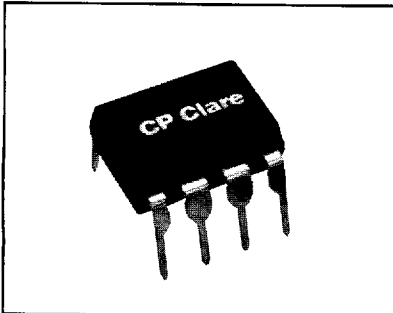


OptoMOS® "TS" Series Multifunction Solid State Telecom Switches



DESCRIPTION

CP Clare's "TS" series telecom switches provide optimal function density for tip/ring interface circuits. The "TS" series incorporates an optically isolated solid state relay for hookswitch, dial-pulse or loop start switching with a bi-directional optocoupler for detection of ringing signal or loop current (off-hook/on-hook).

The "TS" products may be used to switch and detect AC or DC. Aside from the obvious advantage of board space savings, there are significant cost savings due to the elimination of multiple discrete components.

FEATURES

- Two functions in one package (hookswitch and ring detect/loop detect)
- Small 8 pin DIP package (.370) length
- Bi-directional current sensing
- Bi-directional current switching
- Replaces up to eight components
- 3750V_{RMS} input/output isolation
- FCC compatible
- No EMI/RFI generation
- Machine insertable, wave solderable
- Surface Mount and Tape & Reel version available
- UL recognized file #: E76270
- CSA certified file #: LR 43639-10
- VDE compatible
- BSI certified to:
 - BS EN 60950: 1992 (BS 7002: 1992)
 - Certificate #: 7344
 - BS EN 41003: 1993
 - Certificate #: 7344
- Complies with EN41003: 1993

APPLICATIONS

- Telecom switching
- Tip/Ring circuits
- Modem switching (laptop, notebook, pocket size)
- Hookswitch
- Dial pulsing
- Ground start
- Ringer injection
- Loop detect
- Ring detect

RATINGS (@ 25°C)

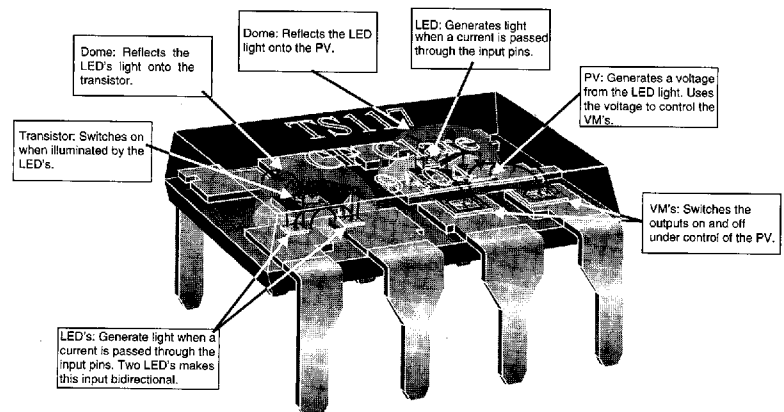
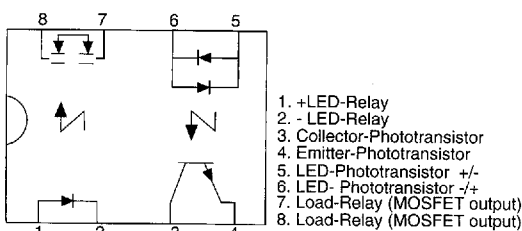
Parameter	Min	Typ	Max	Units
Input Power Dissipation	-	-	150 ¹	mW
Input Control Current	-	-	100	mA
Peak (10ms)	-	-	1	A
Reverse Input Voltage	-	-	5	V
Phototransistor	-	-	150 ²	mW
Power Dissipation	-	-	500 ³	mW
Capacitance				
Input to Output	-	3	-	pF
Isolation Voltage				
Input to Output	2500	-	-	V _{RMS}
"E" Suffix (optional)	3750	-	-	V _{RMS}
Operating Temperature	-40	-	+85	°C
Storage Temperature	-40	-	+125	°C
Soldering Temperature (10 Seconds Max)	-	-	+260	°C

¹ Derate Linearly 1.33 mW/°C

² Derate Linearly 2.70 mW/°C

³ Derate Linearly 1.67 mW/°C

EQUIVALENT CIRCUIT



Note: For Mechanical Dimensions see pages 46-49.

Relay Portion (Pins 1,2,7,8)

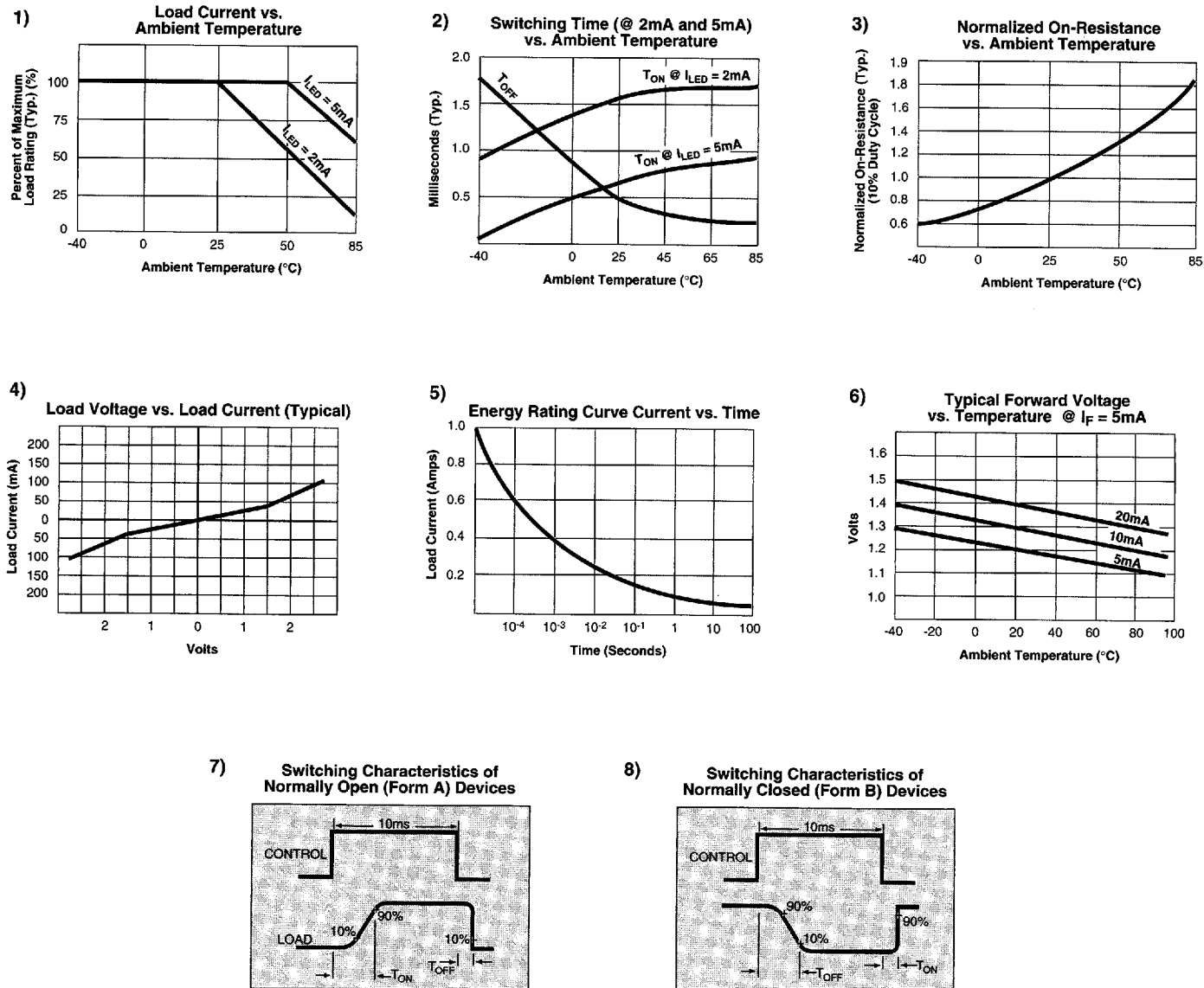
PART NUMBER		TS117 ²	TS118 ²	TS120 ²	TS122 ²	TS190 ²	UNITS
Contact Form		Form A ³	Form B ³	Form A ³	Form A ³	Form A ³	
Output Characteristics (Pins 7,8) @ 25°C	Load Voltage, DC or Peak AC	350	350	350	250	400	V
	Load Current, Continuous	120	120	120	170	150	mA
	Peak Load Current (10ms)	350	350	350	400	350	mA
	On-Resistance Min	15	15	15	10	10	Ω
	@ Rated Loaded Current Typ	23	23	23	12	15	
	Max	35	35	35	20	22	
	Off State Leakage Current Max	1	1	1	1	1	μA
	@ Rated Load Voltage						
	Typical Output Capacitance @50V, F=1MHz	25	25	25	50	25	pF
Input Characteristics (Pins 1,2) @ 25°C	T _{ON} @ I _{LED} =5mA						ms
	^A (Also Operates at 2mA with	Typ	1 ^A	1	1	0.4	
	T _{ON} ≤5ms, T _{OFF} ≤3ms max) ¹	Max	3 ^A	3	2.5	3	
	T _{OFF} @ I _F =5mA	Typ	1	1	1	.01	ms
		Max	3	3	2.5	3	
	Input Control Current Min	2	5	5	5	5	
	I _{LED} Max	100	100	100	100	100	mA
Input Characteristics (Pins 1,2) @ 25°C	Input Voltage Drop Min	0.9	0.9	0.9	0.9	0.9	V
	V _F @ 5mA Typ	1.2	1.2	1.2	1.2	1.2	
	Max	1.4	1.4	1.4	1.4	1.4	
	Reverse Input Current Max	10	10	10	10	10	μA
	Reverse Input Voltage Max	5	5	5	5	5	V

Detector Portion (Pins 3,4,5,6)

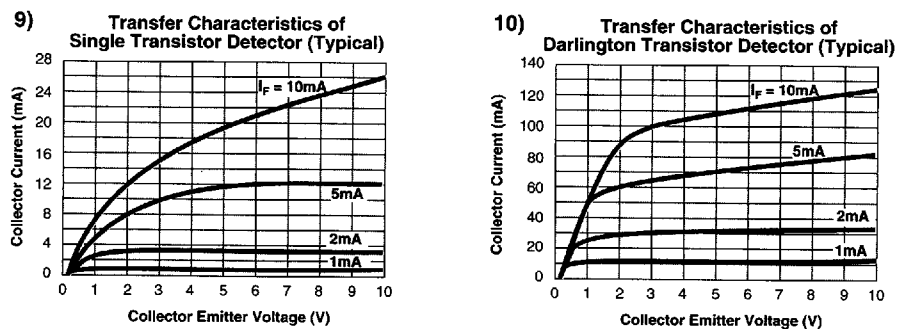
Output Characteristics (Pins 3,4) @ 25°C	Phototransistor BV _{CEO} @ I _C =10μA	Min	20	20	20	20	20	V
		Typ	50	50	50	50	50	
	Phototransistor I _{CEO} V _{CE} =5V, I _{LED} =0mA	Typ	50	50	100	50	50	nA
		Max	500	500	1000	500	500	
Input Characteristics (Pins 5,6) @ 25°C	Saturation Voltage							V
	I _C =2mA, I _{LED} =16mA	Typ	0.3	0.3	0.5 ^B	0.3	0.3	
	^B I _C =15mA, I _{LED} =0.05mA (Darlington)	Max	0.5	0.5	0.8 ^B	0.5	0.5	
	Current Transfer Ratio							%
	I _{LED} =6mA, V _{CE} =0.5V	Typ	33	33	300 ^C	33	33	
	^C I _C =20mA, V _{CE} =0.8 (Darlington)	Max	100	100	1000 ^C	100	100	
	Input Control Current							mA
	I _C =2mA, V _{CE} =0.5V	Typ	2	2	1 ^D	2	2	
	^D I _C =20mA, V _{CE} =0.8V (Darlington)	Max	6	6	2 ^D	6	6	
	Input Voltage Drop							V
	V _F @ 5mA	Min	0.9	0.9	0.9	0.9	0.9	
		Typ	1.2	1.2	1.2	1.2	1.2	
		Max	1.4	1.4	1.4	1.4	1.4	
	Input Current, Detector must be off	Min	5	5	N/A	5	5	μA
	I _C =1μA, V _{CE} =5V	Typ	25	25	N/A	25	25	
Input to Output Isolation With "E" Suffix (optional)			2500	2500	2500	2500	2500	V _{RMS}
Current Limiting Version Available ¹ (Add "L" Suffix To Part Number)			Yes	No	Yes	Yes	Yes	

¹Current limiting typically adds 5Ω to the total on-resistance of the device. ²Available in low profile flatpack (add "P" suffix). ³Form A=Norm. Open, Form B=Norm. Closed.

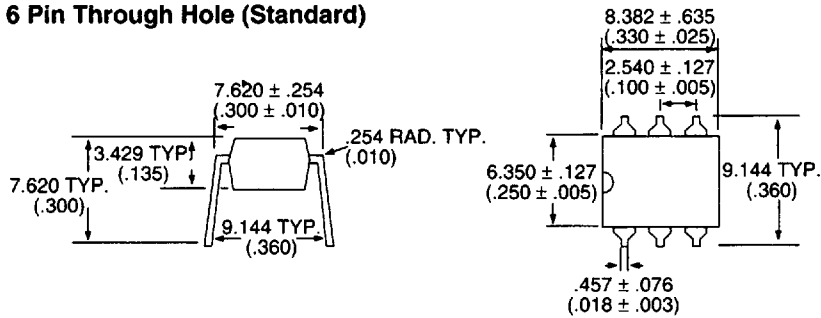
Relay Portion



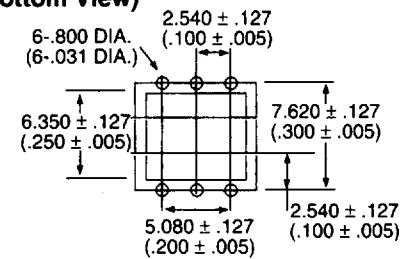
Detector Portion



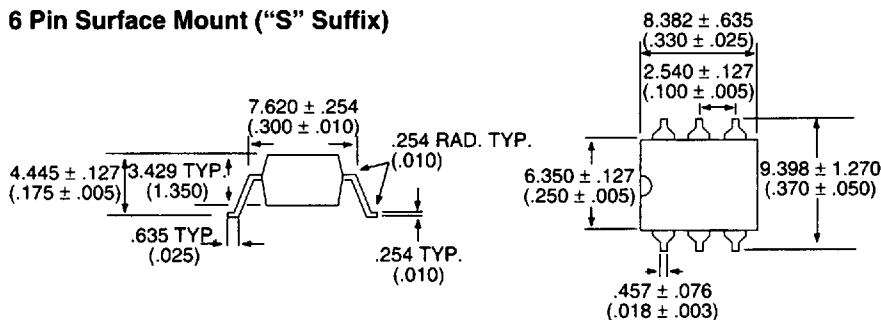
6 Pin Through Hole (Standard)



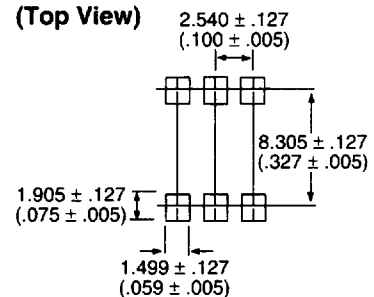
6 Pin PC Board Pattern (Bottom View)



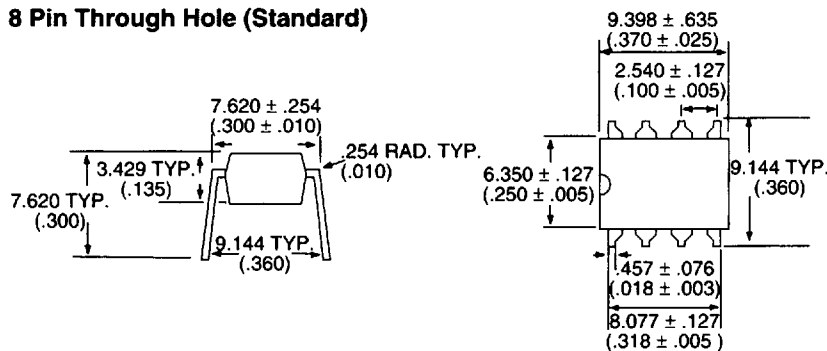
6 Pin Surface Mount ("S" Suffix)



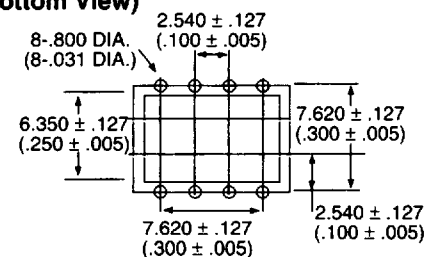
6 Pin Mounting Pad (Top View)



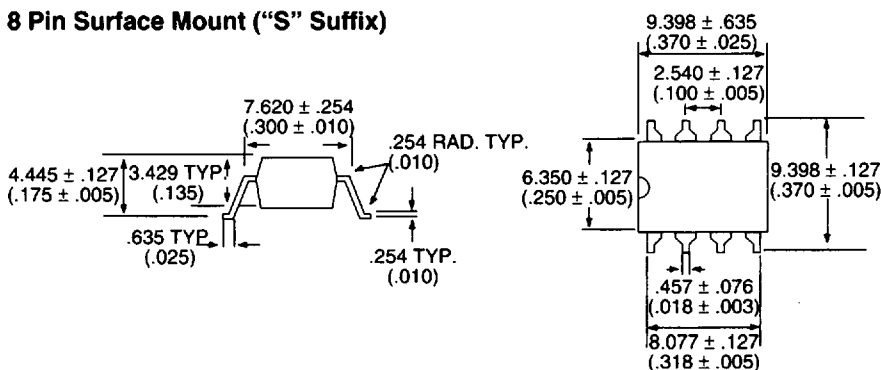
8 Pin Through Hole (Standard)



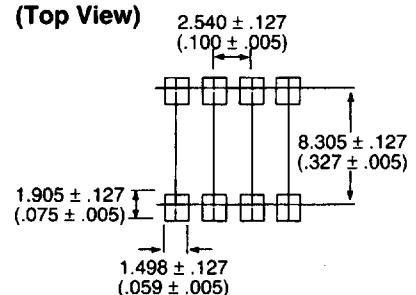
8 Pin PC Board Pattern (Bottom View)



8 Pin Surface Mount ("S" Suffix)

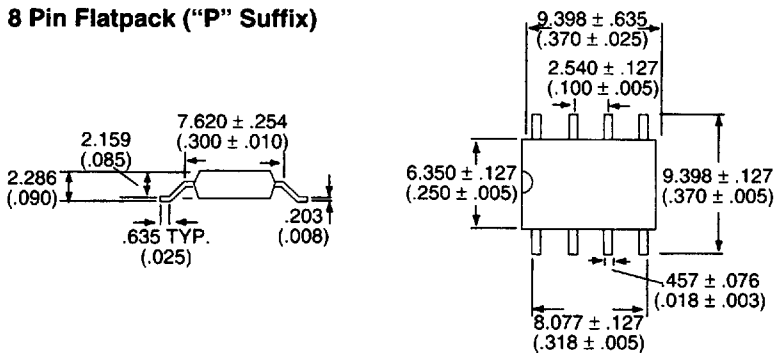


8 Pin Mounting Pad (Top View)

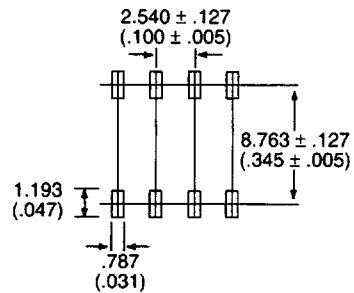


DIMENSIONS
mm
(Inches)

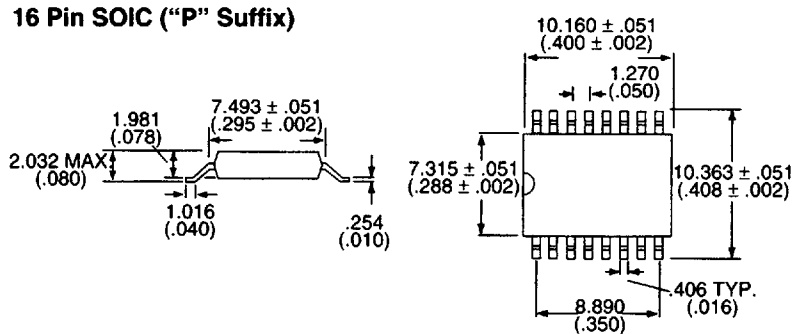
8 Pin Flatpack ("P" Suffix)



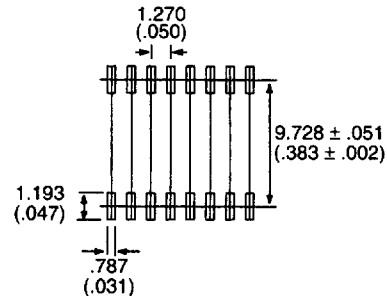
8 Pin Flatpack Mounting Pad (Top View)



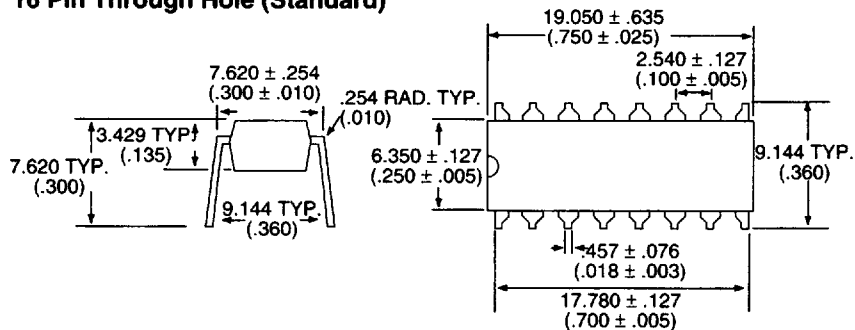
16 Pin SOIC ("P" Suffix)



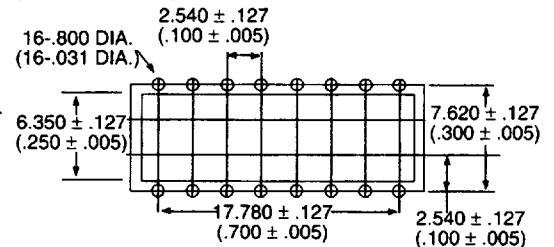
16 Pin SOIC Mounting Pad (Top View)



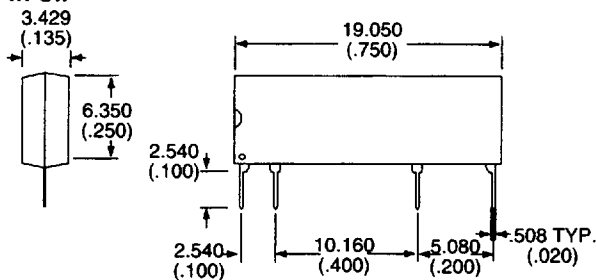
16 Pin Through Hole (Standard)



16 Pin PC Board Pattern (Bottom View)

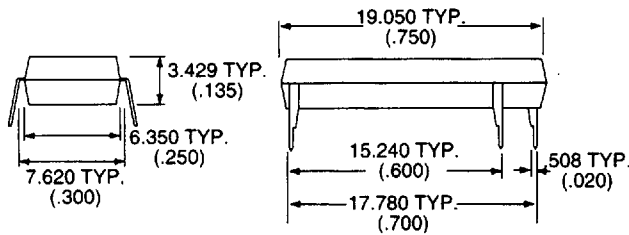


8 Pin SIP

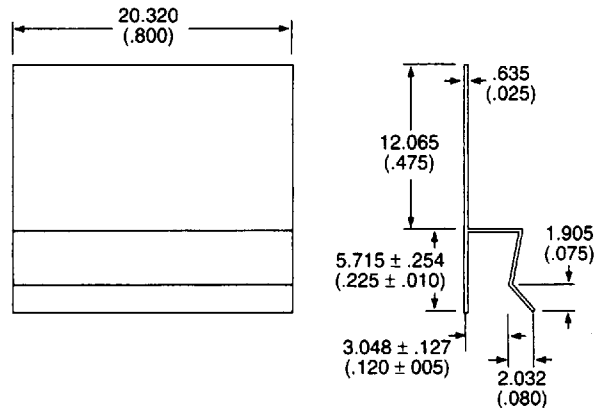


DIMENSIONS
mm
(Inches)

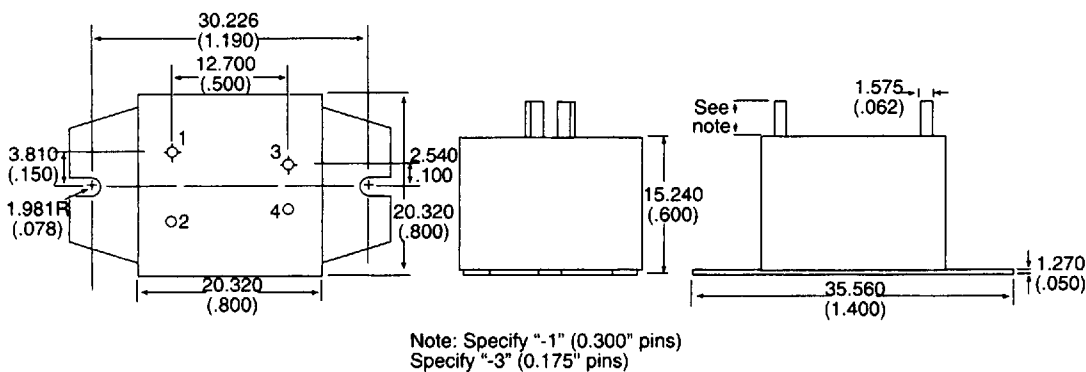
16 Pin DIP



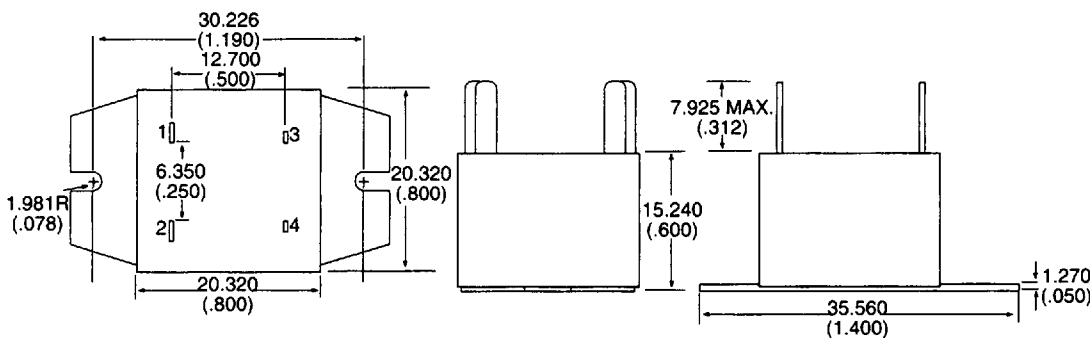
Thermal Clip



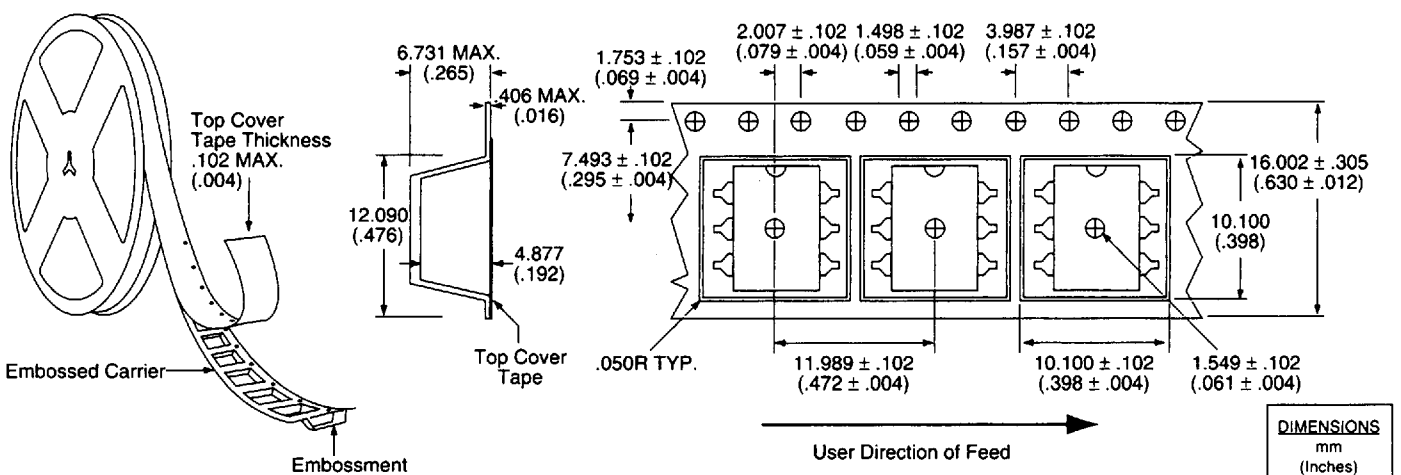
OptoFILM® 10A Series, Pins



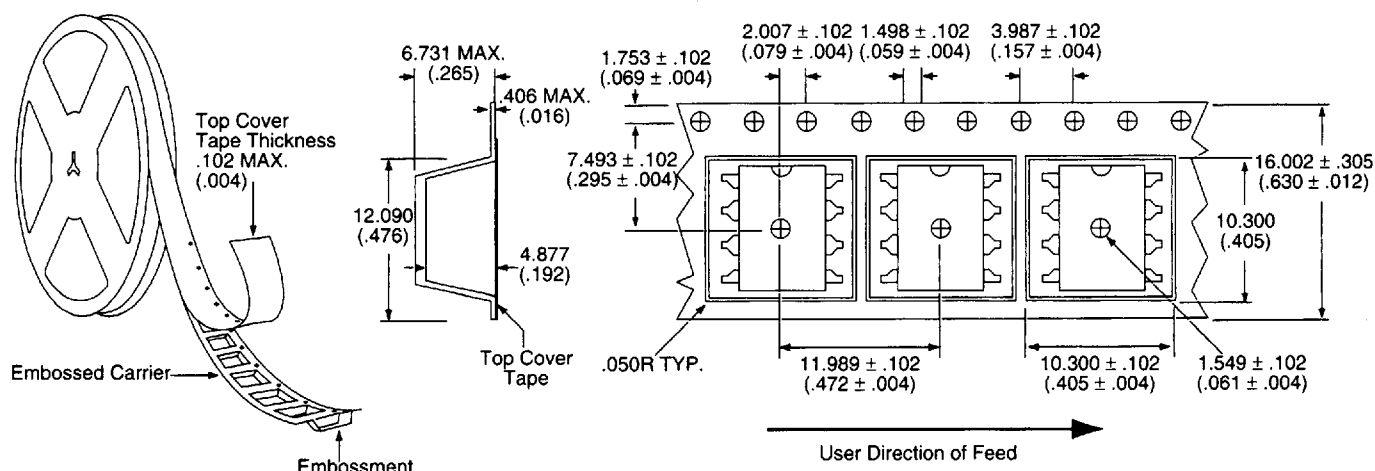
OptoFILM® 10A Series, Quick Connect



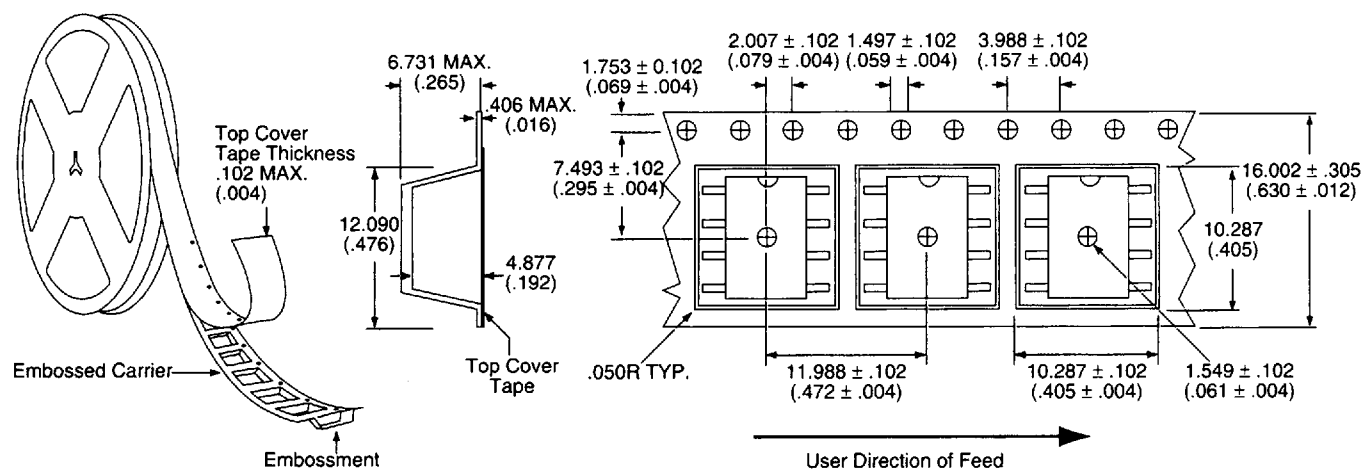
Tape and Reel Packaging for 6 Pin Surface Mount Package



Tape and Reel Packaging for 8 Pin Surface Mount Package



Tape and Reel Packaging for 8 Pin Flatpack Package



Tape and Reel Packaging for 16 Pin SOIC Package

