Bulletin PD-21037 rev. A 02/07

International
IOR Rectifier

40L15CTSPbF
40L15CT-1PbF

SCHOTTKY RECTIFIER

2 x 20 Amps

$I_{F(AV)}$ = 40Amp
V_R = 15V

Major Ratings and Characteristics

Characteristics		Values	Units
$I_{F(AV)}$	Rectangular waveform	40	A
V_{RRM}		15	V
I_{FSM}	@tp = 5 µs sine	700	A
V_F	@19Apk, T_J=125°C (per leg, Typical)	0.25	V
T_J		- 55 to 125	°C

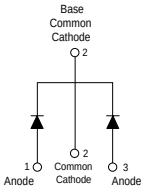
Description/ Features

The center tap Schottky rectifier module has been optimized for ultra low forward voltage drop specifically for the OR-ing of parallel power supplies. The proprietary barrier technology allows for reliable operation up to 125 °C junction temperature. Typical applications are in parallel switching power supplies, converters, reverse battery protection, and redundant power subsystems.

- 125°C T_J operation (V_R < 5V)
- Center tap module
- Optimized for OR-ing applications
- 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
- Lead-Free ("PbF" suffix)

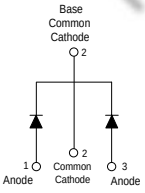
Case Styles

40L15CTSPbF



D²PAK

40L15CT-1PbF



TO-262

Voltage Ratings

	Part number	40L15CTSPbF, 40L15CT-1PbF
V_R	Max. DC Reverse Voltage (V) @ T_J = 100 °C	15
V_{RWM}	Max. Working Peak Reverse Voltage (V) @ T_J = 100 °C	

Absolute Maximum Ratings

	Parameters	Values	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward (Per Leg)	20	A	50% duty cycle @ T_C = 85°C, rectangular wave form	
	Current * See Fig. 5 (Per Device)	40			
I_{FSM}	Max. Peak One Cycle Non-Repetitive	700	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
	Surge Current (Per Leg) * See Fig. 7	330		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)	10	mJ	T_J = 25 °C, I_{AS} = 2 Amps, L = 6 mH	
I_{AR}	Repetitive Avalanche Current (Per Leg)	2	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	Values		Units	Conditions	
		Typ.	Max.			
V_{FM}	Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	-	0.41	V	@ 19A	T_J = 25 °C
		-	0.52	V	@ 40A	
		0.25	0.33	V	@ 19A	T_J = 125 °C
		0.37	0.50	V	@ 40A	
I_{RM}	Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	-	10	mA	T_J = 25 °C	V_R = rated V_R
		-	600	mA	T_J = 100 °C	
$V_{F(TO)}$	Threshold Voltage	0.182		V	T_J = T_J max.	
r_t	Forward Slope Resistance	7.6		mΩ		
C_T	Max. Junction Capacitance (Per Leg)	-	2000	pF	V_R = 5V_{DC} (test signal range 100Khz to 1Mhz) 25°C	
L_S	Typical Series Inductance (Per Leg)	8	-	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 < 300µs, Duty Cycle <2%

Thermal-Mechanical Specifications

	Parameters		Values	Units	Conditions
T_J	Max. Junction Temperature Range		-55 to 125	°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 * See Fig. 4
R_{thCS}	Typical Thermal Resistance Case to Heatsink		0.50	°C/W	Mounting surface, smooth and greased Only for TO-220
R_{thJA}	Max. Thermal Resistance Junction to Ambient		40	°C/W	DC operation For D²Pak and TO-262
wt	Approximate Weight		2 (0.07)	g (oz.)	
T	Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)	Non-lubricated threads
		Max.	12 (10)		
	Marking Device		40L15CTS		Case style D²Pak
			40L15CT-1		Case style TO-262

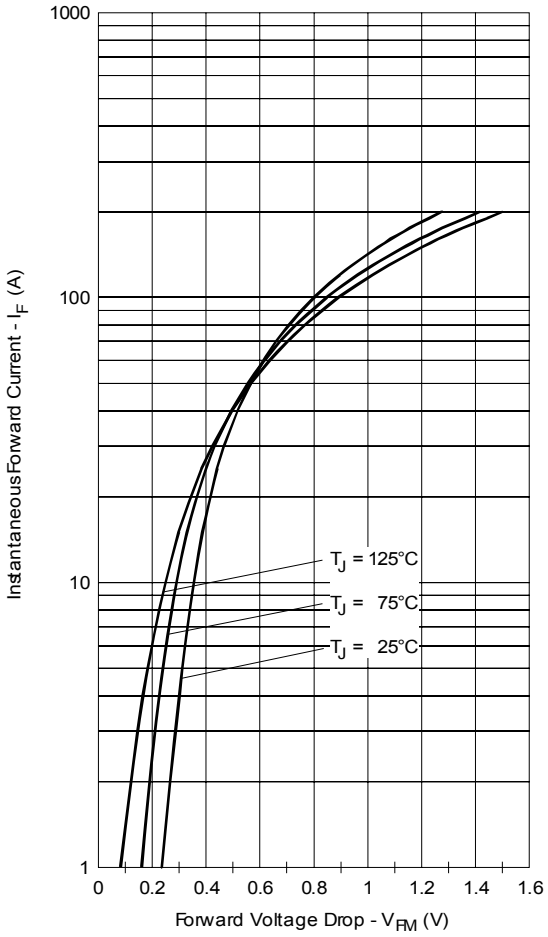


Fig. 1 - Maximum Forward Voltage Drop Characteristics

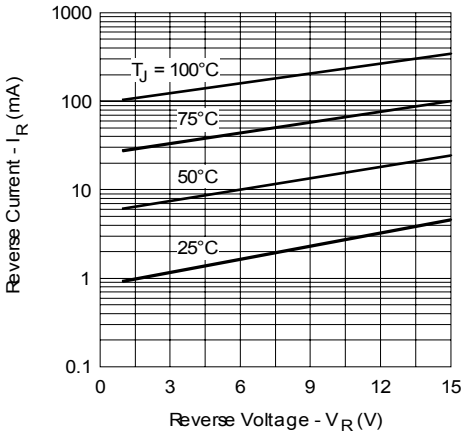


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

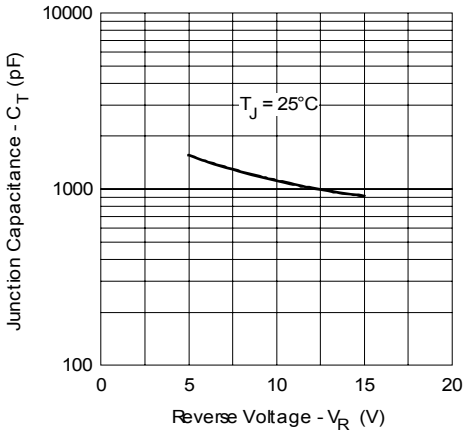


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

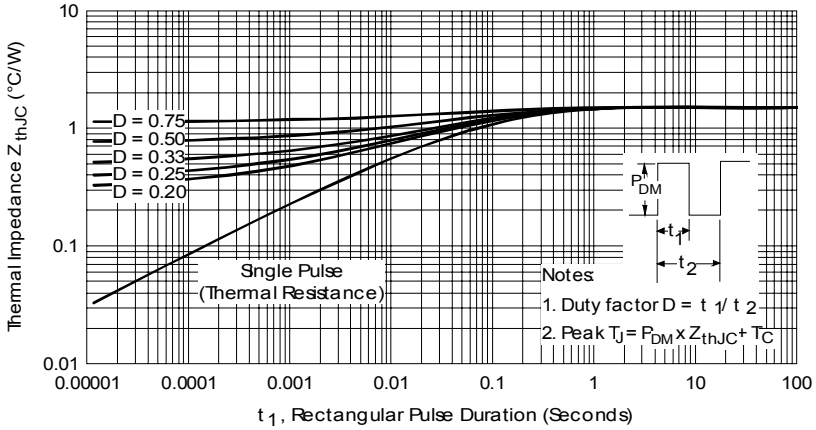


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

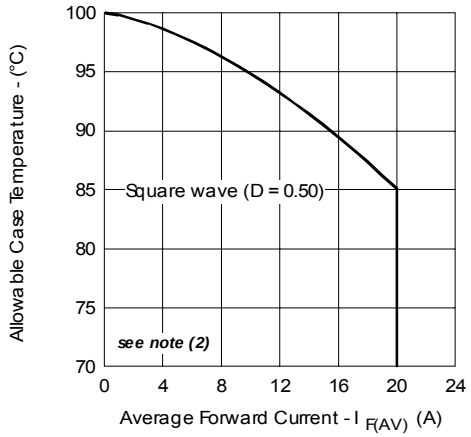


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

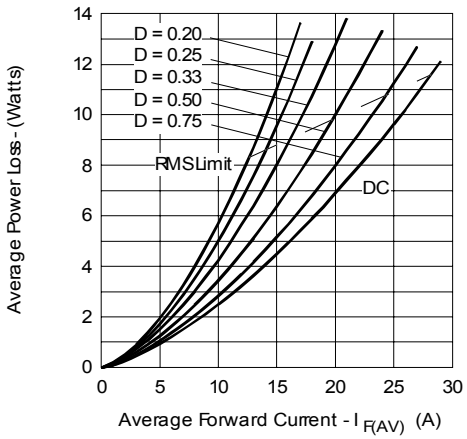


Fig. 6 - Forward Power Loss Characteristics

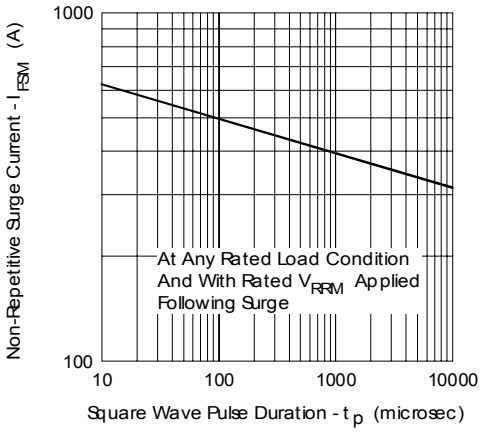


Fig. 7 - Maximum Non-Repetitive Surge Current

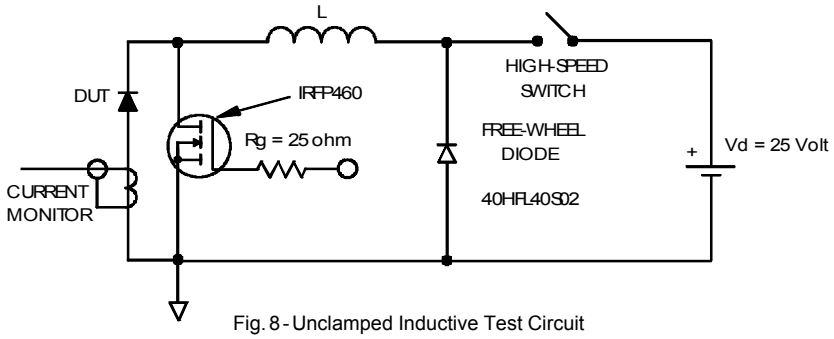
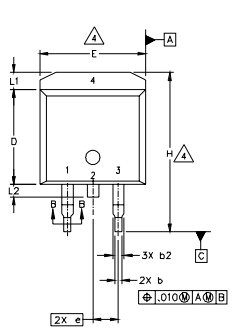


Fig. 8 - Unclamped Inductive Test Circuit

(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

Outlines Table



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 [.005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.
4. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.
5. CONTROLLING DIMENSION: INCH.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	.160	.190	
A1	0.00	0.254	.000	.010	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	4
b2	1.14	1.78	.045	.070	
c	0.38	0.74	.015	.029	
c1	0.38	0.58	.015	.023	4
c2	1.14	1.65	.045	.065	
D	8.51	9.65	.335	.380	3
D1	6.86		.270		
E	9.65	10.67	.380	.420	3
E1	6.22		.245		
e	2.54 BSC		.100 BSC		
H	14.61	15.88	.575	.625	
L	1.78	2.79	.070	.110	
L1		1.65		.065	
L2	1.27	1.78	.050	.070	
L3	0.25 BSC		.010 BSC		
L4	4.78	5.28	.188	.208	
m	17.78		.700		
m1	8.89		.350		
n	11.43		.450		
o	2.08		.082		
p	3.81		.150		
R	0.51	0.71	.020	.028	
θ	90°	93°	90°	93°	

LEAD ASSIGNMENTS

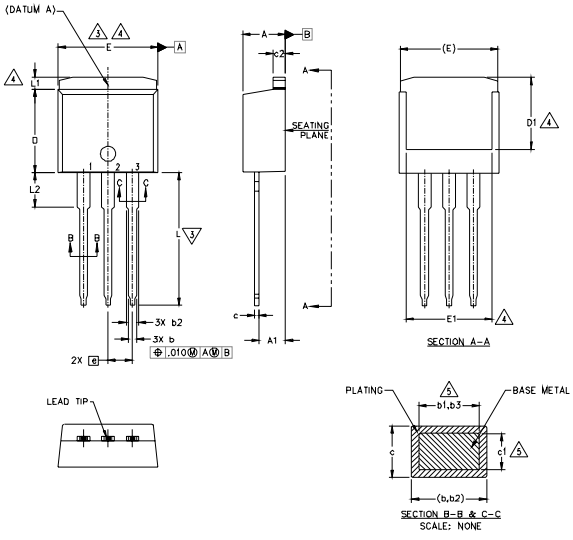
HEXFET
1.- GATE
2, 4.- DRAIN
3.- SOURCE

IGBTs, CoPACK
1.- GATE
2, 4.- COLLECTOR
3.- EMITTER

DIODES
1.- ANODE *
2, 4.- CATHODE
3.- ANODE

* PART DEPENDENT.

Conform to JEDEC outline D²Pak (SMD-220)
Dimensions in millimeters and (inches)



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 [.005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.
4. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSION E, L1, D1 & E1.
5. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.
6. CONTROLLING DIMENSION: INCH.
7. - OUTLINE CONFORM TO JEDEC TO-262 EXCEPT A1(max.), b(min.) AND D1(min.) WHERE DIMENSIONS DERIVED THE ACTUAL PACKAGE OUTLINE.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	.160	.190	
A1	2.03	3.02	.080	.119	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	5
b2	1.14	1.78	.045	070	
b3	1.14	1.73	.045	.068	5
c	0.38	0.74	.015	.029	
c1	0.38	0.58	.015	.023	5
c2	1.14	1.65	.045	.065	
D	8.38	9.65	.330	.380	3
D1	6.86	–	.270	–	4
E	9.65	10.67	.380	.420	3,4
E1	6.22	–	.245	–	4
e	2.54 BSC		.100 BSC		
L	13.46	14.10	.530	.555	
L1	–	1.65	–	.065	4
L2	3.56	3.71	.140	.146	

LEAD ASSIGNMENTS

HEXFET
1.- GATE
2.- DRAIN
3.- SOURCE
4.- DRAIN

IGBTs, CoPACK
1.- GATE
2.- COLLECTOR
3.- EMITTER
4.- COLLECTOR

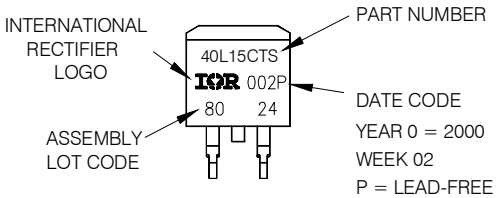
Modified JEDEC outline TO-262
Dimensions in millimeters and (inches)

Part Marking Information

D²PAK

EXAMPLE: THIS IS A 40L15CTS
LOT CODE 8024
ASSEMBLED ON WW 02, 2000

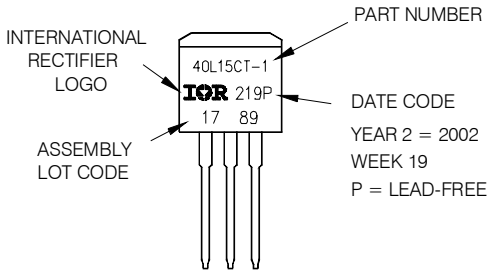
Note: "P" in assembly line position indicates "Lead-Free"



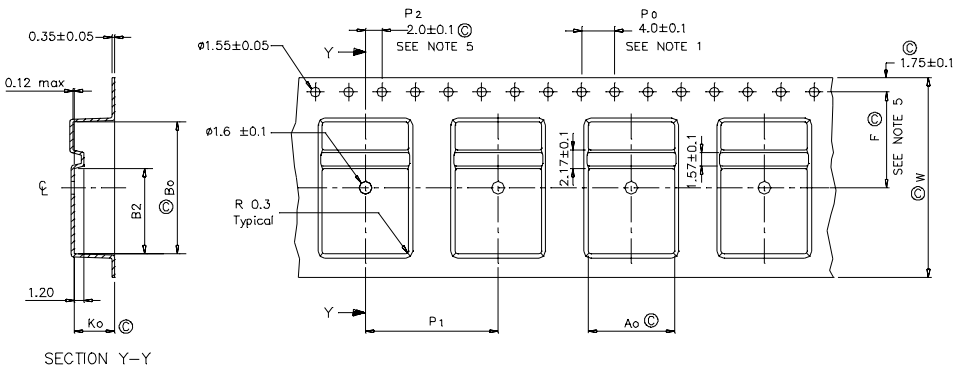
TO-262

EXAMPLE: THIS IS A 40L15CT-1
LOT CODE 1789
ASSEMBLED ON WW 19, 2002

Note: "P" in assembly line position indicates "Lead-Free"



Tape & Reel Information



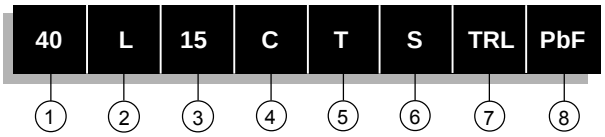
Ao	10.50 +/- 0.1
Bo	15.80 +/- 0.1
B2	10.25 +/- 0.1
Ko	4.90 +/- 0.1
F	11.50 +/- 0.1
P1	16.00 +/- 0.1
W	24.00 +/- 0.3

NOTES:
1.0 10 SPROCKET HOLE PITH CUMULATIVE TOLERANCE ±.02
2.0 CAMBER NOT TO EXCEED 1mm In 100mm
3.0 MATERIAL: CONDUCTIVE BLACK STYRENIC ALLOY
4.0 Ko MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE OF THE CARRIER
5.0 MEASURED FROM CENTRELINE OF SPROCKET HOLE TO CENTRELINE OF POCKET
6.0 VENDOR: (OPTIONAL)
7.0 MUST ALSO MEET REQUIREMENTS OF EIA STANDAR #EIA-481A TAPING OF SURFACE MOUNT COMPONENTS FOR AUTOMATIC PLACEMENT
8.0 SURFACE RESISTIVITY OF MOLDED MATL. MUST MEASURE LESS OR EQUAL TO 10^6 OHMS PER SQUARE. MEASURED IN ACCORDANCE TO PROCEDURE GIVEN IN ASTM D-257 & ASTM D-991
9.0 TOTAL LENGTH PER REEL MUST BE 45 METERS
10.0 © CRITICAL

Dimensions in millimeters and (inches)

Ordering Information Table

Device Code



1	-	Current Rating (40A)
2	-	L = Schottky L Series
3	-	Voltage Rating (15V)
4	-	C = Common Cathode
5	-	T = TO-220
6	-	• S = D^2Pak • -1= TO-262
7	-	• none = Tube (50 pieces) • TRL = Tape & Reel (Left Oriented - for D^2Pak only) • TRR = Tape & Reel (Right Oriented - for D^2Pak only)
8	-	• none = Standard Production • PbF = Lead-Free

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

International
IOR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
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Visit us at www.irf.com for sales contact information. 02/07