

### FEATURES

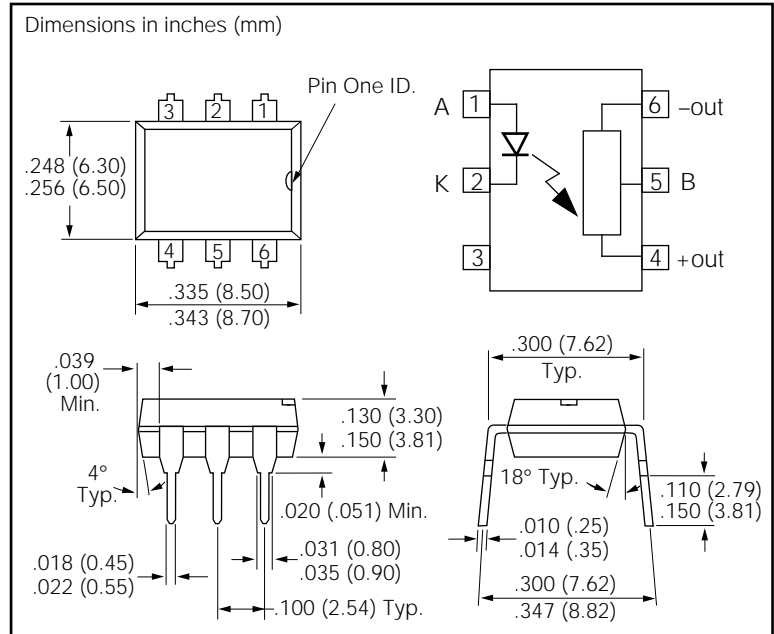
- Fast Turn On
- Fast Turn Off
- Low Input Current
- Isolation Test Voltage, 5300 VAC<sub>RMS</sub>

### APPLICATIONS

- Motor Drive Controls
- IGBT-predrivers
- AC/DC Power Inverters

### DESCRIPTION

The IL485 is a photovoltaic generator (optically coupled) designed to drive highly capacitive loads such as the gate of a power MOSFET transistor and at the same time provide isolation and floating voltage supply capability. The coupler consists of a GaAlAs light emitting diode as input control and a custom photo IC chip with photodiode array (PDA) as output device. When the LED is turned on, the emitted light produces a voltage in the PDA. The output of the PDA is used to drive the gate of a power MOSFET. The photo IC chip contains additional circuitry to enhance the switching speeds, (both turn on turn off). The optocoupler is packaged in a 6 pin DIP.



### Maximum Ratings

#### Emitter

Reverse Voltage	4 V
Forward Current	60 mA
Peak Forward Current	600 mA
Power Dissipation	100 mW
Thermal Resistance	700 °C/W

#### Detector

Breakdown Voltage (pin 5 to 6)	300 V
Peak Input Current (pin 5 to 4)	50 mA
Reverse Current (pin 5 to 6, V=100 V)	200 nA
Power Dissipation (pin 5 to 4)	150 mW

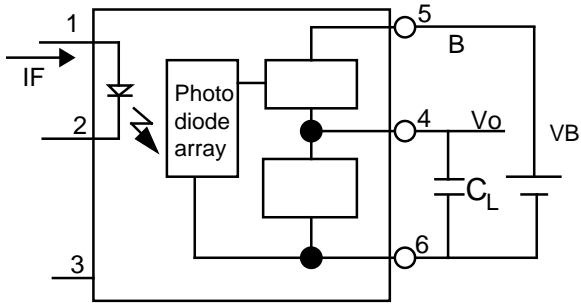
#### Package

Insulation Thickness between Emitter and Detector	≥0.4 mm
Isolation Test Voltage (1 sec.)	5300 VAC <sub>RMS</sub>
Isolation Resistance	
V <sub>IO</sub> =500 V, T <sub>A</sub> =25°C	≥10 <sup>12</sup> Ω
V <sub>IO</sub> =500 V, T <sub>A</sub> =100°C	≥10 <sup>11</sup> Ω
Comparative Tracking Index per	
DIN IEC 112/VDE 303, Part 1	≥175
Total Power Dissipation	250 mW
Storage Temperature Range	-55°C to +150°C
Operating Temperature Range	-55°C to +100°C
Junction Temperature	100°C
Soldering Temperature (max. 10 sec., dip soldering distance to seating plane >1.5 mm)	260°C

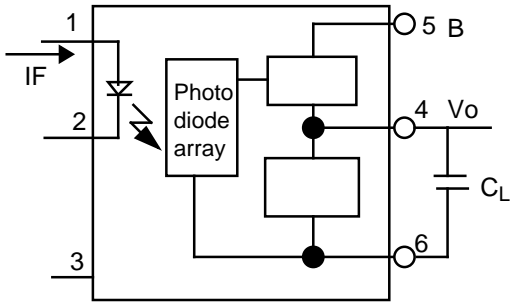
## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
<b>Input — Emitter</b>						
LED Forward Voltage	$V_F$	0.9	1.5	2.1	V	$I_F=10\text{ mA}$
LED Junction Capacitance	$C_J$		25		pF	$V_R=0\text{ V}$ , $f=1\text{ MHz}$
<b>MOSFET Driver Output with External Biasing (see Figure 1 and Figure 3)</b>						
Zener Voltage (pin 4 to 6)	$V_Z$		13		V	$I_{ZT}=10\text{ }\mu\text{A}$
Dynamic Output Voltage (pin 4 to 6)	$V_{OUT}$	9	11		V	$C_L=2000\text{ pF}$ , $V_B=20\text{ V}$ $I_F=10\text{ mA}$
Dynamic Output Current (pin 4 to 6)	$I_{OUT}$		5 15		mA mA	$C_L=2000\text{ pF}$ , $V_B=20\text{ V}$ $I_F=10\text{ mA}$ $I_F=40\text{ mA}$
Dynamic Output Resistance Sourcing (pin 4) Sinking (pin 4)	$R_{OUT}$		300 20		$\Omega$ $\Omega$	$I_F=10\text{ mA}$
Turn-on Time	$t_{ON}$		3.5	5	$\mu\text{s}$	$C_L=2000\text{ pF}$ , $I_F=40\text{ mA}$ Measure at $V_{OUT}=5\text{ V}$ , $V_B=20\text{ V}$
Turn-off Time	$t_{OFF}$		3.5	5	$\mu\text{s}$	$C_L=2000\text{ pF}$ , $I_F=40\text{ mA}$ Measure at $V_{OUT}=2\text{ V}$ , $V_B=20\text{ V}$
<b>MOSFET Driver Output without External Biasing (see Figure 2 and Figure 3)</b>						
Output Open Circuit Voltage (pin 4 to 6)	$V_{OC}$	7	10		V	$I_F=10\text{ mA}$
Output Short Circuit Current (pin 4 to 6)	$I_{SC}$	2.1 8.4	4 16		$\mu\text{A}$ $\mu\text{A}$	$I_F=10\text{ mA}$ $I_F=40\text{ mA}$
Dynamic Output Resistance Sinking (pin 4)	$R_{OUT}$		20		$\Omega$	$I_F=10\text{ mA}$
Turn-on Time	$t_{ON}$		650	1000	$\mu\text{s}$	$C_L=2000\text{ pF}$ (see Figure 3) Measure at $V_{OUT}=5\text{ V}$ , $I_F=40\text{ mA}$
Turn-off Time	$t_{OFF}$		3	5	$\mu\text{s}$	$C_L=2000\text{ pF}$ (see Figure 3) Measure at $V_{OUT}=2\text{ V}$ , $I_F=40\text{ mA}$
<b>MOSFET Driver Output Switching Speed (see Figure 3, Figure 4, Figure 5)</b>						
Rise time	$t_R$		500		ns	$M1\text{ Cgs}=2000\text{ pF}$ , $V_S=50\text{ V}$ Measure at 90%–10% $M1\text{ }V_{DS}$ (see Figure 4)
Turn-on Time	$t_{ON}$		3.5		$\mu\text{s}$	
Fall time	$t_F$		300		ns	
Turn-off Time	$t_{OFF}$		3.5		$\mu\text{s}$	
<b>Package Isolation Characteristics</b>						
Input-Output CMRR	$dv/dt$		15 kV		V/ $\mu\text{s}$	$V_{CM}=1000\text{ V}$
Coupling Capacitance	$C_{IO}$		1		pF	$f=1\text{ MHz}$

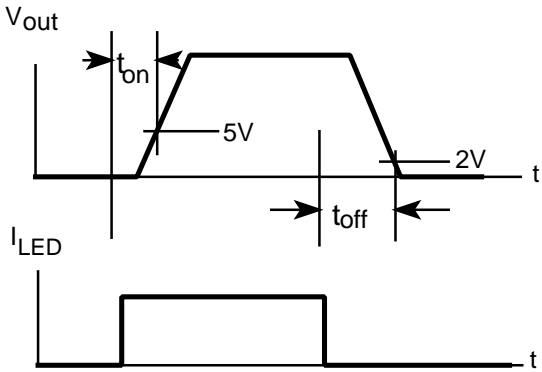
**Figure 1. Switching time measurement with external voltage bias**



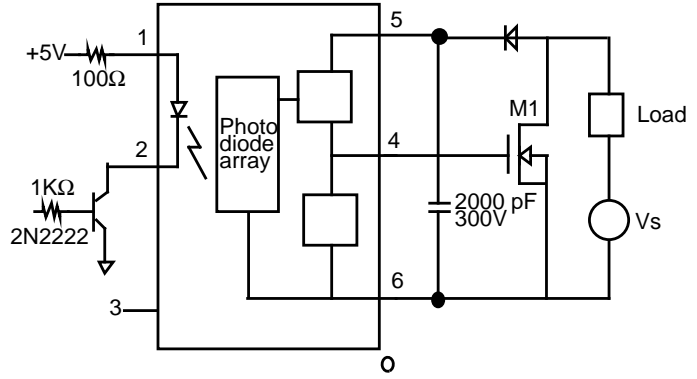
**Figure 2. Switching time measurement**



**Figure 3. IL485 connected in AC load switching configuration**



**Figure 4. Switching time measurement without voltage bias**



**Figure 5. IL485 connected in DC load switching configuration**

