GENERAL PURPOSE 6-PIN PHOTOTRANSISTOR OPTOCOUPLERS

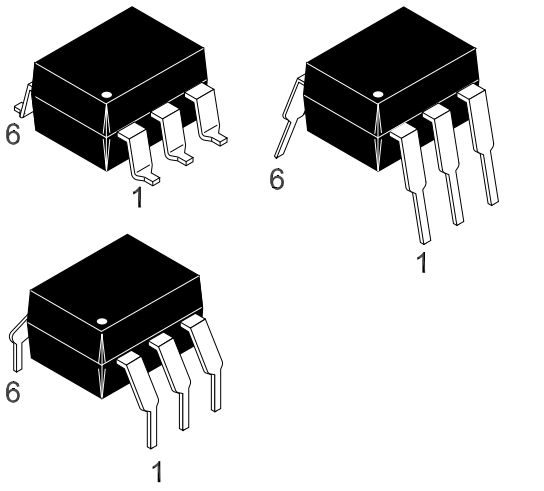
MOC8204

DESCRIPTION

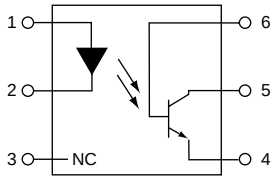
The MOC8204 device consists of a gallium arsenide infrared emitting diode optically coupled to a high voltage, silicon, phototransistor detector in a standard 6-pin DIP package. It is designed for high voltage applications and is particularly useful in copy machines and solid state relays.

APPLICATIONS

- Copy Machines
- Interfacing and coupling systems of different potentials and impedances
- Monitor and Detection Circuits
- Solid State Relays



SCHEMATIC



PIN 1. ANODE
2. CATHODE
3. NO CONNECTION
4. EMITTER
5. COLLECTOR
6. BASE

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
Input-Output Isolation Voltage Peak ac Voltage, 60 Hz, 1 Second Duration(1)	V_{ISO}	7500	Vac(pk)
Total Device Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	250 2.94	mW
EMITTER DC/Average Forward Input Current	I_F	60	mA
Forward Current - Peak (Pulse Width = 1µs, 330 pps)	I_F(pk)	1.2	A
LED Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	120 1.41	mW mW/°C
DETECTOR Collector-Emitter Voltage	V_{CEO}	400	V
Collector-Base Voltage	V_{CBO}	400	V
Emitter-Collector Voltage	V_{ECO}	7	V
Detector Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	150 1.76	mW mW/°C

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

INDIVIDUAL COMPONENT CHARACTERISTICS

Parameter	Test Conditions	Symbol	Min	Typ(1)	Max	Unit
EMITTER						
Input Forward Voltage	(I_F = 10 mA)	V_F	—	1.2	15	V
Reverse Leakage Current	(V_R = 6.0 V)	I_R	—	—	10	µA
Capacitance	(V = 0, f =1 MHz)	C_J	—	18	—	pF
DETECTOR						
Collector-Emitter Breakdown Voltage	(I_C = 1.0 mA, R_{BE} = 1MΩ)	BV_{CEO}	400	—	—	V
Collector-Base Breakdown Voltage	(I_C = 100 µA)	BV_{CBO}	400	—	—	V
Emitter-Base Breakdown Voltage	(I_E = 100 µA)	BV_{EBO}	7	—	—	V
Collector-Emitter Dark Current						
T_A = 25°C	(R_{BE} = 1MΩ, V_{CE} = 300 V)	I_{CEO}	—	—	100	nA
T_A = 100°C			—	—	250	µA

ISOLATION CHARACTERISTICS

Characteristic	Test Conditions	Symbol	Min	Typ(1)	Max	Units
Output Collector Current	(V_{CE} = 10 V, I_F = 10 mA, R_{BE} = 1MΩ)	I_C (CTR)(2)	2 (20)	—	—	mA(%)
Collector-Emitter Saturation Voltage	(I_C = 0.5 mA, I_F = 10 mA, R_{BE} = 1MΩ)	$V_{(SAT)}$	—	—	0.4	V
Input-Output Isolation Voltage(3)	(I_{I-O} ≤ 1 µA, Time = 1min)	V_{ISO}	5300	—	—	$V_{AC(RMS)}$
			7300	—	—	$V_{AC(PEAK)}$
Isolation Resistance(3)		R_{ISO}	—	10^{11}	—	Ω
Isolation Capacitance(1)		C_{ISO}		0.2		pf
Turn-On Time	(V_{CC} = 10 V, I_C = 2 mA, R_L = 100Ω)	t_{ON}	—	5	—	µs
Turn-Off Time		t_{OFF}	—	5	—	

Notes
1. Alway design to the specified minimum/maximum electrical limits (where applicable).
2. Current Transfer Ratio (CTR) = I_C /I_F x 100%.
3. For this test LED pins 1 and 2 are common and phototransistor Pins 4,5 and 6 are common.

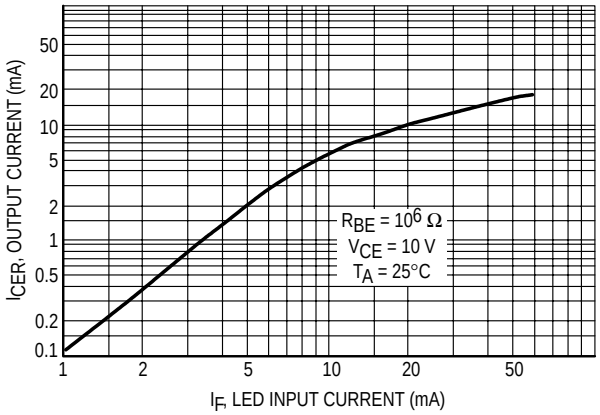


Figure 1. Output Current versus LED Input Current

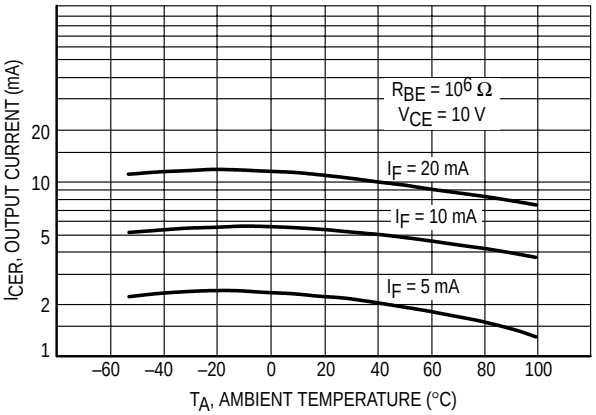


Figure 2. Output Current versus Temperature

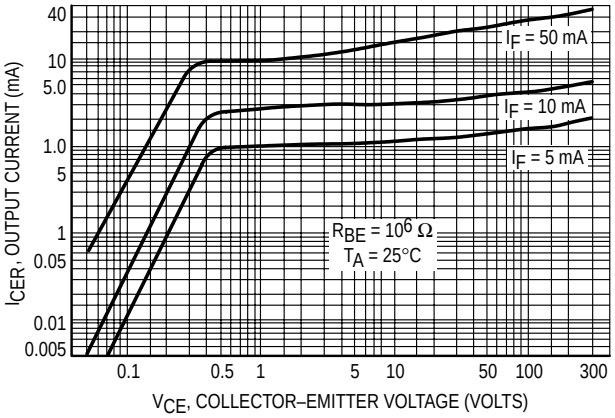


Figure 3. Output Characteristics

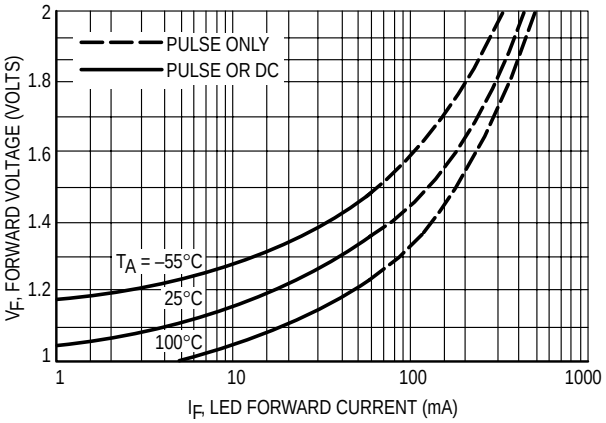


Figure 4. Forward Characteristics

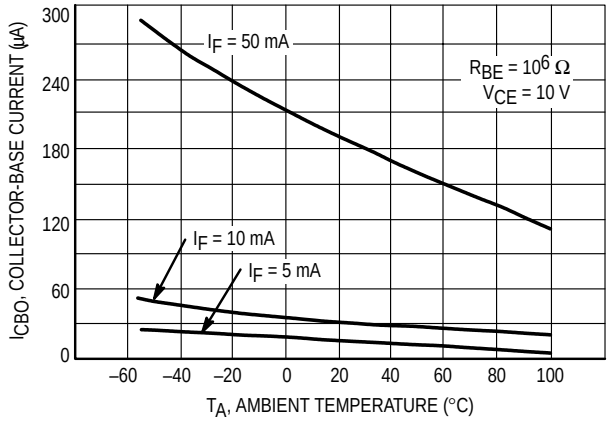


Figure 5. Collector–Base Current versus Temperature

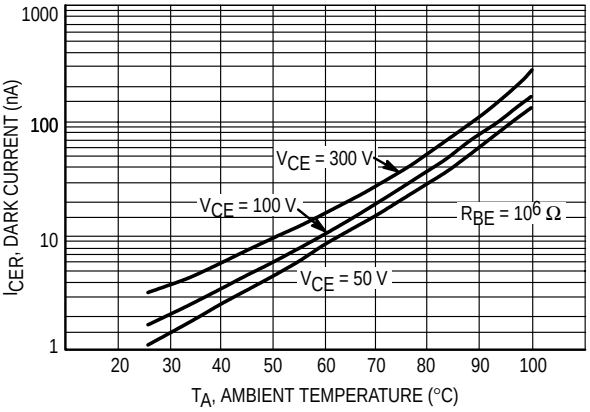
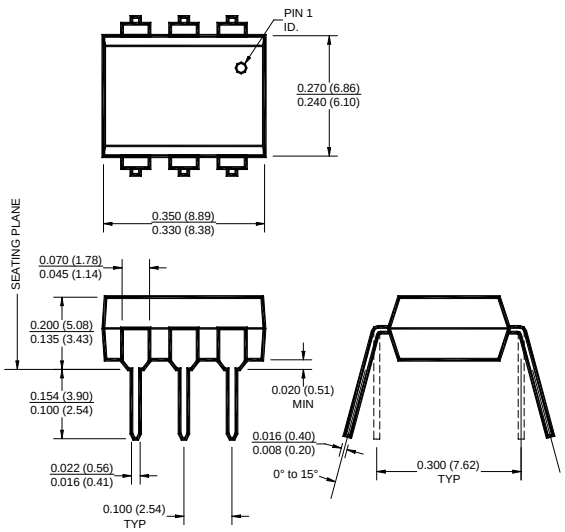


Figure 6. Dark Current versus Temperature

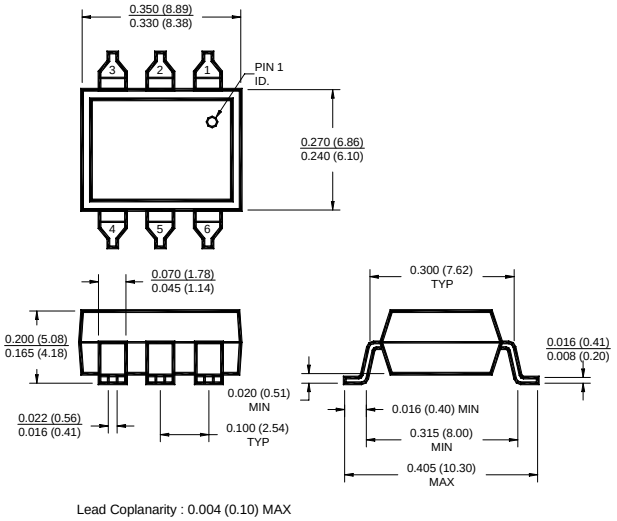
GENERAL PURPOSE 6-PIN PHOTOTRANSISTOR OPTOCOUPLERS

MOC8204

Package Dimensions (Through Hole)

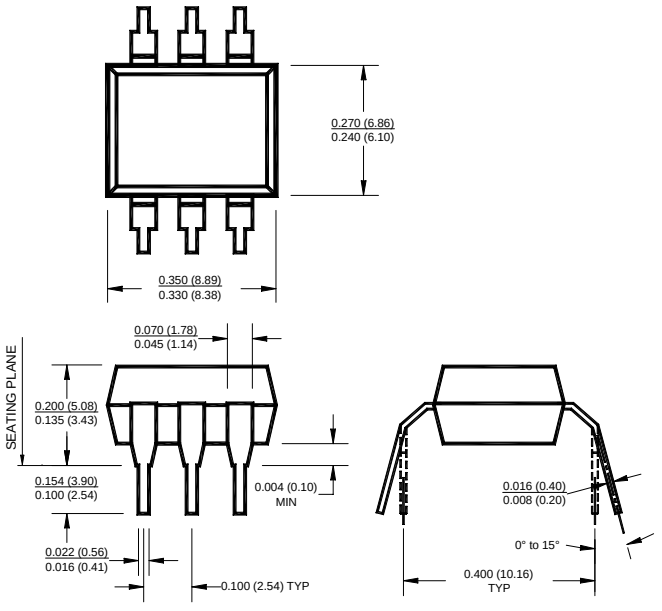


Package Dimensions (Surface Mount)

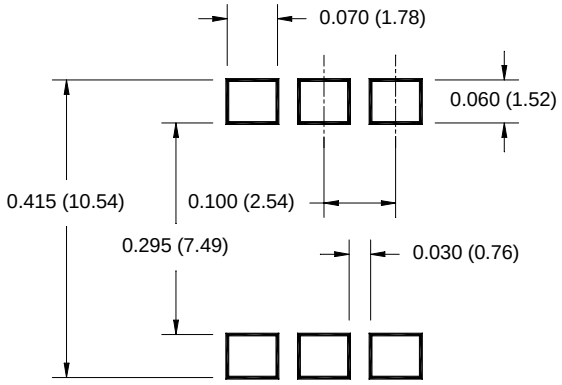


Lead Coplanarity : 0.004 (0.10) MAX

Package Dimensions (0.4”Lead Spacing)



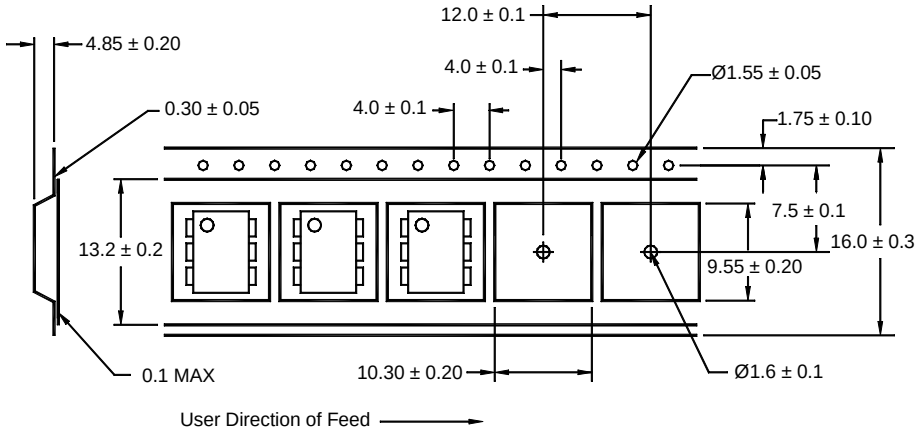
Recommended Pad Layout for Surface Mount Leadform



ORDERING INFORMATION

Option	Order Entry Idenifier	Description
R2	.R2	Opto Plus Reliability Conditioning
S	.S	Surface Mount Lead Bend
SD	.SD	Surface Mount; Tape and reel
SDL	.SDL	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



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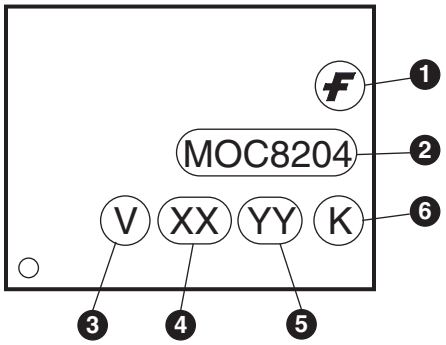
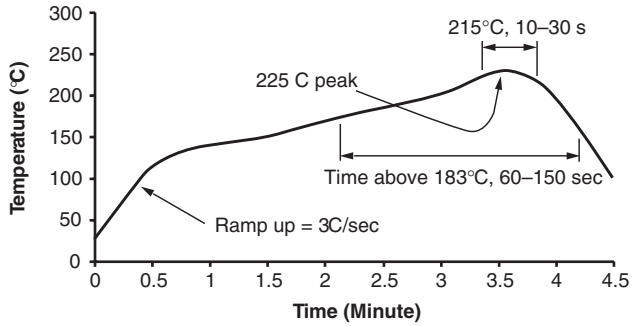
MARKING INFORMATION



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®
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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™	

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.