

6-PIN DIP OPTOCOUPLERS FOR POWER SUPPLY APPLICATIONS (NO BASE CONNECTION)

MOC8101
MOC8105
CNY17F-1

MOC8102
MOC8106
CNY17F-2

MOC8103
MOC8107
CNY17F-3

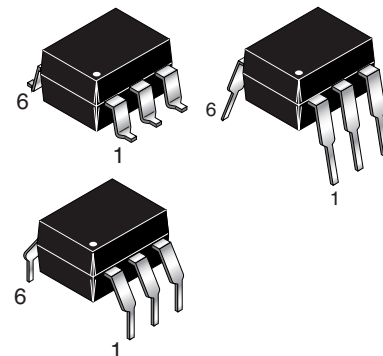
MOC8104
MOC8108
CNY17F-4

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.



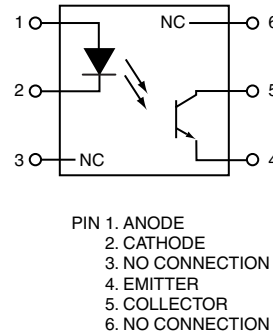
APPLICATIONS

- 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}		Volts
MOC8106/7/8, CNY17F-1/2/3/4		70	
MOC8101/2/3/4/5		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	mW/°C
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	mW/°C
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



NOTE

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

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ELECTRICAL CHARACTERISTICS (T_A = 25°C Unless otherwise specified)⁽¹⁾

Characteristic	Symbol	Min	Typ**	Max	Unit
INPUT LED					
Forward Voltage (I _F = 60 mA)	V _F	1.0	1.4	1.65	V
Reverse Leakage Current (V _R = 5.0 V)	I _R	—	0.001	10	μA
Capacitance	C	—	18	—	pF
OUTPUT TRANSISTOR					
Collector-Emitter Dark Current (V _{CE} = 10 V, T _A = 25°C) (V _{CE} = 10 V, T _A = 100°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 mA) MOC8106/7/8, CNY17F-1/2/3/4 (I _C = 1.0 mA)	V _{(BR) CEO}	30	100	—	V
		70	100	—	
Emitter-Collector Breakdown Voltage (I _E = 100 μA)	V _{(BR) ECO}	7.0	10	—	V
Collector-Emitter Capacitance (f = 1.0 MHz, V _{CE} = 0)	C _{CE}	—	8	—	pF
COUPLED					
Output Collector Current (I _F = 10 mA, V _{CE} = 10 V)	MOC8101	50	—	80	% (CTR) ⁽²⁾
	MOC8102	73	—	117	
	MOC8103	108	—	173	
	MOC8104	160	—	256	
	MOC8105	65	—	133	
	MOC8106	50	—	150	
	MOC8107	100	—	300	
	MOC8108	250	—	600	
(I _F = 10 mA, V _{CE} = 5 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 mA, I _F = 10 mA) MOC8101/2/3/4/5/6/7/8 (I _C = 500 μA, I _F = 5.0 mA)	V _{CE(sat)}	—	—	0.4	V
		—	—	—	
Isolation Voltage (f = 60 Hz, t = 1.0 min.) ⁽⁴⁾	V _{ISO}	5300	—	—	Vac(rms)
Isolation Resistance (V _{I-O} = 500 V) ⁽⁴⁾	R _{ISO}	10 ¹¹	—	—	Ω
Isolation Capacitance (V _{I-O} = 0, f = 1.0 MHz) ⁽⁴⁾	C _{ISO}	—	0.5	—	pF

** All typicals at T_A = 25°C

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TRANSFER CHARACTERISTICS (T _A =25°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 Ω, I _C = 2 mA)	t _{on}	—	2	10	μs	
Turn-off Time	CNY17F-1/2/3/4 Only	(V _{CC} = 10 V)	t _{off}	—	3	10		
Turn-On Time			t _{on}	—	2	—	μs	
All Devices	(I _C = 2.0 mA, V _{CC} = 10 V, R _L = 100 Ω) ⁽³⁾							
Turn-Off Time			t _{off}	—	3	—		
All Devices	(I _C = 2.0 mA, V _{CC} = 10 V, R _L = 100 Ω) ⁽³⁾							
Rise Time			t _r	—	1	—	μs	
All Devices	(I _C = 2.0 mA, V _{CC} = 10 V, R _L = 100 Ω) ⁽³⁾							
Fall Time			t _f	—	2	—		
All Devices	(I _C = 2.0 mA, V _{CC} = 10 V, R _L = 100 Ω) ⁽³⁾							
SATURATED SWITCHING TIMES								
Turn-on Time		(I _F = 20 mA, V _{CE} = 0.4 V)	t _{on}	—	—	5.5	μs	
CNY17F-1								
CNY17F-2								
CNY17F-3		(I _F = 10 mA, V _{CE} = 0.4 V)		—	—	8.0		
CNY17F-4								
Rise Time		(I _F = 20 mA, V _{CE} = 0.4 V)	t _r	—	—	4.0	μs	
CNY17F-1								
CNY17F-2								
CNY17F-3		(I _F = 10 mA, V _{CE} = 0.4 V)		—	—	6.0		
CNY17F-4								
Turn-off Time		(I _F = 20 mA, V _{CE} = 0.4 V)	t _{off}	—	—	34	μs	
CNY17F-1								
CNY17F-2								
CNY17F-3		(I _F = 10 mA, V _{CE} = 0.4 V)		—	—	39		
CNY17F-4								
Fall Time		(I _F = 20 mA, V _{CE} = 0.4 V)	t _f	—	—	20	μs	
CNY17F-1								
CNY17F-2								
CNY17F-3		(I _F = 10 mA, V _{CE} = 0.4 V)		—	—	24		
CNY17F-4								

** 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.

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TYPICAL PERFORMANCE CURVES

Fig. 1 LED Forward Voltage vs. Forward Current

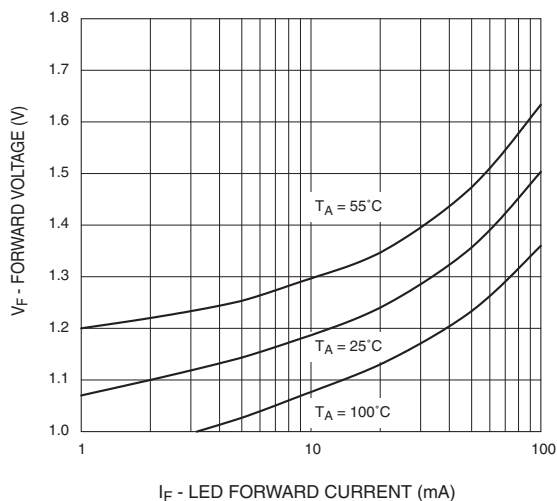


Fig. 2 Normalized CTR vs. Forward Current

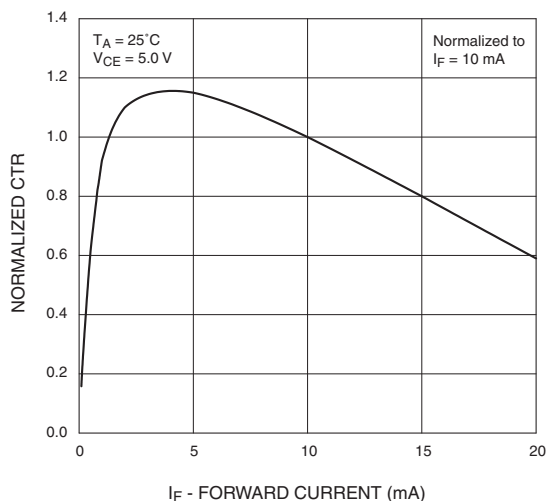


Fig. 3 Normalized CTR vs. Ambient Temperature

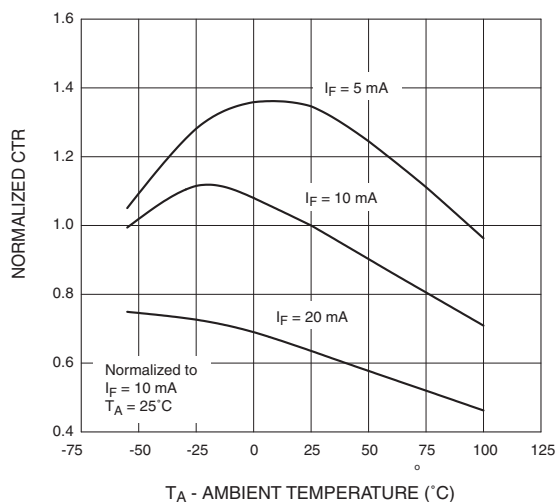
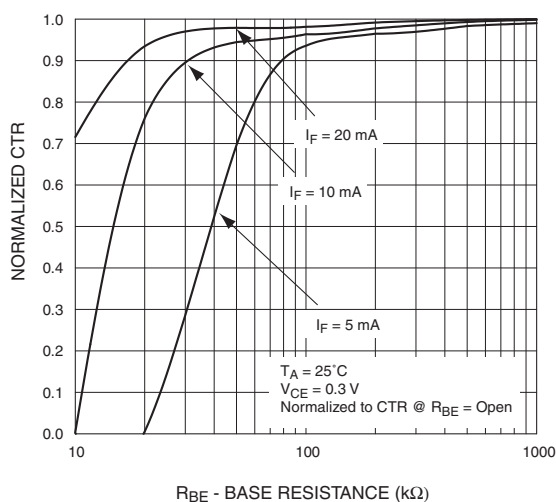


Fig. 4 CTR vs. R_{BE} (Saturated)



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

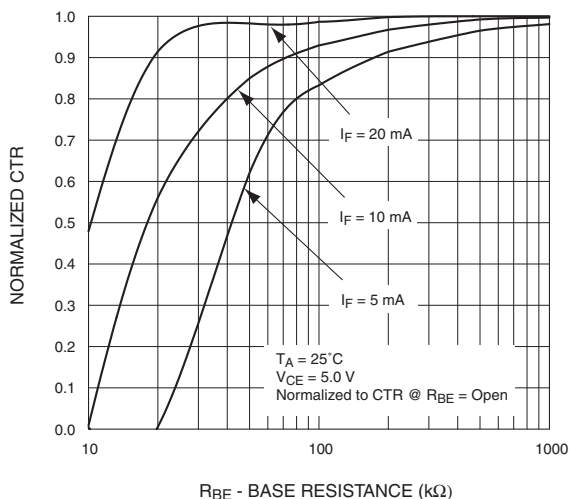


Fig. 6 Collector Emitter Saturation Voltage vs Collector Current

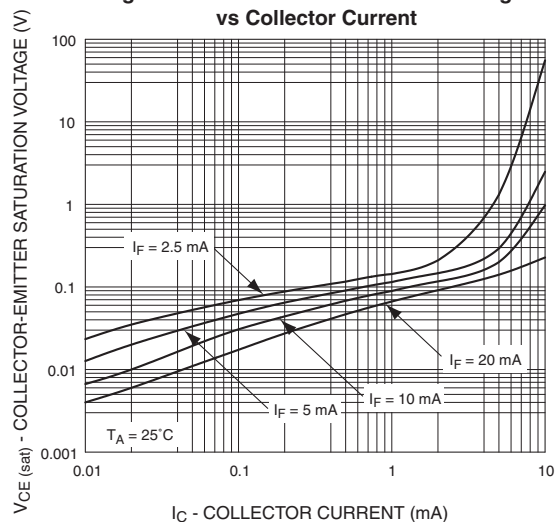


Fig. 7 Normalized t_{on} vs. R_{BE}

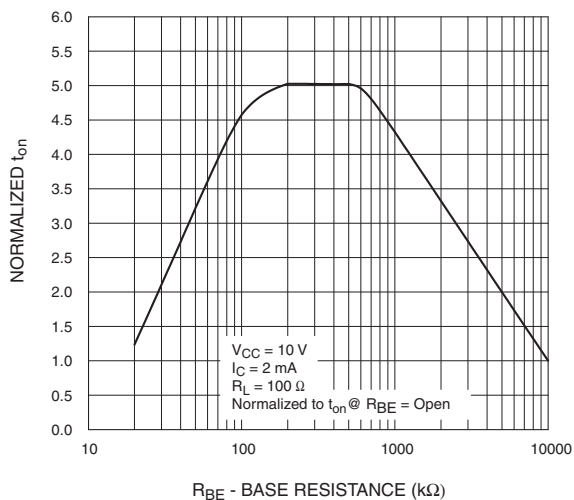
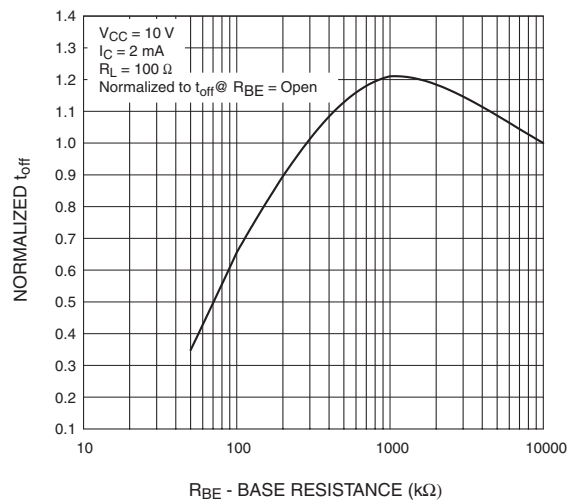


Fig. 8 Normalized t_{off} vs. R_{BE}



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Fig. 9 Switching Speed vs. Load Resistor

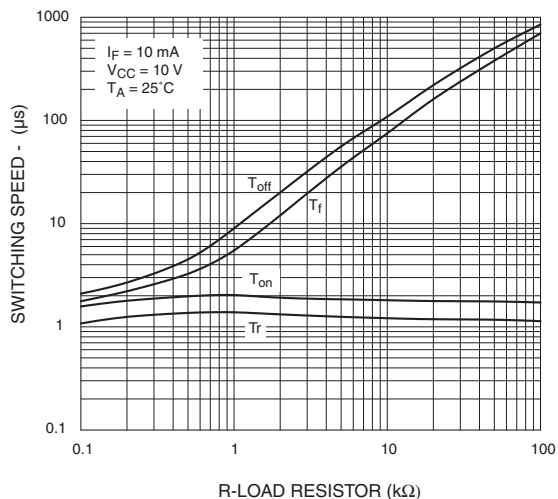
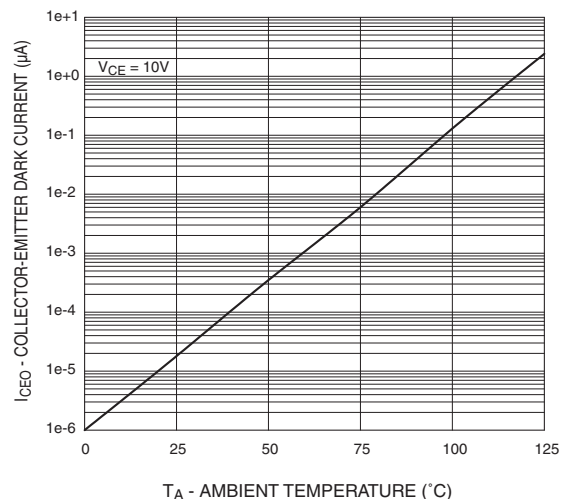


Fig. 10 Dark current vs. Ambient Temperature.



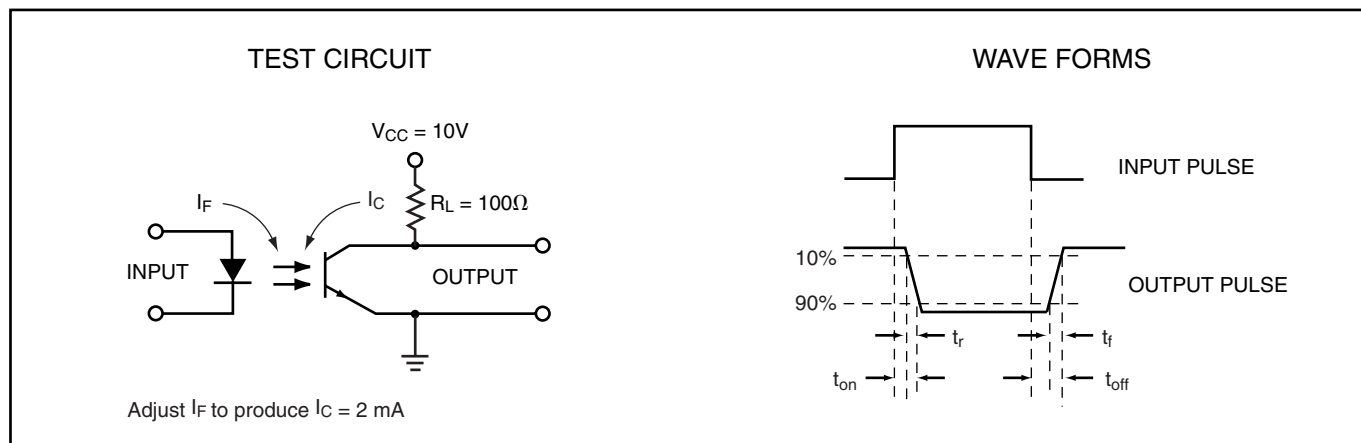
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Figure 7. Switching Time Test Circuit and Waveforms



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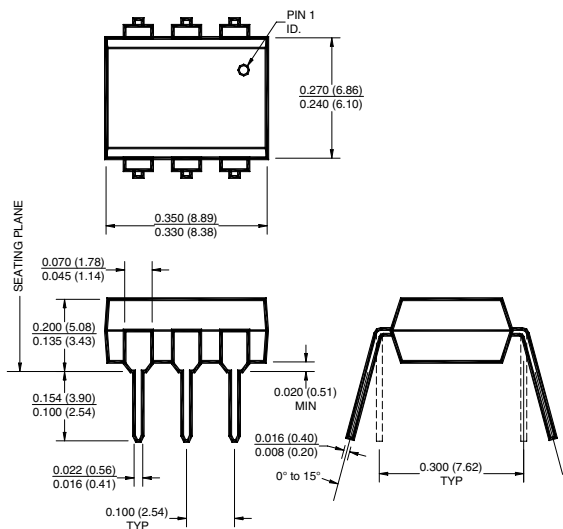
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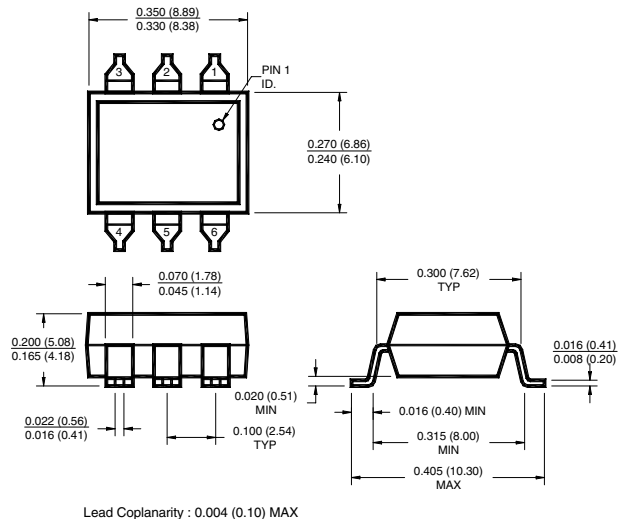
MOC8103
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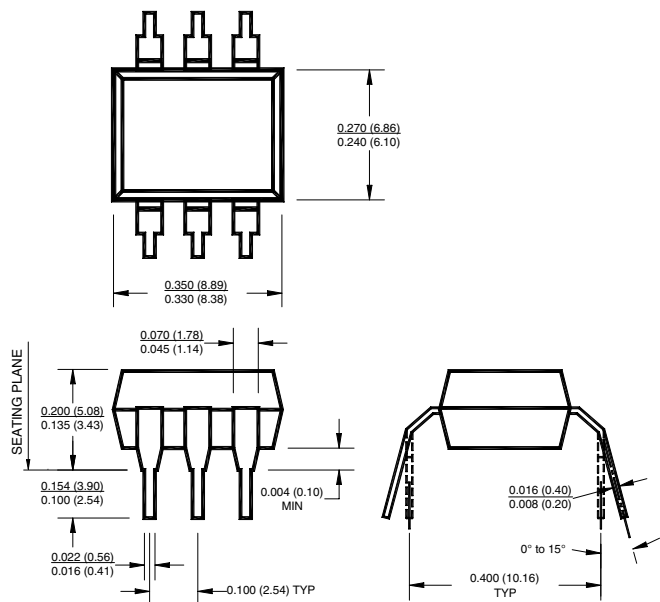
Package Dimensions (Through Hole)



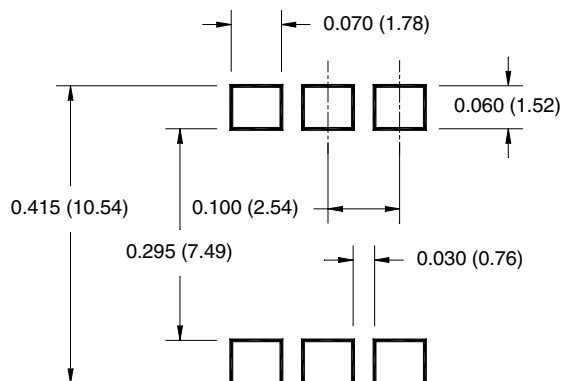
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



Recommended Pad Layout for Surface Mount Leadform



NOTE

All dimensions are in inches (millimeters)

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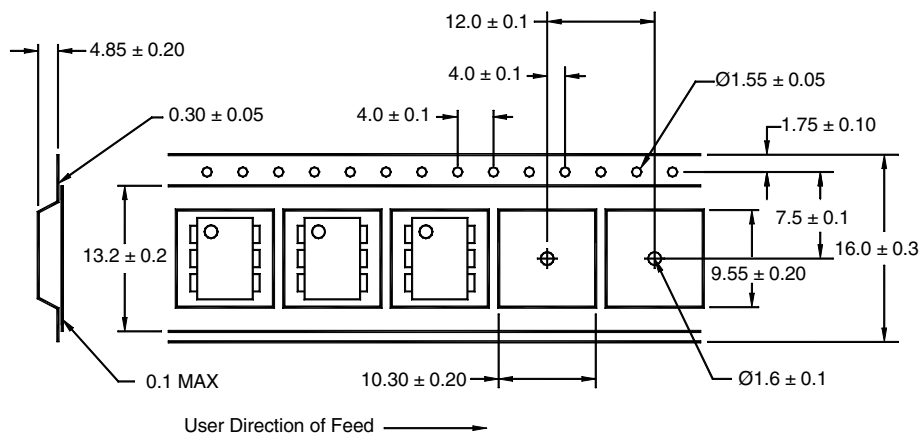
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ORDERING INFORMATION

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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