



|                     | TS112 | Units |
|---------------------|-------|-------|
| Load Voltage        | 350   | V     |
| Load Current        | 120   | mA    |
| Max R <sub>ON</sub> | 20    | Ω     |

### Description

TS112 is a 350V, 120mA, 20Ω 1-Form-A relay with an optocoupler in a single package for telecom applications. It features lower on-resistance and high sensitivity.

### Features

- Small 8 Pin SOIC Narrow Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- 1500V<sub>RMS</sub> Input/Output Isolation
- FCC Compatible
- VDE Compatible
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Tape & Reel Version Available

### Approvals

- UL Recognized: File Number Pending
- CSA Certified: File Number Pending
- BSI Certified: Pending

### Options/Suffixes

- Narrow Package
- TR: Tape & Reel

### Applications

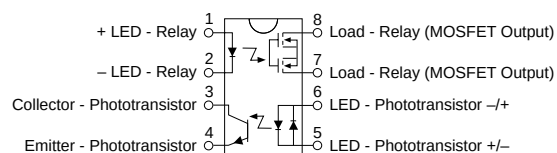
- Telecommunications
  - Telecom Switching
  - Tip/Ring Circuits
  - Modem Switching (Laptop, Notebook, Pocket Size)
  - Hookswitch
  - Dial Pulsing
  - Ground Start
  - Ringer Injection
- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
  - Meters (Watt-Hour,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

### Ordering Information

| Part #  | Description                        |
|---------|------------------------------------|
| TS112   | 8 Pin SOIC (50/Tube)               |
| TS112TR | 8 Pin SOIC Tape & Reel (1000/Reel) |

### Pin Configuration

TS112 Pinout



### Absolute Maximum 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               |
| Isolation Voltage<br>Input to Output       | 1500 | -   | -                | V <sub>RMS</sub> |
| Operational Temperature                    | -40  | -   | +85              | °C               |
| Storage Temperature                        | -40  | -   | +125             | °C               |
| Soldering Temperature<br>(10 Seconds Max.) | -    | -   | +220             | °C               |

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

<sup>2</sup> 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.*

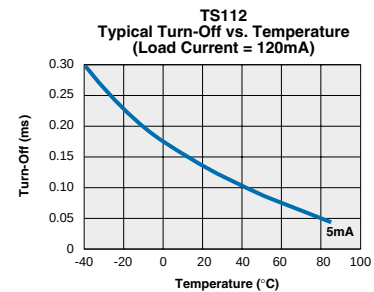
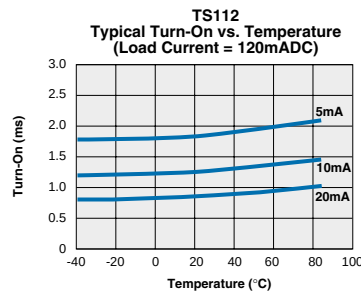
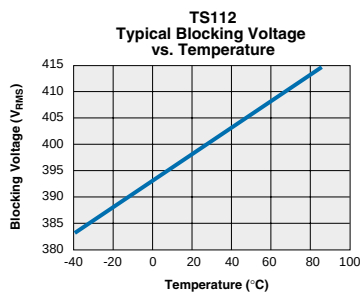
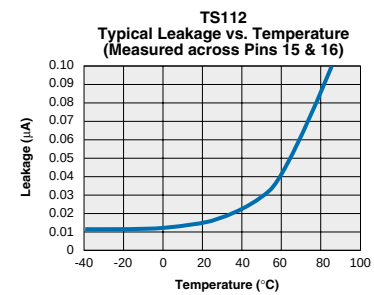
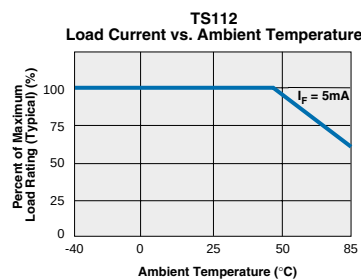
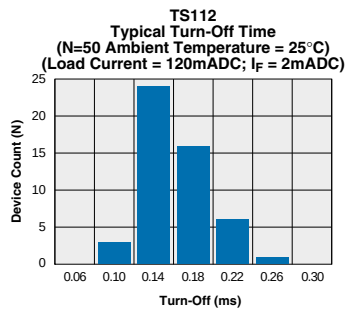
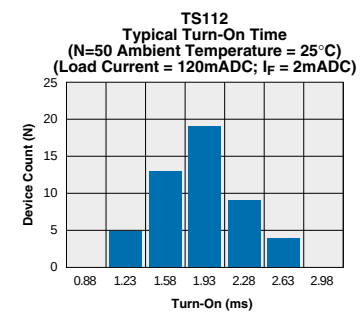
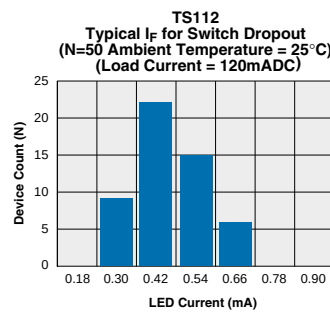
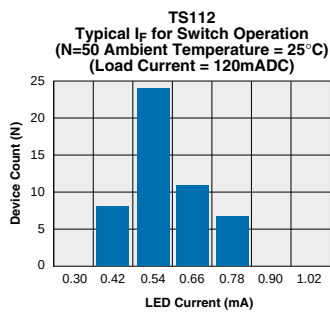
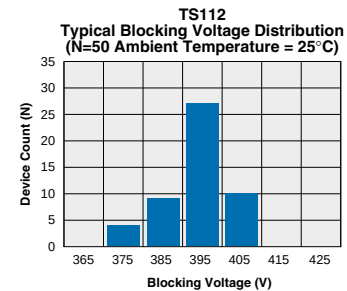
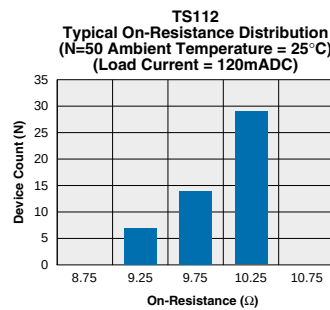
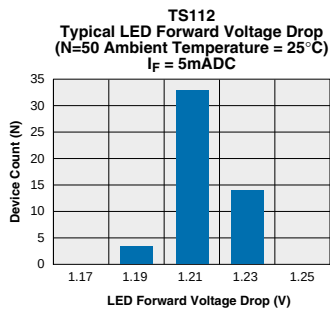
### Electrical Characteristics

| Parameter                            | Conditions                                 | Symbol            | Min | Typ | Max | Units |
|--------------------------------------|--------------------------------------------|-------------------|-----|-----|-----|-------|
| <b>Relay Portion (Pins 7, 8)</b>     |                                            |                   |     |     |     |       |
| <b>Output Characteristics @ 25°C</b> |                                            |                   |     |     |     |       |
| Load Voltage (Peak)                  | -                                          | V <sub>L</sub>    | -   | -   | 350 | V     |
| Load Current (Continuous)            | -                                          | I <sub>L</sub>    | -   | -   | 120 | mA    |
| Peak Load Current                    | 10ms                                       | I <sub>LPK</sub>  | -   | -   | 350 | mA    |
| On-Resistance                        | I <sub>L</sub> =120mA                      | R <sub>ON</sub>   | -   | 15  | 20  | Ω     |
| Off-State Leakage Current            | V <sub>L</sub> =350V                       | I <sub>LEAK</sub> | -   | -   | 1   | μA    |
| <b>Switching Speeds</b>              |                                            |                   |     |     |     |       |
| Turn-On                              | I <sub>F</sub> =5mA, V <sub>L</sub> =10V   | T <sub>ON</sub>   | -   | -   | 3   | ms    |
| Turn-Off                             | I <sub>F</sub> =5mA, V <sub>L</sub> =10V   | T <sub>OFF</sub>  | -   | -   | 3   | ms    |
| Output Capacitance                   | 50V; f=1MHz                                | C <sub>OUT</sub>  | -   | 25  | -   | pF    |
| Load Current Limit                   |                                            | I <sub>CL</sub>   | -   | -   | -   | mA    |
| <b>Relay Portion (Pins 1, 2)</b>     |                                            |                   |     |     |     |       |
| <b>Input Characteristics @ 25°C</b>  |                                            |                   |     |     |     |       |
| Input Control Current                | I <sub>L</sub> =120mA                      | I <sub>F</sub>    | 2   | -   | 50  | mA    |
| Input Dropout Current                | -                                          | I <sub>F</sub>    | 0.4 | 0.7 | -   | mA    |
| Input Voltage Drop                   | I <sub>F</sub> =5mA                        | V <sub>F</sub>    | 0.9 | 1.2 | 1.4 | V     |
| Reverse Input Voltage                | -                                          | V <sub>R</sub>    | -   | -   | 5   | V     |
| Reverse Input Current                | V <sub>R</sub>                             | I <sub>R</sub>    | -   | -   | 10  | μA    |
| <b>Detector Portion (Pins 3, 4)</b>  |                                            |                   |     |     |     |       |
| <b>Output Characteristics @ 25°C</b> |                                            |                   |     |     |     |       |
| Phototransistor Blocking Voltage     | I <sub>C</sub> =10μA                       | BV <sub>CEO</sub> | 20  | 50  | -   | V     |
| Phototransistor Output Current       | V <sub>CE</sub> =5V, I <sub>F</sub> =0mA   | I <sub>CEO</sub>  | -   | 50  | 500 | nA    |
| Saturation Voltage                   | I <sub>C</sub> =2mA, I <sub>F</sub> =16mA  | V <sub>SAT</sub>  | -   | 0.3 | 0.5 | V     |
| Current Transfer Ratio               | I <sub>F</sub> =6mA, V <sub>CE</sub> =0.5V | CTR               | 33  | 100 | -   | %     |

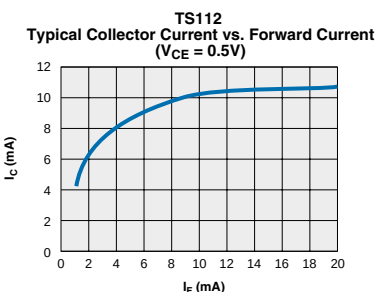
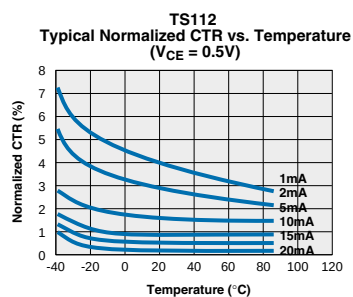
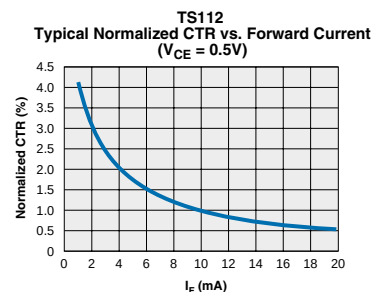
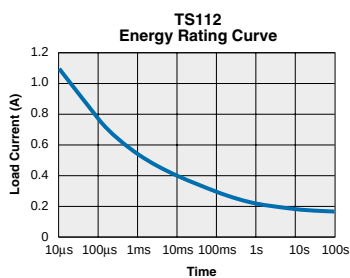
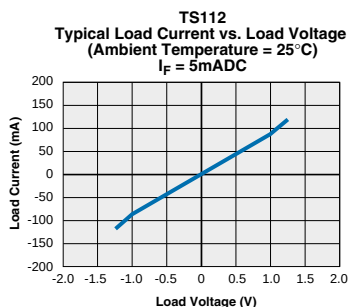
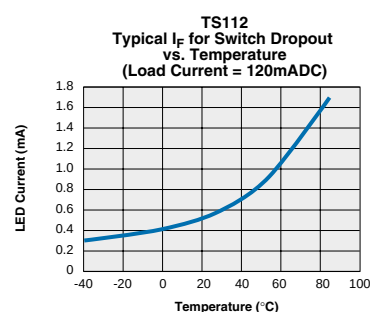
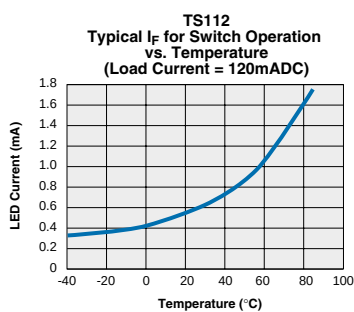
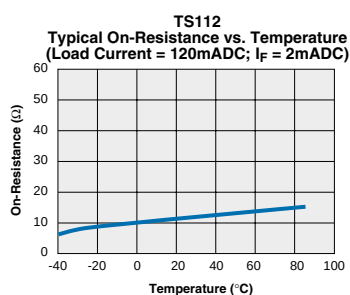
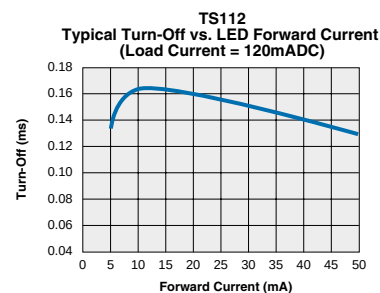
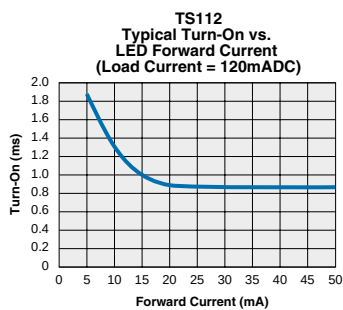
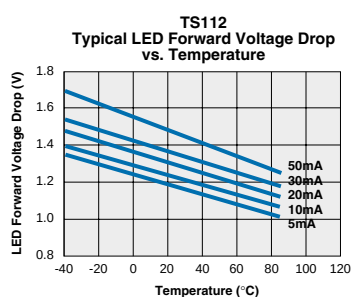
### Electrical Characteristics (continued)

| Parameter                                   | Conditions                              | Symbol    | Min  | Typ | Max | Units            |
|---------------------------------------------|-----------------------------------------|-----------|------|-----|-----|------------------|
| <b>Detector Portion (Pins 5, 6)</b>         |                                         |           |      |     |     |                  |
| <b>Input Characteristics @ 25°C</b>         |                                         |           |      |     |     |                  |
| Input Control Current                       | $I_C=2\text{mA}$ , $V_{CE}=0.5\text{V}$ | $I_F$     | 6    | 2   | 100 | mA               |
| Input Voltage Drop                          | $I_F=5\text{mA}$                        | $V_F$     | 0.9  | 1.2 | 1.4 | V                |
| Input Current<br>(Detector must be off)     | $I_C=1\mu\text{A}$ , $V_{CE}=5\text{V}$ | $I_F$     | 5    | 25  | -   | $\mu\text{A}$    |
| Input to Output Capacitance<br>(Relay Only) | -                                       | $C_{I/O}$ | -    | 0.8 | -   | pF               |
| Input to Output Isolation                   | -                                       | $V_{I/O}$ | 1500 | -   | -   | $V_{\text{RMS}}$ |

## PERFORMANCE DATA\*

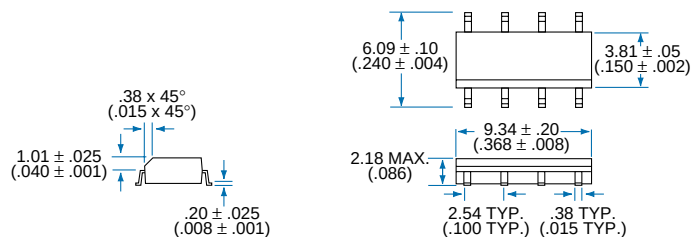


The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

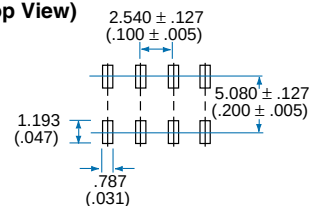
**PERFORMANCE DATA\***


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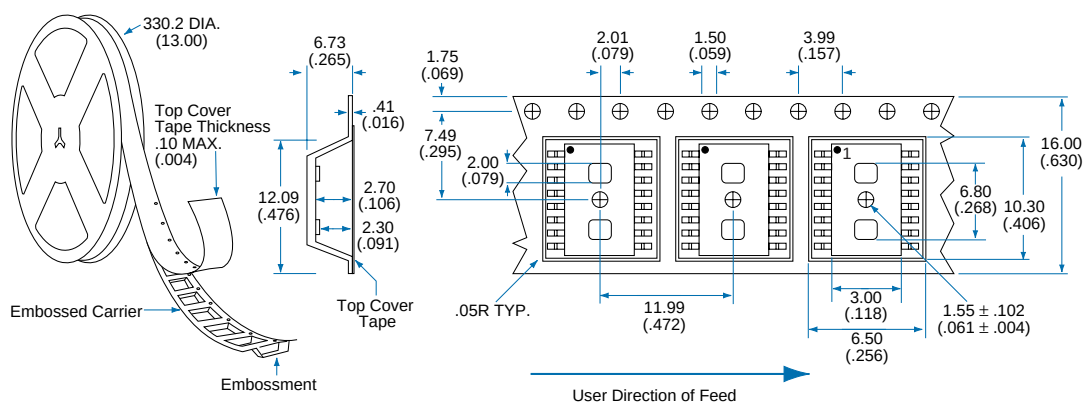
### 8 Pin SOIC Narrow (“N” Suffix)



**(Top View)**



### Tape and Reel Packaging for 8 and 16 Pin Narrow SOIC Package



Dimensions  
mm  
(inches)



# CLARE

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6/25/02