

PHOTO TRANSISTOR COUPLER

MT6350, MT6360

APPLICATIONS

- OFFICE MACHINERY
- COPIERS
- SOLID STATE RELAY
- SWITCHING POWER SUPPLY
- PROGRAMABLE CONTROLLERS

The MARKTECH MT6350 and MT6360 consist of a photo-transistor optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP package.

MT6360 is no-base internal connection for high-EMI environments.

FEATURES

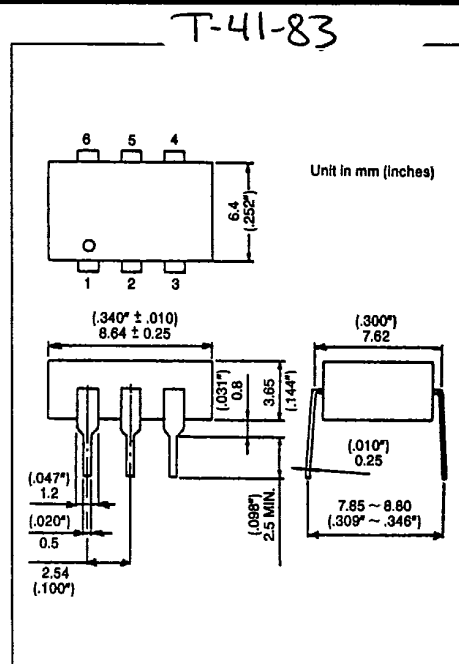
- Collector-Emitter Voltage : 55V Min.
- Current Transfer Ratio : 50% Min.
Rank GB : 100% Min.
- Isolation Voltage : 5000V_{rms} Min.
- Guaranteed Requirements of IEC380/VDE0806
- Climatic Test Class : 55/150/21
- Isolation Creepage Path : 8.0mm Min.
- Isolation Clearance : 7.3mm Min.
- Isolation Operating Voltage : 500V_{ac} or 600V_{dc} for Isolation Group C. *1
- Creeping Current Resistance : Group I *2

*1 : According to VDE0110, table 4

*2 : According to VDE0110, table 3

THE MT6350 CONTAINS ALL MECHANICAL & OPTO ELECTRICAL PARAMETERS AS THE MT6310, WITH NEW SAFETY STANDARDS ADDED.

THE MT6360 CONTAINS ALL MECHANICAL & OPTO ELECTRICAL PARAMETERS AS THE MT6320, WITH NEW SAFETY STANDARDS ADDED.



PIN CONFIGURATIONS (TOP VIEW)

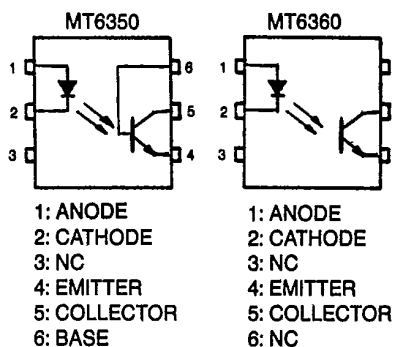


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*T-41-83***MAXIMUM RATINGS (Ta = 25°C)**

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I _F	60	mA
	Forward Current Derating (Ta ≥ 39°C)	ΔI _F /°C	-0.7	mA/°C
	Peak Forward Current (100μs pulse, 100pps)	I _{FP}	1	A
	Power Dissipation	P _D	100	mW
	Power Dissipation Derating (Ta ≥ 25°C)	ΔP _D /°C	-1.0	mW/°C
	Reverse Voltage	V _R	5	V
	Junction Temperature	T _J	125	°C
DETECTOR	Collector-Emitter Voltage	V _{CEO}	55	V
	Collector-Base Voltage (MT6350)	V _{CB0}	80	V
	Emitter-Collector Voltage	V _{ECO}	7	V
	Emitter-Base Voltage (MT6350)	V _{EBO}	7	V
	Collector Current	I _C	50	mA
	Power Dissipation	P _C	150	mW
	Power Dissipation Derating (Ta ≥ 25°C)	ΔP _C /°C	-1.5	mW/°C
Junction Temperature		T _J	125	°C
Storage Temperature Range		T _{stg}	-55 ~ 150	°C
Operating Temperature Range		T _{opr}	-55 ~ 100	°C
Lead Soldering Temperature (10 sec.)		T _{sold}	260	°C
Total Package Power Dissipation		P _T	250	mW
Total Package Power Dissipation Derating (Ta ≥ 25°C)		ΔP _T /°C	-2.5	mW/°C
Isolation Voltage (AC, 1 min., RH ≤ 60%)		BV _S	5000	V _{rms}

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ISOLATION CHARACTERISTICS ($T_a=25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C_S	$V_S=0, f=1\text{MHz}$	—	0.8	—	pF
Isolation Resistance	R_S	$V_S=500\text{V}$	5×10^{10}	10^{11}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	5000	—	—	V_{rms}
		AC, 1 second	—	10000	—	
		DC, 1 minute	—	10000	—	V_{dc}

SWITCHING CHARACTERISTICS ($T_a=25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t_r	$V_{CC}=10\text{V}$ $I_C=2\text{mA}$ $R_L=100\Omega$	—	2	—	μs
Fall Time	t_f		—	3	—	
Turn-on Time	t_{on}		—	3	10	
Turn-off Time	t_{off}		—	3	10	
Turn-on Time	t_{ON}	$R_L=1.9\text{k}\Omega$ (Fig. 1)	—	2	—	μs
Storage Time	t_S	$R_{BE}=\text{OPEN}$	—	15	—	
Turn-off Time	t_{OFF}	$V_{CC}=5\text{V}, I_F=16\text{mA}$	—	25	—	
Turn-on Time	t_{ON}	$R_L=1.9\text{k}\Omega$ (Fig. 1)	—	2	—	μs
Storage Time	t_S	$R_{BE}=220\text{k}\Omega$ (MT6350)	—	12	—	
Turn-off Time	t_{OFF}	$V_{CC}=5\text{V}, I_F=16\text{mA}$	—	20	—	

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	—	5	24	V
Forward Current	I_F	—	16	25	mA
Collector Current	I_C	—	1	10	mA
Operating Temperature	T_{opr}	-25	—	85	$^\circ\text{C}$

Fig. 1 SWITCHING TIME TEST CIRCUIT

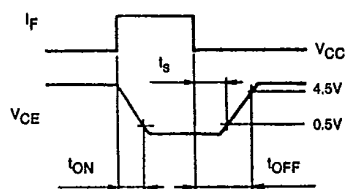
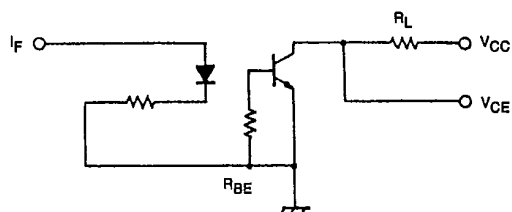


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INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta=25°C)

	CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	$I_F=10\text{mA}$	1.0	1.15	1.3	V
	Reverse Current	I_R	$V_R=5\text{V}$	—	—	10	μA
	Capacitance	C_T	$V=0, f=1\text{MHz}$	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=0.5\text{mA}$	55	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E=0.1\text{mA}$	7	—	—	V
	Collector-Base Breakdown Voltage (MT6350)	$V_{(BR)CBO}$	$I_C=0.1\text{mA}$	80	—	—	V
	Emitter-Base Breakdown Voltage (MT6350)	$V_{(BR)EBO}$	$I_E=0.1\text{mA}$	7	—	—	V
	Collector Dark Current	I_{CEO}	$V_{CE}=24\text{V}$	—	10	100	nA
			$V_{CE}=24\text{V}, T_a=85^\circ\text{C}$	—	2	50	μA
	Collector Dark Current (MT6350)	I_{CER}	$V_{CE}=24\text{V}, T_a=85^\circ\text{C}, R_{BE}=1\text{M}\Omega$	—	0.5	10	μA
	Collector Dark Current (MT6350)	I_{CBO}	$V_{CB}=10\text{V}$	—	0.1	—	nA
	DC Forward Current Gain (MT6350)	h_{FE}	$V_{CE}=5\text{V}, I_C=0.5\text{mA}$	—	400	—	—
	Capacitance Collector to Emitter	C_{CE}	$V=0, f=1\text{MHz}$	—	10	—	pF

COUPLED ELECTRICAL CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C/I_F	$I_F=5\text{mA}, V_{CE}=5\text{V}$ Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	$I_C/I_F(\text{sat})$	$I_F=1\text{mA}, V_{CE}=0.4\text{V}$ Rank GB	—	60	—	%
			30	—	—	
Base Photo-Current (MT6350)	I_{PB}	$I_F=5\text{mA}, V_{CB}=5\text{V}$	—	10	—	μA
Collector-Emitter Saturation Voltage	$V_{CE(\text{sat})}$	$I_C=2.4\text{mA}, I_F=8\text{mA}$	—	—	0.4	V
		$I_C=0.2\text{mA}, I_F=1\text{mA}$	—	0.2	—	
		Rank GB	—	—	0.4	

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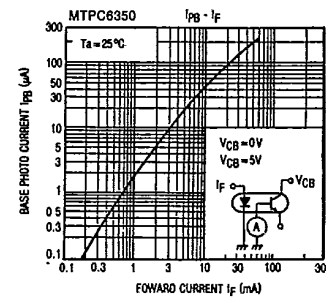
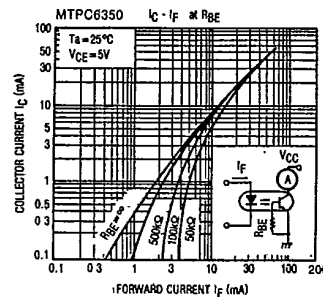
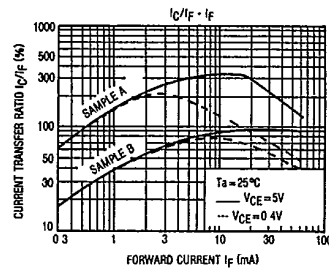
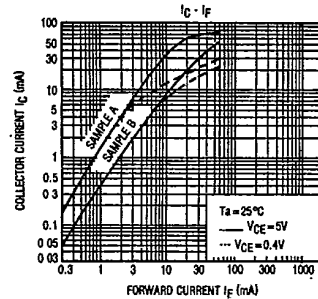
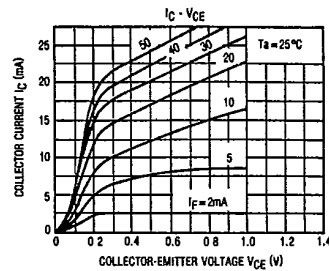
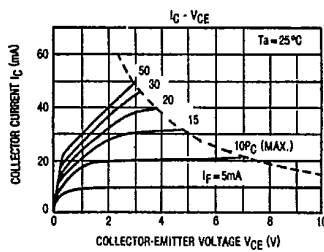
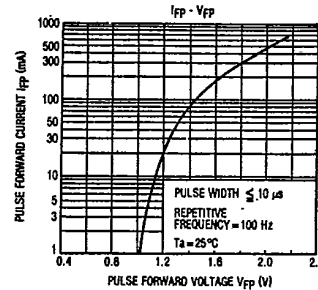
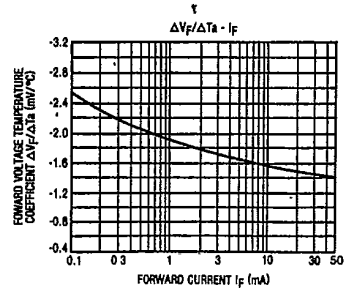
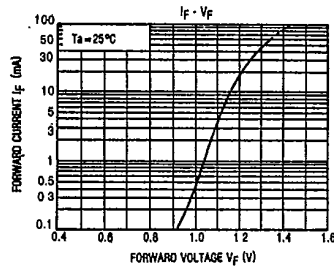
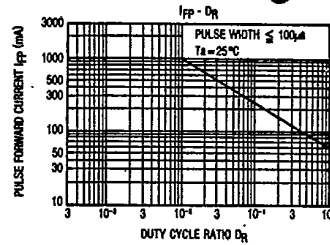
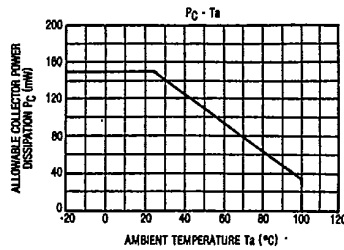
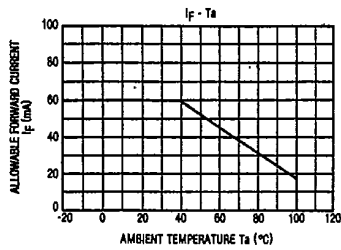


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