



	TS120	Units
Load Voltage	350	V
Load Current	120	mA
Max R _{ON}	35	Ω

Description

TS120 is a 350V, 120mA, 35Ω 1-Form-A relay with an optocoupler in a single package. It is a more cost effective solution for telecom applications that do not require a high sensitivity relay.

Features

- Small 8 Pin DIP Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- 3750V_{RMS} Input/Output Isolation
- FCC Compatible
- VDE Compatible
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Surface Mount and Tape & Reel Versions Available

Approvals

- UL Recognized: File Number E76270
- CSA Certified: File Number LR 43639-10
- BSI Certified:
 - BS EN 60950:1992 (BS7002:1992) Certificate #: 7344
 - BS EN 41003:1993 Certificate #: 7344

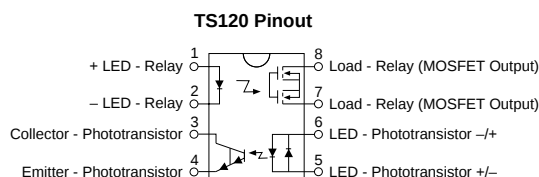
Applications

- Telecommunications
 - Telecom Switching
 - Tip/Ring Circuits
 - Modem Switching (Laptop, Notebook, Pocket Size)
 - Hookswitch
 - Dial Pulsing
 - Ground Start
 - Ringer Injection
- Instrumentation
 - Multiplexers
 - Data Acquisition
 - Electronic Switching
 - I/O Subsystems
 - Meters (Watt-Hour, Water, Gas)
- Medical Equipment-Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

Ordering Information

Part #	Description
TS120	8 Pin DIP (50/Tube)
TS120P	8 Pin Flatpack (50/Tube)
TS120PTR	8 Pin Flatpack (1000/Reel)
TS120S	8 Pin Surface Mount (50/Tube)
TS120STR	8 Pin Surface Mount (1000/Reel)

Pin Configuration



Absolute Maximum Ratings (@ 25° C)

Parameter	Min	Typ	Max	Units
Input Power Dissipation	-	-	150 ¹	mW
Input Control Current	-	-	50	mA
Peak (10ms)	-	-	1	A
Reverse Input Voltage	-	-	5	V
Total Power Dissipation	-	-	800 ²	mW
Isolation Voltage Input to Output	3750	-	-	V _{RMS}
Operational Temperature	-40	-	+85	°C
Storage Temperature	-40	-	+125	°C
Soldering Temperature	-	-	-	-
DIP Package	-	-	+260	°C
Flatpack/Surface Mount Package (10 Seconds Max.)	-	-	+220	°C

¹ Derate Linearly 1.33 mW/°C² Derate Linearly 6.67 mW/°C

Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this data sheet is not implied. Exposure of the device to the absolute maximum ratings for an extended period may degrade the device and effect its reliability.

Electrical Characteristics

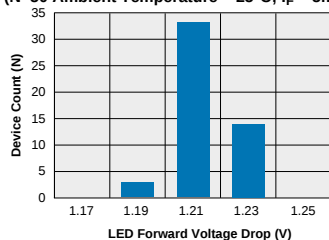
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Relay Portion (Pins 7, 8) Output Characteristics @ 25°C						
Load Voltage (Peak)	-	V _L	-	-	350	V
Load Current (Continuous)	-	I _L	-	-	120	mA
Peak Load Current	10ms	I _{LPK}	-	-	350	mA
On-Resistance	I _L =120mA	R _{ON}	-	23	35	Ω
Off-State Leakage Current	V _L =350V	I _{LEAK}	-	-	1	μA
Switching Speeds						
Turn-On	I _F =5mA, V _L =10V	T _{ON}	-	-	3.0	ms
Turn-Off	I _F =5mA, V _L =10V	T _{OFF}	-	-	3.0	ms
Output Capacitance	50V; f=1MHz	C _{OUT}	-	25	-	pF
Relay Portion (Pins 1, 2) Input Characteristics @ 25°C						
Input Control Current	I _L =120mA	I _F	5	-	50	mA
Input Dropout Current	-	I _F	0.4	0.7	-	mA
Input Voltage Drop	I _F =5mA	V _F	0.9	1.2	1.4	V
Reverse Input Voltage	-	V _R	-	-	5	V
Reverse Input Current	V _R =5V	I _R	-	-	10	μA

Electrical Characteristics (Continued)

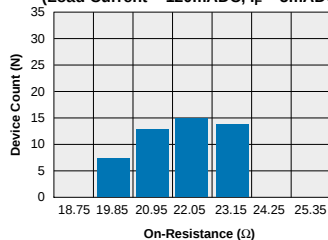
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Detector Portion (Pins 3, 4) Output Characteristics @ 25°C						
Phototransistor Blocking Voltage	$I_C=10\mu A$	BV_{CEO}	20	50	-	V
Phototransistor Output Current	$V_{CE}=5V, I_F=0mA$	I_{CEO}	-	100	1000	nA
Saturation Voltage	$I_C=0.15mA, I_F=.05mA$	V_{SAT}	-	0.5	0.8	V
Current Transfer Ratio	$I_F=0.05mA, V_{CE}=0.8V$	CTR	300	1000	-	%
Detector Portion (Pins 5, 6) Input Characteristics @ 25°C						
Input Control Current	$I_C=2mA, V_{CE}=0.5V$	I_F	2	1	100	mA
Input Voltage Drop	$I_F=5mA$	V_F	0.9	1.2	1.4	V
Input to Output Capacitance (Relay Only)	-	$C_{I/O}$	-	3	-	pF
Capacitance Input to Output	-	-	-	3	-	pF
Input to Output Isolation	-	$V_{I/O}$	3750	-	-	V_{RM}

PERFORMANCE DATA*

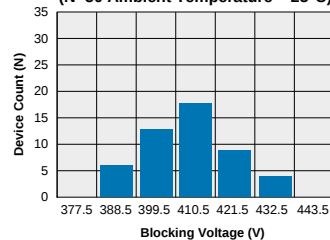
TS120
Typical LED Forward Voltage Drop
(N=50 Ambient Temperature = 25°C; $I_F = 5\text{mA}$)



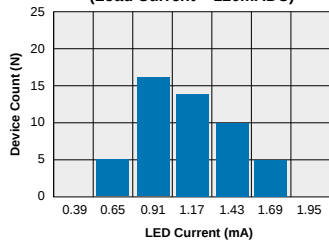
TS120
Typical On-Resistance Distribution
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mA, $I_F = 5\text{mA}$)



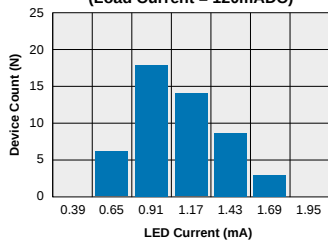
TS120
Typical Blocking Voltage Distribution
(N=50 Ambient Temperature = 25°C)



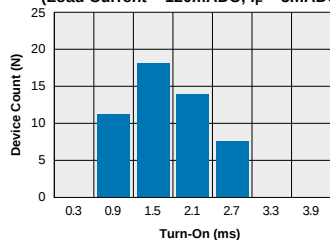
TS120
Typical I_F for Switch Operation
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mA)



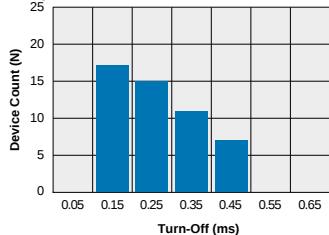
TS120
Typical I_F for Switch Dropout
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mA)



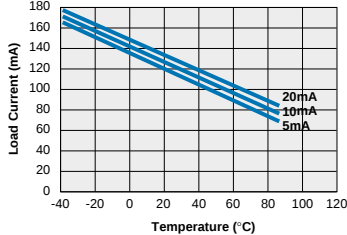
TS120
Typical Turn-On Time
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mA; $I_F = 5\text{mA}$)



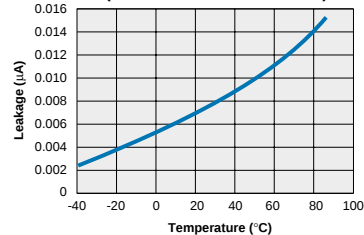
TS120
Typical Turn-Off Time
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mA; $I_F = 5\text{mA}$)



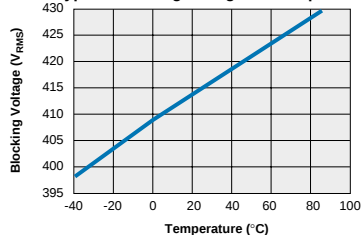
TS120
Typical Load Current vs. Temperature



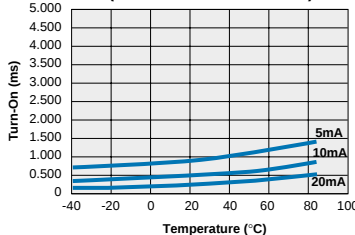
TS120
Typical Leakage vs. Temperature
(Measured across Pins 7 & 8)



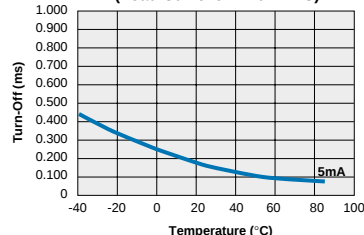
TS120
Typical Blocking Voltage vs. Temperature



TS120
Typical Turn-On vs. Temperature
(Load Current = 120mA)

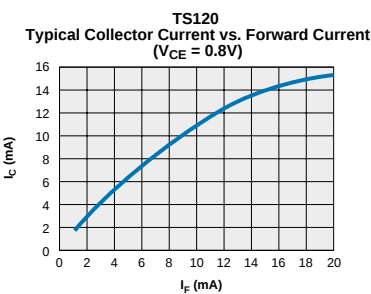
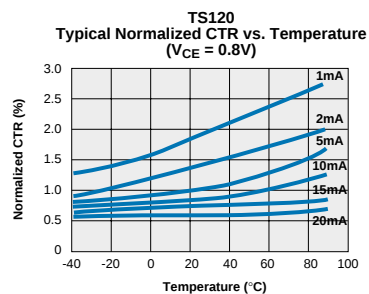
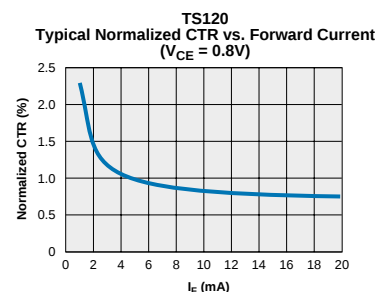
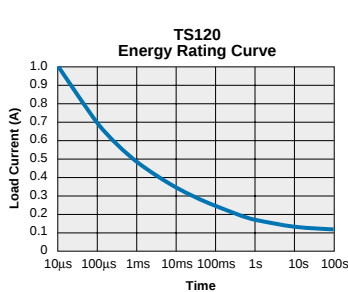
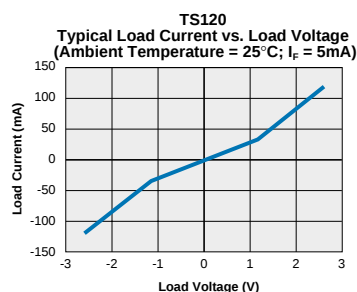
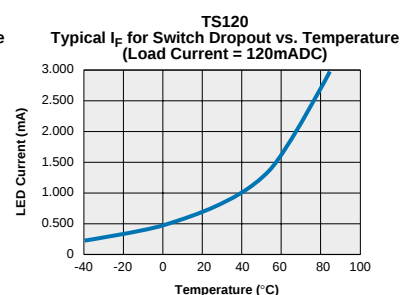
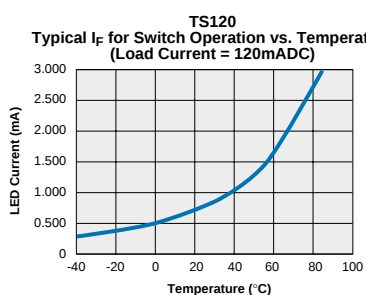
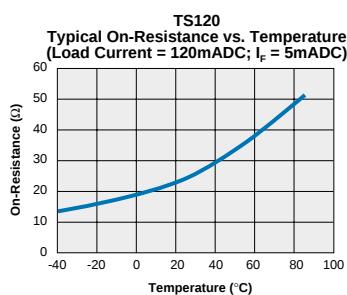
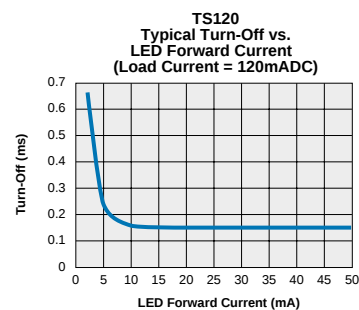
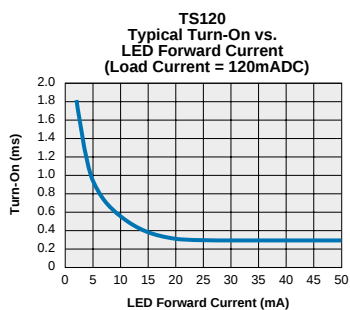
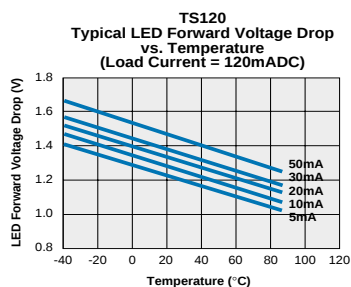


TS120
Typical Turn-Off vs. Temperature
(Load Current = 120mA)



The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

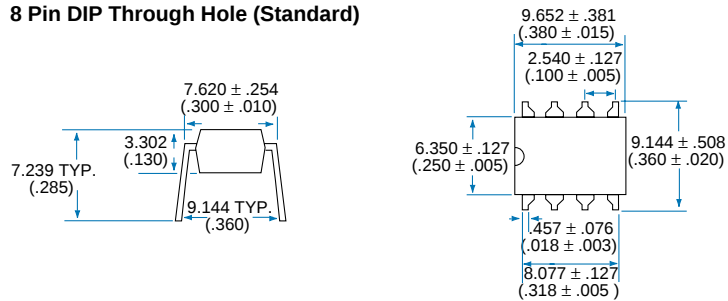
PERFORMANCE DATA*



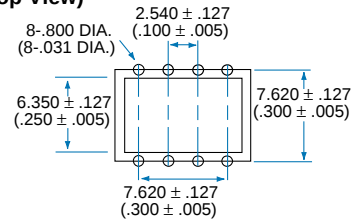
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

Mechanical Dimensions

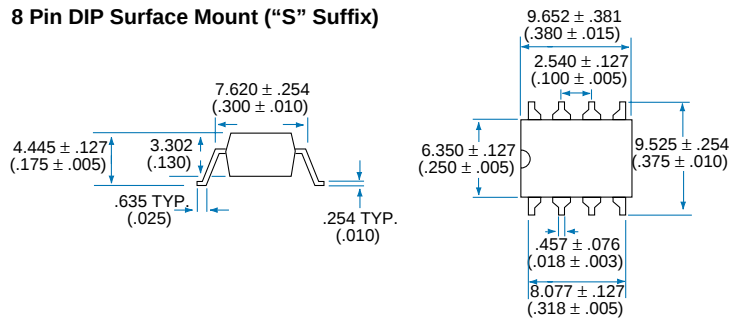
8 Pin DIP Through Hole (Standard)



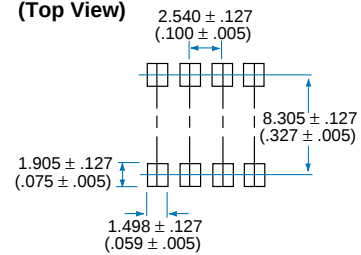
PC Board Pattern (Top View)



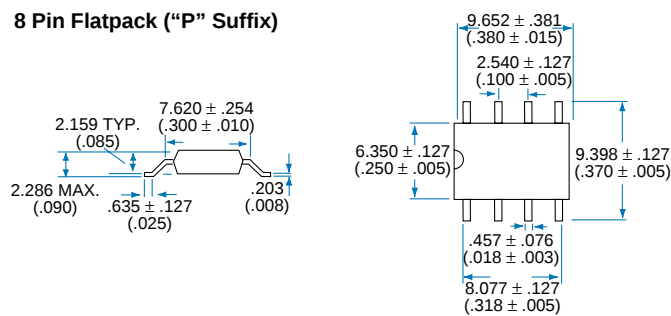
8 Pin DIP Surface Mount ("S" Suffix)



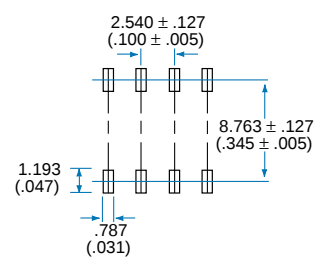
PC Board Pattern (Top View)



8 Pin Flatpack ("P" Suffix)



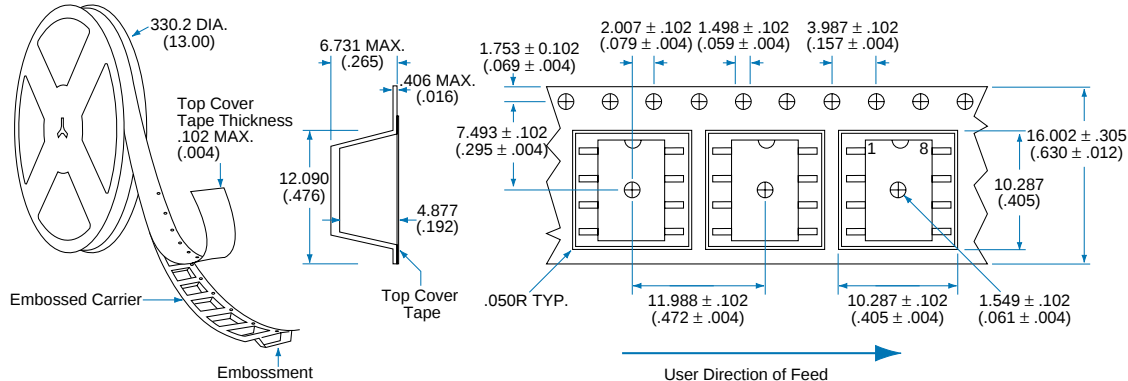
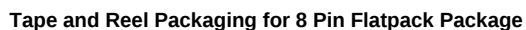
PC Board Pattern (Top View)



Dimensions

mm
(inches)

Tape and Reel Packaging for 8 Pin Surface Mount Package



7

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