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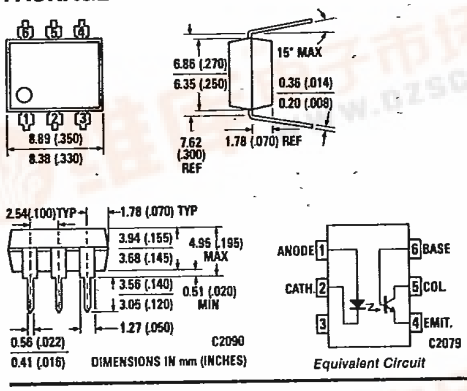
GENERAL INSTRUMENT

PHOTOTRANSISTOR OPTOCOUPLER

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 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 mA
Reverse current I_R	—	.15	10	μA	V_R = 3.0 V
Capacitance C_J	—	50	—	pF	V = 0
Detector					
h_{FE}	—	150	—		V_{CE} = 5 V, I_C = 100 μA
BV_{CEO}	30	85	—	V	I_C = 1.0 mA, I_F = 0
BV_{ECO}	7	12	—	V	I_E = 100 μA, I_F = 0
I_{CEO}	—	5	100	nA	V_{CE} = 5 V, I_F = 0
Capacitance Collector-emitter C_{CE}	—	8	—	pF	V_{CE} = 0
BV_{CBO}	30	165	—	V	I_C = 10 μA
I_{CBO} (dark)	—	1	100	nA	V_{CB} = 5 V, I_F = 0
Coupled					
DC current transfer ratio CTR	6	14	—	%	I_F = 10 mA, V_{CE} = 10 V, note 1
Breakdown voltage	4000	—	—	VDC	t = 1 second
	2500	—	—		VAC, RMS @ f = 60 Hz, t = 1 minute
Resistance emitter-detector R_{I-O}	10^{11}	10^{12}		Ω	V_{E-D} = 500 VDC
V_{CE} (SAT)	—	0.2	0.3	V	I_C = 250 μA, I_F = 20 mA
	—	0.2	0.5	V	I_C = 1.6 mA, I_F = 60 mA
Capacitance LED to detector C_{I-O}	—	0.5	—	pF	f = 1 MHz
Bandwidth (see figure 5) B_W	—	300	—	kHz	I_C = 2 mA, note 2
Rise time + fall time (see oper. schematics) t_r, t_f	2		—	μs	I_C = 2 mA, V_{CE} = 10 V, note 3

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TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES

(25°C Free Air Temperature Unless Otherwise Specified)

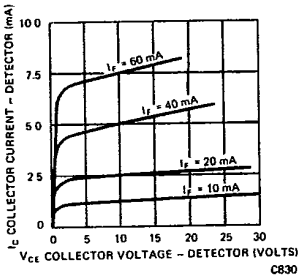


Fig. 1 Detector Output Characteristics

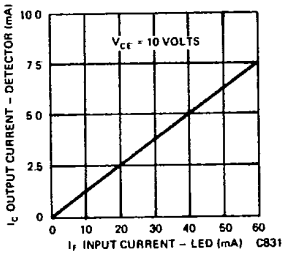


Fig. 2 Input Current vs. Output Current

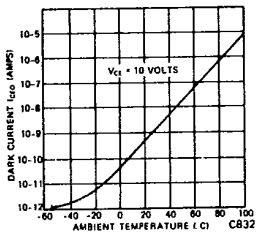


Fig. 3 Dark Current vs. Temperature (°C)

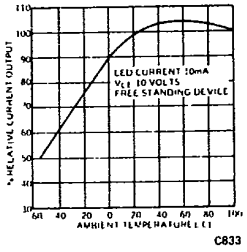


Fig. 4 Current Output vs. Temperature

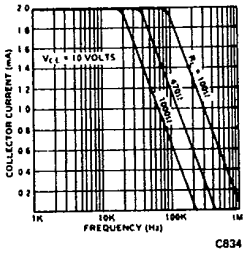


Fig. 5 Output vs. Frequency

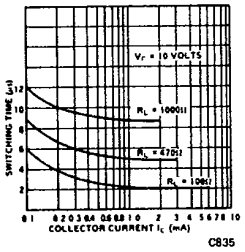
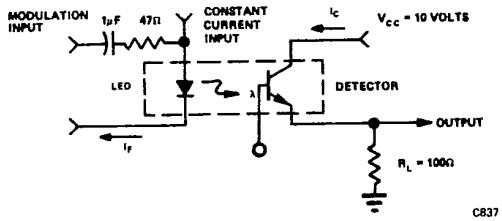


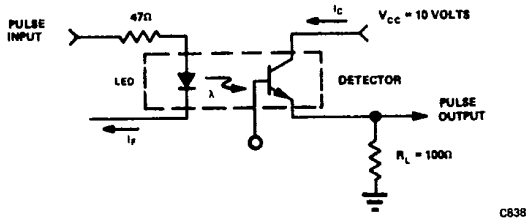
Fig. 6 Switching Time vs. Collector Current

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_F) 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%.*