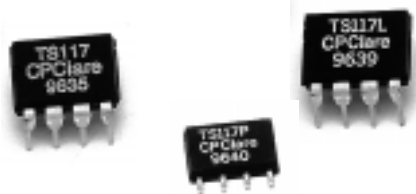


## TS117/TS117L



### 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<sub>RMS</sub> Input/Output Isolation
- FCC Compatible
- VDE Compatible
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Surface Mount and Tape & Reel Versions Available

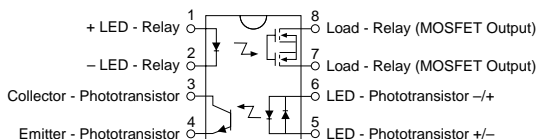
### APPROVALS

- 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

### OPTIONS / SUFFIXES

- P: Flatpack Package
- L: Current Limiting
- S: Surface Mount Package
- TR: Tape & Reel

TS117/TS117L Pinout



### DESCRIPTION

The TS117 is a 350V, 120mA, 35Ω type 1-Form-A solid state relay for hookswitch combined with an optocoupler for detection of loop current or ringing signal in a single 8 pin DIP package. Current limiting version available. ("L" suffix).

### 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

### RATINGS (@ 25° C)

Parameter	Min	Typ	Max	Units
Input Power Dissipation	-	-	150 <sup>1</sup>	mW
Input Control Current	-	-	100	mA
Peak (10ms)	-	-	1	A
Reverse Input Voltage	-	-	5	V
Total Power Dissipation	-	-	800 <sup>2</sup>	mW
Capacitance				
Input to Output	-	3	-	pF
Isolation Voltage				
Input to Output	3750	-	-	V <sub>RMS</sub>
Operational Temperature	-40	-	+85	°C
Storage Temperature	-40	-	+125	°C
Soldering Temperature (10 Seconds Max.)				
DIP Package	-	-	+260	°C
Flatpack/Surface Mount Package	-	-	+220	°C

<sup>1</sup> Derate Linearly 1.33 mw/°C

<sup>2</sup> Derate Linearly 1.67 mw/°C

**Note: For Mechanical Dimensions See Pages 396-401**

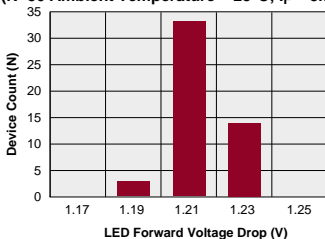
## SPECIFICATIONS

TS117						TS117L			
PARAMETERS	CONDITIONS	SYMBOL	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
<b>Relay Portion (Pins 7, 8) Output Characteristics @ 25°C</b>									
Load Voltage (Peak)	-	V <sub>L</sub>	-	-	350	-	-	350	V
Load Current (Continuous)	-	I <sub>L</sub>	-	-	120	-	-	120	mA
Peak Load Current	10ms	I <sub>LPK</sub>	-	-	350	-	-	-	mA
On-Resistance	I <sub>L</sub> =120mA	R <sub>ON</sub>	-	23	35	-	30	35	Ω
Off-State Leakage Current	V <sub>L</sub> =350V	I <sub>LEAK</sub>	-	-	1	-	-	1	μA
Switching Speeds									
Turn-On	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	T <sub>ON</sub>	-	-	3.0	-	-	3.0	ms
Turn-Off	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	T <sub>OFF</sub>	-	-	3.0	-	-	3.0	ms
Output Capacitance	50V; f=1MHz	C <sub>OUT</sub>	-	25	-	-	25	-	pF
Load Current Limit		I <sub>CL</sub>	-	-	-	130	170	210	mA
<b>Relay Portion (Pins 1, 2) Input Characteristics @ 25°C</b>									
Input Control Current	I <sub>L</sub> =120mA	I <sub>F</sub>	2	-	50	2	-	50	mA
Input Dropout Current	-	I <sub>F</sub>	0.4	0.7	-	0.4	0.7	-	mA
Input Voltage Drop	I <sub>F</sub> =5mA	V <sub>F</sub>	0.9	1.2	1.4	0.9	1.2	1.4	V
Reverse Input Voltage	-	V <sub>R</sub>	-	-	5	-	-	5	V
Reverse Input Current	V <sub>R</sub> =5V	I <sub>R</sub>	-	-	10	-	-	10	μA
<b>Detector Portion (Pins 3,4) Output Characteristics @ 25°C</b>									
Phototransistor Blocking Voltage	I <sub>C</sub> =10μA	BV <sub>CEO</sub>	20	50	-	20	50	-	V
Phototransistor Output Current	V <sub>CE</sub> =5V, I <sub>F</sub> =0mA	I <sub>CEO</sub>	-	50	500	-	50	500	nA
Saturation Voltage	I <sub>C</sub> =2mA, I <sub>F</sub> =16mA	V <sub>SAT</sub>	-	0.3	0.5	-	0.3	0.5	V
Current Transfer Ratio	I <sub>F</sub> =6mA, V <sub>CE</sub> =0.5V	CTR	33	100	-	33	100	-	%
<b>Detector Portion (Pins 5,6) Input Characteristics @ 25°C</b>									
Input Control Current	I <sub>C</sub> =2mA, V <sub>CE</sub> =0.5V	I <sub>F</sub>	6	2	100	6	2	100	mA
Input Voltage Drop	I <sub>F</sub> =5mA	V <sub>F</sub>	0.9	1.2	1.4	0.9	1.2	1.4	V
Input Current (Detector must be off)	I <sub>C</sub> =1μA, V <sub>CE</sub> =5V	I <sub>F</sub>	5	25	-	5	25	-	μA
Input to Output Capacitance (Relay Only)	-	C <sub>I/O</sub>	-	3	-	-	3	-	pF
Input to Output Isolation	-	V <sub>I/O</sub>	3750	-	-	3750	-	-	V <sub>RMS</sub>

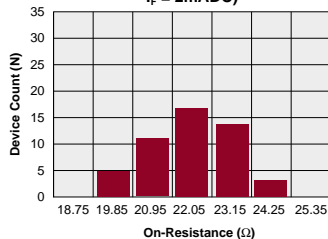
Note: For Mechanical Dimensions See Pages 396-401

### PERFORMANCE DATA

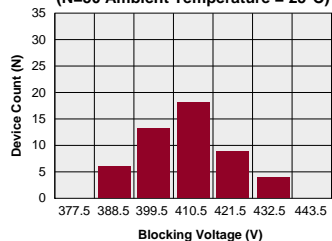
**TS117**  
Typical LED Forward Voltage Drop  
(N=50 Ambient Temperature = 25°C;  $I_F$  = 5mADC)



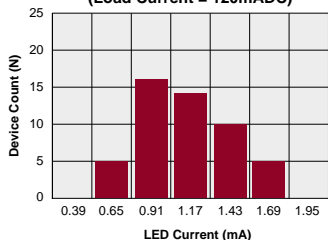
**TS117**  
Typical On-Resistance Distribution  
(N=50 Ambient Temperature = 25°C)  
(Load: Voltage = 350VDC; Current = 120mADC;  
 $I_F$  = 2mADC)



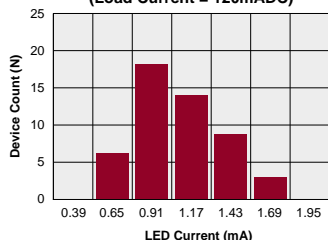
**TS117**  
Typical Blocking Voltage Distribution  
(N=50 Ambient Temperature = 25°C)



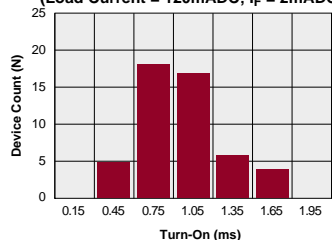
**TS117**  
Typical  $I_F$  for Switch Operation  
(N=50 Ambient Temperature = 25°C)  
(Load Current = 120mADC)



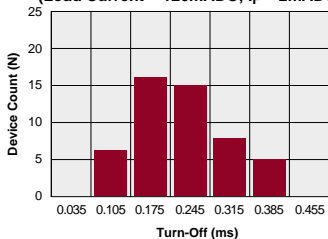
**TS117**  
Typical  $I_F$  for Switch Dropout  
(N=50 Ambient Temperature = 25°C)  
(Load Current = 120mADC)



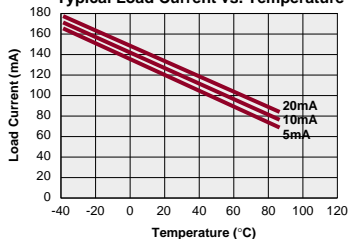
**TS117**  
Typical Turn-On Time  
(N=50 Ambient Temperature = 25°C)  
(Load Current = 120mADC;  $I_F$  = 2mADC)



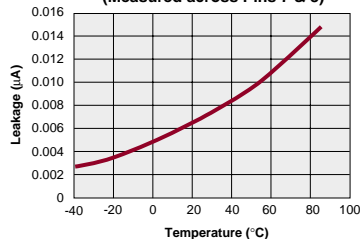
**TS117**  
Typical Turn-Off Time  
(N=50 Ambient Temperature = 25°C)  
(Load Current = 120mADC;  $I_F$  = 2mADC)



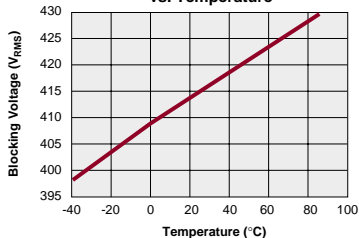
**TS117**  
Typical Load Current vs. Temperature



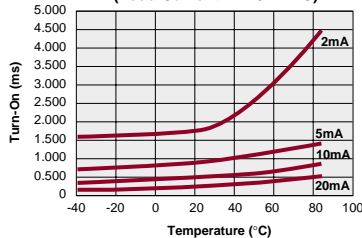
**TS117**  
Typical Leakage vs. Temperature  
(Measured across Pins 7 & 8)



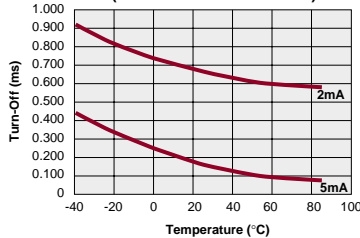
**TS117**  
Typical Blocking Voltage vs. Temperature



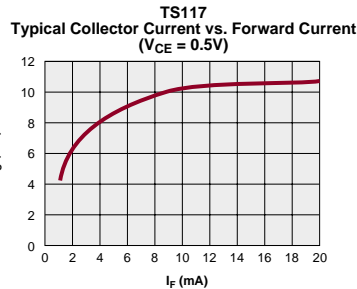
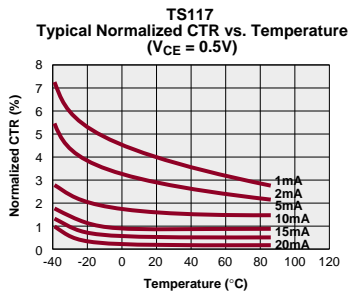
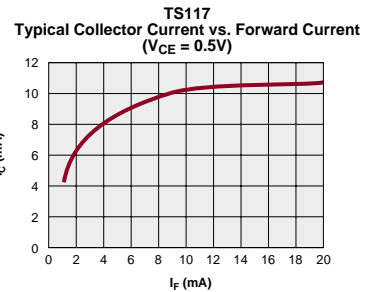
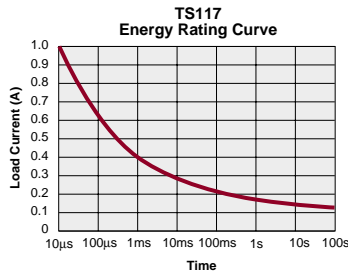
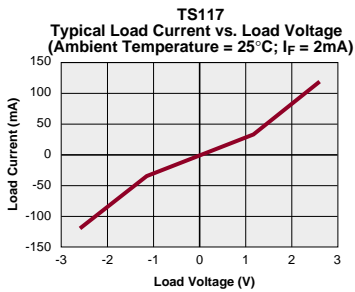
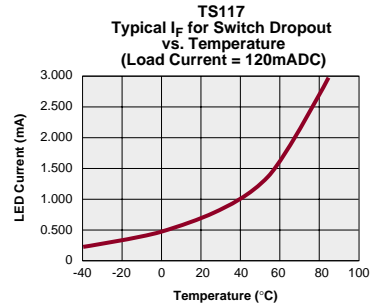
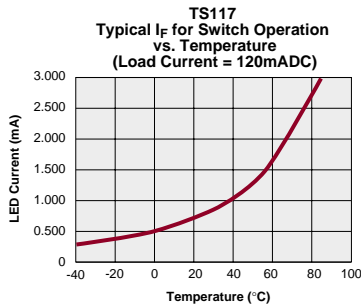
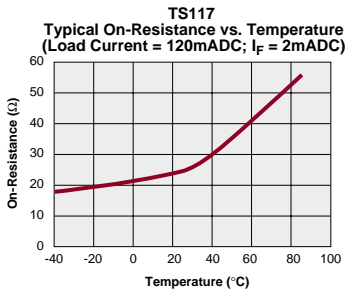
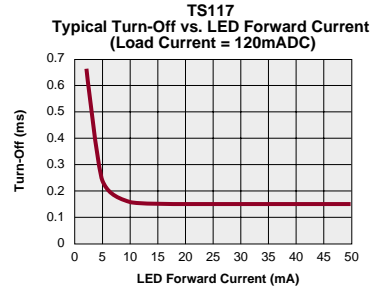
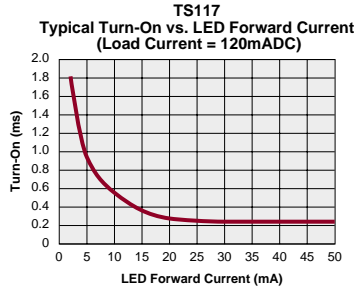
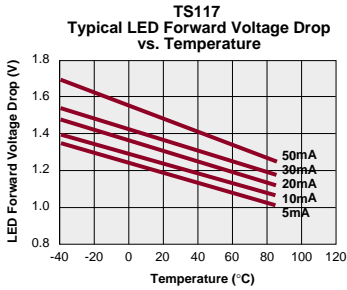
**TS117**  
Typical Turn-On vs. Temperature  
(Load Current = 120mADC)



**TS117**  
Typical Turn-Off vs. Temperature  
(Load Current = 120mADC)

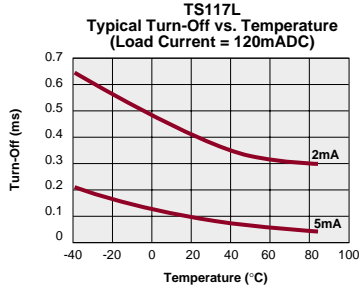
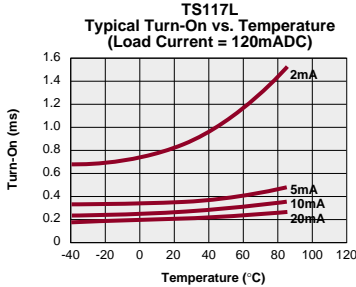
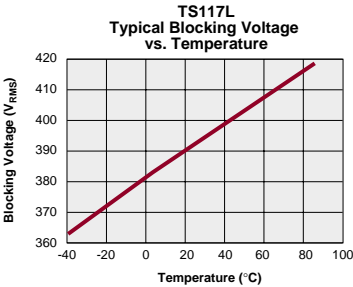
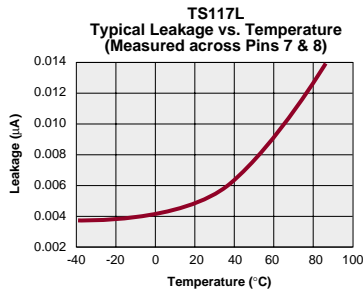
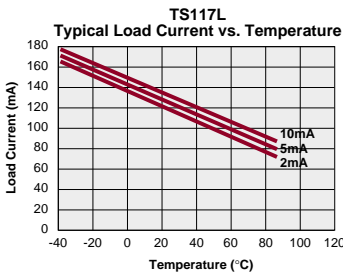
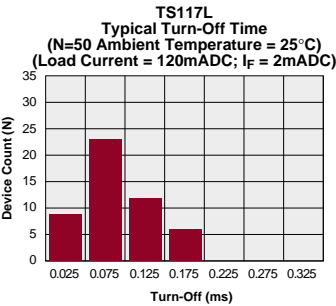
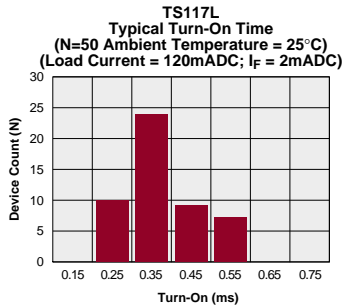
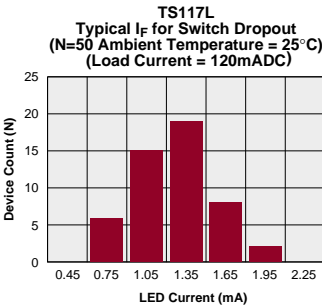
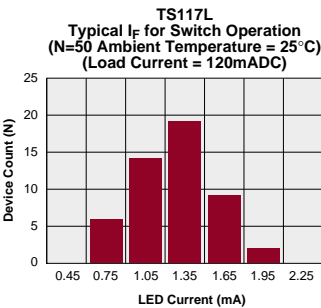
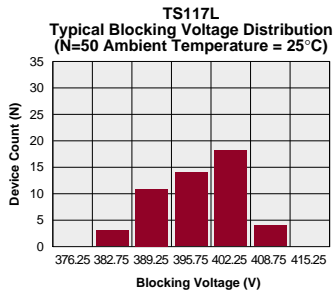
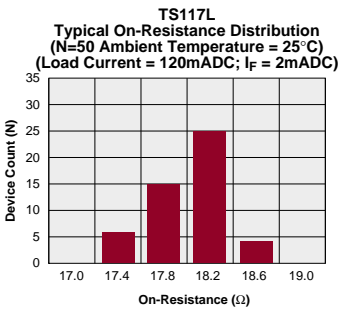
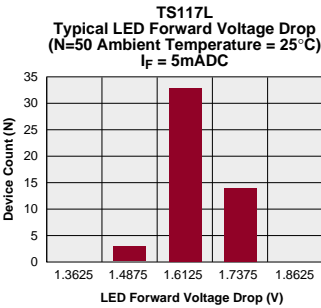


PERFORMANCE DATA



TS117/TS117L

PERFORMANCE DATA



PERFORMANCE DATA

