



# THE DATASHEET OF MOC8020

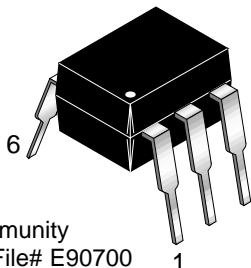


**DESCRIPTION**

The MOC8020 and MOC8021 are photodarlington-type optically coupled optocouplers. The devices have a gallium arsenide infrared emitting diode coupled with a silicon darlington phototransistor.

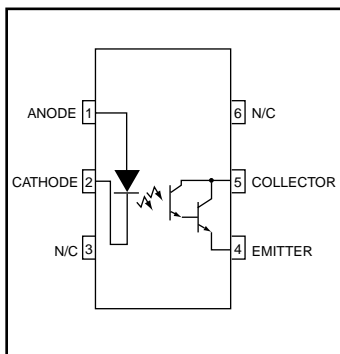
**FEATURES**

- High current transfer ratio  
-500% (MOC8020)  
-1000% (MOC8021)
- No base connection for improved noise immunity
- Underwriters Laboratory (UL) recognized File# E90700

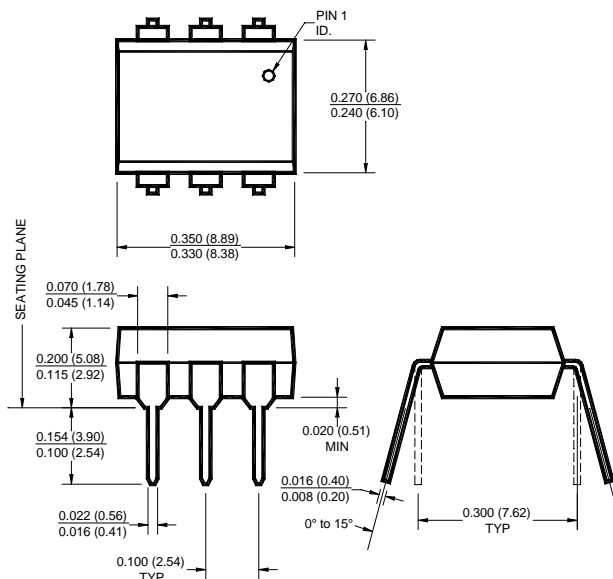


**APPLICATIONS**

- Appliances, measuring instruments
- I/O interface for computers
- Programmable controllers
- Portable electronics
- Interfacing and coupling systems of different potentials and impedance
- Solid state relays



**PACKAGE DIMENSIONS**



**NOTE**  
All dimensions are in inches (millimeters)

**ABSOLUTE MAXIMUM RATINGS** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified.)

Parameter	Symbol	Value	Units
<b>TOTAL DEVICE</b>			
Storage Temperature	$T_{STG}$	-55 to +150	$^\circ\text{C}$
Operating Temperature	$T_{OPR}$	-55 to +100	$^\circ\text{C}$
Lead Solder Temperature	$T_{SOL}$	260 for 10 sec	$^\circ\text{C}$
Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$	$P_D$	250	mW
Derate above $25^\circ\text{C}$		2.94	mW/ $^\circ\text{C}$
Input-Output Isolation Voltage	$V_{ISO}$	5300	Vac(rms)
<b>EMITTER</b>			
DC/Average Forward Input Current	$I_F$	60	mA
Reverse Input Voltage	$V_R$	3	V
LED Power Dissipation @ $T_A = 25^\circ\text{C}$	$P_D$	120	mW
Derate above $25^\circ\text{C}$		1.41	mW/ $^\circ\text{C}$
<b>DETECTOR</b>			
Collector-Emitter Voltage	$V_{CEO}$	50	V
Detector Power Dissipation @ $T_A = 25^\circ\text{C}$	$P_D$	150	mW
Derate above $25^\circ\text{C}$		1.76	mW/ $^\circ\text{C}$
Continuous Collector Current	$I_C$	150	mA

**MOC8020**

**MOC8021**

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified.)

**INDIVIDUAL COMPONENT CHARACTERISTICS**

Parameter	Test Conditions	Symbol	Min	Typ**	Max	Unit
<b>EMITTER</b>						
Input Forward Voltage	( $I_F = 10\text{ mA}$ )	$V_F$		1.15	2	V
Input Capacitance	( $V_F = 0, f = 1\text{ MHz}$ )	$C_{IN}$		18		pF
Reverse Leakage Current	( $V_R = 3.0\text{ V}$ )	$I_R$		0.05	10	$\mu\text{A}$
<b>DETECTOR</b>						
Collector-Emitter Breakdown Voltage	( $I_C = 1.0\text{ mA}$ )	$BV_{CEO}$	50			V
Emitter-Collector Breakdown Voltage	( $I_E = 100\text{ }\mu\text{A}$ )	$BV_{ECO}$	5			V
Collector-Emitter Dark Current	( $V_{CE} = 10\text{ V}$ )	$I_{CEO}$			100	nA

**TRANSFER CHARACTERISTICS**

DC Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Units
Current Transfer Ratio,	MOC8020 ( $I_F = 10\text{ mA}, V_{CE} = 5\text{ V}$ )	CTR	500			%
Collector-Emitter	MOC8021 ( $I_F = 10\text{ mA}, V_{CE} = 5\text{ V}$ )		1000			
Collector-Emitter Saturation Voltage	( $I_F = 10\text{ mA}, I_C = 25\text{ mA}$ )	$V_{CE(SAT)}$			2	V

**TRANSFER CHARACTERISTICS**

Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Units
<b>SWITCHING TIMES</b>						
Turn-on Time	( $V_{CC} = 10\text{ V}, R_L = 100\Omega, I_F = 5\text{ mA}$ )	$t_{on}$		3.5		$\mu\text{s}$
Turn-off Time		$t_{off}$		95		$\mu\text{s}$

**ISOLATION CHARACTERISTICS**

Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Units
Input-Output Isolation Voltage	( $I_{I-O} \leq 1\text{ }\mu\text{A}, 1\text{ min.}$ )	$V_{ISO}$	7500			Vac(pk)
	( $I_{I-O} \leq 1\text{ }\mu\text{A}, 1\text{ min.}$ )		5300			Vac(rms)
Isolation Resistance	( $V_{I-O} = 500\text{ VDC}$ )	$R_{ISO}$	$10^{11}$			$\Omega$
Isolation Capacitance	( $f = 1\text{ MHz}$ )	$C_{ISO}$		0.5		pf

Note  
\*\* Typical values at  $T_A = 25^\circ\text{C}$

Fig. 1 Output Current vs. Input Current

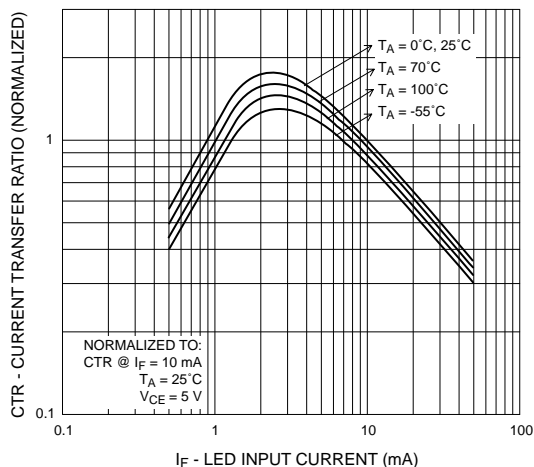


Fig. 2 Current Transfer Ratio vs. Ambient Temperature

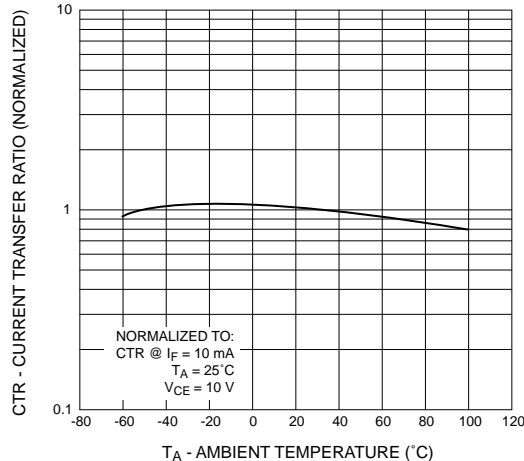


Fig. 3 Collector Current vs. Collector-Emitter Voltage

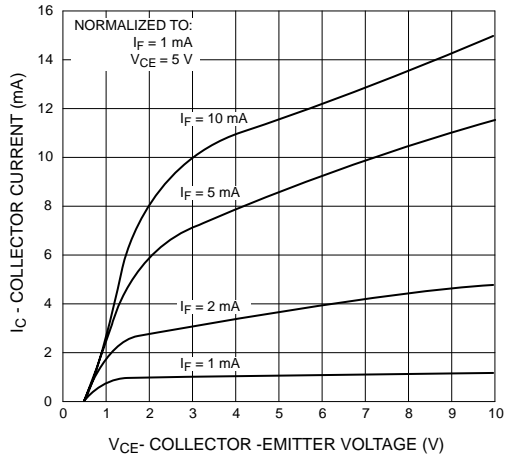


Fig. 4 Dark Current vs. Ambient Temperature

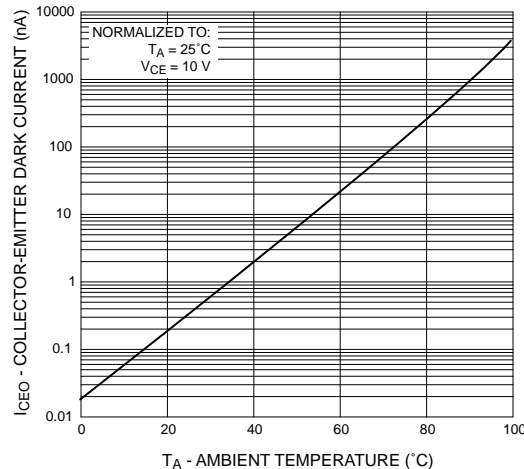


Fig. 5 Turn-On Time vs. Input Current

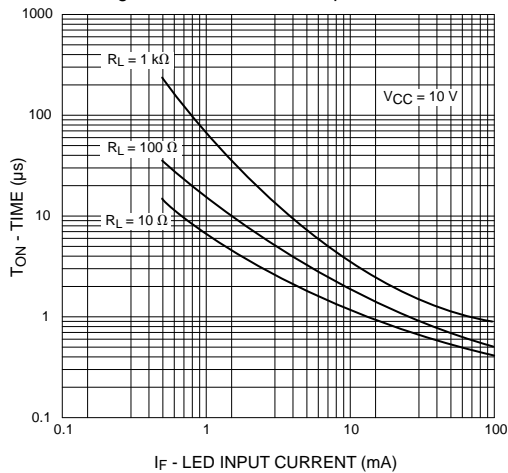
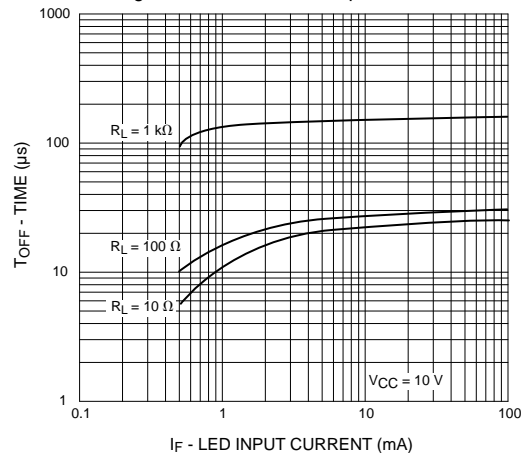


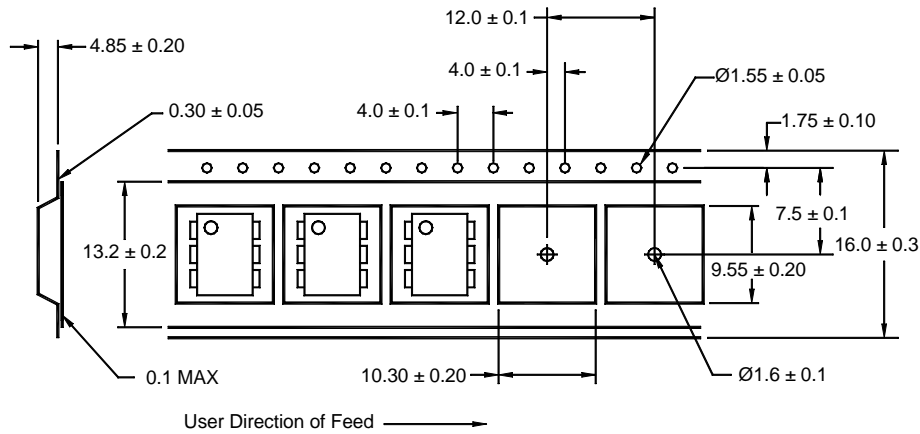
Fig. 6 Turn-Off Time vs. Input Current



**ORDERING INFORMATION**

Option	Order Entry Identifier	Description
S	.S	Surface Mount Lead Bend
SD	.SD	Surface Mount; Tape and reel
W	.W	0.4" Lead Spacing
300	.300	VDE 0884
300W	.300W	VDE 0884, 0.4" Lead Spacing
3S	.3S	VDE 0884, Surface Mount
3SD	.3SD	VDE 0884, Surface Mount, Tape & Reel

**QT Carrier Tape Specifications ("D" Taping Orientation)**



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