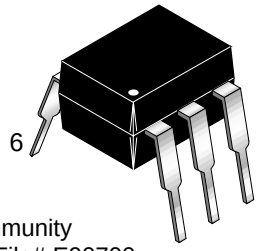
FAIRCHILD
SEMICONDUCTOR®

PHOTODARLINGTON OPTOCOUPLERS (NO BASE CONNECTION)

MOC8020 MOC8021

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.

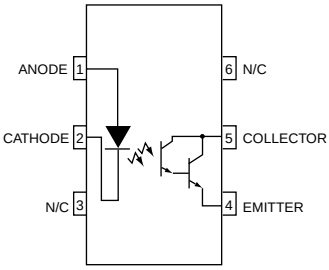


FEATURES

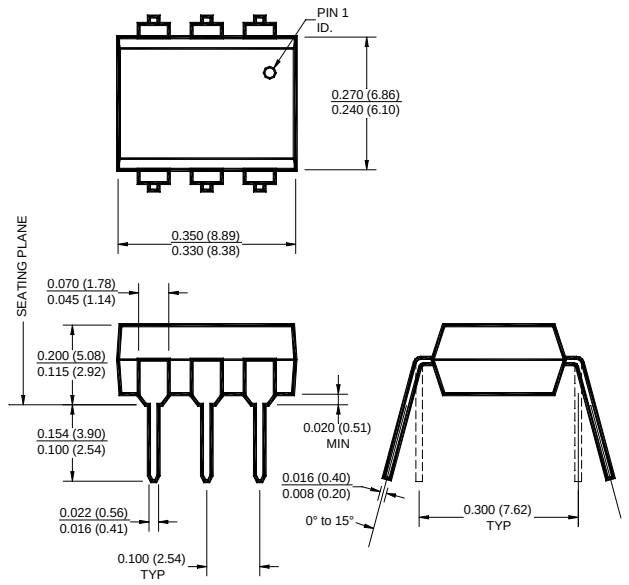
- High current transfer ratio
  - -500% (MOC8020)
  - -1000% (MOC8021)
- No base connection for improved noise immunity
- Underwriters Laboratory (UL) recognized File# E90700

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°C Unless otherwise specified.)

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

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ELECTRICAL CHARACTERISTICS (T_A = 25°C Unless otherwise specified.)

INDIVIDUAL COMPONENT CHARACTERISTICS

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

TRANSFER CHARACTERISTICS

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

TRANSFER CHARACTERISTICS

Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Units
SWITCHING TIMES						
Turn-on Time	(V_{CC}= 10 V, R_L = 100Ω, I_F = 5 mA)	t_{on}		3.5		µs
Turn-off Time		t_{off}		95		µs

ISOLATION CHARACTERISTICS

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

Note
** Typical values at T_A = 25°C

Fig. 1 Output Current vs. Input Current

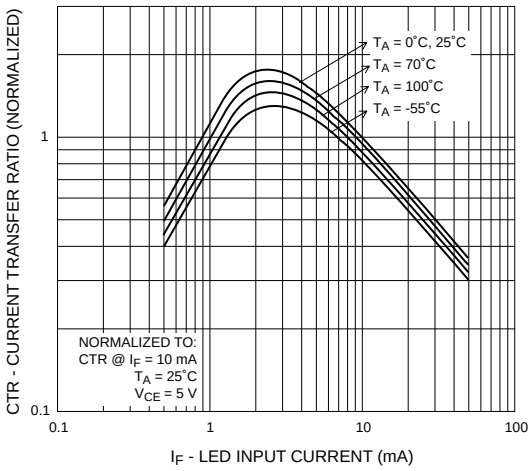


Fig. 2 Current Transfer Ratio vs. Ambient Temperature

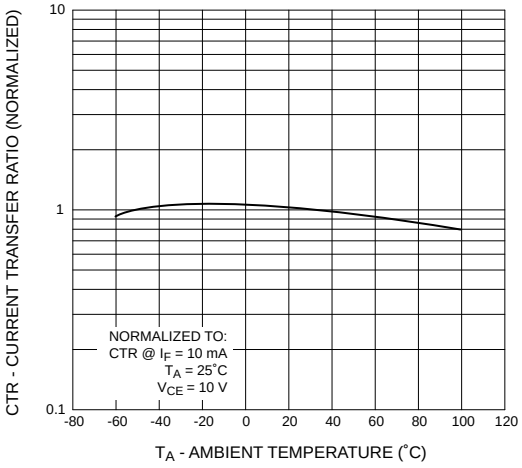


Fig. 3 Collector Current vs. Collector-Emitter Voltage

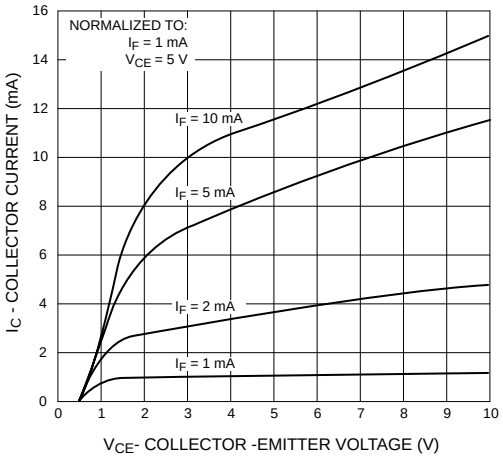


Fig. 4 Dark Current vs. Ambient Temperature

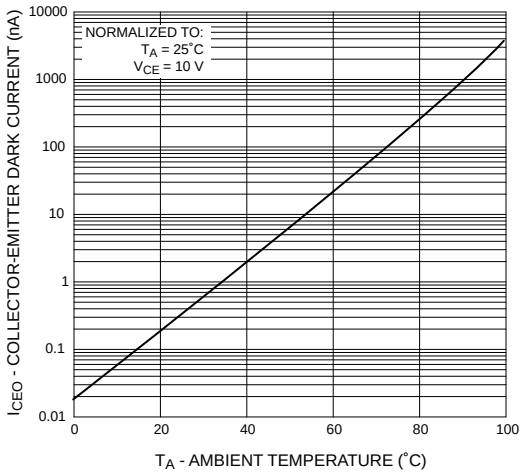


Fig. 5 Turn-On Time vs. Input Current

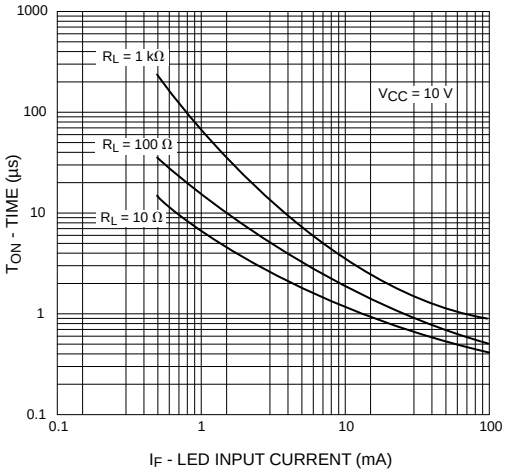
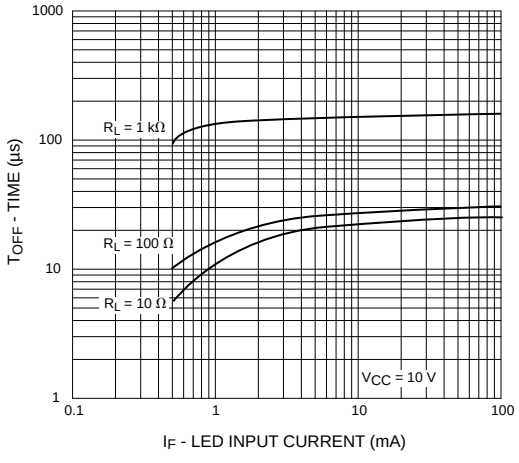


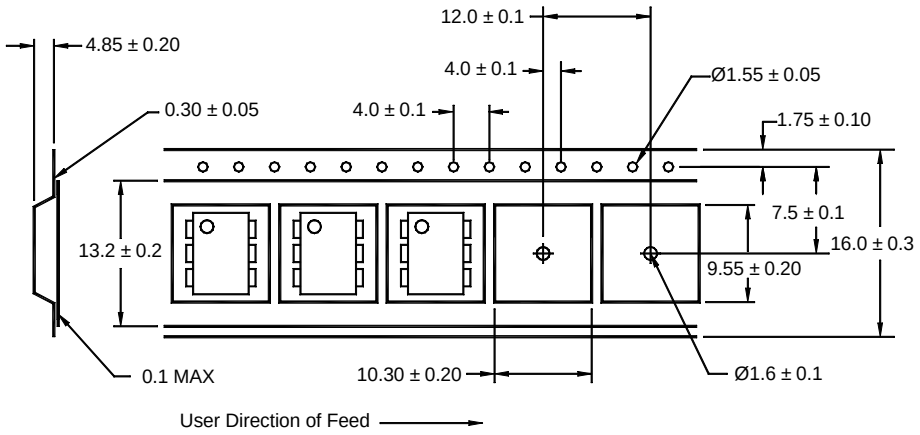
Fig. 6 Turn-Off Time vs. Input Current



ORDERING INFORMATION

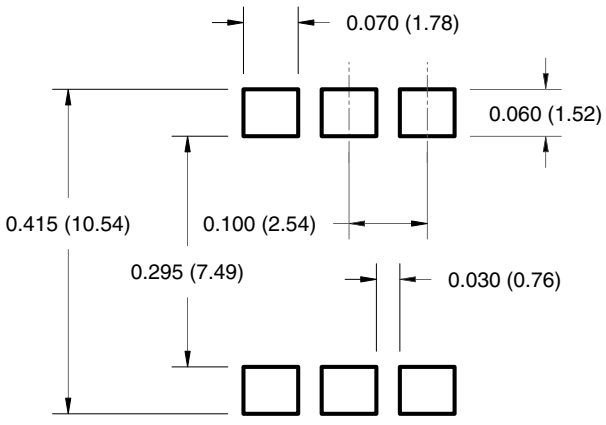
Option	Order Entry Identifier	Description
S	.S	Surface Mount Lead Bend
SD	.SD	Surface Mount; Tape and reel
W	.W	0.4” Lead Spacing
300	.300	VDE 0884
300W	.300W	VDE 0884, 0.4” Lead Spacing
3S	.3S	VDE 0884, Surface Mount
3SD	.3SD	VDE 0884, Surface Mount, Tape & Reel

QT Carrier Tape Specifications (“D” Taping Orientation)



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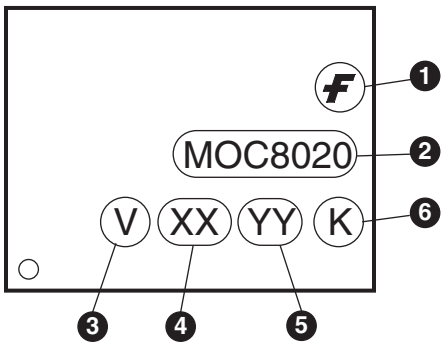
Recommended Pad Layout for Surface Mount Leadform



Note
All dimensions are in inches (millimeters)

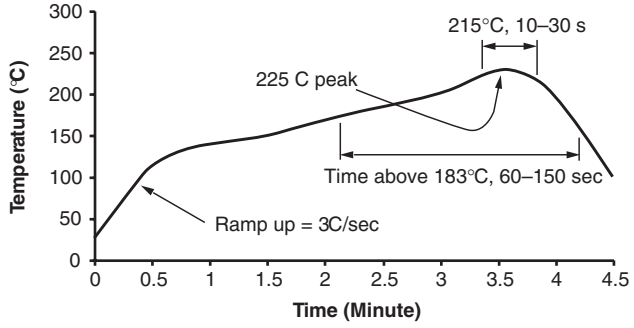
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MARKING INFORMATION



Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	Two digit year code, e.g., ‘03’
5	Two digit work week ranging from ‘01’ to ‘53’
6	Assembly package code

Reflow Profile (Black Package, No Suffix)



- Peak reflow temperature: 225°C (package surface temperature)
- Time of temperature higher than 183°C for 60–150 seconds
- One time soldering reflow is recommended

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CoolFET™	FRFET™	MicroFET™	PowerTrench®	SuperSOT™-6
CROSSVOLT™	GlobalOptoisolator™	MicroPak™	QFET®	SuperSOT™-8
DOME™	GTO™	MICROWIRE™	QS™	SyncFET™
EcoSPARK™	HiSeC™	MSX™	QT Optoelectronics™	TinyLogic®
E^2CMOS™	I^2C™	MSXPro™	Quiet Series™	TINYOPTO™
EnSigna™	*i-Lo*™	OCX™	RapidConfigure™	TruTranslation™
FACT™	ImpliedDisconnect™	OCXPro™	RapidConnect™	UHC™
FACT Quiet Series™		OPTOLOGIC®	μSerDes™	UltraFET®
Across the board. Around the world.™		OPTOPLANAR™	SILENT SWITCHER®	VCX™
The Power Franchise®		PACMAN™	SMART START™	
Programmable Active Droop™		POP™	SPM™	

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.