



	TS112N	Units
Load Voltage	350	V
Load Current	120	mA
Max R _{ON}	20	Ω

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_{RMS} Input/Output Isolation
- FCC Compatible
- VDE Compatible
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Tape & Reel Version Available

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

Description

The TS112 Multifunction Telecom switch combines a 350V Form A relay and an optocoupler in a single package. The relay uses optically coupled MOSFET technology to provide 1500V of input to output isolation. The efficient MOSFET switch and photovoltaic die use Clare's patented OptoMOS architecture. The optically coupled input uses highly efficient GaAlAs infrared LEDs. TS112N allows telecom circuit designers to combine two discrete functions, such as hook switch and ring detect, in a single component. The TS112's small package uses less space than traditional discrete component solutions.

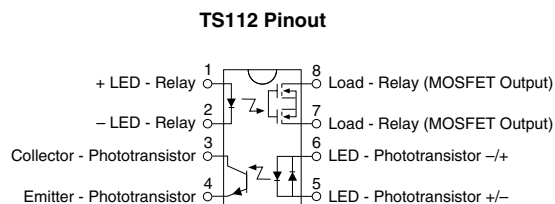
Approvals

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

Ordering Information

Part #	Description
TS112N	8 Pin SOIC (50/Tube)
TS112NTR	8 Pin SOIC Tape & Reel (1000/Reel)

Pin Configuration



Absolute Maximum 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
Total Power Dissipation	-	-	800 ²	mW
Isolation Voltage Input to Output	1500	-	-	V _{RMS}
Operational Temperature	-40	-	+85	°C
Storage Temperature	-40	-	+125	°C
Soldering Temperature (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

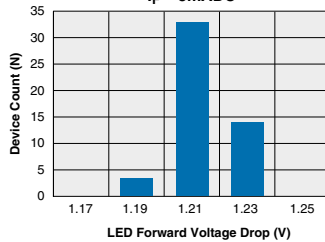
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Relay Portion (Pins 7, 8)						
Output Characteristics @ 25°C						
Load Voltage (Peak)	-	V _L	-	-	350	V
Load Current (Continuous)	-	I _L	-	-	120	mA
Peak Load Current	10ms	I _{LPK}	-	-	350	mA
On-Resistance	I _L =120mA	R _{ON}	-	15	20	Ω
Off-State Leakage Current	V _L =350V	I _{LEAK}	-	-	1	μA
Switching Speeds						
Turn-On	I _F =5mA, V _L =10V	T _{ON}	-	-	3	ms
Turn-Off	I _F =5mA, V _L =10V	T _{OFF}	-	-	3	ms
Output Capacitance	50V; f=1MHz	C _{OUT}	-	25	-	pF
Load Current Limit		I _{CL}	-	-	-	mA
Relay Portion (Pins 1, 2)						
Input Characteristics @ 25°C						
Input Control Current	I _L =120mA	I _F	2	-	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	I _R	-	-	10	μA
Detector Portion (Pins 3, 4)						
Output Characteristics @ 25°C						
Phototransistor Blocking Voltage	I _C =10μA	BV _{CEO}	20	50	-	V
Phototransistor Output Current	V _{CE} =5V, I _F =0mA	I _{CEO}	-	50	500	nA
Saturation Voltage	I _C =2mA, I _F =16mA	V _{SAT}	-	0.3	0.5	V
Current Transfer Ratio	I _F =6mA, V _{CE} =0.5V	CTR	33	100	-	%

Electrical Characteristics (continued)

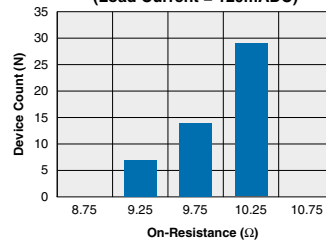
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Detector Portion (Pins 5, 6)						
Input Characteristics @ 25°C						
Input Control Current	$I_C=2\text{mA}$, $V_{CE}=0.5\text{V}$	I_F	6	2	100	mA
Input Voltage Drop	$I_F=5\text{mA}$	V_F	0.9	1.2	1.4	V
Input Current (Detector must be off)	$I_C=1\mu\text{A}$, $V_{CE}=5\text{V}$	I_F	5	25	-	μA
Input to Output Capacitance (Relay Only)	-	$C_{I/O}$	-	0.8	-	pF
Capacitance Input to Output	-	-	-	3	-	pF
Input to Output Isolation	-	$V_{I/O}$	1500	-	-	V_{RMS}

PERFORMANCE DATA*

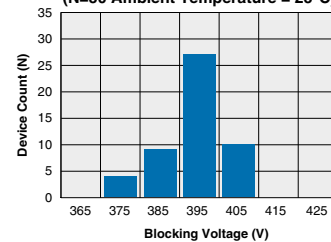
TS112
Typical LED Forward Voltage Drop
(N=50 Ambient Temperature = 25°C)
 $I_F = 5\text{mADC}$



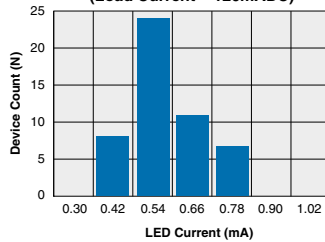
TS112
Typical On-Resistance Distribution
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mADC)



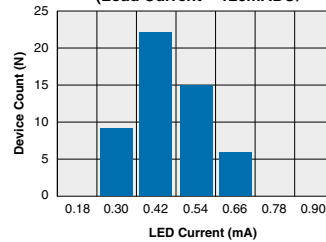
TS112
Typical Blocking Voltage Distribution
(N=50 Ambient Temperature = 25°C)



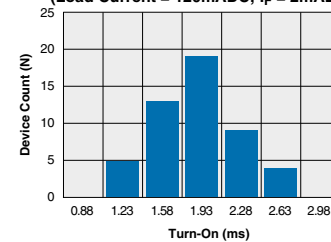
TS112
Typical I_F for Switch Operation
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mADC)



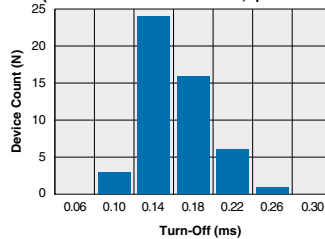
TS112
Typical I_F for Switch Dropout
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mADC)



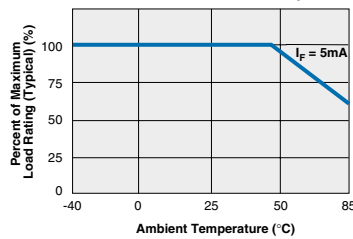
TS112
Typical Turn-On Time
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mADC; $I_F = 2\text{mADC}$)



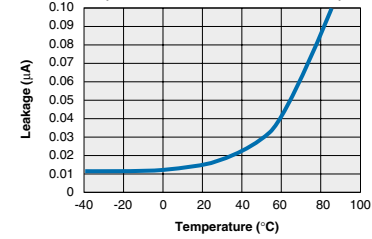
TS112
Typical Turn-Off Time
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mADC; $I_F = 2\text{mADC}$)



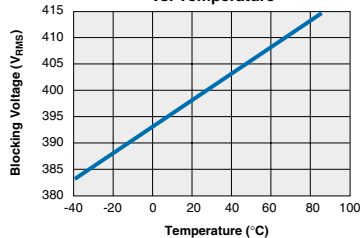
TS112
Load Current vs. Ambient Temperature
 $I_F = 5\text{mA}$



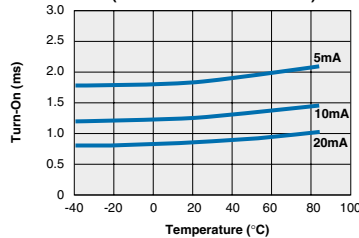
TS112
Typical Leakage vs. Temperature
(Measured across Pins 15 & 16)



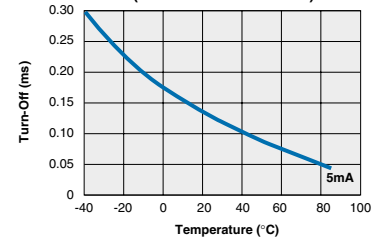
TS112
Typical Blocking Voltage vs. Temperature



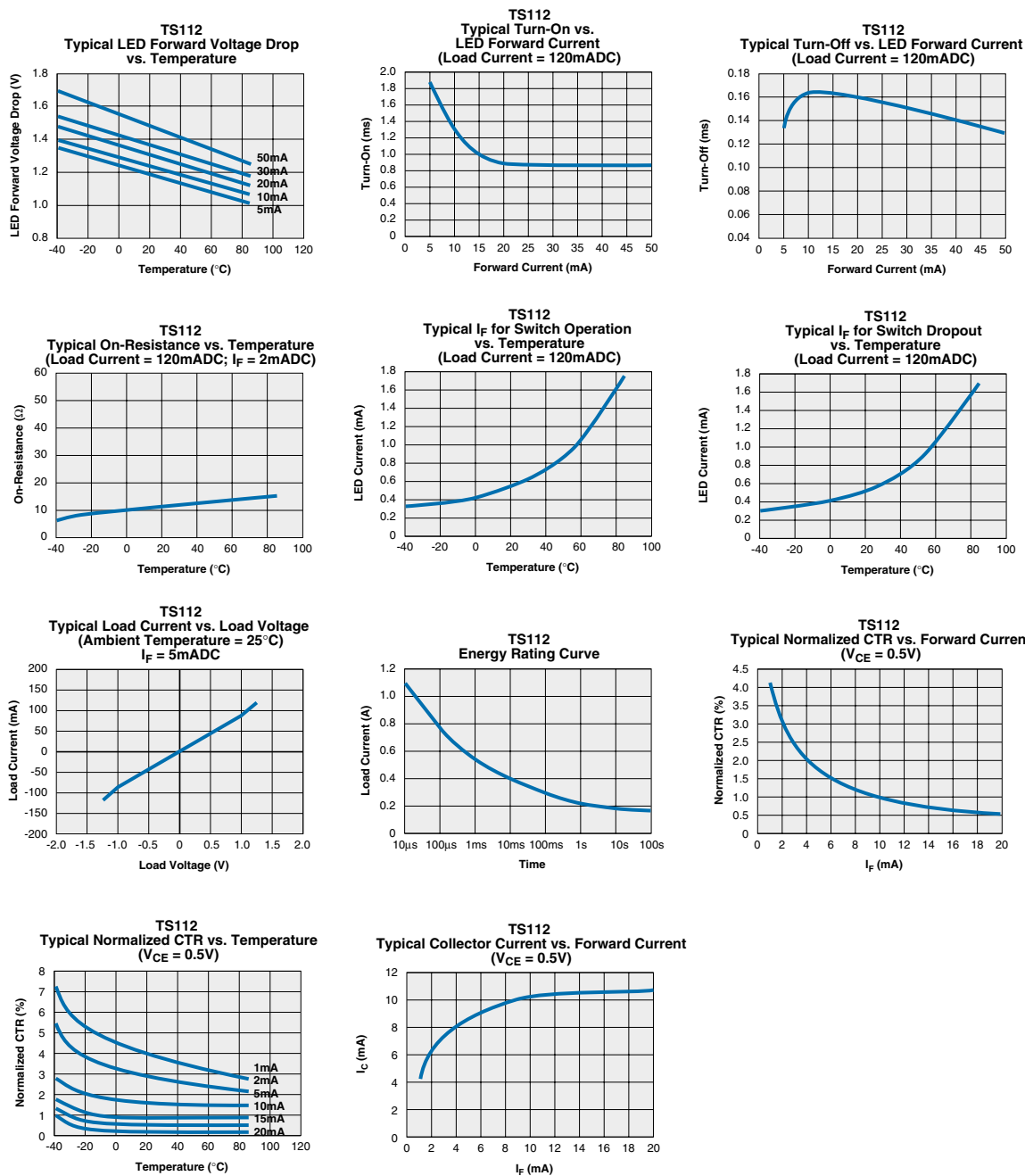
TS112
Typical Turn-On vs. Temperature
(Load Current = 120mADC)



TS112
Typical Turn-Off vs. Temperature
(Load Current = 120mA)



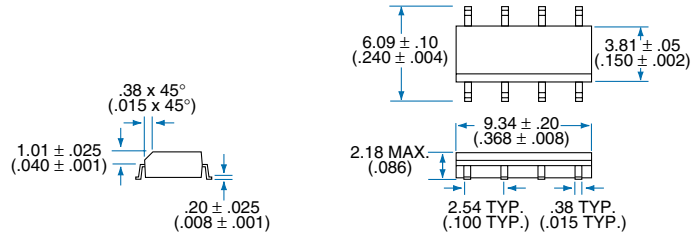
The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*


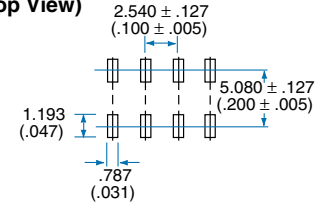
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

Mechanical Dimensions

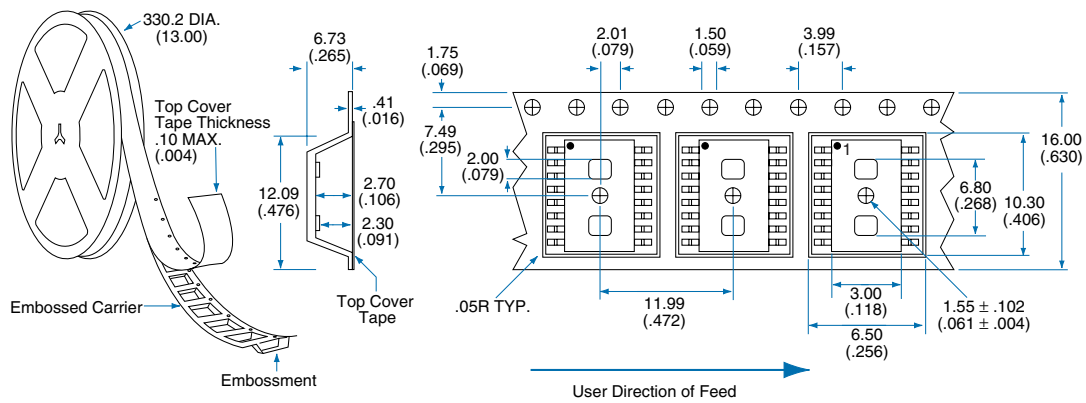
8 Pin SOIC Narrow ("N" Suffix)



PC Board Pattern (Top View)



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



Dimensions
mm
(inches)

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