

## 80CNQ... SERIES

SCHOTTKY RECTIFIER

80 Amp

### Major Ratings and Characteristics

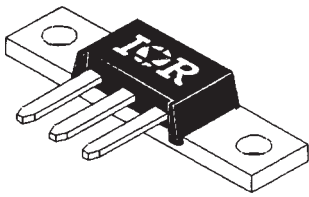
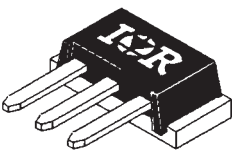
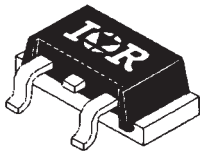
| Characteristics                               | 80CNQ...   | Units      |
|-----------------------------------------------|------------|------------|
| $I_{F(AV)}$ Rectangular waveform              | 80         | A          |
| $V_{RRM}$ range                               | 35 to 45   | V          |
| $I_{FSM}$ @ $t_p = 5 \mu s$ sine              | 5800       | A          |
| $V_F$ @ 40 Apk, $T_J = 125^\circ C$ (per leg) | 0.47       | V          |
| $T_J$ range                                   | -55 to 150 | $^\circ C$ |

### Description/Features

The 80CNQ center tap Schottky rectifier module series has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to  $150^\circ C$  junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- $150^\circ C$   $T_J$  operation
- Center tap module
- Very 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
- Low profile, small footprint, high current package

### Case Styles

| 80CNQ...                                                                            | 80CNQ...SM                                                                          | 80CNQ...SL                                                                            |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |
| <b>D61-8</b>                                                                        | <b>D61-8-SM</b>                                                                     | <b>D61-8-SL</b>                                                                       |

## Voltage Ratings

| Part number                                     | 80CNQ035 | 80CNQ040 | 80CNQ045 |
|-------------------------------------------------|----------|----------|----------|
| $V_R$ Max. DC Reverse Voltage (V)               | 35       | 40       | 45       |
| $V_{RWM}$ Max. Working Peak Reverse Voltage (V) |          |          |          |

## Absolute Maximum Ratings

| Parameters                                                                           | 80CNQ       | Units | Conditions                                                                                                                                                 |
|--------------------------------------------------------------------------------------|-------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_{F(AV)}$ Max. Average Forward (Per Leg)<br>Current * See Fig. 5 (Per Device)      | 40<br>80    | A     | 50% duty cycle @ $T_C = 114^\circ\text{C}$ , rectangular wave form                                                                                         |
| $I_{FSM}$ Max. Peak One Cycle Non-Repetitive<br>Surge Current (Per Leg) * See Fig. 7 | 5800<br>750 | A     | 5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse<br>10ms Sine or 6ms Rect. pulse<br>Following any rated load condition and with rated $V_{RWM}$ applied |
| $E_{AS}$ Non-Repetitive Avalanche Energy<br>(Per Leg)                                | 54          | mJ    | $T_J = 25^\circ\text{C}$ , $I_{AS} = 8$ Amps, $L = 1.7$ mH                                                                                                 |
| $I_{AR}$ Repetitive Avalanche Current<br>(Per Leg)                                   | 8           | 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                                                          | 80CNQ  | Units            | Conditions                                                              |
|---------------------------------------------------------------------|--------|------------------|-------------------------------------------------------------------------|
| $V_{FM}$ Max. Forward Voltage Drop<br>(Per Leg) * See Fig. 1 (1)    | 0.52   | V                | @ 40A<br>$T_J = 25^\circ\text{C}$                                       |
|                                                                     | 0.66   | V                | @ 80A                                                                   |
|                                                                     | 0.47   | V                | @ 40A<br>$T_J = 125^\circ\text{C}$                                      |
|                                                                     | 0.61   | V                | @ 80A                                                                   |
| $I_{RM}$ Max. Reverse Leakage Current<br>(Per Leg) * See Fig. 2 (1) | 5      | mA               | $T_J = 25^\circ\text{C}$                                                |
|                                                                     | 250    | mA               | $T_J = 125^\circ\text{C}$<br>$V_R = \text{rated } V_R$                  |
| $V_{F(TO)}$ Threshold Voltage                                       | 0.26   | V                | $T_J = T_J \text{ max.}$                                                |
| $r_t$ Forward Slope Resistance                                      | 3.93   | m $\Omega$       |                                                                         |
| $C_T$ Max. Junction Capacitance (Per Leg)                           | 2600   | pF               | $V_R = 5V_{DC}$ , (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$ |
| $L_S$ Typical Series Inductance (Per Leg)                           | 5.5    | nH               | Measured lead to lead 5mm from package body                             |
| $dv/dt$ Max. Voltage Rate of Change<br>(Rated $V_R$ )               | 10,000 | V/ $\mu\text{s}$ |                                                                         |

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle <2%

## Thermal-Mechanical Specifications

| Parameters                                                              | 80CNQ      | Units              | Conditions                           |
|-------------------------------------------------------------------------|------------|--------------------|--------------------------------------|
| $T_J$ Max. Junction Temperature Range                                   | -55 to 150 | $^\circ\text{C}$   |                                      |
| $T_{stg}$ Max. Storage Temperature Range                                | -55 to 150 | $^\circ\text{C}$   |                                      |
| $R_{thJC}$ Max. Thermal Resistance Junction<br>to Case (Per Leg)        | 0.85       | $^\circ\text{C/W}$ | DC operation * See Fig. 4            |
| $R_{thJC}$ Max. Thermal Resistance Junction<br>to Case (Per Package)    | 0.42       | $^\circ\text{C/W}$ | DC operation                         |
| $R_{thCS}$ Typical Thermal Resistance, Case<br>to Heatsink (D61-8 Only) | 0.30       | $^\circ\text{C/W}$ | Mounting surface, smooth and greased |
| wt Approximate Weight                                                   | 7.8 (0.28) | g (oz.)            |                                      |
| T Mounting Torque<br>(D61-8 Only)                                       | Min.       | 40 (35)            | Kg-cm<br>(lbf-in)                    |
|                                                                         | Max.       | 58 (50)            |                                      |

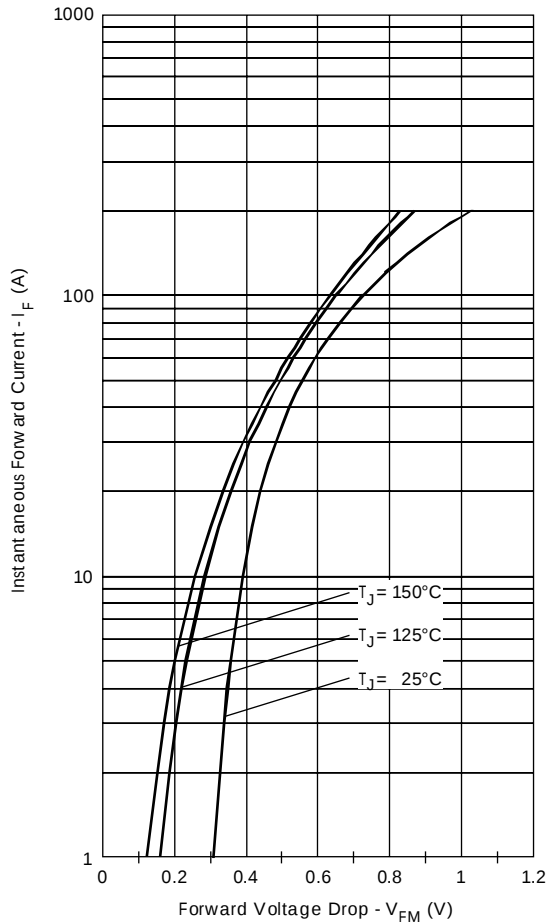


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

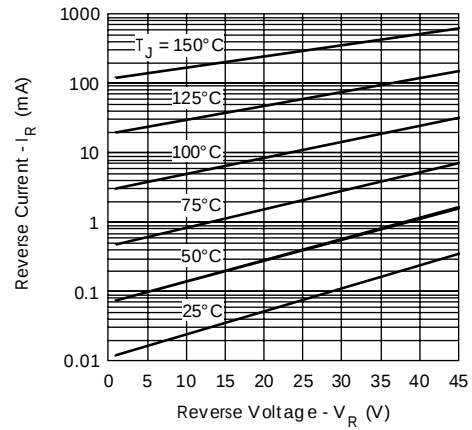


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

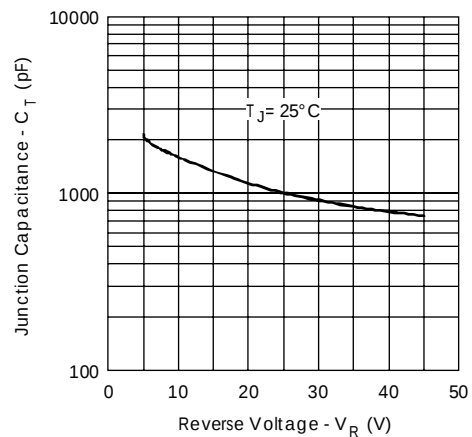


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

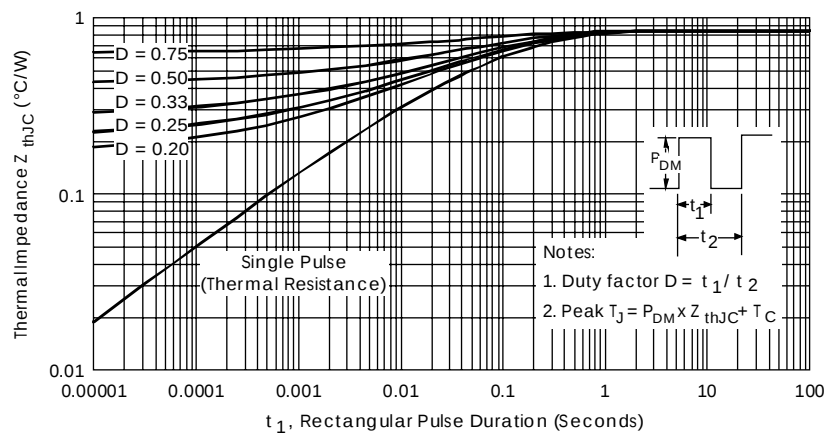


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

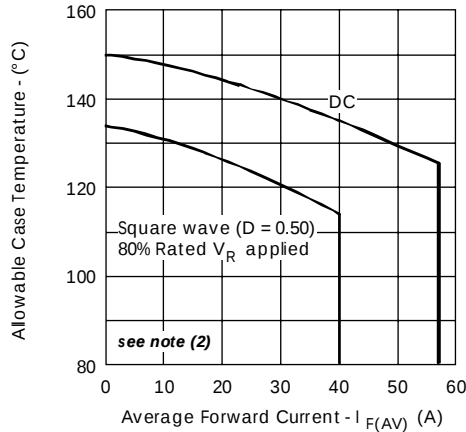


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

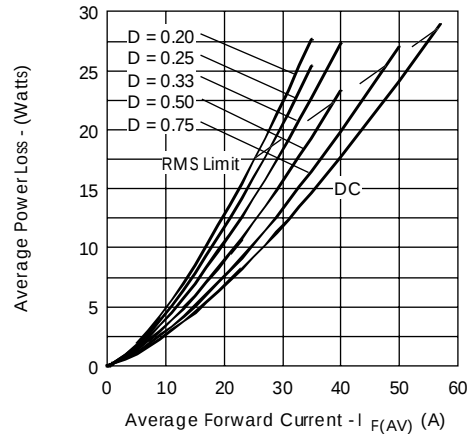


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

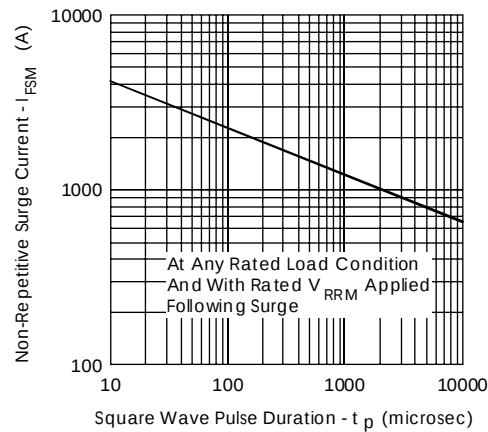


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

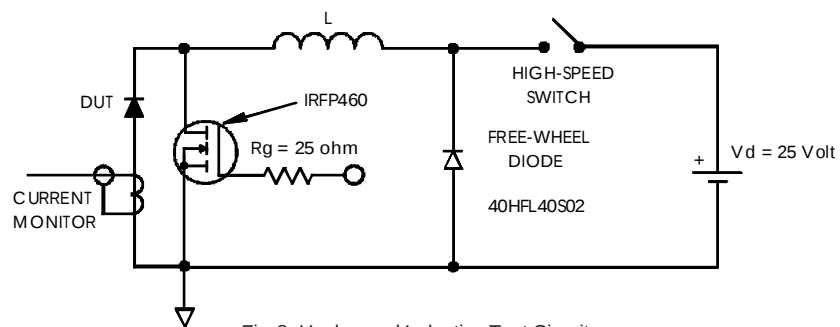


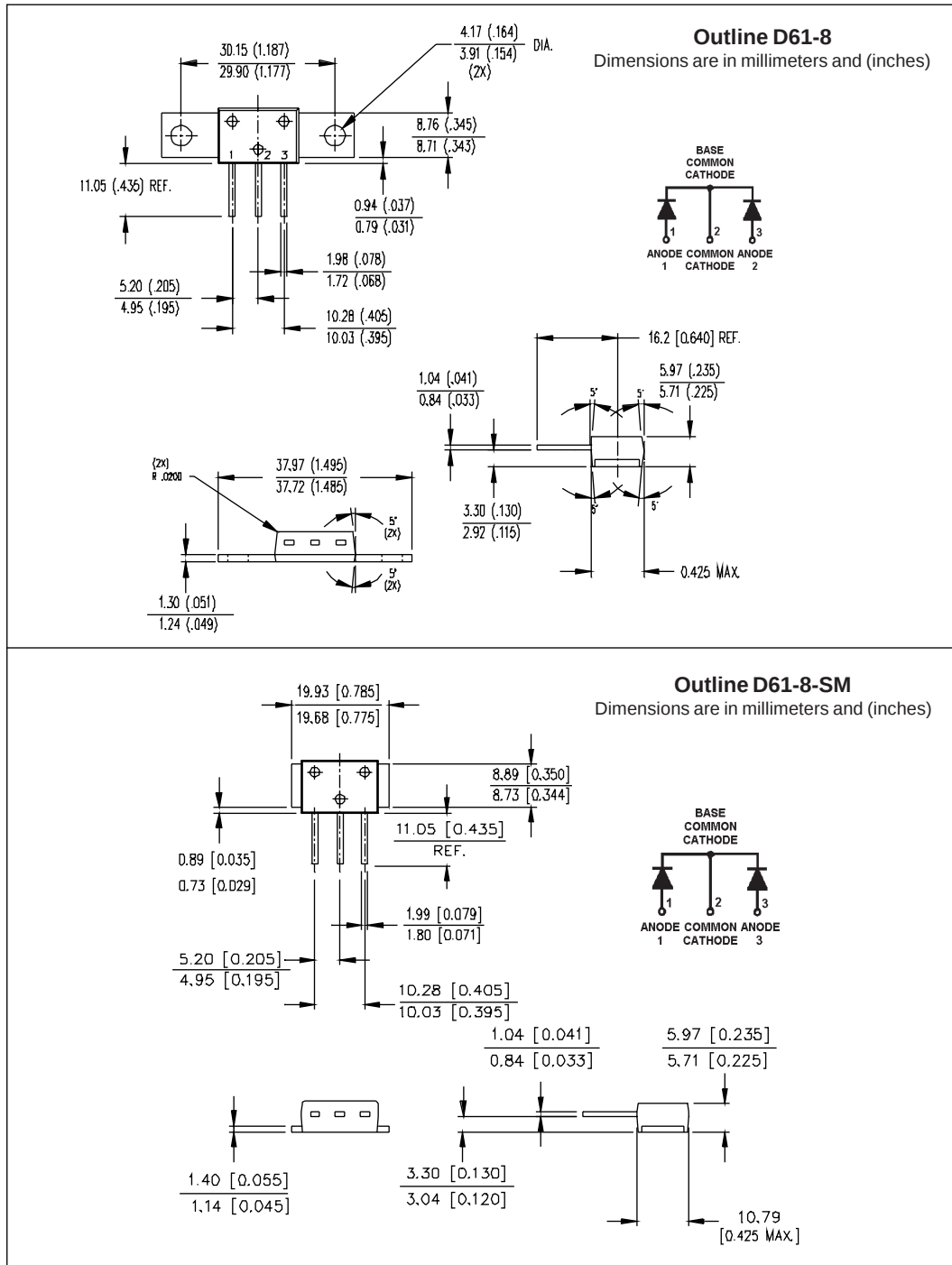
Fig. 8 - Unclamped Inductive Test Circuit

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

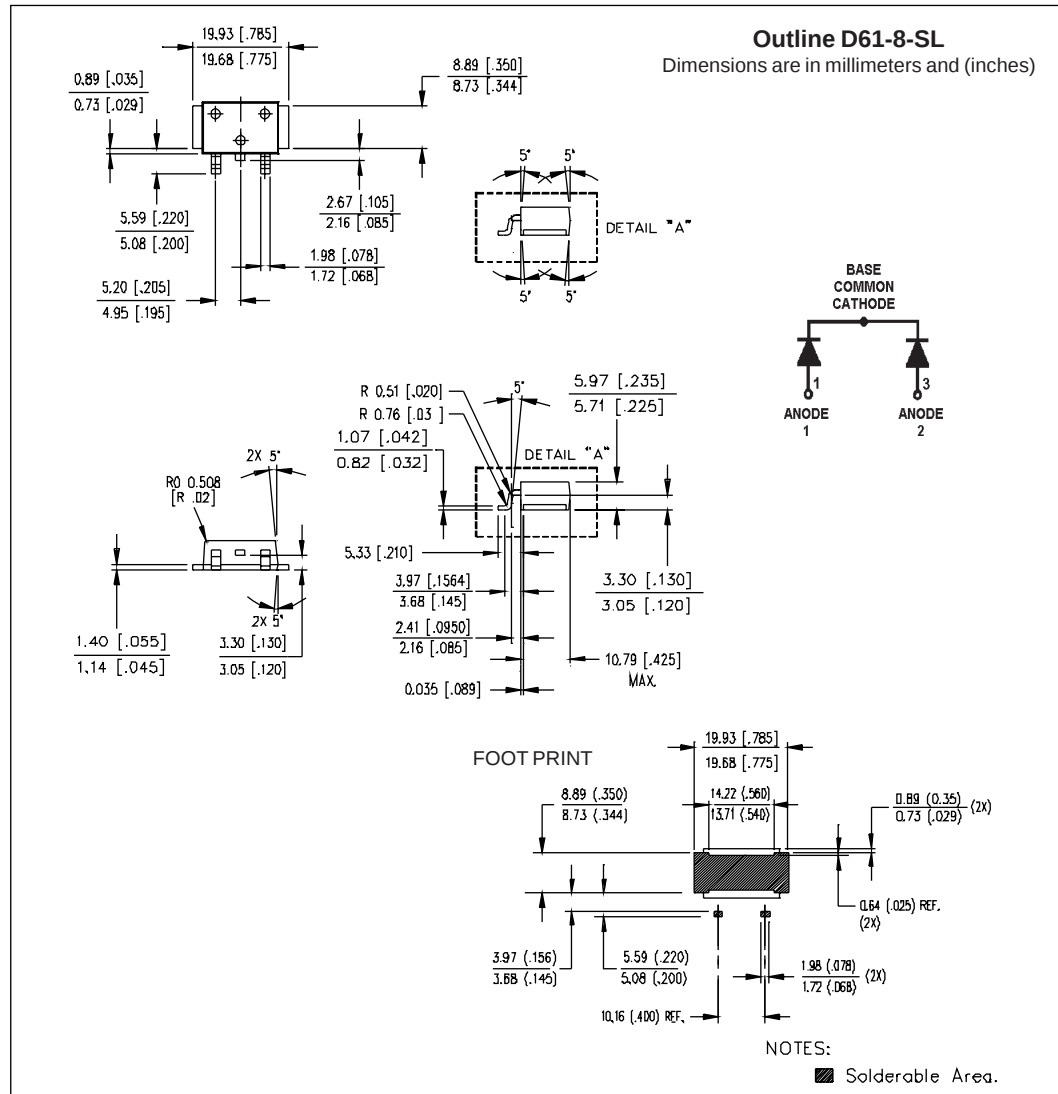
$P_d$  = Forward Power Loss =  $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (see Fig. 6);

$P_{d_{REV}}$  = Inverse Power Loss =  $V_{R1} \times I_{R1} (1 - D)$ ;  $I_{R1} @ V_{R1} = 80\%$  rated  $V_R$

# Outline Table



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**WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245 U.S.A. Tel: (310) 322 3331. Fax: (310) 322 3332.  
**EUROPEAN HEADQUARTERS:** Hurst Green, Oxted, Surrey RH8 9BB, U.K. Tel: ++ 44 1883 732020. Fax: ++ 44 1883 733408.  
**IR CANADA:** 15 Lincoln Court, Brampton, Markham, Ontario L6T3Z2. Tel: (905) 455 2200. Fax: (905) 475 8801.  
**IR GERMANY:** Saalburgstrasse 157, 61350 Bad Homburg. Tel: ++ 49 6172 96590. Fax: ++ 49 6172 965933.  
**IR ITALY:** Via Liguria 49, 10071 Borgaro, Torino. Tel: ++ 39 11 4510111. Fax: ++ 39 11 4510220.  
**IR FAR EAST:** K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo, Japan 171. Tel: 81 3 3983 0086.  
**IR SOUTHEAST ASIA:** 1 Kim Seng Promenade, Great World City West Tower, 13-11, Singapore 237994. Tel: ++ 65 838 4630.  
**IR TAIWAN:** 16 Fl. Suite D.207, Sec. 2, Tun Haw South Road, Taipei, 10673, Taiwan. Tel: 886 2 2377 9936.