel (Right Oriented - for D <sup>2</sup> Pak only)					
<b>8</b>	-	• none = Standard Production					
		• PbF = Lead-Free					

060 = 60V  
 080 = 80V  
 100 = 100V

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16CTQ100
*****
* SPICE Model Diode
*****
.SUBCKT 16CTQ100 ANO CAT
D1 ANO 1 DMOD (0.07089)
*Define diode model
.MODEL DMOD D(IS=21.21E-06,N=1.578,Rs=7.804E-03,Ikf=0.9497, Xti=2,
Eg=1.11
+ Cjo=1.278E-09, M=0.4736, Vj=0.4972, Fc=0.5, Isr =1.114e-21, Nr=4.755,
+ Bv=119.9, Ibv=215.5E-06, Tt=18.2E-09)
*****

.ENDS 16CTQ100

Thermal Model Subcircuit
.SUBCKT 16CTQ100 5 1

CTHERM1 5 4 1.45E+00
CTHERM2 4 3 4.54E+00
CTHERM3 3 2 1.09E+01
CTHERM4 2 1 1.01E+02

RTHERM1 5 4 2.49E+00
RTHERM2 4 3 5.20E-04
RTHERM1 3 2 5.43E-01
RTHERM1 2 1 3.05E-02

.ENDS 16CTQ100
  
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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.

International  
**IOR** Rectifier

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