

1 Description

The C212S series is robust, ideal for ATE, security and analog multiplexing applications. It is a SPST normally open switch (1 Form A) that replaces electromechanical relays in many applications. It is constructed using a GaAlAs LED for actuation control and an integrated monolithic die for the switch output. The die, fabricated in a high-voltage dielectrically isolated technology, is comprised of a photodiode array, switch control circuitry and MOSFET switches.

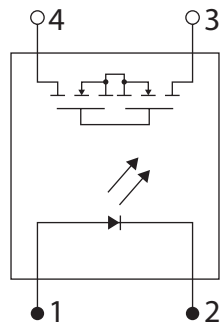
Device Information

Part Series	Package	Body Size (mm)
C212S	SOP	4.4 x 3.9 x 2.0

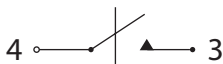
Device Package



4 Schematic



1 FORM A
NORMALLY OPEN



2 Features

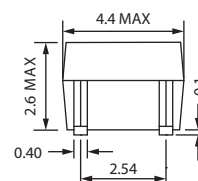
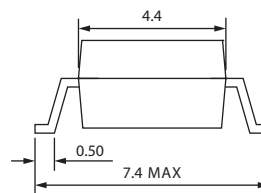
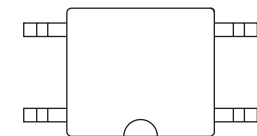
- ▶ Normally open, single pole single throw
- ▶ Controls 60V AC or DC loads
- ▶ Switches up to 400mA
- ▶ Controls low-level analog signals
- ▶ High sensitivity, low ON resistance, low capacitance
- ▶ Low-level off-state leakage current
- ▶ Pb free and RoHS compliant **Pb**
- ▶ UL / CUL Approved (No. E351594)

3 Applications

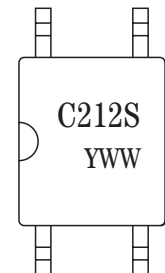
- ▶ Telecommunications (PC, electronic notepad)
- ▶ Security equipment
- ▶ Measurement and test equipment
- ▶ Factory automation equipment
- ▶ High speed inspection machines
- ▶ Probe Cards
- ▶ Data Logger
- ▶ Board Test
- ▶ Analog Multiplexing

5 Device Package Details

5.1 Outside Dimensions (Millimeters)



5.2 Device Marking



Notes:
YWW = Y: Year code / W: Week code

Table of Contents

1. Description	1
2. Features	1
3. Applications	1
4. Schematic	1
5. Device Package Details	1
5.1 Outside Dimensions	1
5.2 Device Marking	1
6. Specifications	3
6.1 Absolute Maximum Ratings	3
6.2 Electro-Optical Characteristics	3
7. Schematic and Wire Diagrams	3
8. C212S Series Graphs	4
Load Current vs. Ambient Temperature	4
On Resistance vs. Ambient Temperature	4
Turn-on Time vs. Ambient Temperature	4
Turn-off Time vs. Ambient Temperature	4
LED Operate Current vs. Ambient Temperature	4
LED Turn-off Current vs. Ambient Temperature	4
LED Dropout Voltage vs. Ambient Temperature	5
Voltage vs. Current Characteristics of Output at MOSFET Portion	5
Turn-on Time vs. LED Forward Current	5
Off-state Leakage Current vs. Load Voltage	5
Turn-off Time vs. LED Forward Current	5
Output Capacitance vs. Applied Voltage	5
9. Using Methods	6
10. Recommended Soldering	7
10.1 Infrared Reflow Soldering	7
10.2 Recommended Temperature Profile of Infrared Reflow	7
10.3 Wave Soldering	7
10.4 Cautions	7
11. 4-Pin SOP Carrier Tape & Reel	8

6 Specifications

6.1 Absolute Maximum Ratings

Parameters		Symbol	Rating	Unit
Input	Continuous Forward Current	I_F	50	mA
	Peak Forward Current	I_{FP}	1	A
	Reverse Voltage	V_R	5	V
	Power Dissipation	P_{in}	100	mW
	Derate Linearly from 25°C	-	1.3	mW/°C
Output	Breakdown Voltage	V_B	60	V
	Continuous Load Current	I_L	400	mA
	Power Dissipation	P_{out}	500	mW
Isolation Voltage		V_{iso}	1500 Vrms	Vrms
Isolation Resistance ($V_{io}=500V$)		R_{iso}	$\geq 10^{10}$	Ω
Total Power Dissipation		P_t	550	mW
Operating Temperature		T_{opr}	-40 to +85	°C
Storage Temperature		T_{stg}	-40 to +125	°C
Junction Temperature		T_j	100	°C
Soldering Temperature 10 seconds		T_{sot}	260	°C

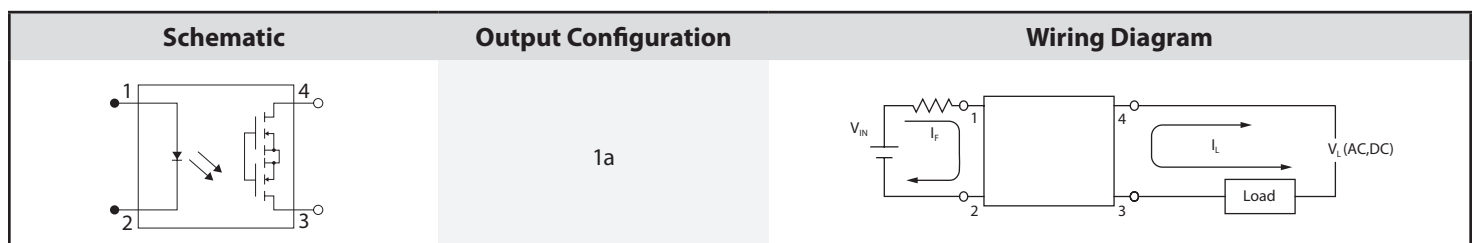
6.2 Electro-Optical Characteristics

Parameters		Symbol	Conditions	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V_F	$I_F=10mA$	-	1.2	1.5	V
	Operation Input Current	I_{FON}	$V_L=20V, I_L=100mA$	-	-	3.0	mA
	Recovery Input Current	I_{FOFF}	$V_L=20V, I_L \leq 5\mu A$	0.2	-	-	mA
Output	Breakdown Voltage	V_B	$I_B=50\mu A$	60	-	-	V
	Off-State Leakage Current	I_{LEAK}	$V_L=100V, I_F=0mA$	-	0.2	1.0	μA
I/O Capacitance		C_{iso}	$V_B=0V, f=1MHz$	-	6	-	pF
Output Capacitance		C_{OUT}	$V_L=0V, f=1MHz$	-	50	-	pF
ON Resistance		R_{ON}	$I_F=10mA, I_L=100mA$	-	0.83	2.5	Ω
Turn-On Time		T_{ON}	$I_F=10mA, V_L=20V$	-	0.3	1.5	ms
Turn-Off Time		T_{OFF}	$I_L=100mA, t=10ms$	-	0.1	1.5	ms

Notes:

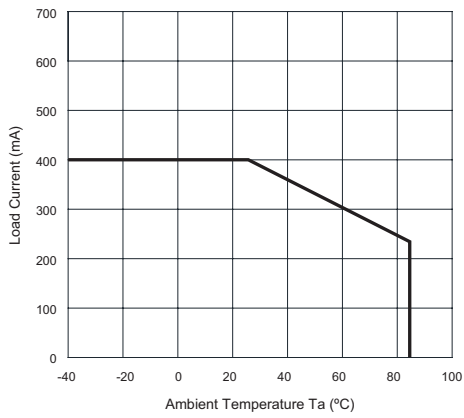
$T_a=25^\circ C$

7 Schematic and Wiring Diagrams

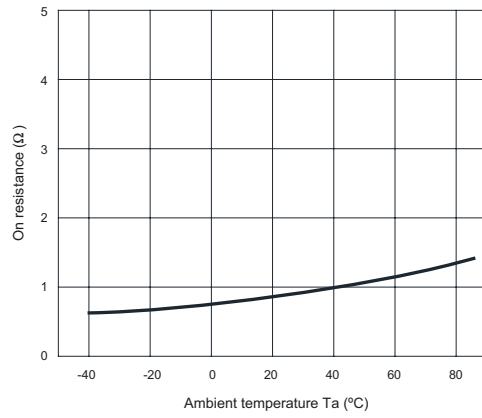


8 C212S Series Graphs

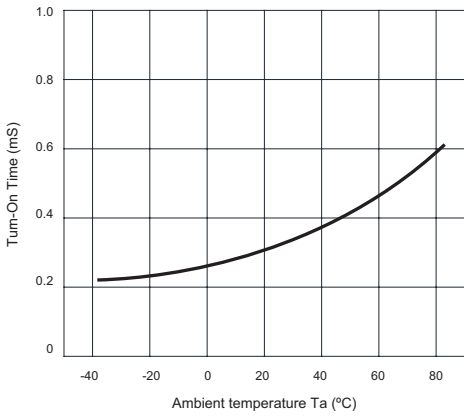
Load Current Vs. Ambient Temperature



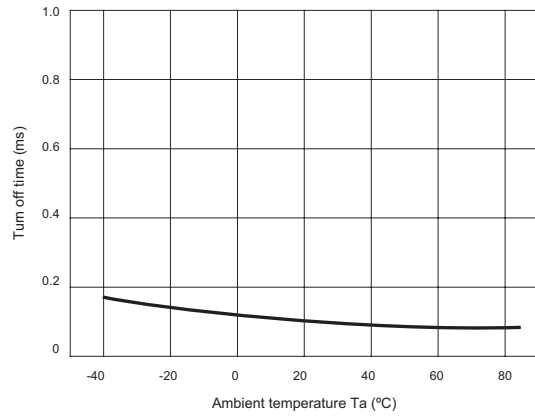
On-Resistance Vs. Ambient Temperature



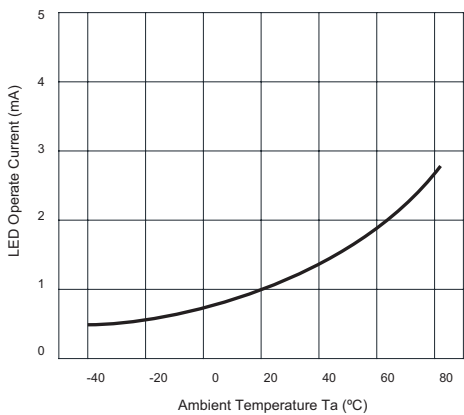
Turn-On Time Vs. Ambient Temperature



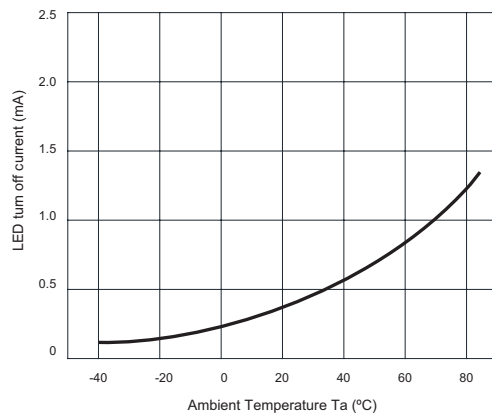
Turn-Off Time Vs. Ambient Temperature



LED Operate Current Vs. Ambient Temperature

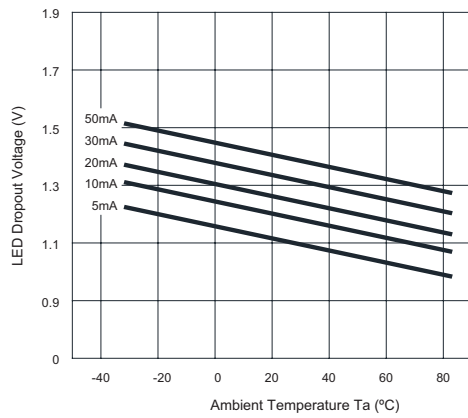


LED Turn-Off Current Vs. Ambient Temperature

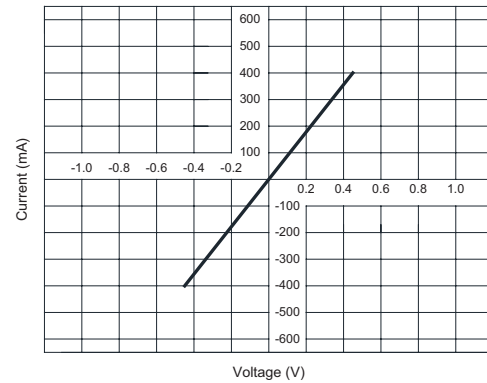


8 C212S Series Graphs

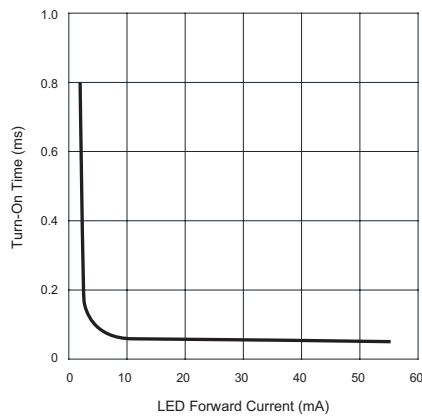
LED Dropout Voltage Vs. Ambient Temperature



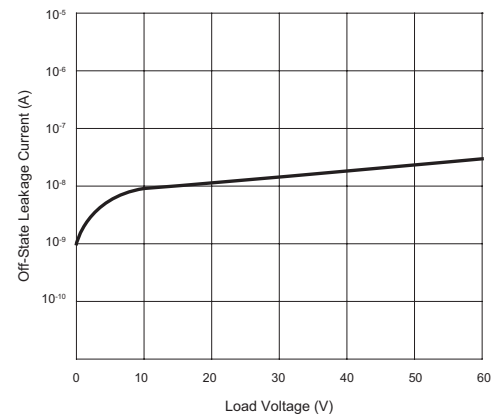
Voltage Vs. Current Characteristics of Output at MOSFET Portion



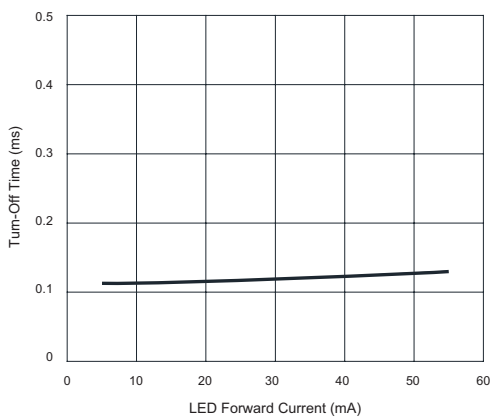
Turn-On Time Vs. LED Forward Current



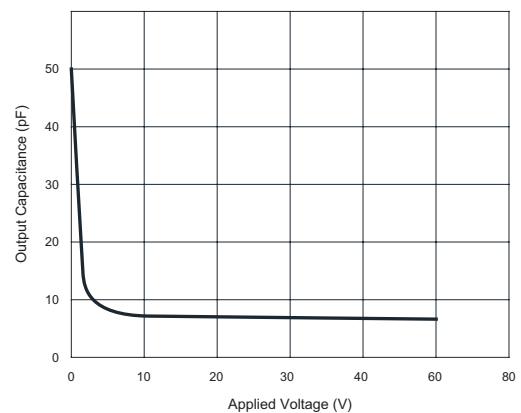
Off-State Leakage Current Vs. Load Voltage



Turn-Off Time Vs. LED Forward Current

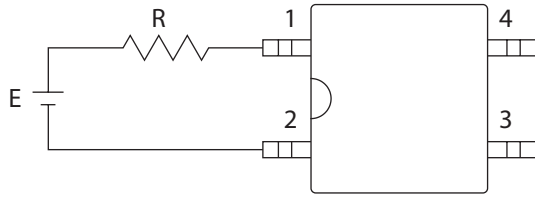


Output Capacitance Vs. Applied Voltage



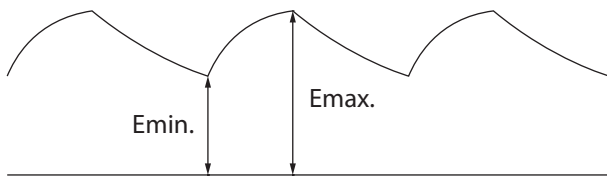
9 Using Methods

Examples of resistance value to control LED forward current ($I_f=5\text{mA}$)

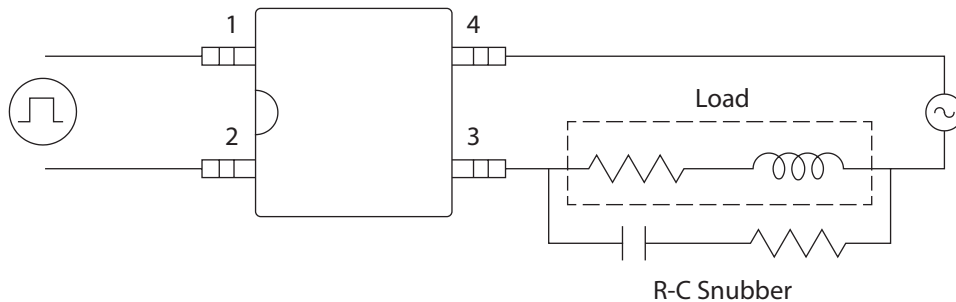
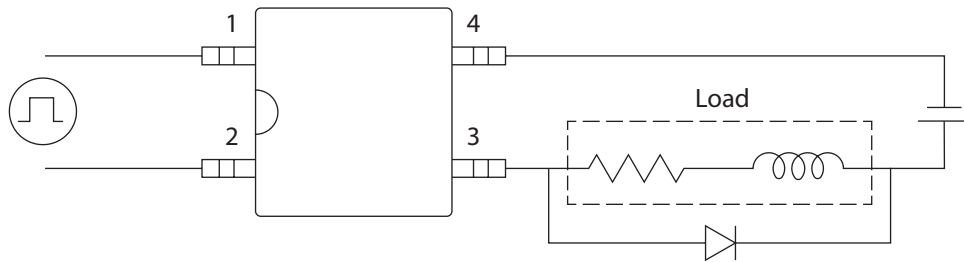


E	R
3.3V	Approx. 333 Ω
5V	Approx. 640 Ω
12V	Approx. 1.9K Ω
15V	Approx. 2.5K Ω
24V	Approx. 4.1K Ω

1. LED forward current must be more than 5mA, at E min.
2. LED forward current must be less than 50mA, at E max.



Regulate the spike voltage generated on the inductive load as follows:

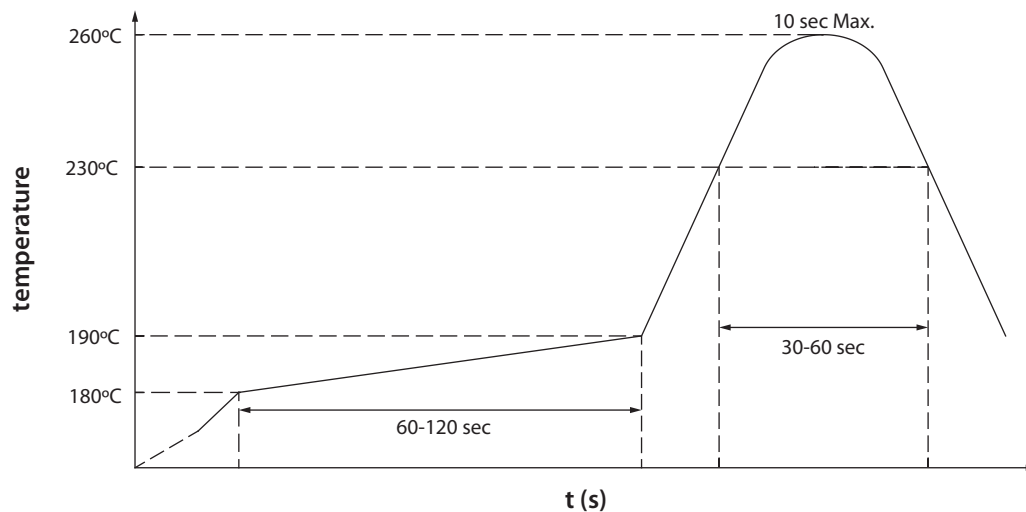


10 Recommended Soldering Conditions

10.1 Infrared Reflow Soldering

- ▶ Peak reflow soldering: 260°C or below (package surface temperature)
- ▶ Time of peak reflow temperature: 10 seconds
- ▶ Time of temperature higher than 230°C: 30-60 seconds
- ▶ Time to preheat temperature from 180~190°C: 60-120 seconds
- ▶ Number of reflows: Two
- ▶ Flux: Rosin flux containing small amount of chlorine
(The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

10.2 Recommended Temperature Profile of Infrared Reflow



10.3 Wave Soldering

- ▶ Temperature: 260°C or below (molten solder temperature)
- ▶ Time: 10 seconds or less
- ▶ Preheating conditions: 120°C or below (package surface temperature)
- ▶ Number of times: One
- ▶ Flux: Rosin flux containing small amount of chlorine
(The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

10.4 Cautions

- ▶ Fluxes: Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.
- ▶ Avoid shorting between portion of frame and leads.

11 4-pin SOP Carrier Tape & Reel Units: mm

