IS4N46
IS4N45

# LOW INPUT CURRENT DARLINGTON OUTPUT OPTICALLY COUPLED ISOLATOR

ROHS COMPLIANT

## APPROVALS

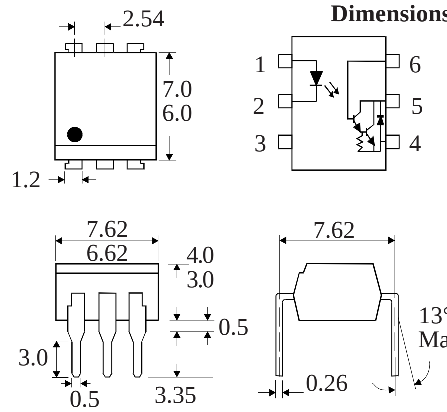
- UL recognised, File No. E91231 "JJ "

'X' SPECIFICATION APPROVALS

- VDE 0884 in 3 available lead form : -
  - STD
  - G form
  - SMD approved to CECC 00802

## DESCRIPTION

The IS4N45, IS4N46 are optically coupled isolators consisting of an infrared light emitting diode and a NPN silicon photo darlington which has an integral base-emitter resistor to optimise switching speed and elevated temperature characteristics in a standard 6pin dual in line plastic package. These devices are designed to equal the 4N45, 4N46 characteristics while providing greater voltage and current capability.



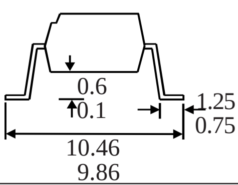

## FEATURES

- Options :-
  10mm lead spread - add G after part no.
  Surface mount - add SM after part no.
  Tape&reel - add SMT&R after part no.
- High Isolation Voltage (5.3kV$_{RMS}$,7.5kV$_{PK}$)
- High Current Transfer Ratio ( 1500% typ.)
- High BV$_{CEO}$ ( 55V min.)
- Internal base-emitter resistor minimizes output leakage
- Low input current 0.5mA I$_F$

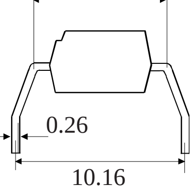
## APPLICATIONS

- Telephone ring detector
- Digital logic ground isolation
- Low input current line receiver
- Logic to reed relay interface
- Level shifting
- Interface between logic families
- Line voltage status indicator - low input power dissipation

OPTION SM
SURFACE MOUNT




OPTION G




## ABSOLUTE MAXIMUM RATINGS
**(25°C unless otherwise specified)**

| | |
|---|---|
| Storage Temperature | -40°C to + 125°C |
| Operating Temperature | -25°C to + 100°C |
| Lead Soldering Temperature (1/16 inch (1.6mm) from case for 10 secs) | 260°C |

## INPUT DIODE

| | |
|---|---|
| Forward Current | 50mA |
| Reverse Voltage | 6V |
| Power Dissipation | 70mW |

## OUTPUT TRANSISTOR

| | |
|---|---|
| Collector-emitter Voltage V$_{CEO}$ | 55V |
| Emitter-base Voltage V$_{EBO}$ | 6V |
| Collector Current | 150mA |
| Power Dissipation | 300mW |

## POWER DISSIPATION

| | |
|---|---|
| Total Power Dissipation | 350mW |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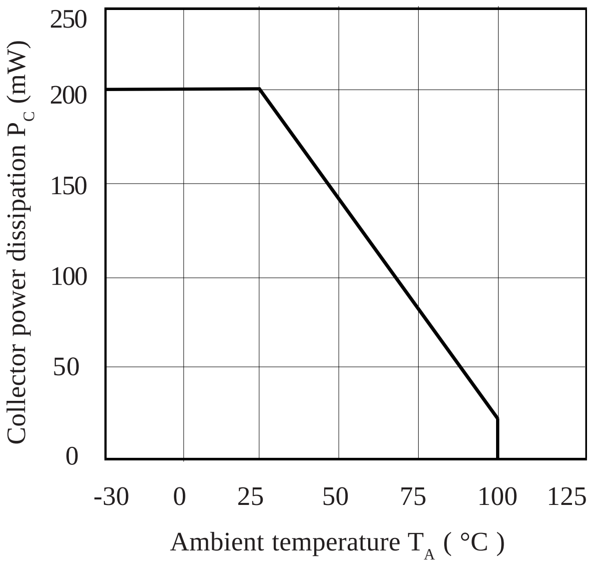
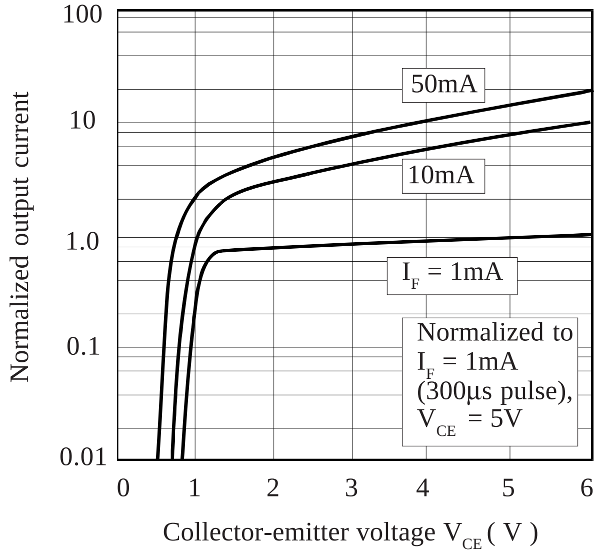
**ELECTRICAL CHARACTERISTICS ( $T_A$= 25°C Unless otherwise noted )**

| PARAMETER | | MIN | TYP | MAX | UNITS | TEST CONDITION |
|---|---|---|---|---|---|---|
| Input | Forward Voltage ($V_F$) | | 1.2 | 1.5 | V | $I_F$ = 10mA |
| | Reverse Current ($I_R$) | | | 10 | µA | $V_R$ = 4V |
| Output | Collector-emitter Breakdown (BVceo) | 55 | | | V | $I_C$ = 1mA |
| | Emitter-collector Breakdown (BVeco) | 0.1 | | | V | $I_E$ = 10µA |
| | Emitter-base Breakdown (BVebo) | 6 | | | V | $I_E$ = 10µA |
| Coupled | DC Current Transfer Ratio ( CTR ) | | | | | |
| | IS4N46 | 350 | | | % | 0.5mA $I_F$, 1V $V_{CE}$ |
| | IS4N46 | 500 | | | % | 1mA $I_F$, 1V $V_{CE}$ |
| | IS4N45 | 250 | | | % | 1mA $I_F$, 1V $V_{CE}$ |
| | IS4N46, IS4N45 | 200 | | | % | 10mA $I_F$, 1.2V $V_{CE}$ |
| | Logic Low Output Voltage ( $V_{OL}$ ) | | | | | |
| | IS4N46 | | | 1.0 | V | 0.5mA $I_F$, 1.75mA $I_{OL}$ |
| | IS4N46 | | | 1.0 | V | 1mA $I_F$, 5mA $I_{OL}$ |
| | IS4N45 | | | 1.0 | V | 1mA $I_F$, 2.5mA $I_{OL}$ |
| | IS4N46, IS4N45 | | | 1.2 | V | 10mA $I_F$, 20mA $I_{OL}$ |
| | Input to Output Isolation Voltage $V_{ISO}$ | 5300 | | | $V_{RMS}$ | See note 1 |
| | | 7500 | | | $V_{PK}$ | See note 1 |
| | Input-output Isolation Resistance $R_{ISO}$ | $5x10^{10}$ | | | Ω | $V_{IO}$ = 500V (note 1) |
| | Input-output Capacitance Cf | | 0.6 | | pF | V = 0, f =1MHz |
| | Output rise time, tr | | 100 | 300 | µS | $V_{CE}$ = 2V, $I_C$ = 20mA |
| | Output fall time, tf | | 20 | 100 | µS | $R_L$ = 100Ω |

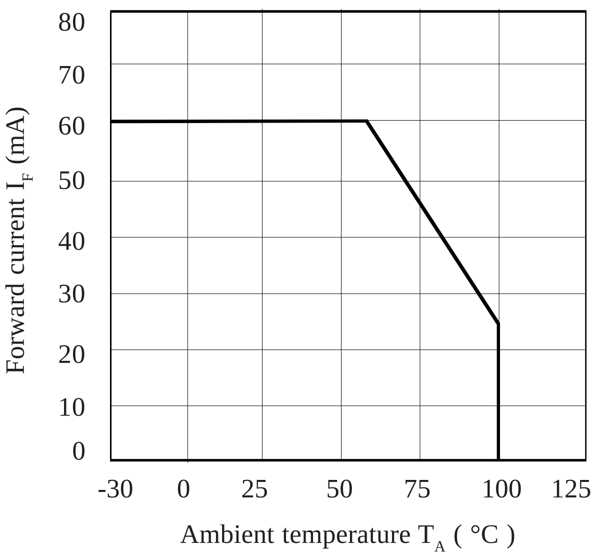
**Collector Power Dissipation vs. Ambient Temperature**



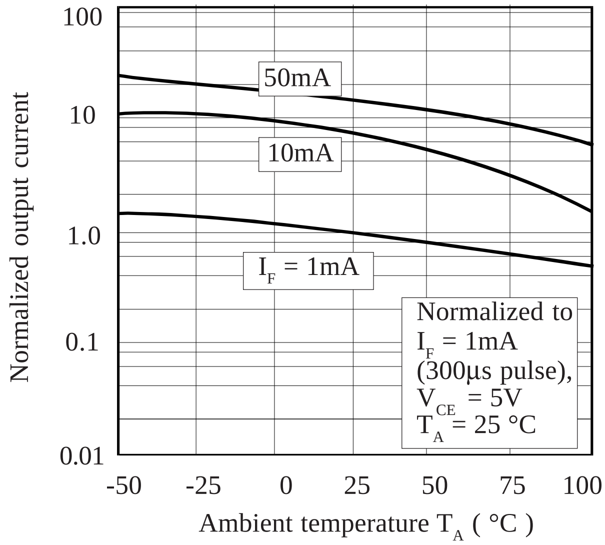

**Normalized Output Current vs. Collector-emitter Voltage**



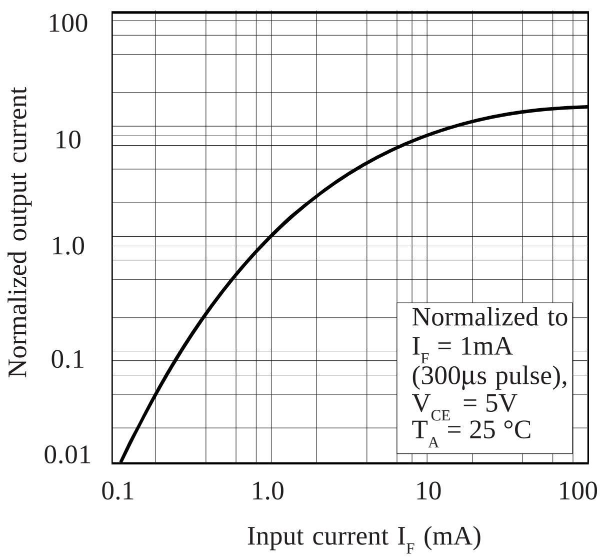

**Forward Current vs. Ambient Temperature**




**Normalized Output Current vs. Ambient Temperature**




**Normalized Output Current vs. Input Current**




**Collector Dark Current vs. Ambient Temperature**