IS4N46
IS4N45

LOW INPUT CURRENT DARLINGTON OUTPUT OPTICALLY COUPLED ISOLATOR

APPROVALS

- UL recognised, File No. E91231

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.

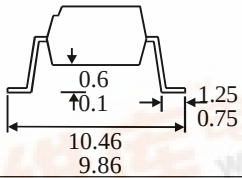
FEATURES

- 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$_F$

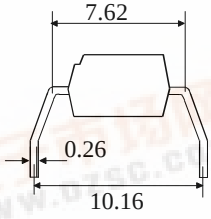
APPLICATIONS

- 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

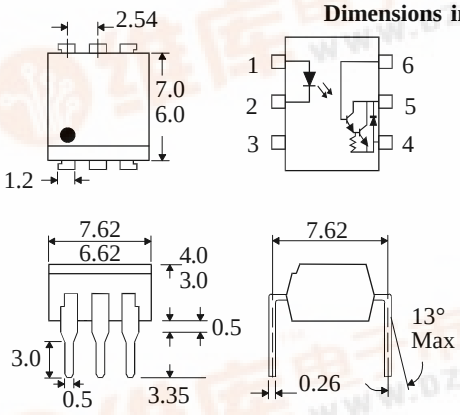
OPTION SM
SURFACE MOUNT



OPTION G



Dimensions in mm



ABSOLUTE MAXIMUM RATINGS (25°C unless otherwise specified)

Storage Temperature	-55°C to + 150°C
Operating Temperature	-55°C to + 100°C
Lead Soldering Temperature (1/16 inch (1.6mm) from case for 10 secs)	260°C

INPUT DIODE

Forward Current	60mA
Reverse Voltage	6V
Peak Forward Current (1µs pulse, 300pps)	3A
Power Dissipation	100mW

OUTPUT TRANSISTOR

Output Voltage (pin 5 - 4) V$_O$	55V
Emitter-baseVoltage (pin 4 - 6)	7V
Power Dissipation	200mW

POWER DISSIPATION

Total Power Dissipation	260mW

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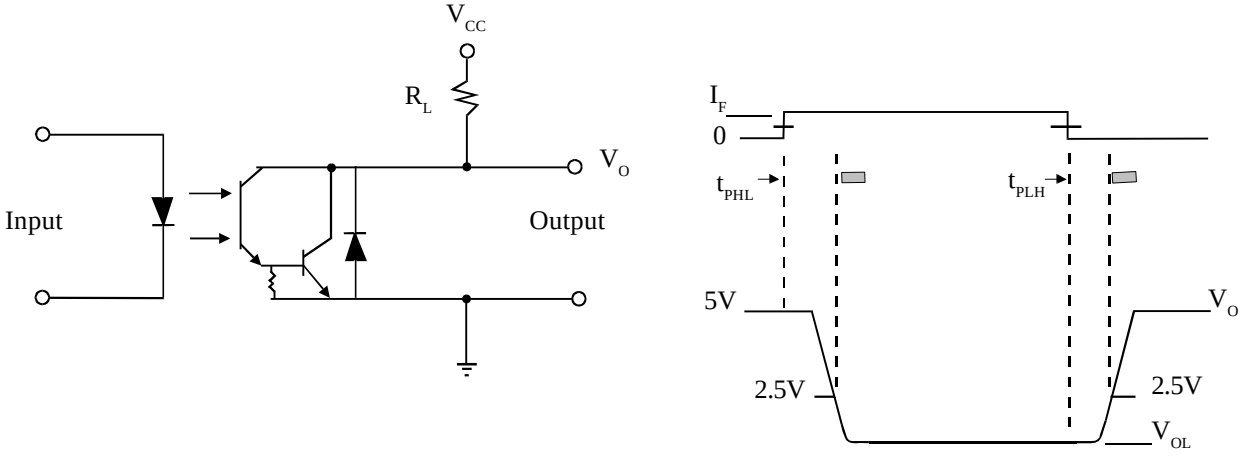
ELECTRICAL CHARACTERISTICS (T_A= 25°C Unless otherwise noted)

PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITION
Input	Forward Voltage (V_F)		1.2	1.5	V	I_F = 10mA
	Reverse Voltage (V_R)	6			V	I_R = 10µA
	Reverse Current (I_R)			10	µA	V_R = 6V
Output	Output Breakdown Voltage (pin 5 - 4)	55			V	I_{54} = 1mA
	Base Breakdown (pin 4 - 6)	7			V	I_E = 0.1mA
	Logic High Output			100	µA	V_{54} = 18V
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}	10^{11}			Ω	V_{IO} = 500V (note 1)
	Input-output Capacitance Cf		0.5		pF	V = 0, f =1MHz

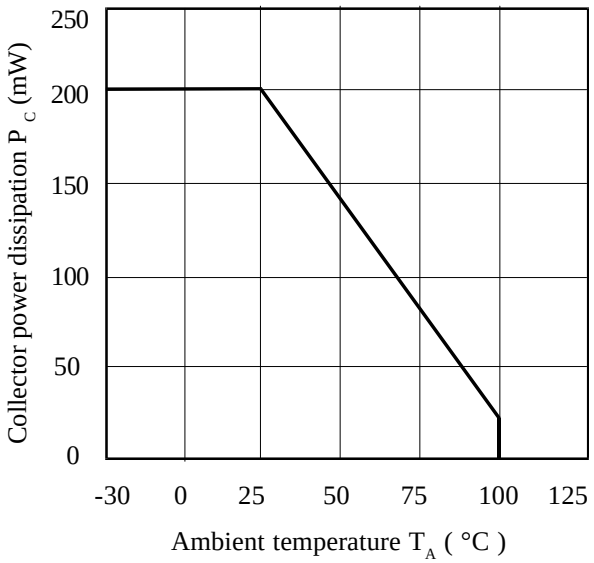
SWITCHING SPECIFICATIONS AT T_A = 25°C (V_{CC} = 5V Unless otherwise noted)

PARAMETER	SYM	DEVICE	MIN	TYP	MAX	UNITS	TEST CONDITION
Propagation Delay Time	t_{PHL}	IS4N46,45		80		µs	I_F = 1mA, R_L = 10kΩ
to Logic Low at Output (fig.1)	t_{PHL}	IS4N46,45		5	50	µs	I_F = 10mA, R_L = 220Ω
Propagation Delay Time	t_{PLH}	IS4N46,45		1500		µs	I_F = 1mA, R_L = 10kΩ
to Logic High at Output(fig.1)	t_{PLH}	IS4N46,45		150	500	µs	I_F = 10mA, R_L = 220Ω
Common Mode Transient Immunity at Logic High Level Output	CM_H			500		V/µs	I_F = 0mA,V_{CM} = 10V_{PP} R_L = 10kΩ
Common Mode Transient Immunity at Logic Low Level Output	CM_L			500		V/µs	I_F= 1mA,V_{CM}= 10V_{PP} R_L = 10kΩ

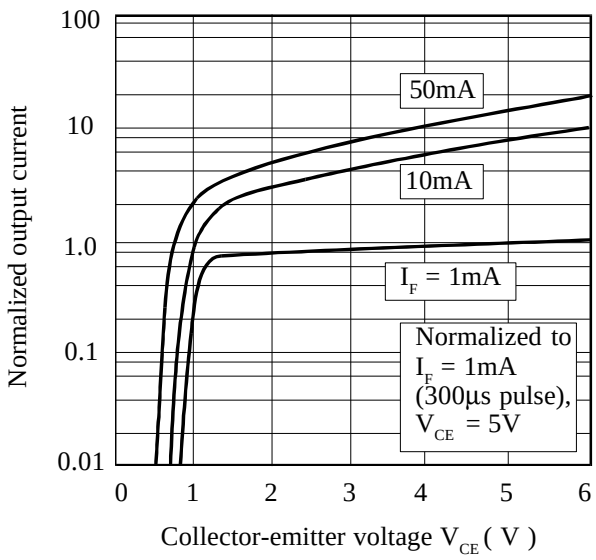
FIGURE 1



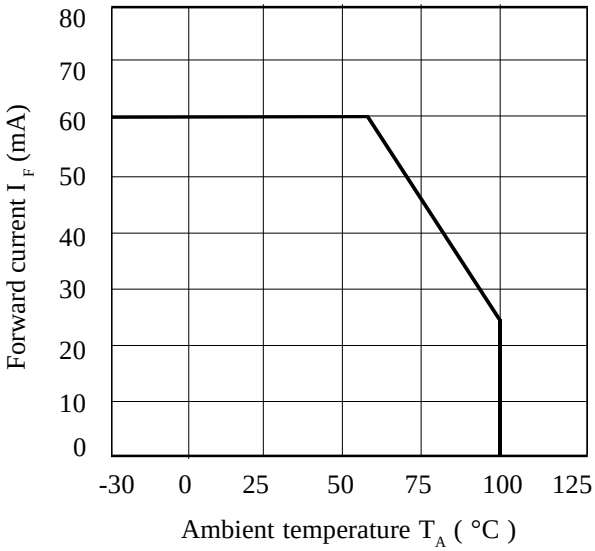
Collector Power Dissipation vs. Ambient Temperature



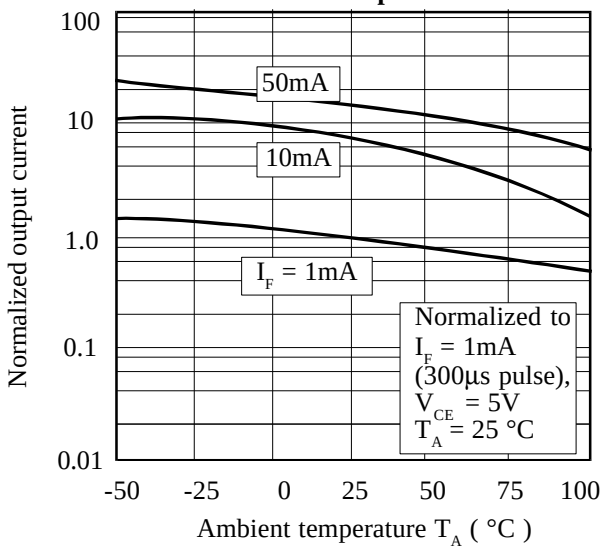
Normalized Output Current vs. Collector-emitter Voltage



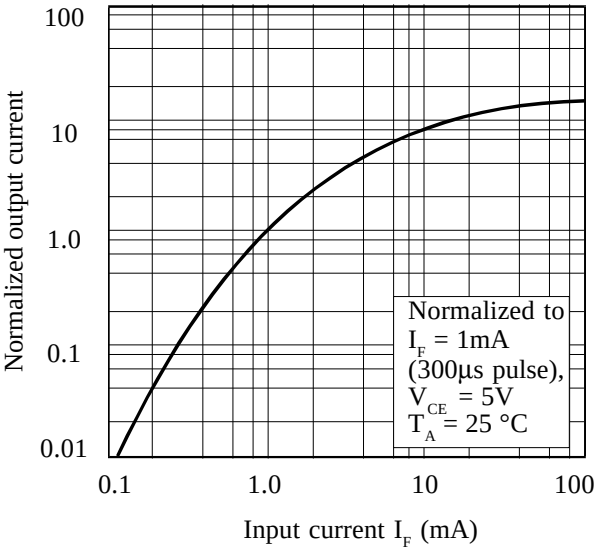
Forward Current vs. Ambient Temperature



Normalized Output Current vs. Ambient Temperature



Normalized Output Current vs. Input Current



Collector Dark Current vs. Ambient Temperature