PHOTO TRANSISTOR COUPLER

MT6350, MT6360

T-41-83

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.

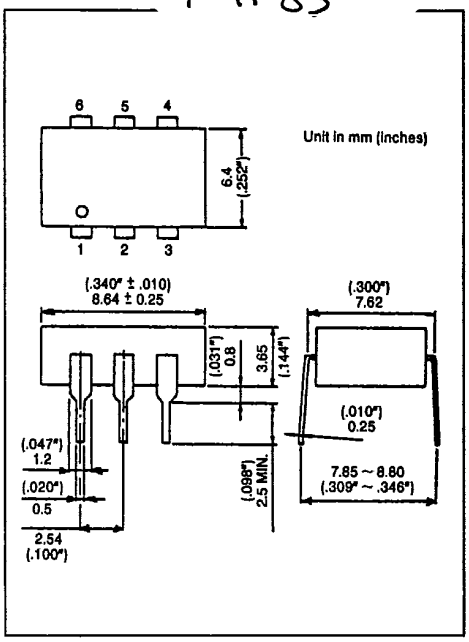
FEATURES

- 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

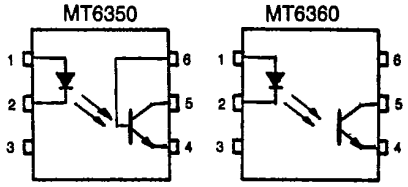
*1 : According to VDE0110, table 4
*2 : According to VDE0110, table 3

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)



MT6350	MT6360
1: ANODE	1: ANODE
2: CATHODE	2: CATHODE
3: NC	3: NC
4: EMITTER	4: EMITTER
5: COLLECTOR	5: COLLECTOR
6: BASE	6: NC

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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_{CBO}	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 (Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C_S	V_S=0, f=1MHz	—	0.8	—	pF
Isolation Resistance	R_S	V_S=500V	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	5000	—	—	V_{rms}
		AC, 1 second	—	10000	—	V_{rms}
		DC, 1 minute	—	10000	—	V_{dc}

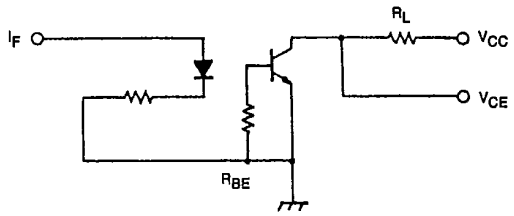
SWITCHING CHARACTERISTICS (Ta=25°C)

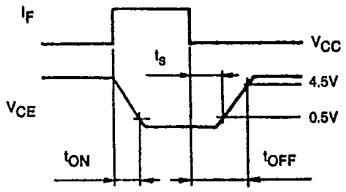
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t_r	V_{CC}=10V, I_C=2mA, R_L=100Ω	—	2	—	μs
Fall Time	t_f		—	3	—	
Turn-on Time	t_{on}		—	3	10	
Turn-off Time	t_{off}		—	3	10	
Turn-on Time	t_{ON}	R_L=1.9kΩ (Fig. 1)	—	2	—	μs
Storage Time	t_S	R_{BE}=OPEN	—	15	—	
Turn-off Time	t_{OFF}	V_{CC}=5V, I_F=16mA	—	25	—	
Turn-on Time	t_{ON}	R_L=1.9kΩ (Fig. 1)	—	2	—	μs
Storage Time	t_s	R_{BE}=220kΩ (MT6350)	—	12	—	
Turn-off Time	t_{OFF}	V_{CC}=5V, I_F=16mA	—	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	°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=10mA	1.0	1.15	1.3	V
	Reverse Current	I_R	V_R=5V	—	—	10	μA
	Capacitance	C_T	V=0, f=1MHz	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 0.5mA	55	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	I_E=0.1mA	7	—	—	V
	Collector-Base Breakdown Voltage (MT6350)	$V_{(BR)CBO}$	I_C=0.1mA	80	—	—	V
	Emitter-Base Breakdown Voltage (MT6350)	$V_{(BR)EBO}$	I_E=0.1mA	7	—	—	V
	Collector Dark Current	I_{CEO}	V_{CE}=24V	—	10	100	nA
			V_{CE}=24V, Ta=85°C	—	2	50	μA
	Collector Dark Current (MT6350)	I_{CER}	V_{CE}=24V, Ta=85°C, R_{BE}=1MΩ	—	0.5	10	μA
	Collector Dark Current (MT6350)	I_{CBO}	V_{CB}=10V	—	0.1	—	nA
	DC Forward Current Gain (MT6350)	h_{FE}	V_{CE}=5V, I_C=0.5mA	—	400	—	—
	Capacitance Collector to Emitter	C_{CE}	V=0, f=1MHz	—	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=5mA, V_{CE}=5V	50	—	600	%
		Rank GB	100	—	600	
Saturated CTR	$I_C/I_{F(sat)}$	I_F=1mA, V_{CE}=0.4V	—	60	—	%
		Rank GB	30	—	—	
Base Photo-Current (MT6350)	I_{PB}	I_F=5mA, V_{CB}=5V	—	10	—	μA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=2.4mA, I_F=8mA	—	—	0.4	V
		I_C=0.2mA, I_F=1mA	—	0.2	—	
		Rank GB	—	—	0.4	

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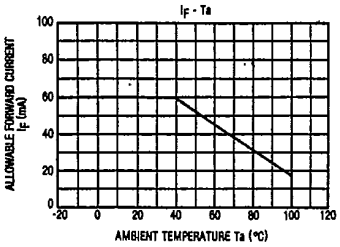

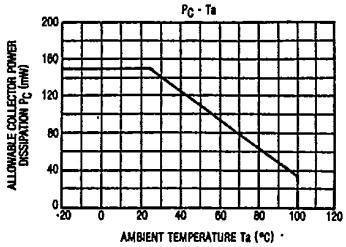

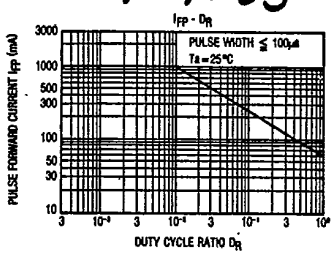

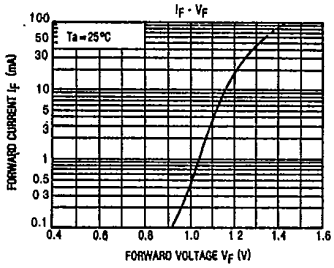

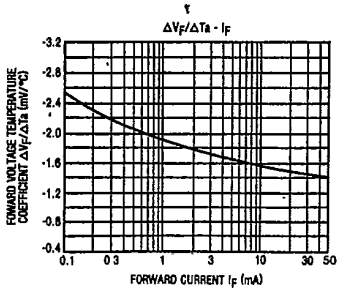

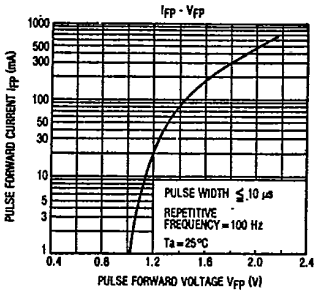

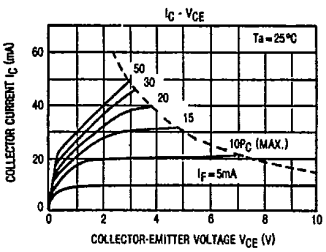

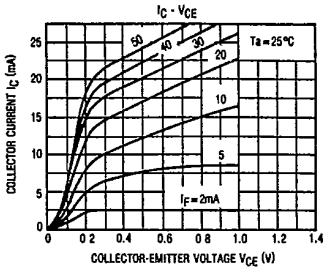

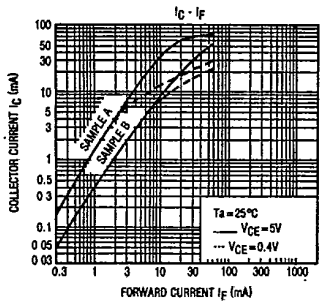

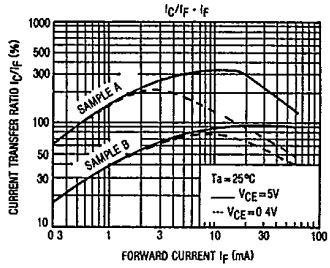

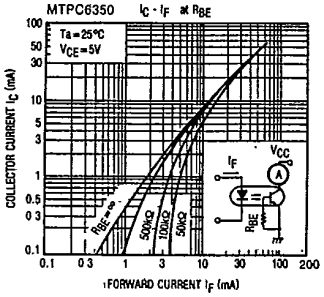

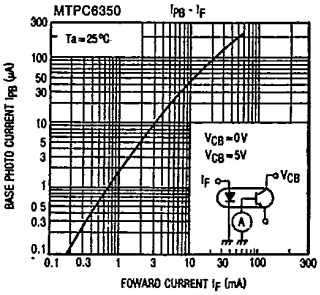

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