

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.

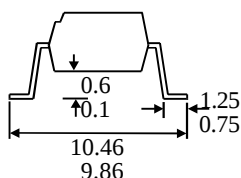
FEATURES

- 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 $0.5mA I_F$

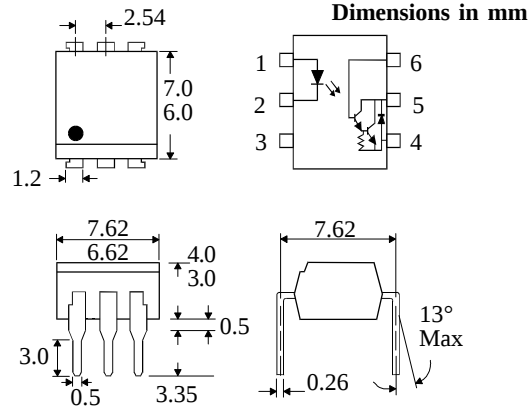
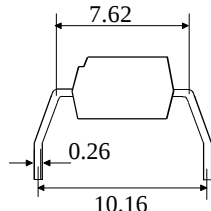
APPLICATIONS

- 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



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 _____ 3A
(1μs pulse, 300pps)
Power Dissipation _____ 100mW

OUTPUT TRANSISTOR

Output Voltage (pin 5 - 4) V_O _____ 55V
Emitter-base Voltage (pin 4 - 6) _____ 7V
Power Dissipation _____ 200mW

POWER DISSIPATION

Total Power Dissipation _____ 260mW

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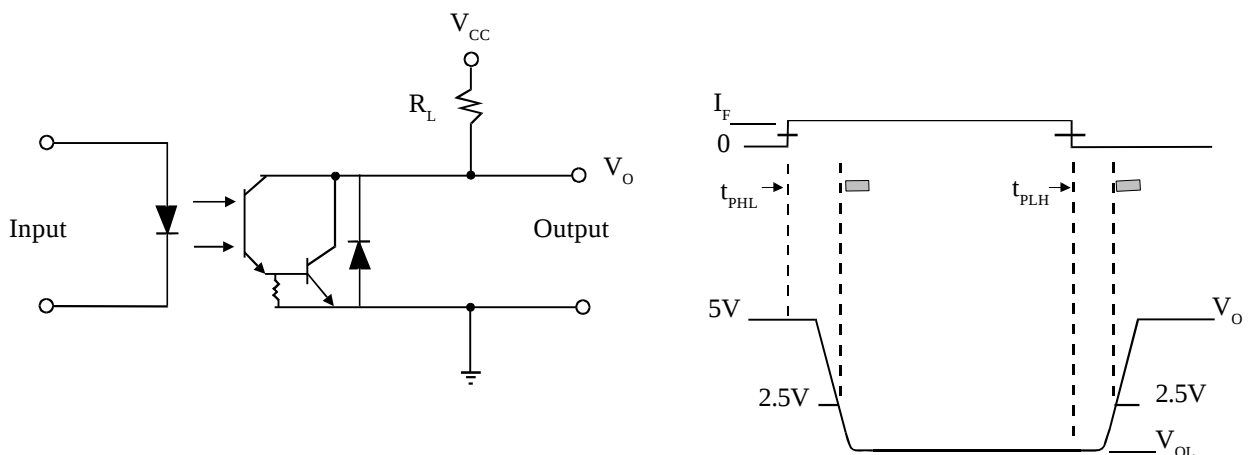
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise noted)

PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITION
Input	Forward Voltage (V_F)		1.2	1.5	V	$I_F = 10\text{mA}$
	Reverse Voltage (V_R)	6			V	$I_R = 10\mu\text{A}$
	Reverse Current (I_R)			10	μA	$V_R = 6\text{V}$
Output	Output Breakdown Voltage (pin 5 - 4)	55			V	$I_{54} = 1\text{mA}$
	Base Breakdown (pin 4 - 6)	7			V	$I_E = 0.1\text{mA}$
	Logic High Output			100	μA	$V_{54} = 18\text{V}$
Coupled	DC Current Transfer Ratio (CTR)					
	IS4N46	350			%	$0.5\text{mA } I_F, 1\text{V } V_{CE}$
	IS4N46	500			%	$1\text{mA } I_F, 1\text{V } V_{CE}$
	IS4N45	250			%	$1\text{mA } I_F, 1\text{V } V_{CE}$
	IS4N46, IS4N45	200			%	$10\text{mA } I_F, 1.2\text{V } V_{CE}$
	Logic Low Output Voltage (V_{OL})					
	IS4N46		1.0		V	$0.5\text{mA } I_F, 1.75\text{mA } I_{OL}$
	IS4N46		1.0		V	$1\text{mA } I_F, 5\text{mA } I_{OL}$
	IS4N45		1.0		V	$1\text{mA } I_F, 2.5\text{mA } I_{OL}$
	IS4N46, IS4N45		1.2		V	$10\text{mA } I_F, 20\text{mA } I_{OL}$
	Input to Output Isolation Voltage V_{ISO}	5300			V_{RMS}	See note 1
	Input-output Isolation Resistance R_{ISO}	7500			V_{PK}	See note 1
	Input-output Capacitance C_f	10^{11}	0.5		Ω pF	$V_{IO} = 500\text{V}$ (note 1) $V = 0, f = 1\text{MHz}$

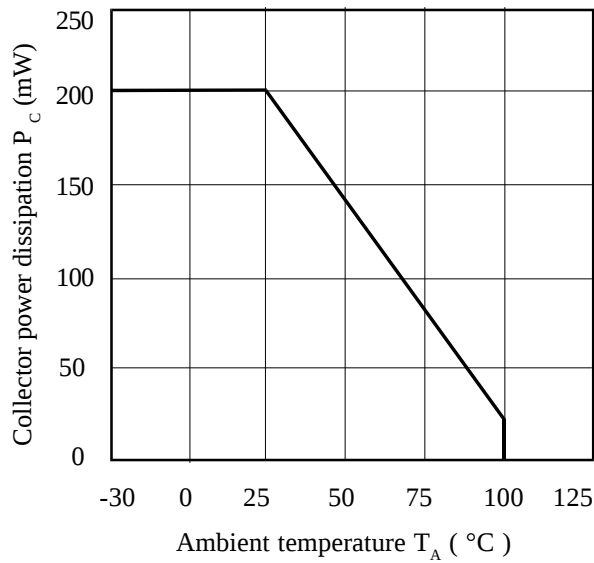
SWITCHING SPECIFICATIONS AT $T_A = 25^\circ\text{C}$ ($V_{CC} = 5\text{V}$ Unless otherwise noted)

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

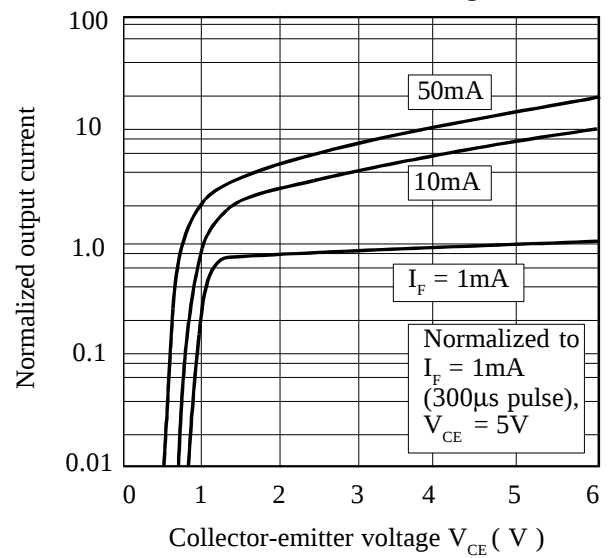
FIGURE 1



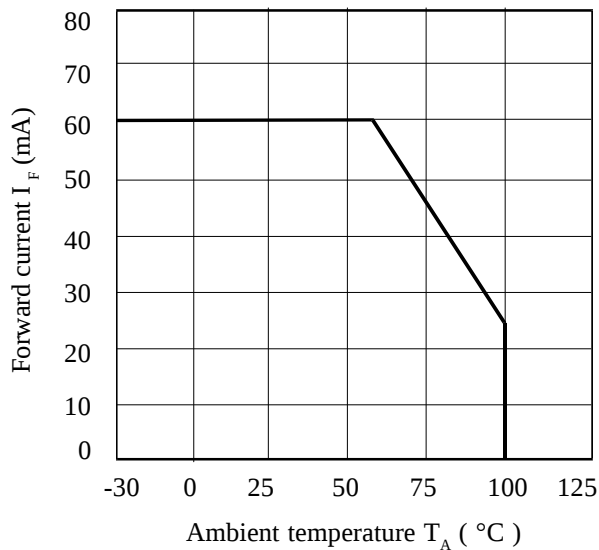
Collector Power Dissipation vs. Ambient Temperature



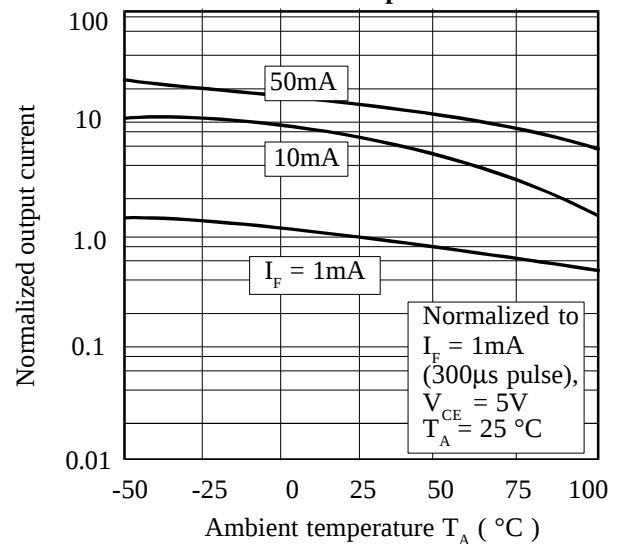
Normalized Output Current vs. Collector-emitter Voltage



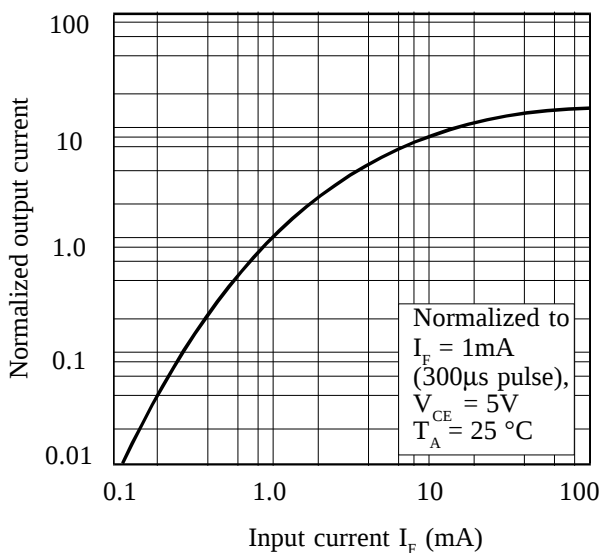
Forward Current vs. Ambient Temperature



Normalized Output Current vs. Ambient Temperature



Normalized Output Current vs. Input Current



Collector Dark Current vs. Ambient Temperature

