

TIL923, TIL924, TIL925 TIL923A, TIL924A, TIL925A SINGLE/DUAL/QUAD CHANNEL OPTOCOUPLEDERS/OPTOISOLATORS

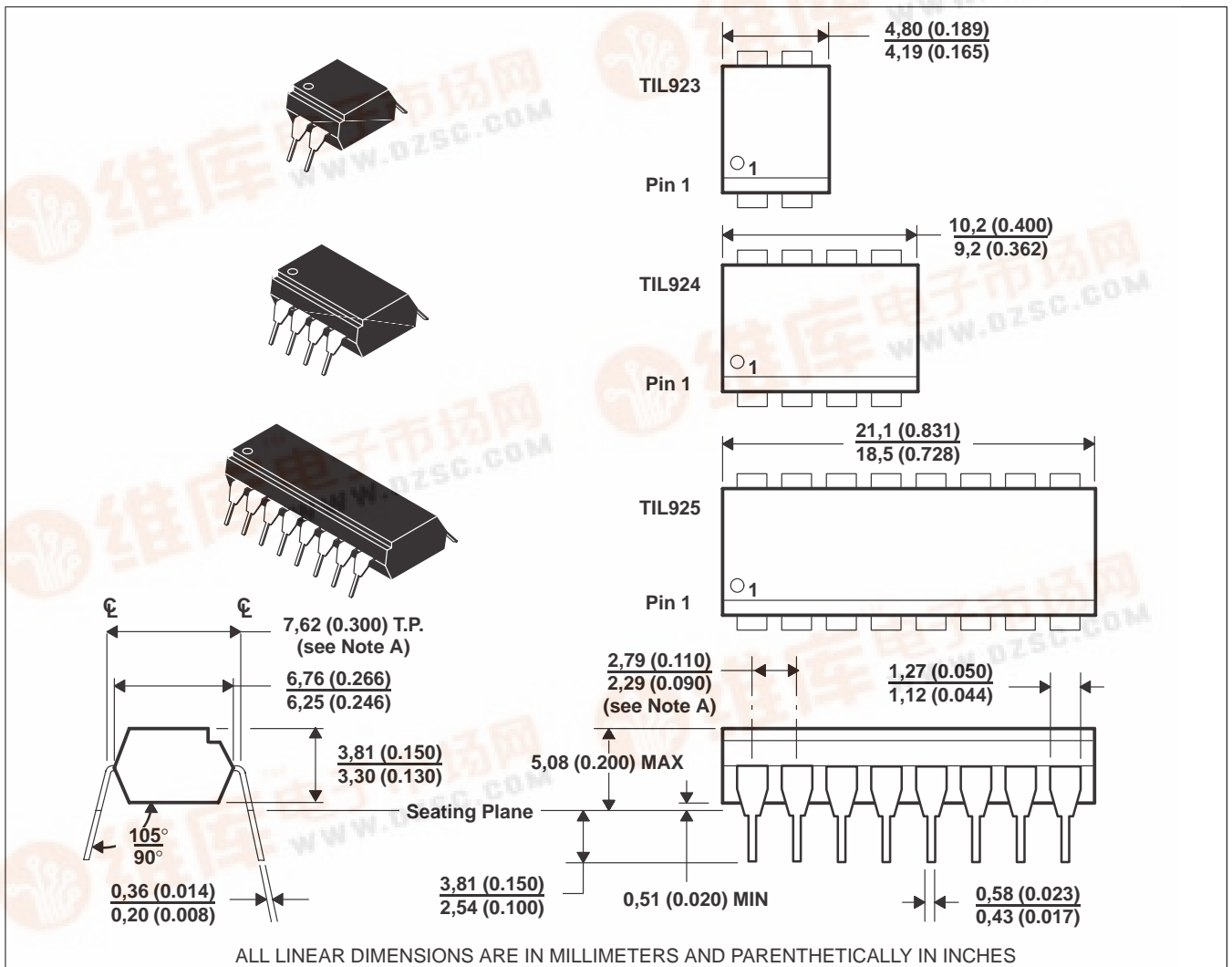
SOOS031 – OCTOBER 1991

- Gallium-Arsenide Diode Infrared Source
- Source Is Optically Coupled to Silicon N-P-N Darlington Phototransistor
- Choice of One, Two, or Four Channels
- Choice of Two Current-Transfer Ratios
- High-Voltage Electrical Isolation . . . 7.5 kV Peak (5.3 kV rms)
- Plastic Dual-In-Line Packages
- UL Listed – File No. E65085

description

These optocouplers consist of a gallium-arsenide light-emitting diode and a silicon n-p-n Darlington phototransistor per channel. The TIL923 has one channel in a 4-pin package, the TIL924 has two channels in a 8-pin package, and the TIL925 has four channels in a 16-pin package. The standard devices, TIL923, TIL924, and TIL925, are tested for a current-transfer ratio of 500% minimum. Devices selected for a current-transfer ratio of 1000% are designated with the suffix.

mechanical data

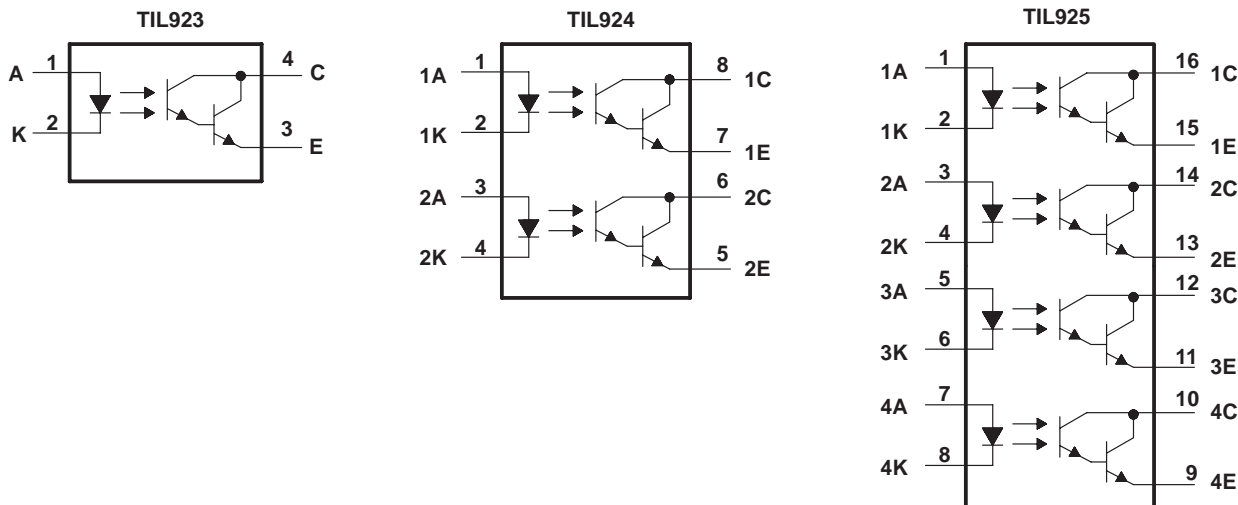


NOTE A: Each pin centerline is located 0,25 (0.010) of its true longitudinal position.



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schematic diagrams



absolute maximum ratings at 25°C free-air temperature (unless otherwise noted)

Input-to-output voltage (see Note 1)	±7.5 kV peak or dc (±5.3 kV rms)
Collector-emitter voltage (see Note 2)	35 V
Emitter-collector voltage	7 V
Input diode reverse voltage	5 V
Input diode continuous forward current at (or below) 25°C free-air temperature (see Note 3)	50 mA
Continuous power dissipation at (or below) 25°C free-air temperature:	
Phototransistor (see Note 4)	150 mW
Input diode plus phototransistor per channel (see Note 5)	200 mW
Operating free-air temperature, T _A	-55°C to 100°C
Storage temperature range	-55°C to 125°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°C

- NOTES: 1. This rating applies for sine-wave operation at 50 or 60 Hz. Service capability is verified by testing in accordance with UL requirements.
 2. This value applies when the base-emitter diode is open circuited.
 3. Derate linearly to 100°C free-air temperature at the rate of 0.67 mA/°C.
 4. Derate linearly to 100°C free-air temperature at the rate of 2 mW/°C.
 5. Derate linearly to 100°C free-air temperature at the rate of 2.67 mW/°C.

electrical characteristics, T_A = 25°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
V _{(BR)CEO}	Collector-emitter breakdown voltage	I _C = 0.5 mA, I _F = 0	35			V
V _{(BR)ECO}	Emitter-collector breakdown voltage	I _C = 100 µA, I _F = 0	7			V
I _R	Input diode static reverse current	V _R = 5 V			10	µA
I _{C(off)}	Off-state collector current	V _{CE} = 10 V, I _F = 0			100	nA
CTR	Current transfer ratio	TIL923, TIL924, TIL925	I _F = 2 mA, V _{CE} = 1 V	500%		
		TIL923A, TIL924A, TIL925A		1000%		
V _F	Input diode static forward voltage	I _F = 20 mA			1.4	V
V _{CE(sat)}	Collector-emitter saturation voltage	I _F = 10 mA, I _C = 50 mA			1	V
C _{io}	Input-to-output capacitance	V _{in-out} = 0, f = 1 MHz, See Note 6		1		pF
r _{io}	Input-to-output internal resistance	V _{in-out} = ±1 kV, See Note 6		10 ¹¹		Ω

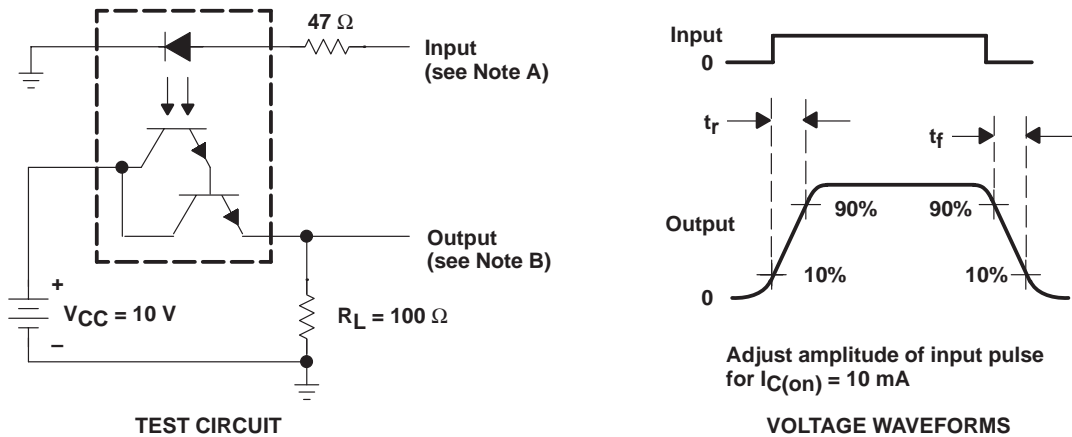
NOTE 6. These parameters are measured between all input-diode leads shorted together and all phototransistor leads shorted together.

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switching characteristics at 25°C free-air temperature

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_r Rise time	$V_{CC} = 10\text{ V}$, $I_{C(on)} = 10\text{ mA}$, $R_L = 100\ \Omega$, See Figure 1		100		μs
t_f Fall time			100		

PARAMETER MEASUREMENT INFORMATION



- NOTES: A. The input waveform is supplied by a generator with the following characteristics: $Z_0 = 50\ \Omega$, $t_r \leq 15\text{ ns}$, duty cycle = 1%, $t_w = 500\ \mu\text{s}$.
B. The output waveform is monitored on an oscilloscope with the following characteristics: $t_r \leq 12\text{ ns}$, $R_{in} \geq 1\text{ M}\Omega$, $C_{in} \leq 20\text{ pF}$.

Figure 1. Switching Times

TYPICAL CHARACTERISTICS

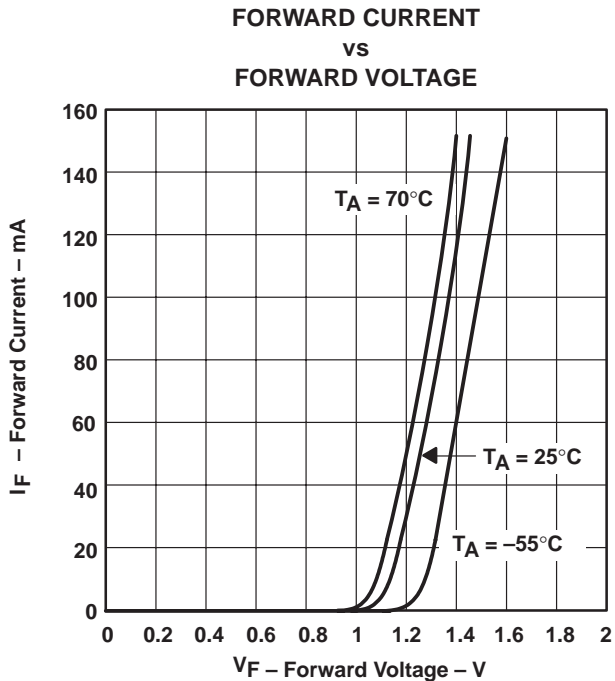


Figure 2

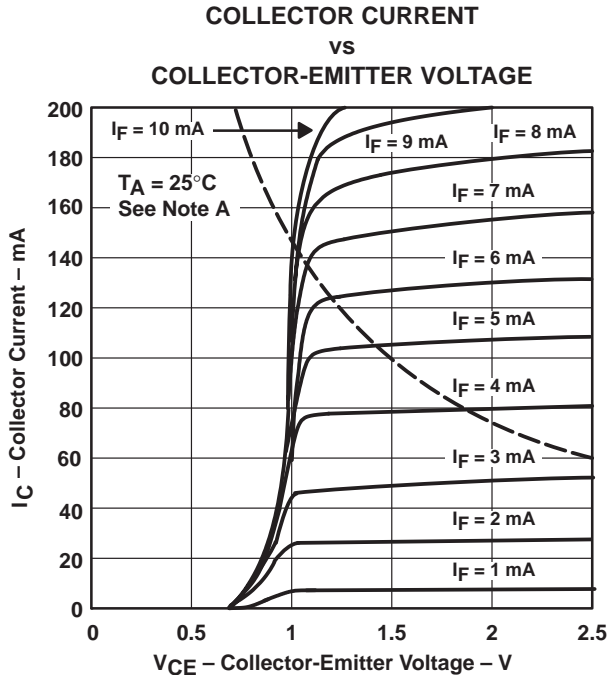
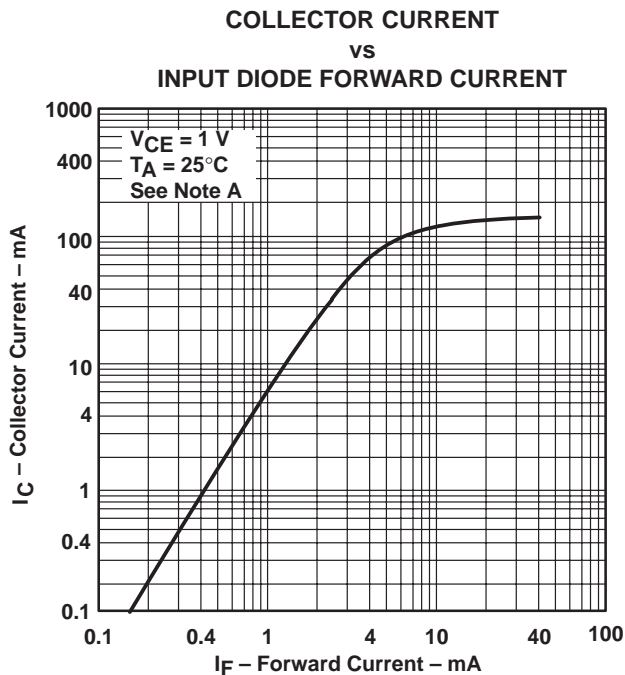


Figure 3

NOTE A: Pulse operation is required for operation beyond limits shown by the dashed line.



NOTE A: These parameters are measured using pulse techniques $t_w = 1 \text{ ms}$, duty cycle $\leq 2\%$.

Figure 4

TYPICAL CHARACTERISTICS

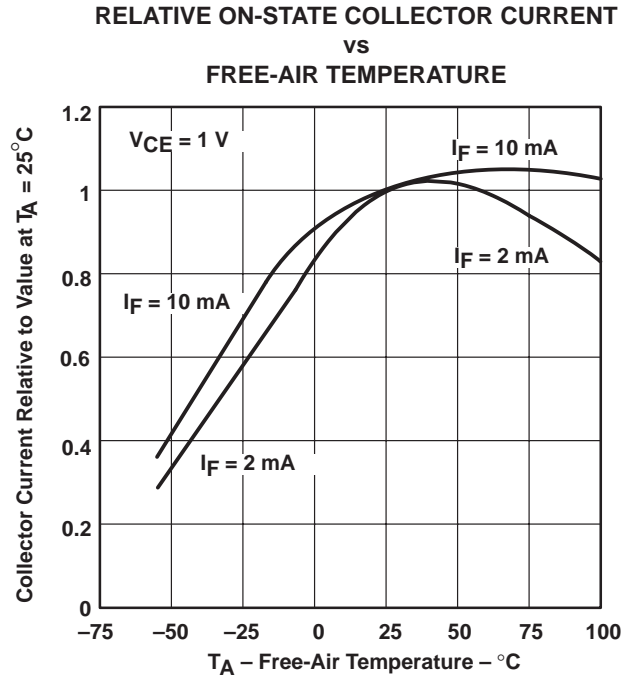


Figure 5

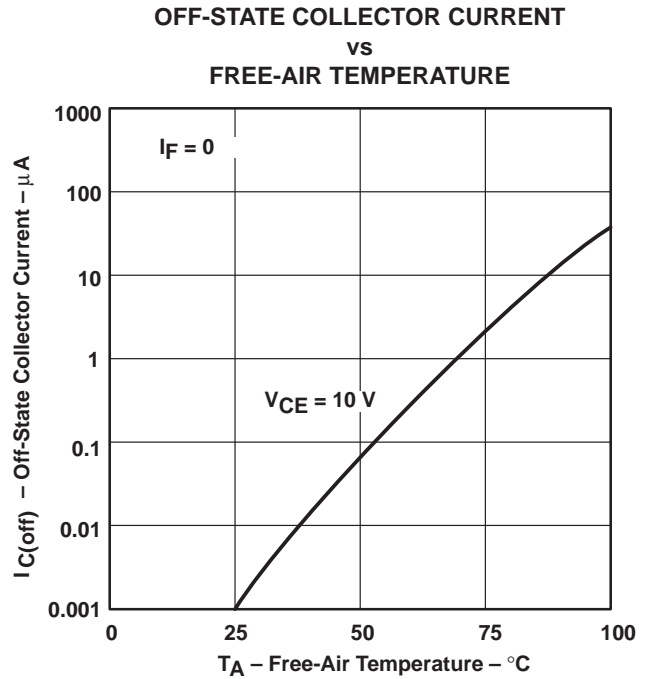


Figure 6

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