

MOC8101
MOC8105
CNY17F-1

MOC8102
MOC8106
CNY17F-2

MOC8103
MOC8107
CNY17F-3

MOC8104
MOC8108
CNY17F-4

FEATURES

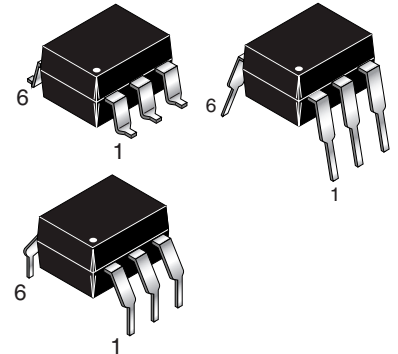
The MOC810X and CNY17F-X devices consist of a gallium arsenide LED optically coupled to a silicon phototransistor in a dual-in-line package.

- Closely Matched Current Transfer Ratio (CTR) Minimizes Unit-to-Unit Variation
- Narrow (CTR) Windows that Translate to a Narrow and Predictable Open Loop Gain Window
- Very Low Coupled Capacitance along with No Chip to Pin 6 Base Connection for Minimum Noise Susceptibility

• To order devices that are tested and marked per VDE 0884 requirements, the suffix “.300” must be included at the end of part number. e.g. MOC8101.300 VDE 0884 is a test option.

APPLICATIONS

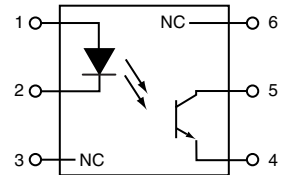
- Switchmode Power Supplies (Feedback Control)
- AC Line/Digital Logic Isolation
- Interfacing and coupling systems of different potentials and impedances



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C Unless otherwise specified)

Parameter	Symbol	Value	Unit
INPUT LED			
Forward Current - Continuous	I _F	100	mA
Forward Current - Peak (PW = 1μs, 300pps)	I _{F(pk)}	1	A
Reverse Voltage	V _R	6	Volts
LED Power Dissipation @ T _A = 25°C	P _D	140	mW
Derate above 25°C		1.33	mW/°C
OUTPUT TRANSISTOR			
Collector-Emitter Voltage	V _{CEO}	70	Volts
MOC8106/7/8, CNY17F-1/2/3/4		30	
Emitter-Collector Voltage	V _{ECO}	7	Volts
Detector Power Dissipation @ T _A = 25°C	P _D	200	mW
Derate above 25°C		2.67	
TOTAL DEVICE			
Input-Output Isolation Voltage ⁽¹⁾ (f = 60 Hz, t = 1 min.)	V _{ISO}	5300	Vac(rms)
Total Device Power Dissipation @ T _A = 25°C	P _D	260	mW
Derate above 25°C		2.94	
Ambient Operating Temperature Range	T _{OPR}	-55 to +100	°C
Storage Temperature Range	T _{STG}	-55 to +150	°C
Lead Soldering Temperature (1/16" from case, 10 sec. duration)	T _{SOL}	260	°C

SCHEMATIC



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

NOTE

1. Input-Output Isolation Voltage, V_{ISO}, is an internal device dielectric breakdown rating.

**MOC8101
MOC8105
CNY17F-1**

**MOC8102
MOC8106
CNY17F-2**

**MOC8103
MOC8107
CNY17F-3**

**MOC8104
MOC8108
CNY17F-4**

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified) ⁽¹⁾						
Characteristic	Symbol	Min	Typ**	Max	Unit	
INPUT LED						
Forward Voltage ($I_F = 60\text{ mA}$)	V_F	1.0	1.4	1.65	V	
Reverse Leakage Current ($V_R = 5.0\text{ V}$)	I_R	—	0.001	10	μA	
Capacitance	C	—	18	—	pF	
OUTPUT TRANSISTOR						
Collector-Emitter Dark Current ($V_{CE} = 10\text{ V}$, $T_A = 25^\circ\text{C}$) ($V_{CE} = 10\text{ V}$, $T_A = 100^\circ\text{C}$)	I_{CEO1}	—	1.0	50	nA	
	I_{CEO2}	—	1.0	—	μA	
Collector-Emitter Breakdown Voltage MOC8101/2/3/4/5 ($I_C = 1.0\text{ mA}$) MOC8106/7/8, CNY17F-1/2/3/4 ($I_C = 1.0\text{ mA}$)	$V_{(BR)CEO}$	30	100	—	V	
		70	100	—		
Emitter-Collector Breakdown Voltage ($I_E = 100\ \mu\text{A}$)	$V_{(BR)ECO}$	7.0	10	—	V	
Collector-Emitter Capacitance ($f = 1.0\text{ MHz}$, $V_{CE} = 0$)	C_{CE}	—	8	—	pF	
COUPLED						
Output Collector Current ($I_F = 10\text{ mA}$, $V_{CE} = 10\text{ V}$)	MOC8101	50	—	80	%	
	MOC8102	73	—	117		
	MOC8103	108	—	173		
	MOC8104	160	—	256		
	MOC8105	65	—	133		
	MOC8106	50	—	150		
	MOC8107	100	—	300		
	MOC8108	250	—	600		
	($I_F = 10\text{ mA}$, $V_{CE} = 5\text{ V}$)	CNY17F-1	40	—		80
		CNY17F-2	63	—		125
CNY17F-3		100	—	200		
CNY17F-4		160	—	320		
Collector-Emitter Saturation Voltage CNY17F-1/2/3/4 ($I_C = 2.5\text{ mA}$, $I_F = 10\text{ mA}$) MOC8101/2/3/4/5/6/7/8 ($I_C = 500\ \mu\text{A}$, $I_F = 5.0\text{ mA}$)	$V_{CE(sat)}$	—	—	0.4	V	
Isolation Voltage ($f = 60\text{ Hz}$, $t = 1.0\text{ min.}$) ⁽⁴⁾	V_{ISO}	5300	—	—	Vac(rms)	
Isolation Resistance ($V_{I-O} = 500\text{ V}$) ⁽⁴⁾	R_{ISO}	10^{11}	—	—	Ω	
Isolation Capacitance ($V_{I-O} = 0$, $f = 1.0\text{ MHz}$) ⁽⁴⁾	C_{ISO}	—	0.5	—	pF	

** All typicals at $T_A = 25^\circ\text{C}$

MOC8101
MOC8105
CNY17F-1

MOC8102
MOC8106
CNY17F-2

MOC8103
MOC8107
CNY17F-3

MOC8104
MOC8108
CNY17F-4

TRANSFER CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified)						
AC Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Unit
NON-SATURATED SWITCHING TIME						
Turn-on Time	CNY17F-1/2/3/4 Only ($R_L = 100\ \Omega$, $I_C = 2\ \text{mA}$)	t_{on}	—	2	10	μs
Turn-off Time	CNY17F-1/2/3/4 Only ($V_{CC} = 10\ \text{V}$)	t_{off}	—	3	10	
Turn-On Time	All Devices ($I_C = 2.0\ \text{mA}$, $V_{CC} = 10\ \text{V}$, $R_L = 100\ \Omega$) ⁽³⁾	t_{on}	—	2	—	μs
Turn-Off Time	All Devices ($I_C = 2.0\ \text{mA}$, $V_{CC} = 10\ \text{V}$, $R_L = 100\ \Omega$) ⁽³⁾	t_{off}	—	3	—	
Rise Time	All Devices ($I_C = 2.0\ \text{mA}$, $V_{CC} = 10\ \text{V}$, $R_L = 100\ \Omega$) ⁽³⁾	t_r	—	1	—	μs
Fall Time	All Devices ($I_C = 2.0\ \text{mA}$, $V_{CC} = 10\ \text{V}$, $R_L = 100\ \Omega$) ⁽³⁾	t_f	—	2	—	
SATURATED SWITCHING TIMES						
Turn-on Time	CNY17F-1 ($I_F = 20\ \text{mA}$, $V_{CE} = 0.4\ \text{V}$)	t_{on}	—	—	5.5	μs
	CNY17F-2 CNY17F-3 CNY17F-4 ($I_F = 10\ \text{mA}$, $V_{CE} = 0.4\ \text{V}$)		—	—	8.0	
Rise Time	CNY17F-1 ($I_F = 20\ \text{mA}$, $V_{CE} = 0.4\ \text{V}$)	t_r	—	—	4.0	μs
	CNY17F-2 CNY17F-3 CNY17F-4 ($I_F = 10\ \text{mA}$, $V_{CE} = 0.4\ \text{V}$)		—	—	6.0	
Turn-off Time	CNY17F-1 ($I_F = 20\ \text{mA}$, $V_{CE} = 0.4\ \text{V}$)	t_{off}	—	—	34	μs
	CNY17F-2 CNY17F-3 CNY17F-4 ($I_F = 10\ \text{mA}$, $V_{CE} = 0.4\ \text{V}$)		—	—	39	
Fall Time	CNY17F-1 ($I_F = 20\ \text{mA}$, $V_{CE} = 0.4\ \text{V}$)	t_f	—	—	20	μs
	CNY17F-2 CNY17F-3 CNY17F-4 ($I_F = 10\ \text{mA}$, $V_{CE} = 0.4\ \text{V}$)		—	—	24	

** All typicals at $T_A = 25^\circ\text{C}$

NOTES:

1. Always design to the specified minimum/maximum electrical limits (where applicable).
2. Current Transfer Ratio (CTR) = $I_C/I_F \times 100\%$.
3. For test circuit setup and waveforms, refer to Figure 7.
4. For this test, Pins 1 and 2 are common, and Pins 4 and 5 are common.

MOC8101
MOC8105
CNY17F-1

MOC8102
MOC8106
CNY17F-2

MOC8103
MOC8107
CNY17F-3

MOC8104
MOC8108
CNY17F-4

TYPICAL PERFORMANCE CURVES

Fig. 1 LED Forward Voltage vs. Forward Current

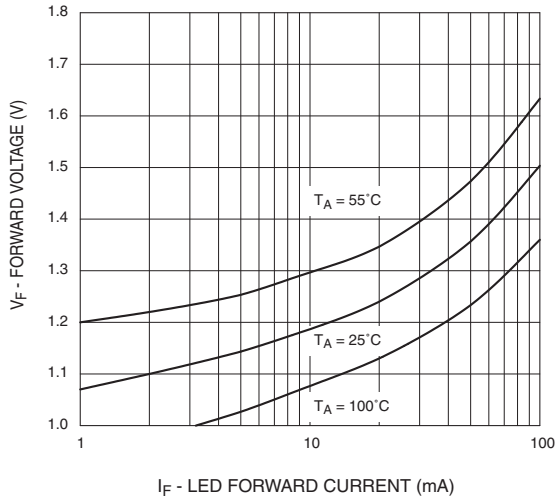


Fig. 2 Normalized CTR vs. Forward Current

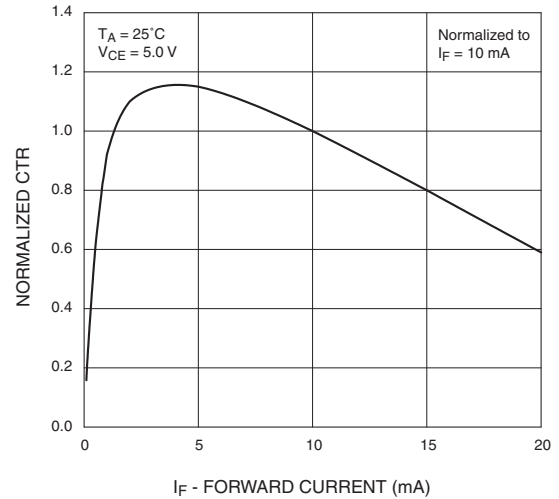


Fig. 3 Normalized CTR vs. Ambient Temperature

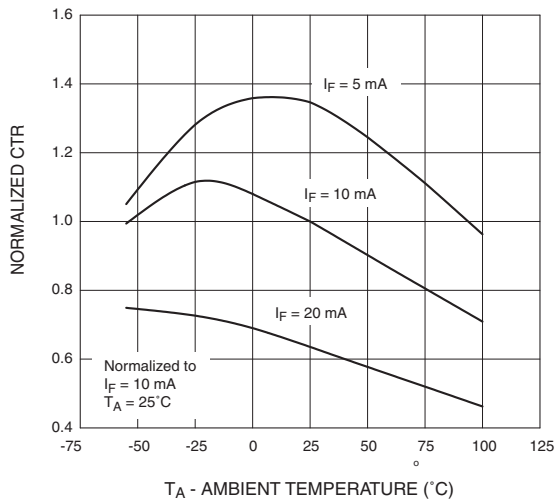
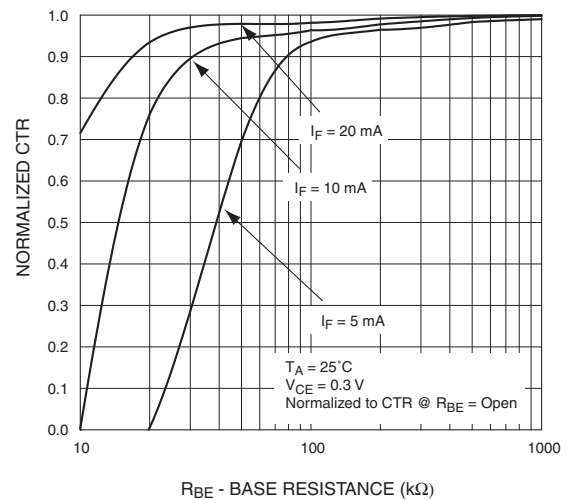


Fig. 4 CTR vs. R_{BE} (Saturated)



MOC8101
MOC8105
CNY17F-1

MOC8102
MOC8106
CNY17F-2

MOC8103
MOC8107
CNY17F-3

MOC8104
MOC8108
CNY17F-4

Fig. 5 CTR vs. R_{BE} (Unsaturated)

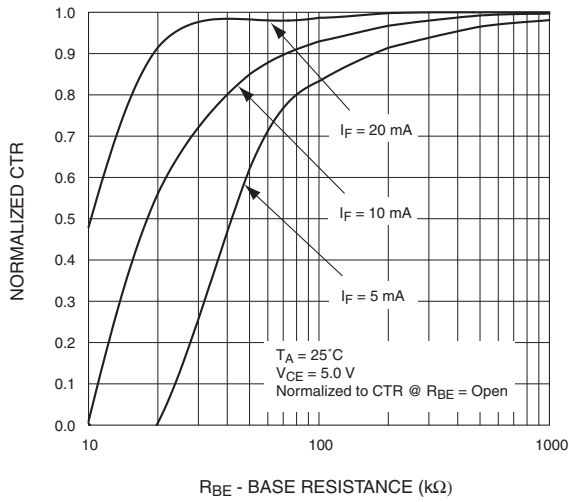


Fig. 6 Collector Emitter Saturation Voltage vs Collector Current

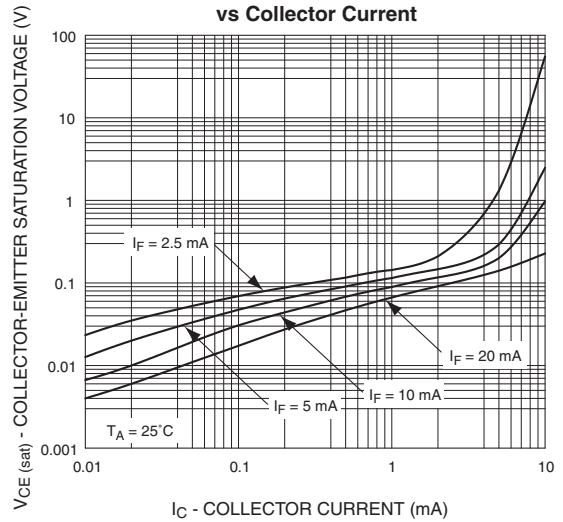


Fig. 7 Normalized t_{on} vs. R_{BE}

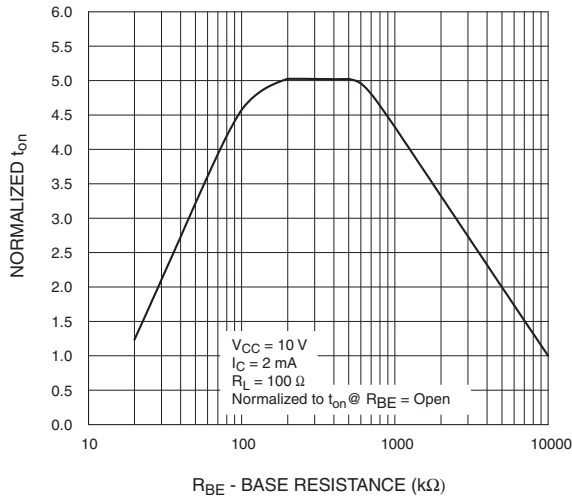
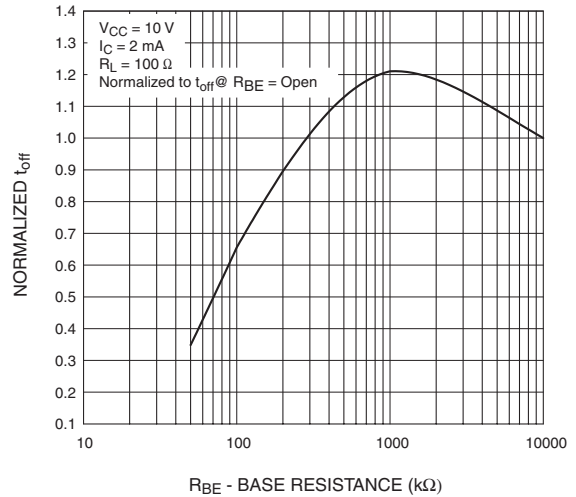


Fig. 8 Normalized t_{off} vs. R_{BE}



MOC8101
MOC8105
CNY17F-1

MOC8102
MOC8106
CNY17F-2

MOC8103
MOC8107
CNY17F-3

MOC8104
MOC8108
CNY17F-4

Fig. 9 Switching Speed vs. Load Resistor

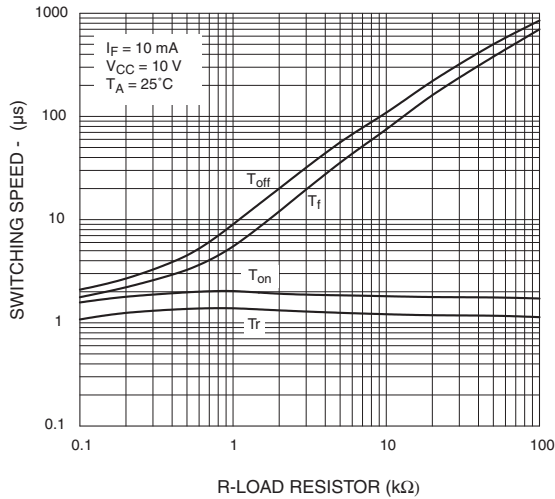
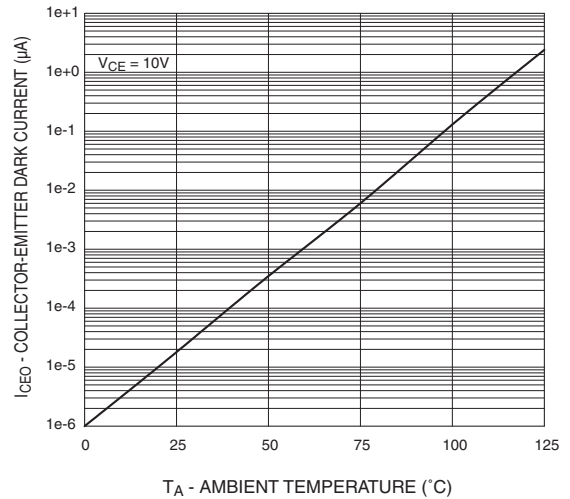
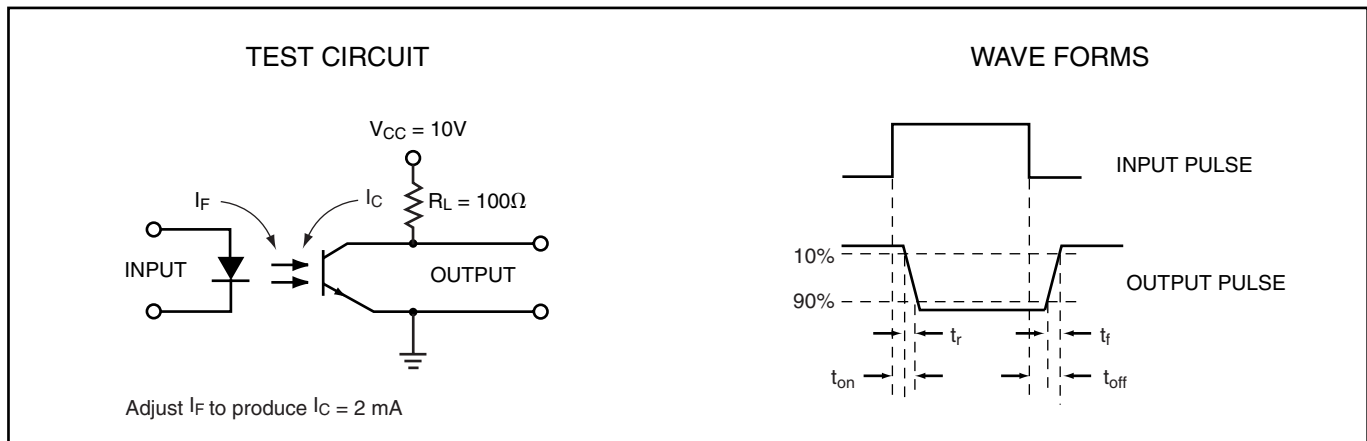


Fig. 10 Dark current vs. Ambient Temperature.



MOC8101	MOC8102	MOC8103	MOC8104
MOC8105	MOC8106	MOC8107	MOC8108
CNY17F-1	CNY17F-2	CNY17F-3	CNY17F-4

Figure 7. Switching Time Test Circuit and Waveforms



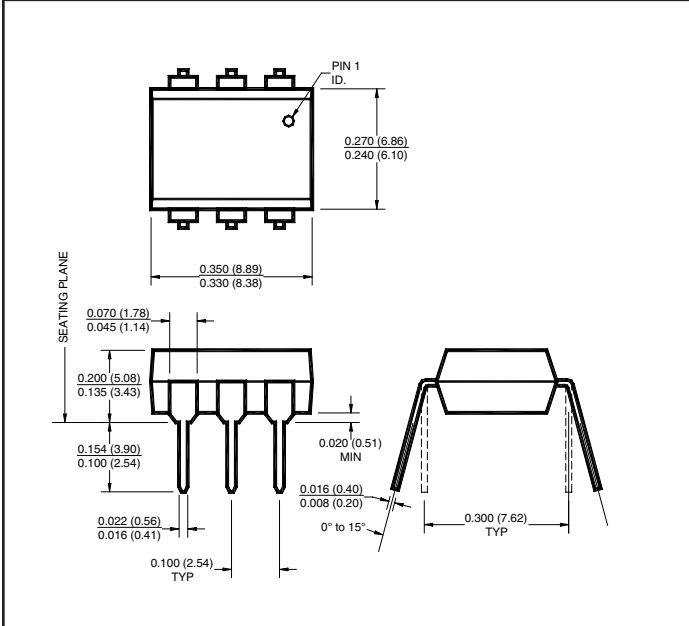
MOC8101
MOC8105
CNY17F-1

MOC8102
MOC8106
CNY17F-2

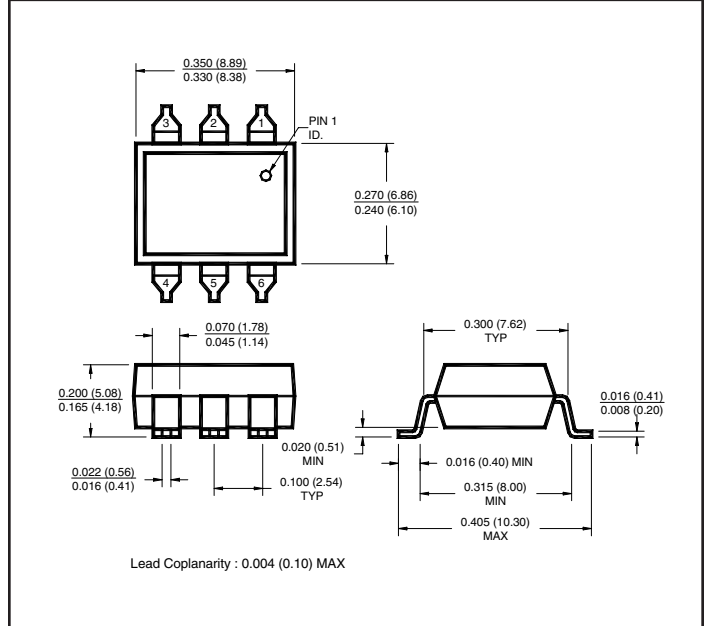
MOC8103
MOC8107
CNY17F-3

MOC8104
MOC8108
CNY17F-4

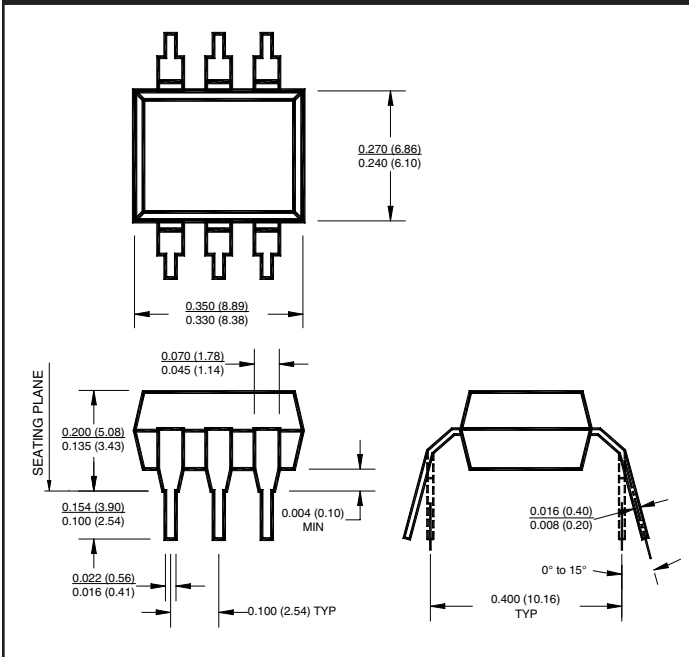
Package Dimensions (Through Hole)



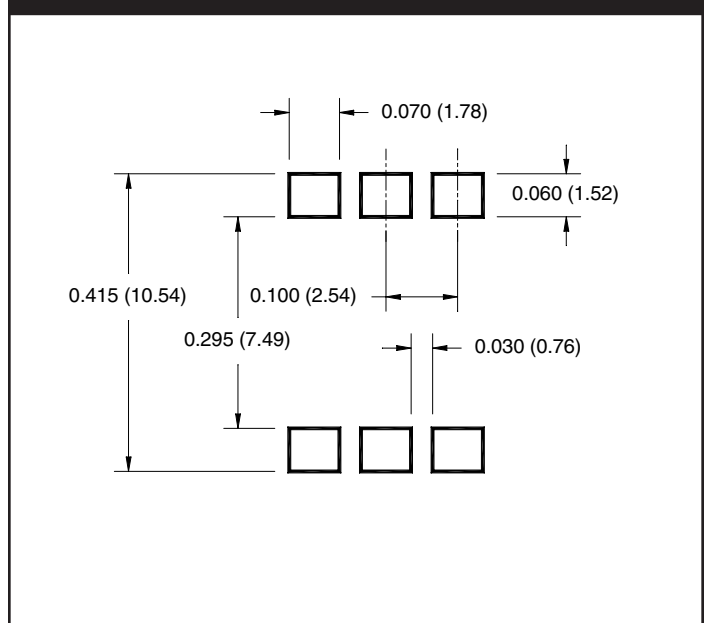
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



**Recommended Pad Layout for
Surface Mount Leadform**



NOTE

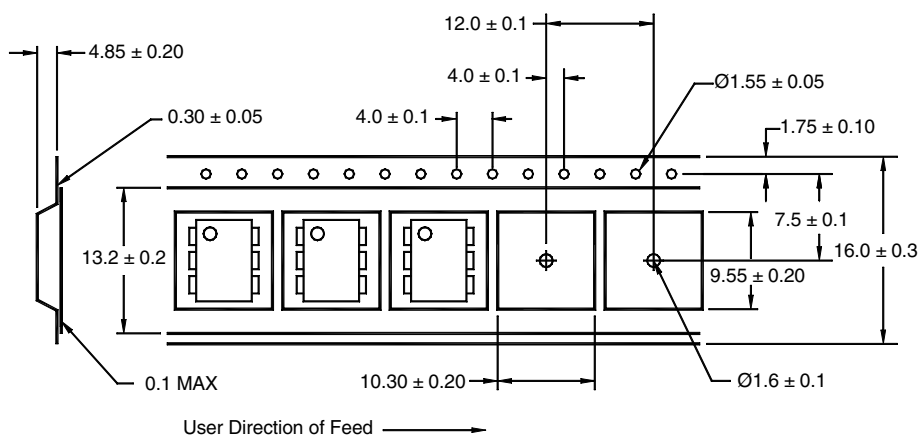
All dimensions are in inches (millimeters)

MOC8101	MOC8102	MOC8103	MOC8104
MOC8105	MOC8106	MOC8107	MOC8108
CNY17F-1	CNY17F-2	CNY17F-3	CNY17F-4

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)



NOTE

All dimensions are in inches (millimeters)

MOC8101	MOC8102	MOC8103	MOC8104
MOC8105	MOC8106	MOC8107	MOC8108
CNY17F-1	CNY17F-2	CNY17F-3	CNY17F-4

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.

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 THE PRESIDENT 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, and (c) whose failure to perform when properly used in accordance with instructions for use provided in labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in 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.