



MOC8030-M, MOC8050-M Photodarlington Optocoupler (No Base Connection)

Features

- High BV_{CEO}
 - Minimum 80V
- High current transfer ratio
 - 300% (MOC8030)
 - 500% (MOC8050)
- No base connection for improved noise immunity
- Underwriters Laboratory (UL) recognized
File #E90700
- VDE recognized (file #102915), – add option V
(e.g., MOC8030V)

Applications

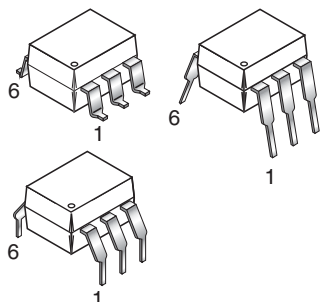
- Appliances, measuring instruments
- I/O interface for computers
- Programmable controllers
- Portable electronics
- Interfacing and coupling systems of different potentials and impedance
- Solid state relays

Description

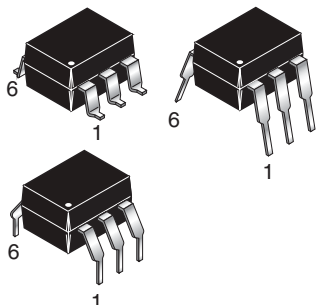
The MOC8030 and MOC8050 are photodarlington-type optically coupled optocouplers. The devices have a gallium arsenide infrared emitting diode coupled with a silicon darlington phototransistor.

Packages

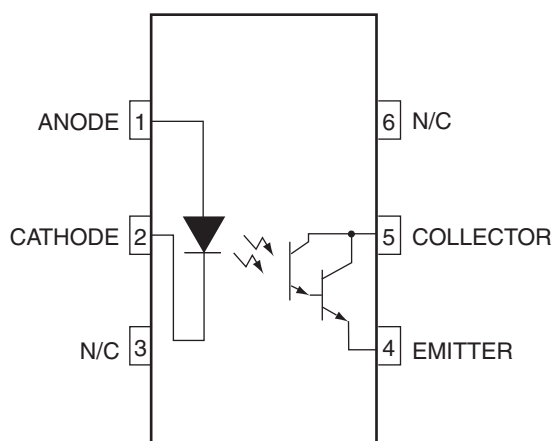
White Package (-M Suffix)



Black Package (No -M Suffix)



Schematic



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)

Symbol	Parameter	Value	Units
TOTAL DEVICE			
T _{STG}	Storage Temperature	-40 to +150	°C
T _{OPR}	Operating Temperature	-40 to +110	°C
T _{SOL}	Lead Solder Temperature	260 for 10 sec	°C
P _D	Total Device Power Dissipation @ T _A = 25°C Derate above 25°C	250	mW
		2.94	mW/°C
EMITTER			
I _F	DC/Average Forward Input Current	60	mA
V _R	Reverse Input Voltage	3	V
P _D	LED Power Dissipation @ T _A = 25°C Derate above 25°C	120	mW
		1.41	mW/°C
DETECTOR			
V _{CEO}	Collector-Emitter Voltage	80	V
P _D	Detector Power Dissipation @ T _A = 25°C Derate above 25°C	150	mW
		1.76	mW/°C
I _C	Continuous Collector Current	150	mA

Electrical Characteristics ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)**Individual Component Characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.*	Max.	Unit
EMITTER						
V_F	Input Forward Voltage	$I_F = 10\text{mA}$		1.18	2.00	V
I_R	Reverse Leakage Current	$V_R = 3.0\text{V}$		0.001	10	μA
DETECTOR						
BV_{CEO}	Collector-Emitter Breakdown Voltage	$I_C = 1.0\text{mA}$, $I_F = 0$	80	100		V
BV_{ECO}	Emitter-Collector Breakdown Voltage	$I_E = 100\mu\text{A}$, $I_F = 0$	5	10		V
I_{CEO}	Collector-Emitter Dark Current	$V_{CE} = 60\text{V}$, $I_F = 0$			1	μA
C_{CE}	Capacitance	$V_{CE} = 0\text{V}$, $f = 1\text{MHz}$		8		pF

Transfer Characteristics

Symbol	Parameter	Test Conditions		Min.	Typ.*	Max.	Unit
DC CHARACTERISTICS							
CTR	Current Transfer Ratio, Collector to Emitter	I _F = 10mA, V _{CE} = 1.5V	MOC8030	300			%
			MOC8050	500			
AC CHARACTERISTICS							
t _{on}	Non-Saturated Turn-on Time	I _F = 5mA, V _{CC} = 10V, R _L = 100Ω			8.5		μS
t _{off}	Turn-off Time	I _F = 5mA, V _{CC} = 10V, R _L = 100Ω			37		μS
t _r	Rise Time	I _F = 5mA, V _{CC} = 10V, R _L = 100Ω					μS
t _f	Fall Time	I _F = 5mA, V _{CC} = 10V, R _L = 100Ω					μS

Isolation Characteristics

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Units
V_{ISO}	Input-Output Isolation Voltage Non '-M', Black Package	$f = 60\text{Hz}$, $t = 1\text{ min.}$	5300			$V_{ac(rms)}^{(1)}$
	'-M', White Package	$f = 60\text{Hz}$, $t = 1\text{ min.}$	7500			$V_{ac(pk)}$
R_{ISO}	Isolation Resistance	$V_{I-O} = 500\text{VDC}$	10^{11}			Ω
C_{ISO}	Isolation Capacitance Non '-M', Black Package	$V_{I-O} = \emptyset$, $f = 1\text{MHz}$		0.5		pF
	'-M', White Package			0.2	2	pF

Notes:*Typical values at $T_A = 25^\circ\text{C}$ 1. 5300 $V_{ac(rms)}$ for 1 minute equates to approximately 9000 $V_{ac(pk)}$ for 1 second.

Typical Performance Curves

Fig. 1 LED Forward Voltage vs. Forward Current (Black Package)

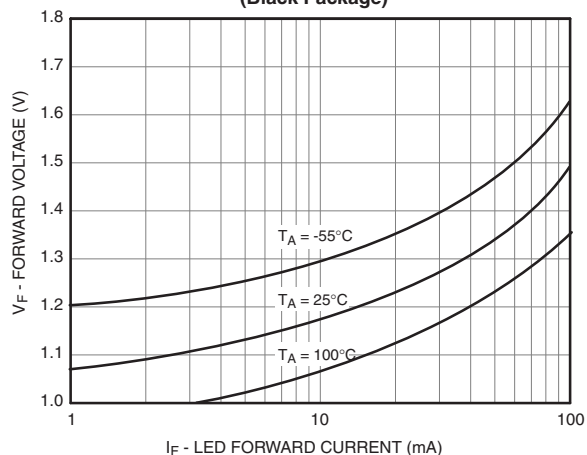


Fig. 2 LED Forward Voltage vs. Forward Current (White Package)

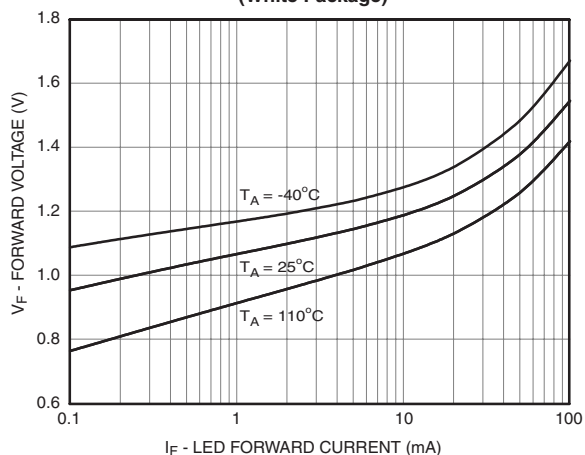


Fig. 3 Normalized CTR vs. Forward Current (Black Package)

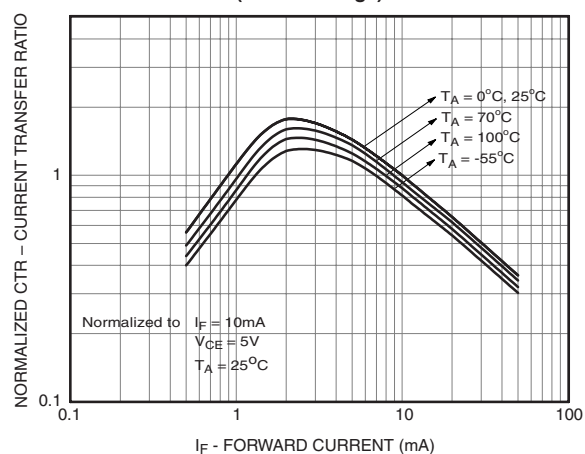


Fig. 4 Normalized CTR vs. Forward Current (White Package)

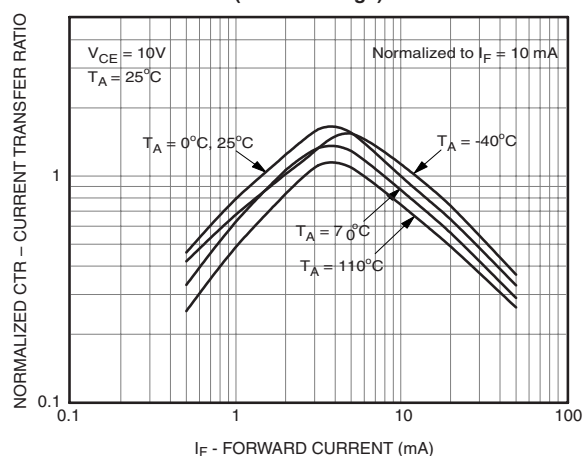
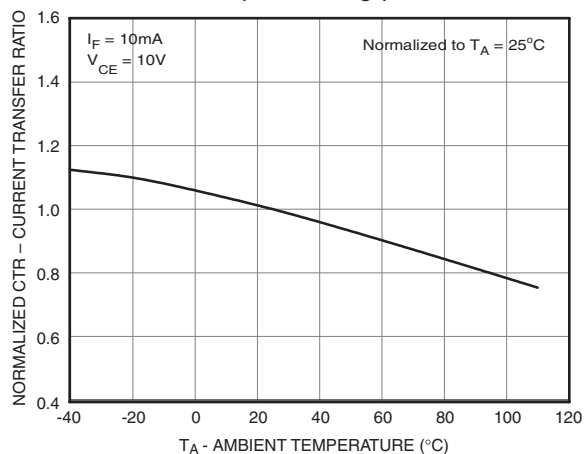


Fig. 5 Normalized CTR vs. Ambient Temperature (White Package)



Typical Performance Curves (Continued)

Fig. 6 Turn-on Time vs. Forward Current (Black Package)

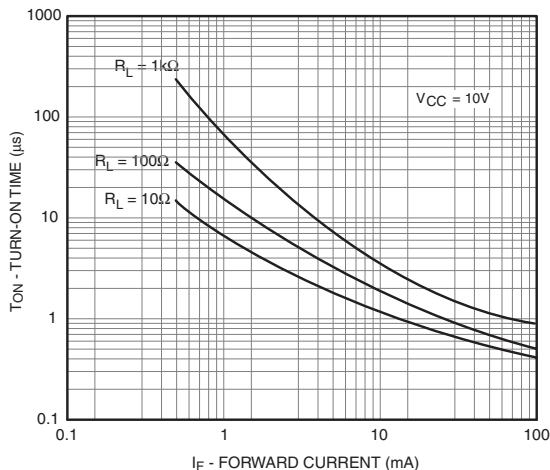


Fig. 7 Turn-on Time vs. Forward Current (White Package)

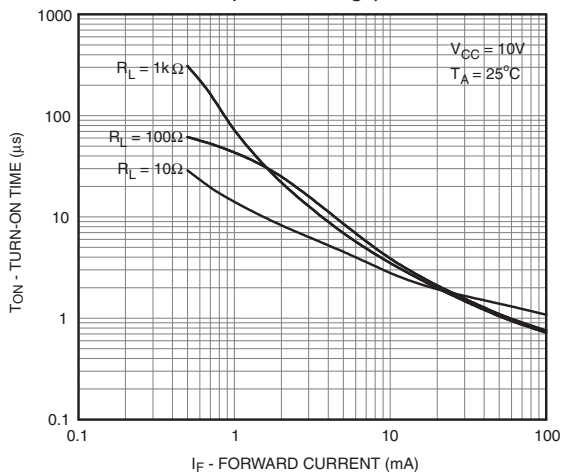


Fig. 8 Turn-off Time vs. Forward Current (Black Package)

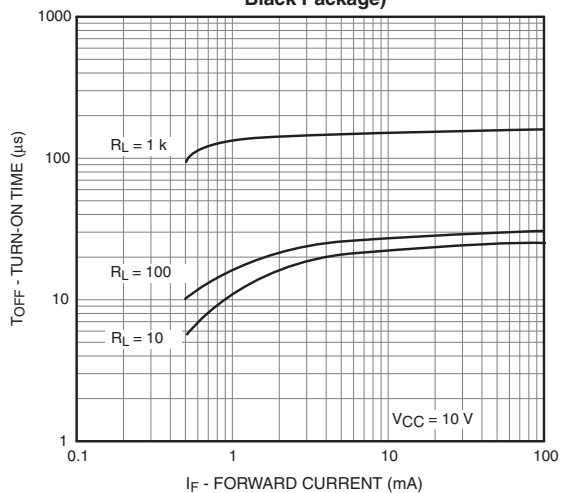


Fig. 9 Turn-off Time vs. Forward Current (White Package)

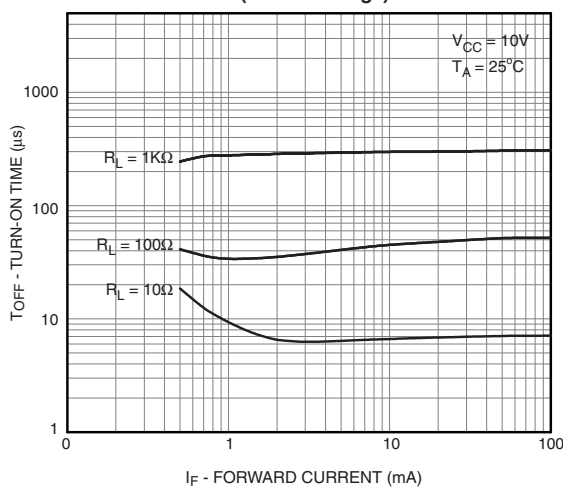


Fig. 10 Normalized Collector-Emitter Current vs. Collector-Emitter Voltage (Black Package)

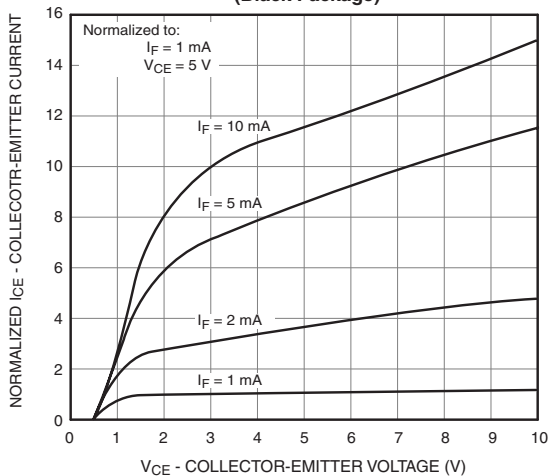
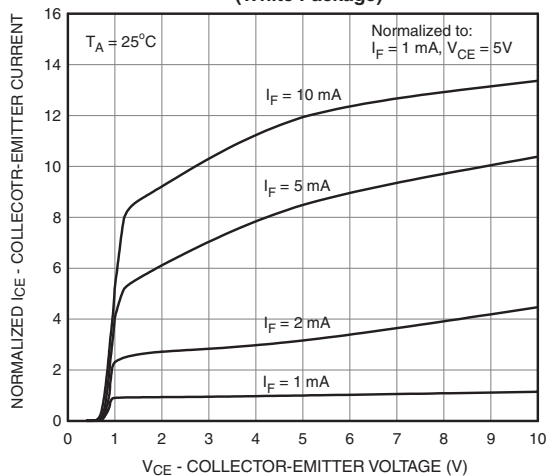
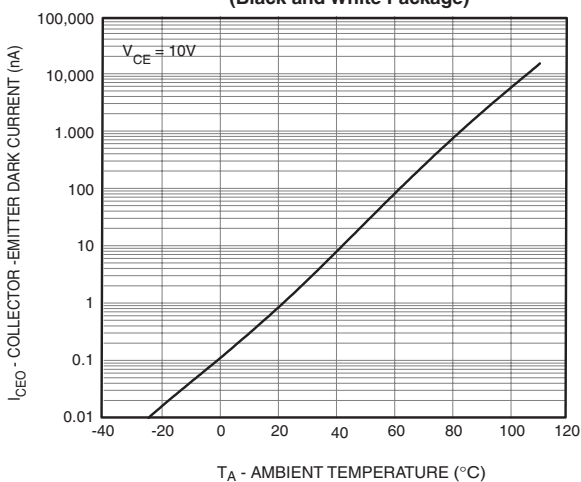


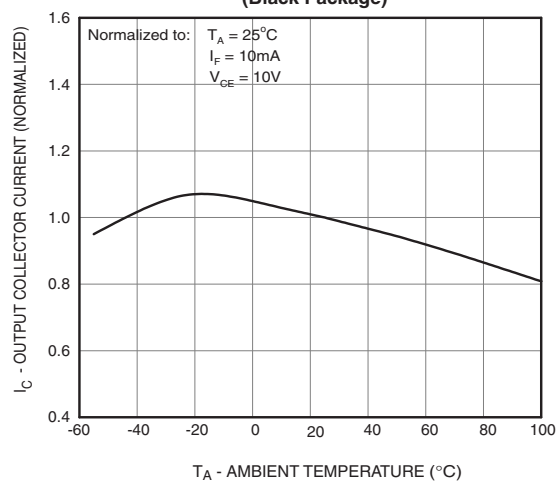
Fig. 11 Normalized Collector-Emitter Current vs. Collector-Emitter Voltage (White Package)



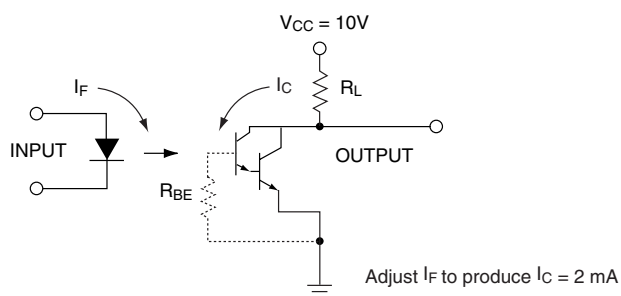
**Fig. 12 Dark Current vs. Ambient Temperature
(Black and White Package)**



**Fig. 13 Output Current vs. Ambient Temperature
(Black Package)**



TEST CIRCUIT



WAVE FORMS

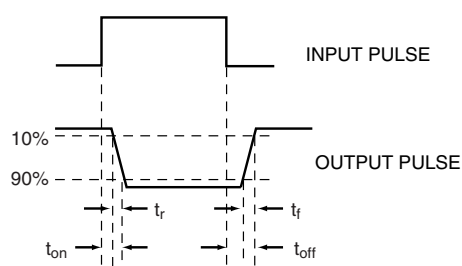
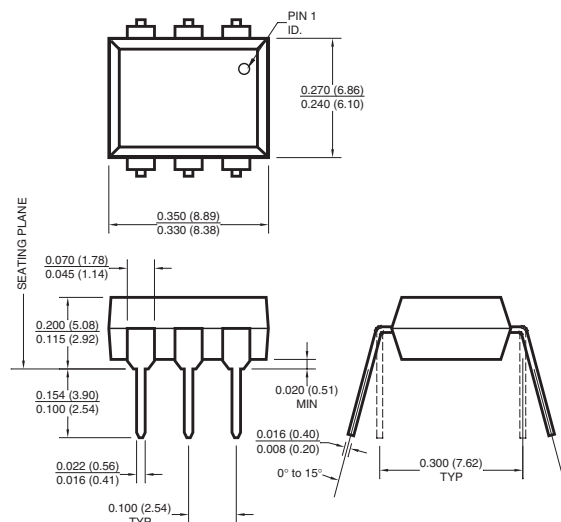


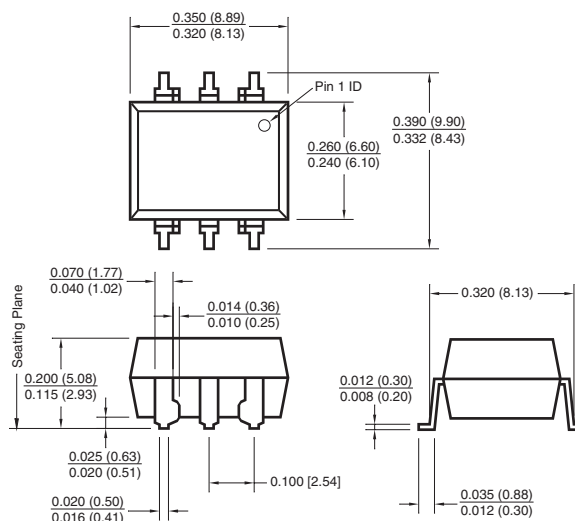
Figure 14. Switching Time Test Circuit and Waveforms

Black Package (No -M Suffix)

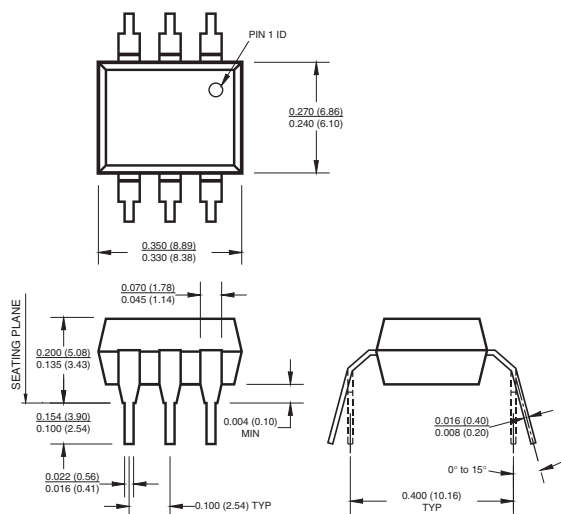
Package Dimensions (Through Hole)



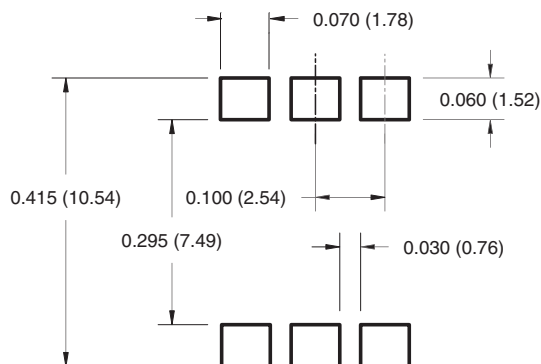
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



Recommended Pad Layout for Surface Mount Leadform

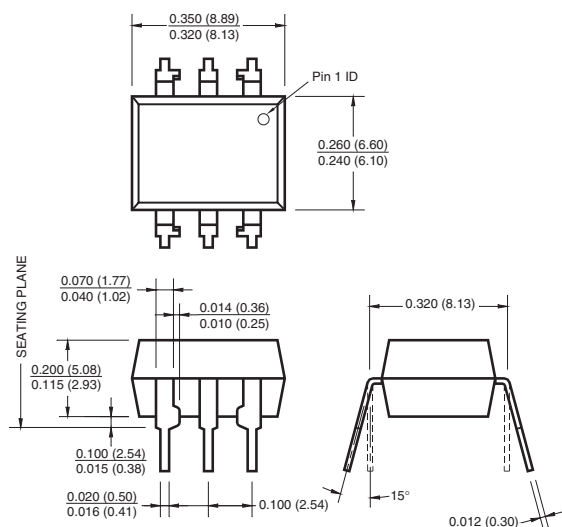


Note:

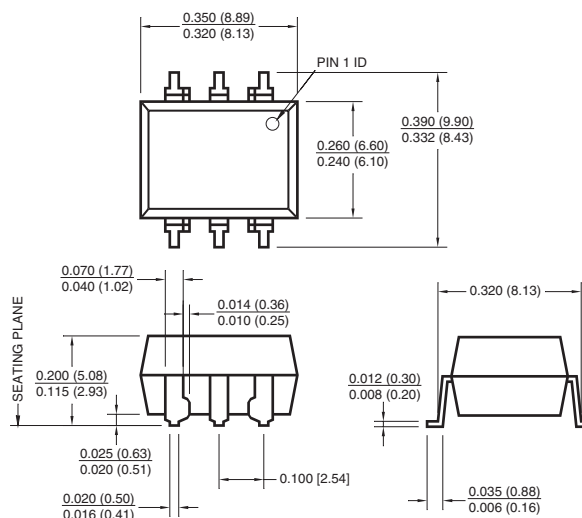
All dimensions are in inches (millimeters).

White Package (-M Suffix)

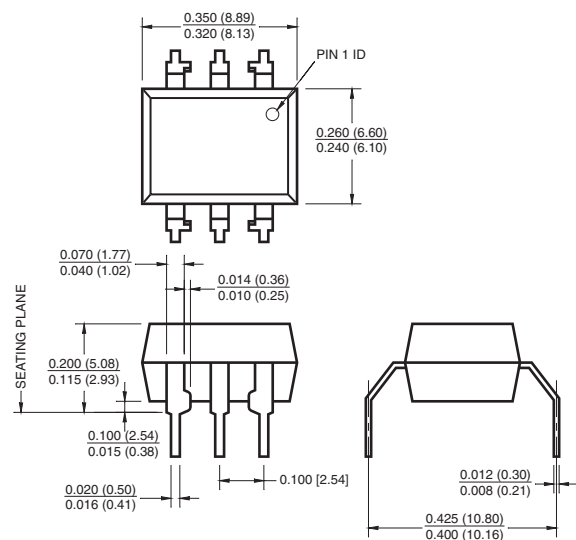
Package Dimensions (Through Hole)



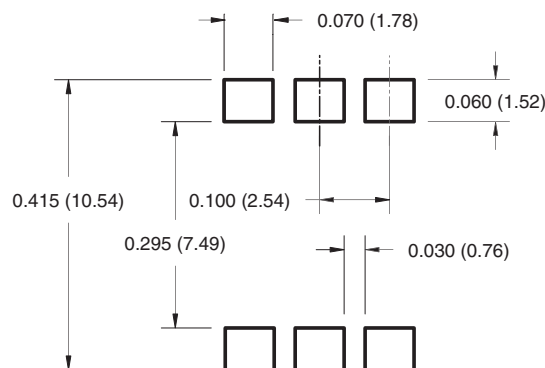
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



Recommended Pad Layout for Surface Mount Leadform



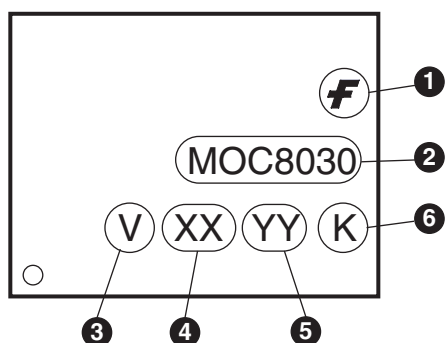
Note:

All dimensions are in inches (millimeters).

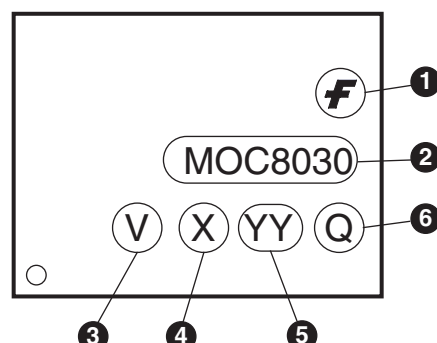
Ordering Information

Black Package (No Suffix)	White Package (-M Suffix)	Option
.S	S	Surface Mount Lead Bend
.SD	SR2	Surface Mount; Tape and reel
.W	T	0.4" Lead Spacing
.300	V	VDE 0884
.300W	TV	VDE 0884, 0.4" Lead Spacing
.3S	SV	VDE 0884, Surface Mount
.3SD	SR2V	VDE 0884, Surface Mount, Tape & Reel

Marking Information



Black Package, No Suffix

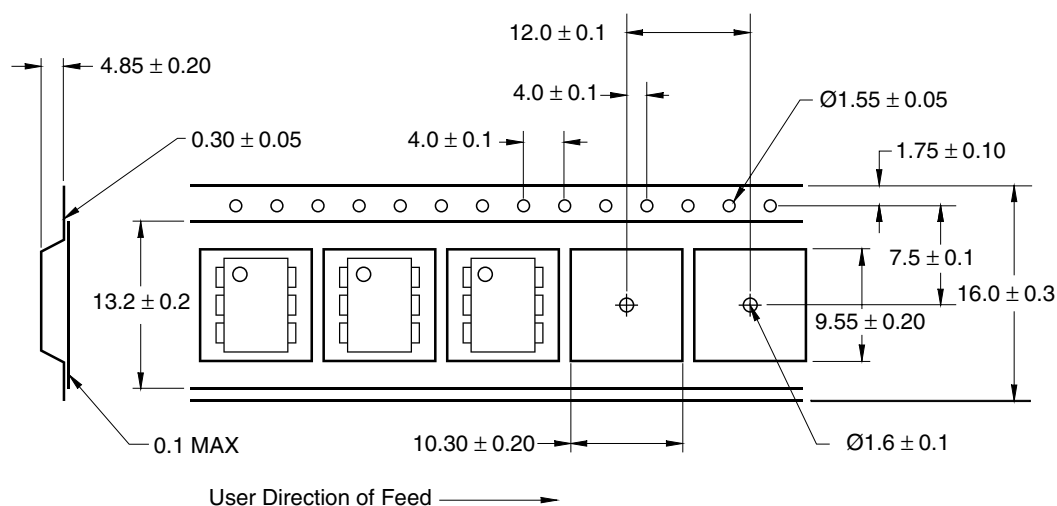


White Package, -M Suffix

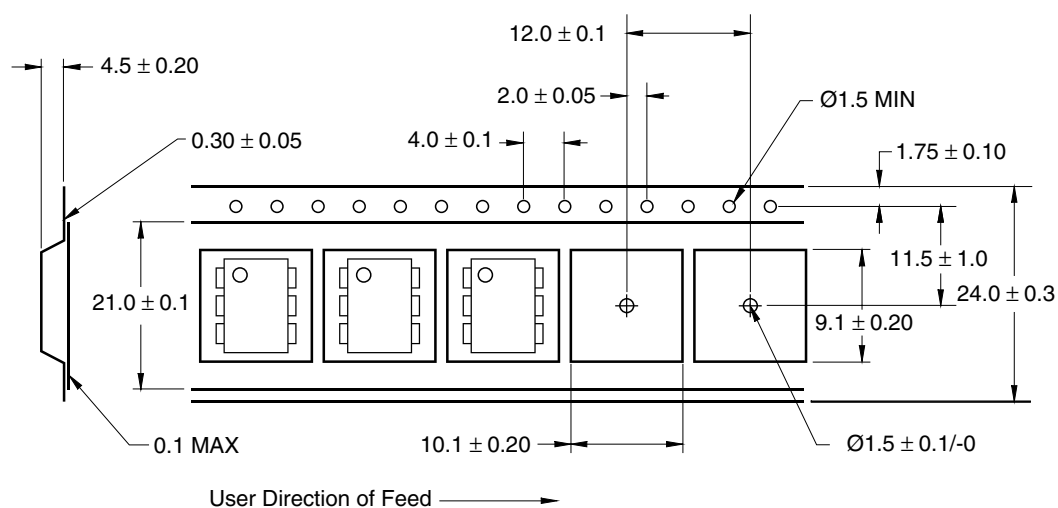
Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One or two digit year code - Two digits for black package parts, e.g., '03' - One digit for white package parts, e.g., '3'
5	Two digit work week ranging from '01' to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

Tape Dimensions

Black Package, No Suffix



White Package, -M Suffix

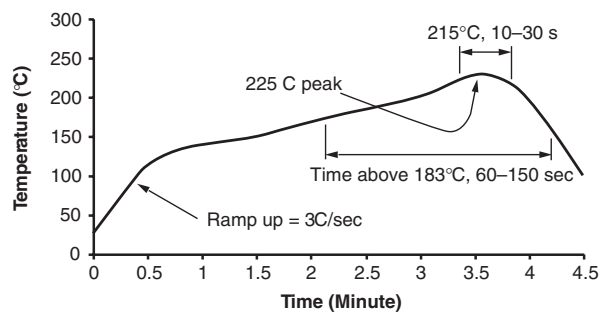


Note:

All dimensions are in millimeters.

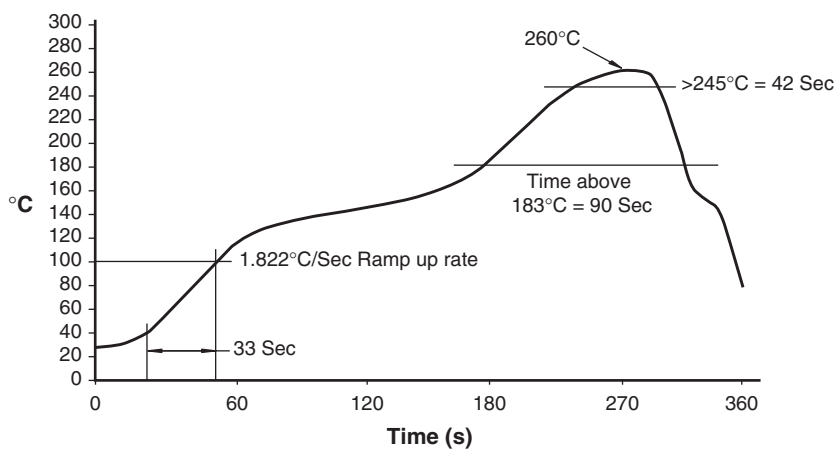
Reflow Soldering Profile

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

White Package, -M Suffix



FAIRCHILD SEMICONDUCTOR TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACE [™]	FACT Quiet Series [™]	OCX [™]	SILENT SWITCHER [®]	UniFET [™]
ActiveArray [™]	GlobalOptoisolator [™]	OCXPro [™]	SMART START [™]	UltraFET [®]
Bottomless [™]	GTO [™]	OPTOLOGIC [®]	SPM [™]	VCX [™]
Build it Now [™]	HiSeC [™]	OPTOPLANAR [™]	Stealth [™]	Wire [™]
CoolFET [™]	I ² C [™]	PACMAN [™]	SuperFET [™]	
CROSSVOLT [™]	i-Lo [™]	POP [™]	SuperSOT [™] -3	
DOME [™]	ImpliedDisconnect [™]	Power247 [™]	SuperSOT [™] -6	
EcoSPARK [™]	IntelliMAX [™]	PowerEdge [™]	SuperSOT [™] -8	
E ² CMOS [™]	ISOPLANAR [™]	PowerSaver [™]	SyncFET [™]	
EnSigna [™]	LittleFET [™]	PowerTrench [®]	TCM [™]	
FACT [®]	MICROCOUPLER [™]	QFET [®]	TinyBoost [™]	
FAST [®]	MicroFET [™]	QS [™]	TinyBuck [™]	
FAST [™]	MicroPak [™]	QT Optoelectronics [™]	TinyPWM [™]	
FPS [™]	MICROWIRE [™]	Quiet Series [™]	TinyPower [™]	
FRFET [™]	MSX [™]	RapidConfigure [™]	TinyLogic [®]	
	MSXPro [™]	RapidConnect [™]	TINYOPTO [™]	
Across the board. Around the world. [™]		μSerDes [™]	TruTranslation [™]	
The Power Franchise [®]		ScalarPump [™]	UHC [®]	
Programmable Active Droop [™]				

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
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 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 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.

Rev. I21