



DUAL PHOTOTRANSISTOR OPTOCOUPLEDERS

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

INDIVIDUAL COMPONENT CHARACTERISTICS

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITION
INPUT DIODE						
Rated forward voltage	V_F		1.25	1.50	V	$I_F = 20 \text{ mA}$
Reverse voltage	V_R	3.0	25		V	$I_R = 10 \text{ } \mu\text{A}$
Reverse current	I_R		.001	10	μA	$V_R = 3.0 \text{ V}$
Junction capacitance	C_J		50		pF	$V_F = 0 \text{ V}$
OUTPUT TRANSISTOR ($I_F = 0$)						
Breakdown voltage, collector to emitter	BV_{CEO}	30	85		V	$I_C = 1.0 \text{ mA}$
Breakdown voltage, emitter to collector	BV_{ECO}	6	13		V	$I_E = 100 \text{ } \mu\text{A}$
Leakage current, collector to emitter	I_{CEO}		5	100	nA	$V_{CE} = 10 \text{ V}$
Capacitance collector to emitter	C_{CE}		8		pF	$V_{CE} = 0 \text{ V}$

TRANSFER CHARACTERISTICS

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITION
COUPLED						
DC current transfer ratio (I_C/I_F)=CTR					%	$V_{CE} = 10 \text{ V}, I_F = 10 \text{ mA}$
MCT6		20			%	$V_{CE} = 5 \text{ V}, I_F = 5 \text{ mA}$
MCT61		50			%	$V_{CE} = 5 \text{ V}, I_F = 5 \text{ mA}$
MCT62		100			%	$V_{CE} = 5 \text{ V}, I_F = 5 \text{ mA}$
Saturation voltage—collector to emitter	$V_{CE(SAT)}$		0.2	0.4	V	$I_C = 2 \text{ mA}, I_F = 16 \text{ mA}$
MCT6, 61, 62						

TRANSFER CHARACTERISTICS

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITION
SWITCHING TIMES, OUTPUT TRANSISTOR						
Non-saturated rise time, fall time (Note 3)			2.4		μs	$I_C = 2 \text{ mA}, V_{CE} = 10 \text{ V}, R_L = 100\Omega$
Non-saturated rise time, fall time (Note 3)			15		μs	$I_C = 2 \text{ mA}, V_{CE} = 10 \text{ V}, R_L = 1\text{K}\Omega$
Saturated turn-on time (from 5.0V to 0.8V)			5		μs	$R_L = 2\text{K}\Omega, I_F = 40 \text{ mA}$
Saturated turn-off time (from saturation to 2.0V)			25		μs	$R_L = 2\text{K}\Omega, I_F = 40 \text{ mA}$
Bandwidth B_w			150		kHz	$I_C = 2 \text{ mA}, V_{CE} = 10 \text{ V}, R_L = 100\Omega$

ISOLATION CHARACTERISTICS

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITION
Isolation voltage	$BV_{(I-O)}$	2500			V_{RMS}	$t = 1 \text{ minute}$
Isolation resistance					Ω	$V_{I-O} = 500 \text{ VDC}$
MCT6X—	$R_{(I-O)}$	10^{11}	10^{12}			
Breakdown voltage—channel-to-channel			500		VDC	Relative humidity = 40% $f = 1 \text{ MHz}$
MCT6X						
Capacitance between channels			0.4		pF	

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

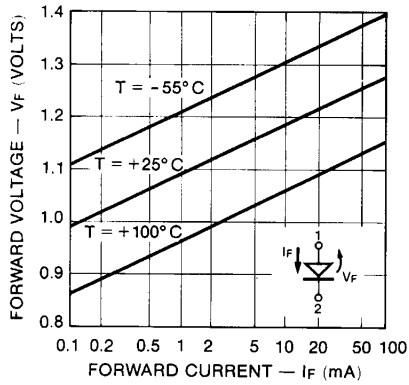


Fig. 1. Forward Voltage vs. Current

C1686

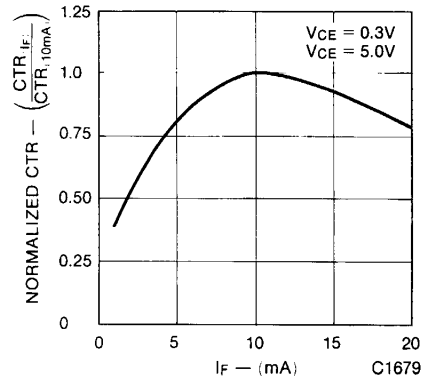


Fig. 2. Normalized CTR vs. Forward Current

C1679

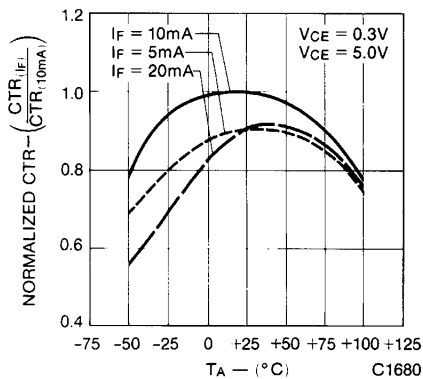


Fig. 3. Normalized CTR vs. Temperature

C1680

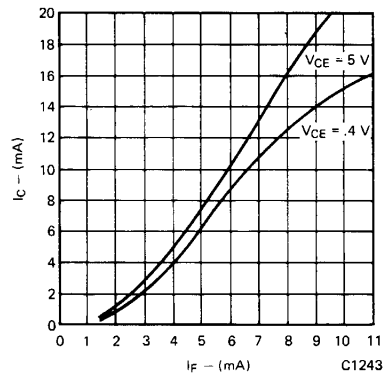


Fig. 4. Collector Current vs. Forward Current

C1243

TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES

(25°C Free Air Temperature Unless Otherwise Specified) (Cont'd)

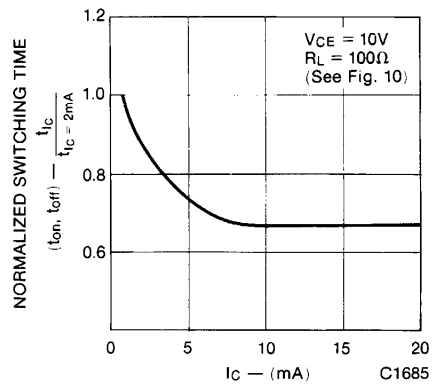


Fig. 5. Switching Time vs. IC

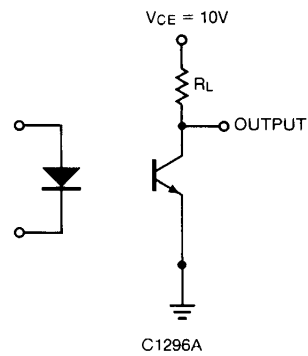


Fig. 6. Switching Time Test Circuit

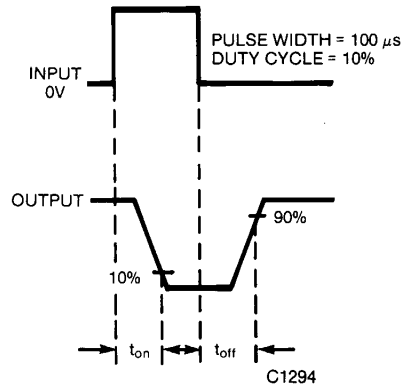


Fig. 7. Switching Time Waveforms

NOTES

1. Normalized CTR degradation = $\frac{CTR_0 - CTR}{CTR_0}$
2. The current transfer ratio (I_c/I_e) is the ratio of the detector collector current to the LED input current with V_{CE} at 10 volts.
3. The frequency at which I_c is 3 dB down from the 1 kHz value.
4. 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%.