

TIL134 THRU TIL136  
12-ELEMENT ARRAYS AND 12-CHANNEL PAIR

D1093, SEPTEMBER 1971—REVISED SEPTEMBER 1989

- TIL134 ... 12-ELEMENT GALLIUM ARSENIDE IRED ARRAY
- TIL135 ... 12-ELEMENT PHOTOTRANSISTOR ARRAY
- TIL136 ... 12-CHANNEL PAIR

T-41-73

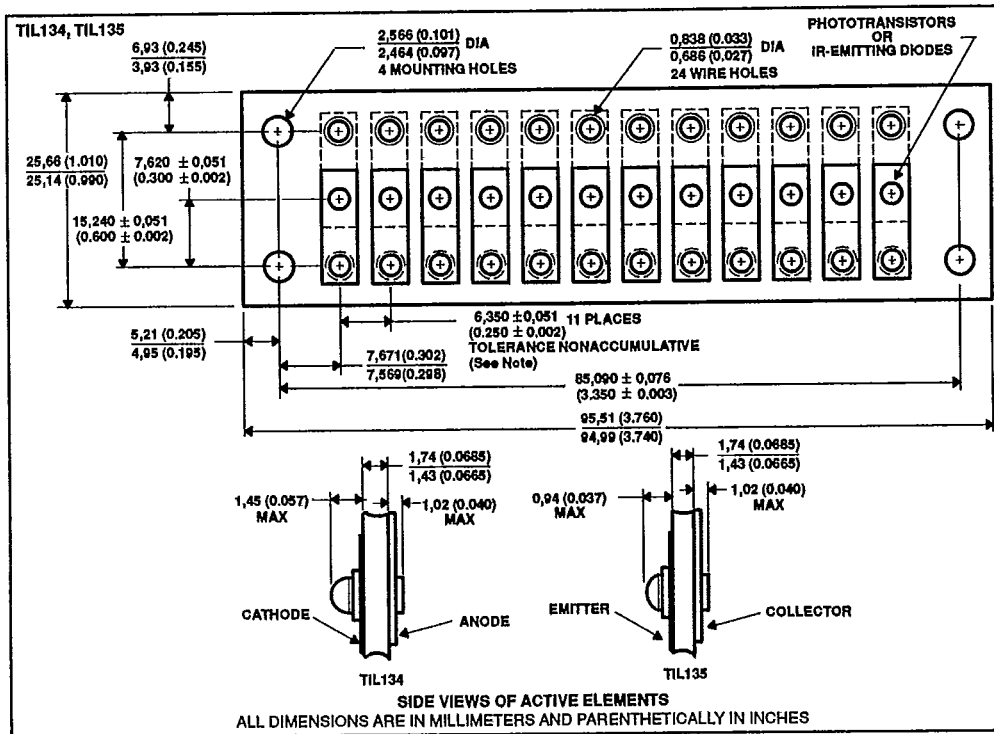
- Center-to-Center Spacing of 6,3 mm (0.250 inch) for Tape Reading
- Reliable Solid-State Components
- IREDS Eliminate Lamp-Filament-Sag Problems
- Spectrally Matched for Improved Performance
- Printed Circuit Board Construction Allows Precise Alignment

description

The TIL134 is an array of twelve TIL23 gallium arsenide infrared-emitting diodes mounted in a printed circuit board. The TIL135 is an array of twelve selected LS600 phototransistors. The TIL136 is a pair of selected arrays comprising a TIL134 and TIL135 and offering specified channel performance.

mechanical data

The printed circuit board material is glass-base NEMA standard FR-4, class II, 0.6-kg/m<sup>2</sup> (2-oz/ft<sup>2</sup>) copper-clad on each side. The approximate weight of the TIL134 and TIL135 is 8.5 grams each.



NOTE: The tolerances shown for these dimensions apply to location of the mounting holes and the active elements only. Tolerance of ±0.13 mm (0.005 inch) applies for location dimensions of the wire holes.

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**TIL134 THRU TIL136  
12-ELEMENT ARRAYS AND 12-CHANNEL PAIR**

*T-41-73*

Infrared Emitters and Phototransistors

**TIL134 absolute maximum ratings at 25°C free-air temperature (unless otherwise noted)**

Reverse voltage .....	2 V
Continuous forward current at (or below) 25°C free-air temperature (see Note 1) .....	100 mA
Operating free-air temperature range .....	-65°C to 125°C
Storage temperature range .....	-65°C to 150°C
Soldering temperature (10 seconds) .....	240°C

NOTE 1: Derate linearly to 125°C free-air temperature at the rate of 1 mW/°C.

**TIL134 operating characteristics of each element at 25°C free-air temperature range**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$P_o$ Radiant power output	$I_F = 50 \text{ mA}$	0.4		1	mW
$\lambda_p$ Wavelength at peak emission			0.93		$\mu\text{m}$
$\Delta\lambda$ Spectral bandwidth				500	$\text{\AA}$
$\theta_{HI}$ Half-intensity beam angle				35°	
$V_F$ Static forward voltage			1.25	1.5	V

**TIL135 absolute maximum ratings at 25°C free-air temperature (unless otherwise noted)**

Collector-emitter voltage .....	50 V
Emitter-collector voltage .....	7 V
Continuous device dissipation at (or below) 25°C free-air temperature (see Note 2) .....	50 mW
Operating free-air temperature range .....	-65°C to 125°C
Storage temperature range .....	-65°C to 150°C
Soldering temperature (10 seconds) .....	240°C

NOTE 2: Derate linearly to 125°C free-air temperature at the rate of 0.5 mW/°C.

**TIL135 electrical characteristics at 25°C free-air temperature**

**Individual element characteristics**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$ Collector-emitter breakdown voltage	$I_C = 100 \mu\text{A}$ , $E_o = 0$	50			V
$V_{(BR)ECO}$ Emitter-collector breakdown voltage	$I_E = 100 \mu\text{A}$ , $E_o = 0$	7			V
$I_o$ Dark current	$V_{CE} = 30 \text{ V}$ , $E_o = 0$			100	nA
$I_L$ Light current	$V_{CE} = 5 \text{ V}$ , $E_o = 20 \text{ mW/cm}^2$ , See Note 3	2		12	mA
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_C = 0.4 \text{ mA}$ , $E_o = 20 \text{ mW/cm}^2$ , See Note 3		0.15		V

**element matching characteristics**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$\frac{I_{Lmin}}{I_{Lmax}}$ Light current matching factor	$V_{CE} = 5 \text{ V}$ , $E_o = 20 \text{ mW/cm}^2$ , See Note 3	0.5			

NOTE 3: Irradiance ( $E_o$ ) is the radiant power per unit area incident upon a surface. For this measurement, the source is an unfiltered tungsten linear-filament lamp operating at a color temperature of 2870 K.

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TIL136 absolute maximum ratings at 25°C free-air temperature (unless otherwise noted)

Maximum ratings of TIL134 and TIL135 apply.

TIL136 electrical characteristics at 25°C free-air temperature

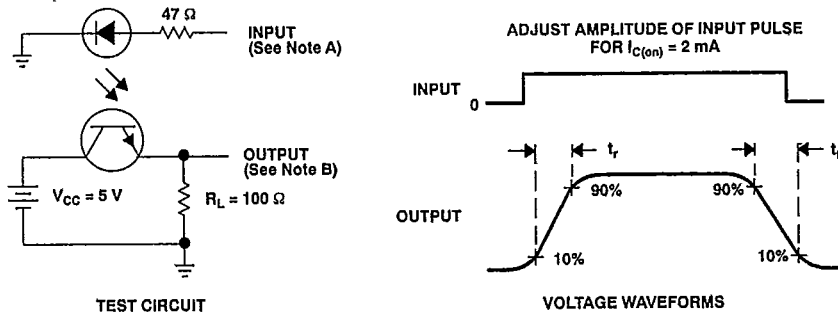
PARAMETER	TEST CONDITIONS†	MIN	TYP	MAX	UNIT
$I_C$ Output collector current	$I_F = 50 \text{ mA}$ , $V_{CE} = 5 \text{ V}$	2.5	4	10	mA
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_F = 50 \text{ mA}$ , $I_C = 2 \text{ mA}$		0.4	0.7	V

TIL136 switching characteristics at 25°C free-air temperature

PARAMETER	TEST CONDITIONS†	MIN	TYP	MAX	UNIT
$t_r$ Rise time	$V_{CC} = 5 \text{ V}$ , $I_{C(on)} = 2 \text{ mA}$		1.5		$\mu\text{s}$
$t_f$ Fall time	$R_L = 100 \Omega$ , See Figure 1		1.5		$\mu\text{s}$

† These parameters are measured at a lens-to-lens distance of 0.100 inch.

PARAMETER MEASUREMENT INFORMATION



NOTES: A. The input waveform is supplied by a generator with the following characteristics:  $Z_{out} = 50 \Omega$ ,  $t_r \leq 15 \text{ ns}$ , duty cycle  $\sim 1\%$ ,  $t_w = 100 \mu\text{s}$ .  
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

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TYPICAL CHARACTERISTICS

Infrared Emitters and Phototransistors

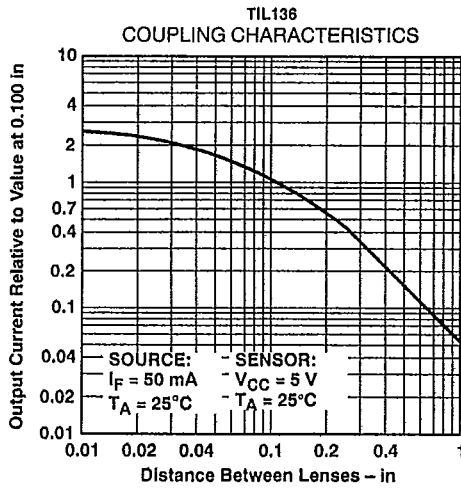


FIGURE 2

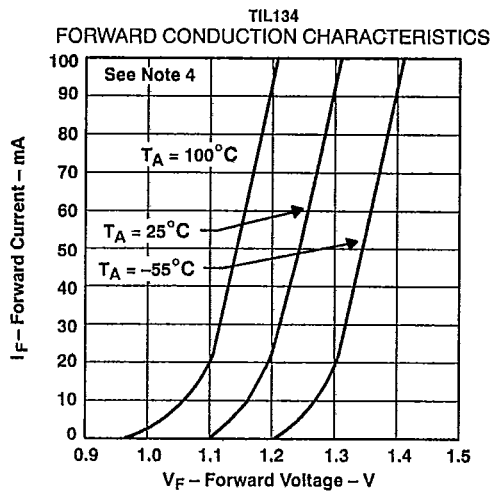


FIGURE 3

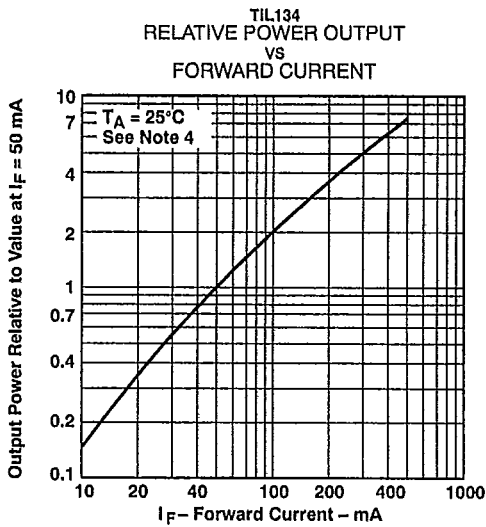


FIGURE 4

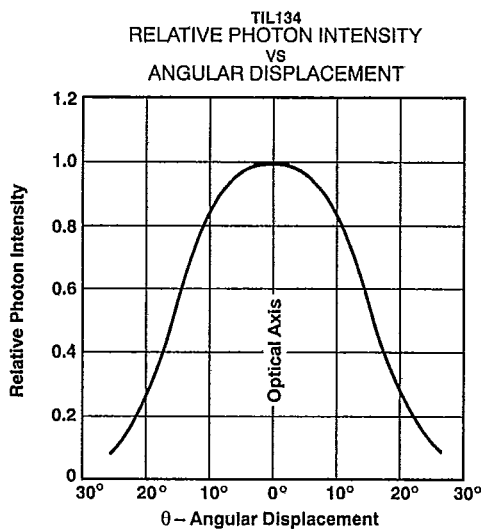


FIGURE 5

NOTE 4: These parameters were measured using pulse techniques:  $t_w = 0.04$  ms, duty cycle  $\leq 10\%$ .

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TYPICAL CHARACTERISTICS

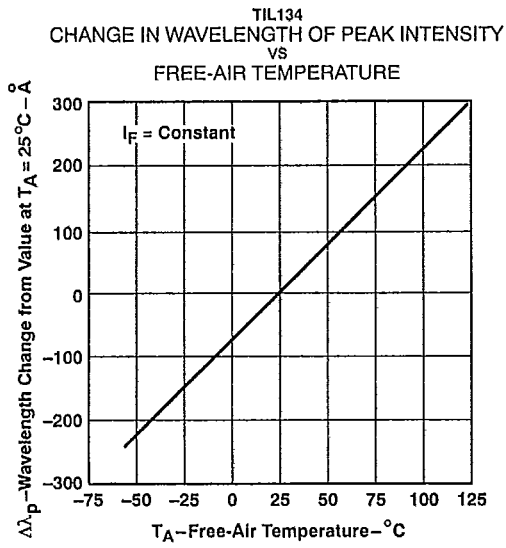


FIGURE 6

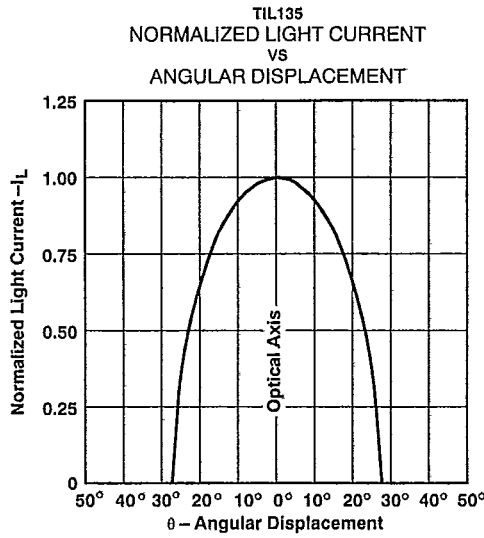


FIGURE 7

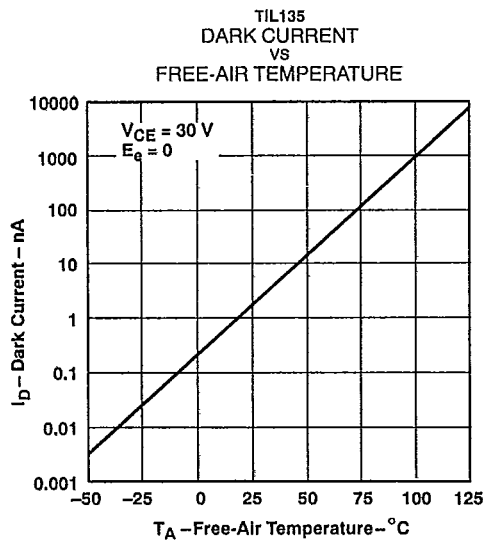


FIGURE 8

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