

TIL917, TIL917A, TIL917B, TIL917C, TIL918, TIL918A TIL918B, TIL918C, TIL919, TIL919A, TIL919B, TIL919C SINGLE/DUAL/QUAD CHANNEL OPTOCOUPLEDERS/OPTOISOLATORS

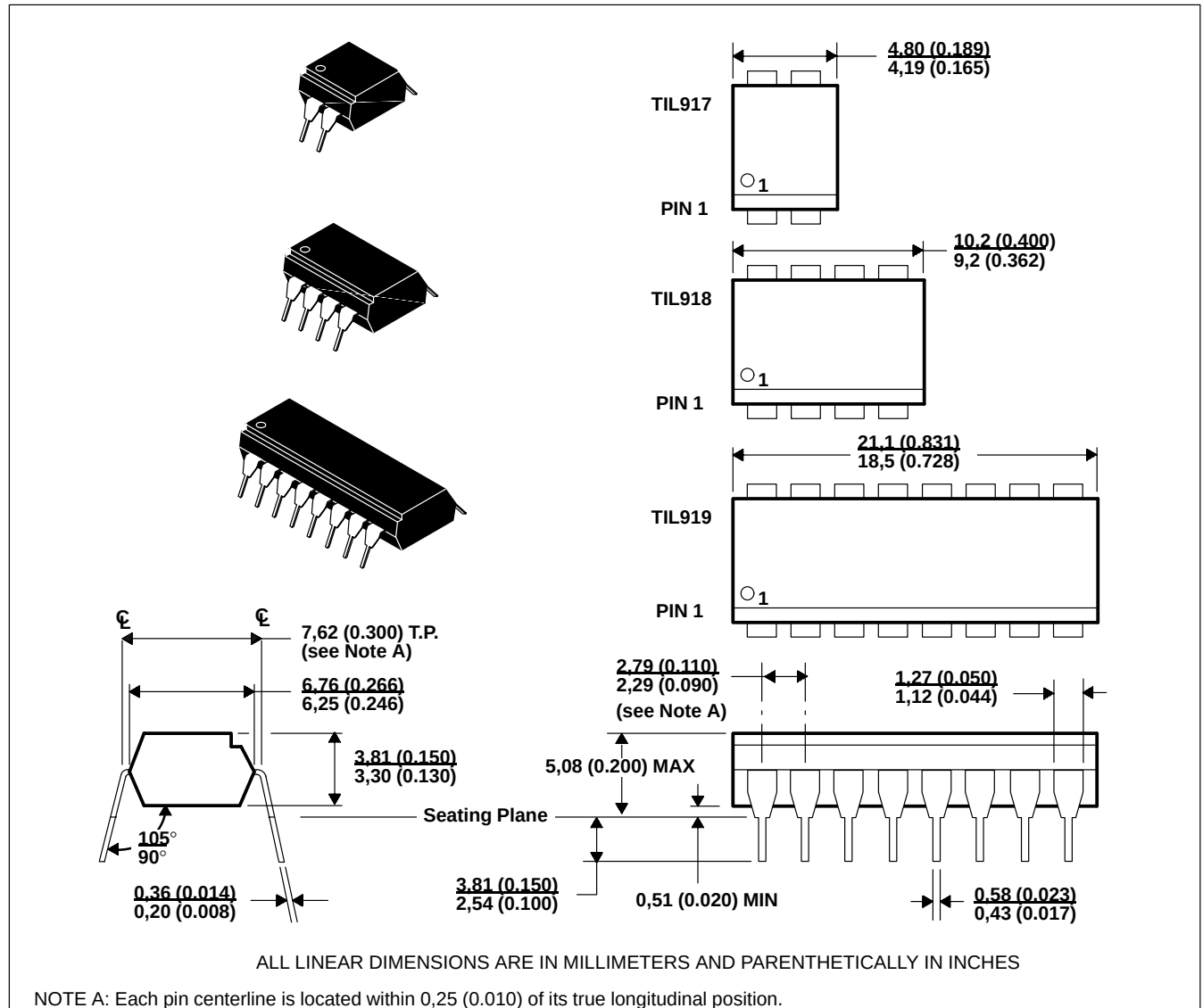
SOOS030 – FEBRUARY 1992

- 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 Four 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 TIL917 has one channel in a 4-pin package, the TIL918 has two channels in an 8-pin package, and the TIL919 has four channels in a 16-pin package. The standard devices, TIL917, TIL918, and TIL919, are tested for a current-transfer ratio of 20% minimum. Devices selected for a current-transfer ratio of 50%, 100%, and 200% minimum are designated with the suffix A, B, and C, respectively.

mechanical data



PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**TEXAS
INSTRUMENTS**

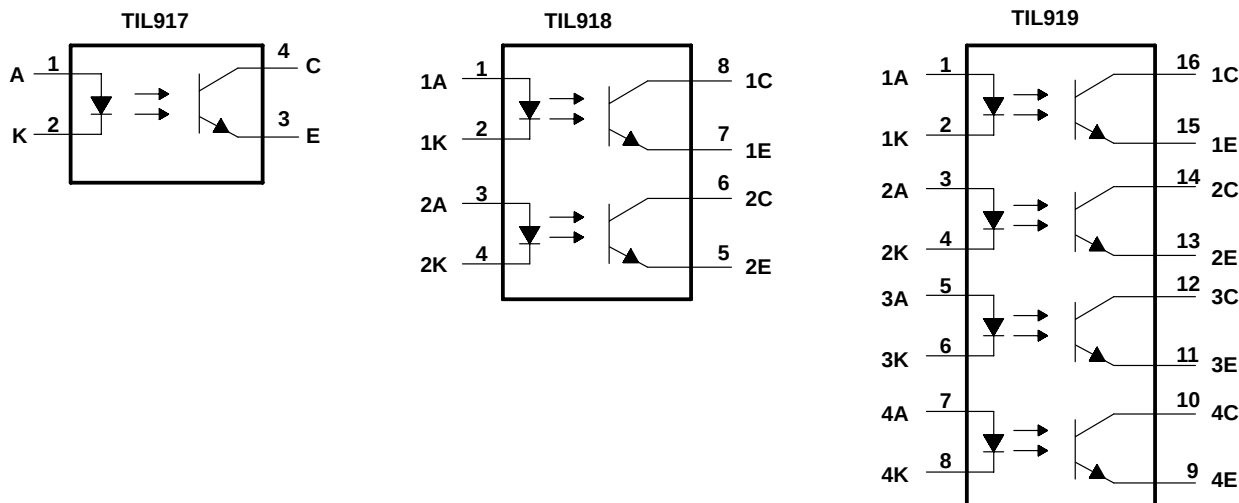
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**TIL917, TIL917A, TIL917B, TIL917C, TIL918, TIL918A
TIL918B, TIL918C, TIL919, TIL919A, TIL919B, TIL919C
SINGLE/DUAL/QUAD CHANNEL OPTOCOUPPLERS/OPTOISOLATORS**

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schematic diagrams



absolute maximum ratings, $T_A = 25^\circ\text{C}$ (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 $0.67 \text{ mA}/^\circ\text{C}$.
4. Derate linearly to 100°C free-air temperature at the rate of $2 \text{ mW}/^\circ\text{C}$.
5. Derate linearly to 100°C free-air temperature at the rate of $2.67 \text{ mW}/^\circ\text{C}$.

**TIL917, TIL917A, TIL917B, TIL917C, TIL918, TIL918A
TIL918B, TIL918C, TIL919, TIL919A, TIL919B, TIL919C
SINGLE/DUAL/QUAD CHANNEL OPTOCOUPLEDERS/OPTOISOLATORS**

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electrical characteristics, $T_A = 25^\circ\text{C}$ (unless otherwise noted)

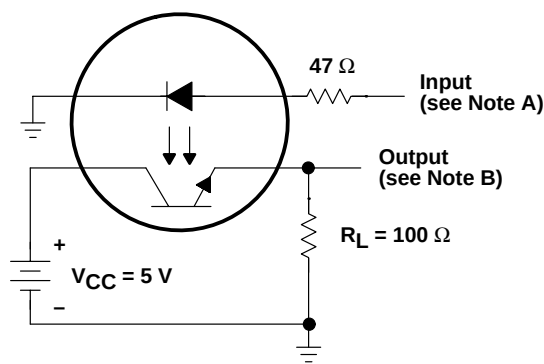
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	$I_C = 0.5\text{ mA}$, $I_F = 0$	35			V
$V_{(BR)ECO}$	Emitter-collector breakdown voltage	$I_C = 100\text{ }\mu\text{A}$, $I_F = 0$	7			V
I_R	Input diode static reverse current	$V_R = 5\text{ V}$			10	μA
$I_{C(off)}$	Off-state collector current	$V_{CE} = 24\text{ V}$, $I_F = 0$			100	nA
CTR	Current transfer ratio	$I_F = 5\text{ mA}$, $V_{CE} = 5\text{ V}$	TIL917, TIL918, TIL919		20%	
			TIL917A, TIL918A, TIL919A		50%	
			TIL917B, TIL918B, TIL919B		100%	
			TIL917C, TIL918C, TIL919C		200%	
V_F	Input diode static forward voltage	$I_F = 20\text{ mA}$			1.4	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	$I_F = 5\text{ mA}$, $I_C = 1\text{ mA}$			0.4	V
C_{io}	Input-to-output capacitance	$V_{in-out} = 0$, $f = 1\text{ MHz}$, See Note 6		1		pF
r_{io}	Input-to-output internal resistance	$V_{in-out} = \pm 1\text{ kV}$, 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.

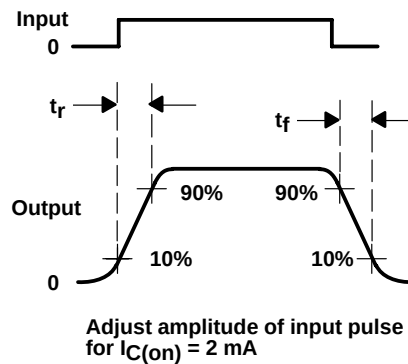
switching characteristics, $T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_r	Rise time	$V_{CC} = 5\text{ V}$, $I_{C(on)} = 2\text{ mA}$, $R_L = 100\text{ }\Omega$, See Figure 1		6		μs
t_f	Fall time			6		

PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



VOLTAGE WAVEFORMS

- NOTES: A. The input waveform is supplied by a generator with the following characteristics: $Z_0 = 50\text{ }\Omega$, $t_r \leq 15\text{ ns}$, duty cycle = 1%, $t_W = 500\text{ }\mu\text{s}$.
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

FORWARD CURRENT
vs
FORWARD VOLTAGE

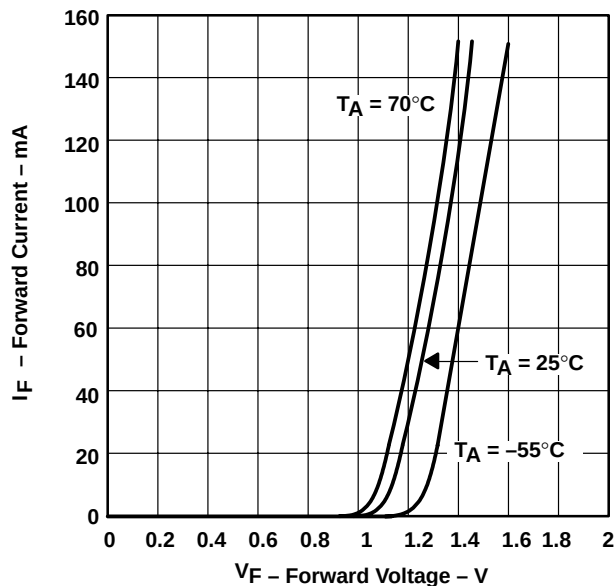


Figure 2

COLLECTOR CURRENT
vs
COLLECTOR-EMITTER VOLTAGE

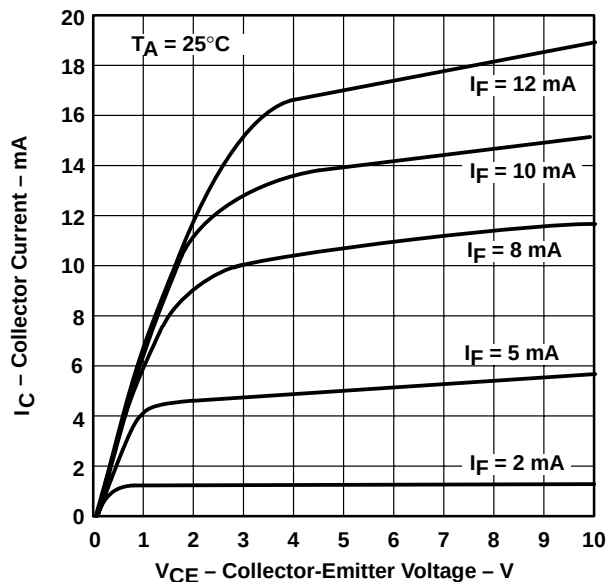


Figure 3

NORMALIZED ON-STATE COLLECTOR CURRENT
vs
INPUT-DIODE FORWARD CURRENT

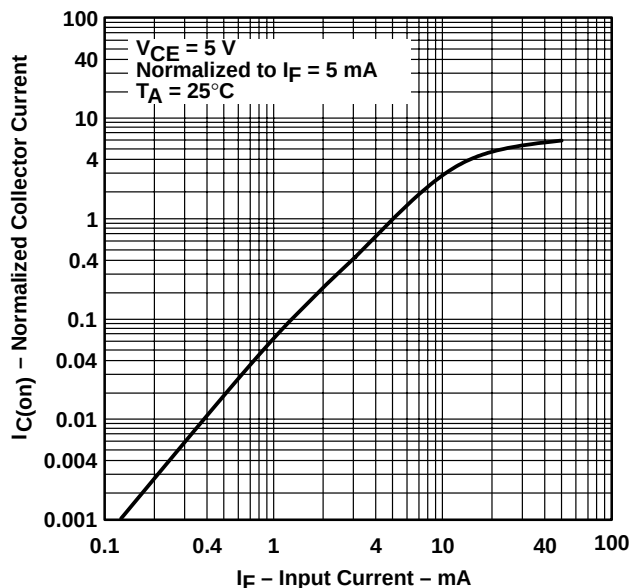


Figure 4

RELATIVE ON-STATE COLLECTOR CURRENT
vs
FREE-AIR TEMPERATURE

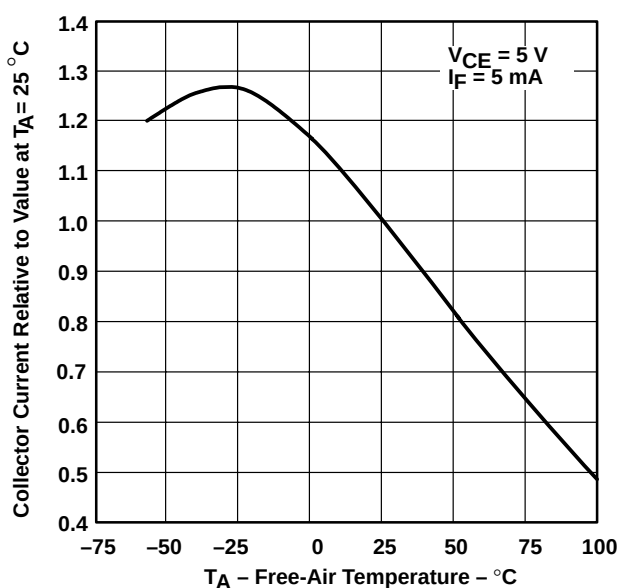


Figure 5

TYPICAL CHARACTERISTICS

TYPICAL COLLECTOR-EMITTER SATURATION VOLTAGE
VS
FREE-AIR TEMPERATURE

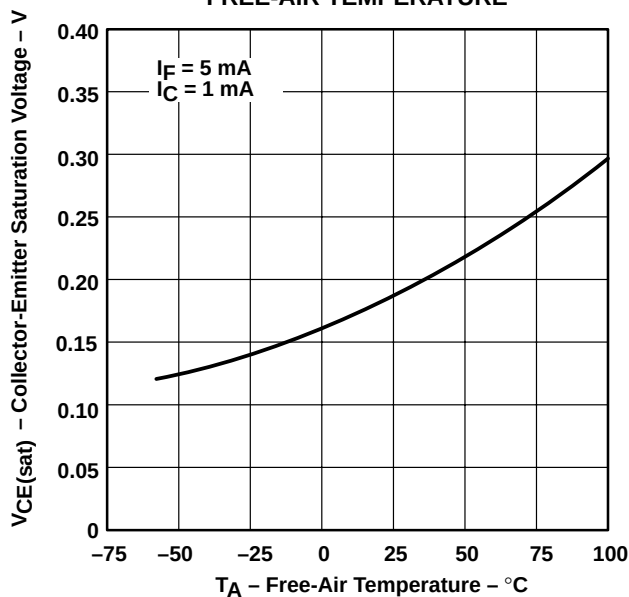


Figure 6

APPLICATION INFORMATION

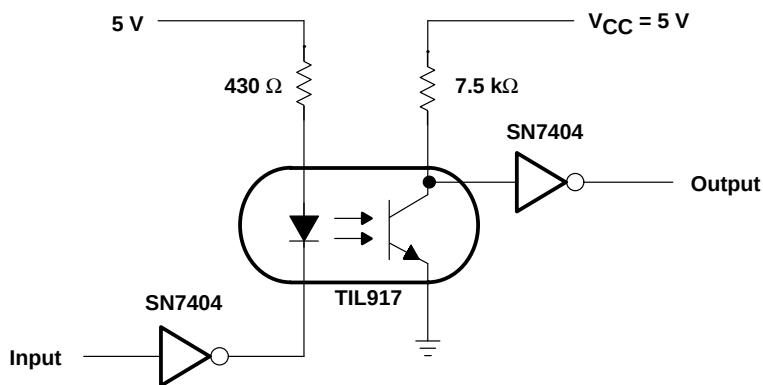


Figure 7. Data Transmission Circuit

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
TIL917	OBSOLETE	PDIP	N	4		TBD	Call TI	Call TI
TIL917B	OBSOLETE	PDIP	N	4		TBD	Call TI	Call TI
TIL917C	OBSOLETE	PDIP	N	4		TBD	Call TI	Call TI
TIL918	OBSOLETE	PDIP	N	8		TBD	Call TI	Call TI
TIL918B	OBSOLETE	PDIP	N	8		TBD	Call TI	Call TI
TIL918C	OBSOLETE	PDIP	N	8		TBD	Call TI	Call TI
TIL919	OBSOLETE	PDIP	N	8		TBD	Call TI	Call TI
TIL919C	OBSOLETE			8		TBD	Call TI	Call TI

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265

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