

T-41-83

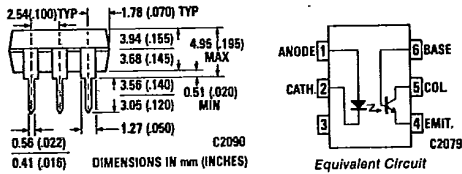
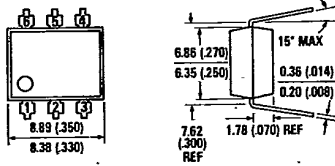
**GENERAL
INSTRUMENT**

PHOTOTRANSISTOR OPTOCOUPLER

Optocouplers

MCT26

PACKAGE DIMENSIONS



FEATURES AND APPLICATIONS

- AC line/digital logic isolator
- Digital logic/digital logic isolator
- Telephone/telegraph line receiver
- Twisted pair line receiver
- High frequency power supply feedback control
- Relay contact monitor
- Power supply monitor
- UL recognized — File E50151
- High isolation voltage
 $V_{ISO} = 2500 \text{ V RMS, 1 minute}$

ABSOLUTE MAXIMUM RATINGS

Storage temperature -55°C to 150°C
 Operating temperature -55°C to 100°C
 Lead soldering temperature (10 sec) 260°C
 Input Diode
 Forward current 60 mA
 Reverse voltage 3.0 V
 Peak forward current (1 μs pulse, 300 pps) 3.0 A

Output Transistor
 Power dissipation at 25°C ambient 200 mW
 Derate linearly from 25°C 2.6 mW/°C
 Input to output voltage isolation 2500 VDC
 Total package power dissipation at 25°C ambient
 (LED plus detector) 250 mW
 Derate linearly from 25°C 3.3 mW/°C

ELECTRO-OPTICAL CHARACTERISTICS (25°C Free Air Temperature Unless Otherwise Specified)

CHARACTERISTICS	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Emitter					
Forward voltage V_F	—	1.25	1.5	V	$I_F = 20 \text{ mA}$
Reverse current I_R	—	.15	10	μA	$V_R = 3.0 \text{ V}$
Capacitance C_j	—	50	—	pF	$V = 0$
Detector					
h_{FE}	—	150	—	—	$V_{CE} = 5 \text{ V, } I_C = 100 \mu\text{A}$
BV_{CEO}	30	85	—	V	$I_C = 1.0 \text{ mA, } I_F = 0$
BV_{ECO}	7	12	—	V	$I_E = 100 \mu\text{A, } I_F = 0$
I_{CEO}	—	5	100	nA	$V_{CE} = 5 \text{ V, } I_F = 0$
Capacitance Collector-emitter C_{CE}	—	8	—	pF	$V_{CE} = 0$
BV_{CBO}	30	165	—	V	$I_C = 10 \mu\text{A}$
I_{CBO} (dark)	—	1	100	nA	$V_{CB} = 5 \text{ V, } I_F = 0$
Coupled					
DC current transfer ratio CTR	6	14	—	%	$I_F = 10 \text{ mA, } V_{CE} = 10 \text{ V, note 1}$
Breakdown voltage	4000	—	—	VDC	$t = 1 \text{ second}$
Resistance emitter-detector $R_{I/O}$	2500	—	—	Ω	VAC, RMS @ $f = 60 \text{ Hz, } t = 1 \text{ minute}$
V_{CE} (SAT)	—	0.2	0.3	V	$V_{E-D} = 500 \text{ VDC}$
Capacitance LED to detector $C_{I/O}$	—	0.2	0.5	pF	$I_C = 250 \mu\text{A, } I_F = 20 \text{ mA}$
Bandwidth (see figure 5) B_W	—	0.5	—	kHz	$I_C = 1.6 \text{ mA, } I_F = 60 \text{ mA}$
Rise time + fall time (see oper. schematics) t_r, t_f	—	300	—	μs	$f = 1 \text{ MHz}$
		2	—		$I_C = 2 \text{ mA, note 2}$
					$I_C = 2 \text{ mA, } V_{CE} = 10 \text{ V, note 3}$

TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES
(25°C Free Air Temperature Unless Otherwise Specified)

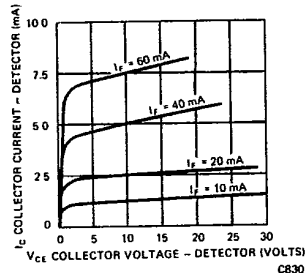


Fig. 1 Detector Output Characteristics

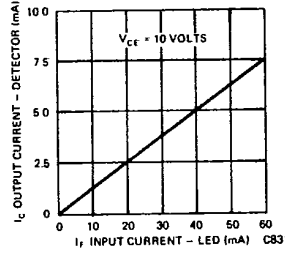


Fig. 2 Input Current vs. Output Current

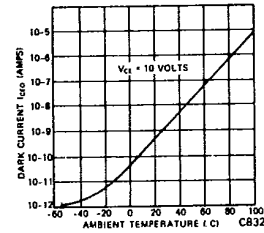


Fig. 3 Dark Current vs. Temperature (°C)

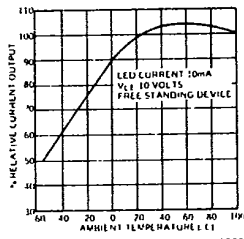


Fig. 4 Current Output vs. Temperature

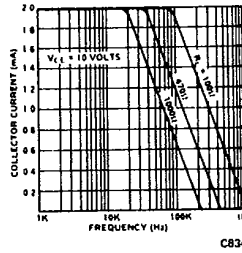


Fig. 5 Output vs. Frequency

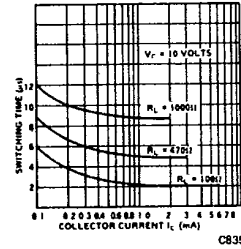
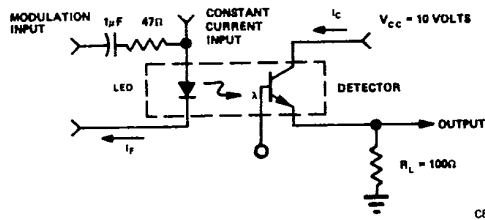


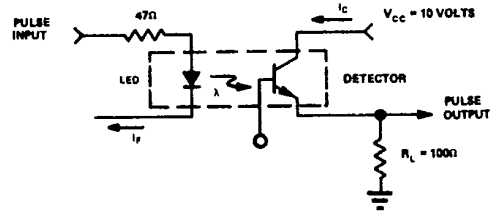
Fig. 6 Switching Time vs. Collector Current

For additional characteristic curves, see figures 2, 3, 5, 6, 8, 11, 12, & 13 on MCT2.

OPERATING SCHEMATICS



Modulation Circuit Used to Obtain Output vs. Frequency Plot



Circuit Used to Obtain Switching Time vs. Collector Current Plot

NOTES

1. The current transfer ratio (I_c/I_i) is the ratio of the detector collector current to the LED input current with V_{CE} at 10 volts.
2. The frequency at which I_c is 3 dB down from the 1 kHz value.
3. Rise time (t_r) is the time required for the collector current to increase from 10% of its final value to 90%. Fall time (t_f) is the time required for the collector current to decrease from 90% of its initial value to 10%.