PR308S31ESU/ PR308S41ESU

Solid State Relay Approved by European Safety Standard

■ Features

1. Approved by European Safety Standards.
   Insulation thickness:0.4mm or more
   Creepage distance:6.4mm or more
   Clearance:6mm or more
2. Isolation voltage ($V_{iso(rms)}$:3kV)
3. RMS ON-state current $I_{T(rms)}$:8A (Tc≤80˚C)
4. Built-in snubber circuit
5. Built-in zero-cross circuit **(PR308S41ESU)**

■ Applications

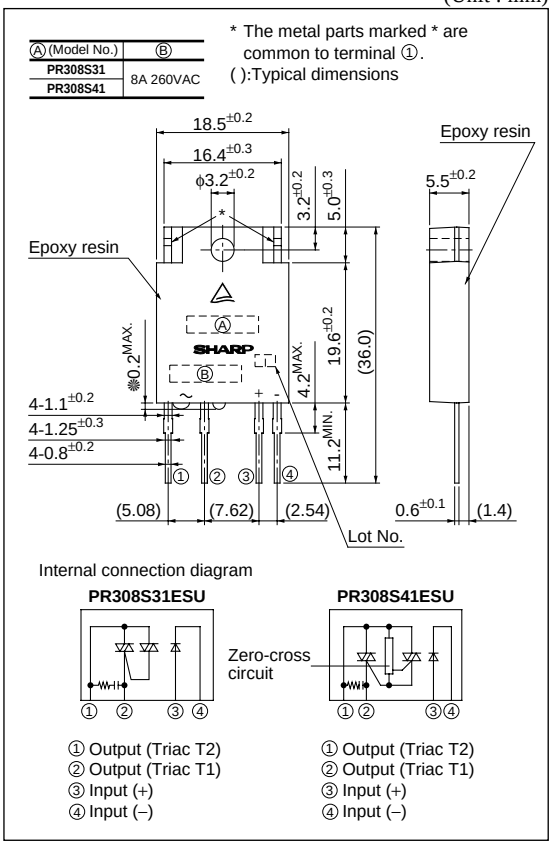
1. Copiers
2. Facsimiles
3. Laser Printers

■ Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Reverse voltage	V_R	6	V
Output	*1 RMS ON-state current	$I_{T\ (rms)}$	8	A
	*2 Peak one cycle surge current	I_{surge}	80	A
	Repetitive peak OFF-state voltage	V_{DRM}	600	V
	Non repetitive peak OFF-state voltage	V_{DSM}	600	V
	Critical rate of rise of ON-state current	dI_T/dt	50	A/μs
	Operating frequency	f	45 to 65	Hz
	Load supply voltage	$V_{OUT\ (rms)}$	260	V
Operating temperature		T_{opr}	−20 to +80	°C
Storage temperature		T_{stg}	−30 to +100	°C
*3 Isolation voltage		$V_{iso\ (rms)}$	3.0	kV
Soldering temperature		T_{sol}	260 (For 10s)	°C

*1 Sine wave, practical value, Refer to Fig.1, 2
*2 50Hz sine wave, start at Tj=25˚C
*3 AC60Hz, for 1 min, 40 to 60%RH
Isolation voltage measuring method
1) Dielectric withstand voltage tester with zero cross circuit shall be used.
2) The applied voltage waveform shall be sine wave.
3) Voltage shall be applied between input and output.
(Input and output terminals shall all be shorted respectively.)

■ Outline Dimensions (Unit : mm)



■ Electrical Characteristics

(Ta=25˚C)

Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage		V_F	I_F=20mA	–	1.2	1.4	V
	Reverse current		I_R	V_R=3V	–	–	10^{-4}	A
Output	ON-state voltage		$V_{T\ (rms)}$	$I_{T\ (rms)}$=2A, Resistance load, I_F=20mA	–	–	1.5	V
	Minimum operating current		$I_{op\ (rms)}$	$V_{OUT\ (rms)}$=240V	–	–	50	mA
	Open circuit leak current		$I_{leak\ (rms)}$	$V_{OUT\ (rms)}$=240V	–	–	10	mA
	Critical rate of rise of OFF-state voltage		dV/dt	V_D=2/3V_{DRM}	30	–	–	V/μs
	Commutation critical rate of rise of OFF-state voltage		(dV/dt)c	Tj=125˚C, V_D=2/3V_{DRM} dI_T/dt=–4.0A/ms	5	–	–	V/μs
Transfer characteristics	Minimum trigger current	**PR308S31ESU**	I_{FT}	V_D=12V, R_L=30Ω	–	–	10	mA
		PR308S41ESU		V_D=6V, R_L=30Ω				
	Isolation resistance		R_{iso}	DC=500V, 40 to 60%RH	1×10^{10}	–	–	Ω
	Zero-cross voltage	**PR308S41ESU**	V_{OX}	I_F=10mA	–	–	35	V
	Turn-on time	**PR308S31ESU**	t_{on}	$V_{D\ (rms)}$=200V, AC50Hz $I_{T\ (rms)}$=2A, Resistance load, I_F=20mA	–	–	1	ms
		PR308S41ESU					10	
	Turn-off time		t_{off}					
Thermal resistance (Between junction and case)			$R_{th\ (j\text{-}c)}$	–	–	4.5	–	˚C/W
Thermal resistance (Between junction and ambience)			$R_{th\ (j\text{-}a)}$	–	–	40	–	˚C/W

■ Recommended Operating Conditions

Parameter		Symbol	Conditions	Unit
Input	Signal current at ON	$I_{F\ (on)}$	20 to 30	mA
	Signal current at OFF	$I_{F\ (off)}$	0 to 0.1	mA
Output	Load supply voltage	$V_{OUT\ (rms)}$	80 to 240	V
	Load supply current	$I_{OUT\ (rms)}$	0.5 to 2.0 *1	A
			0.5 to 8.0 *2	
	Operating frequency	f	47 to 63	Hz

*1 Without external heat sink (Ta≤40˚C)
*2 With external heat sink (Tc≤80˚C)

Fig.1 Forward Current vs. Ambient Temperature

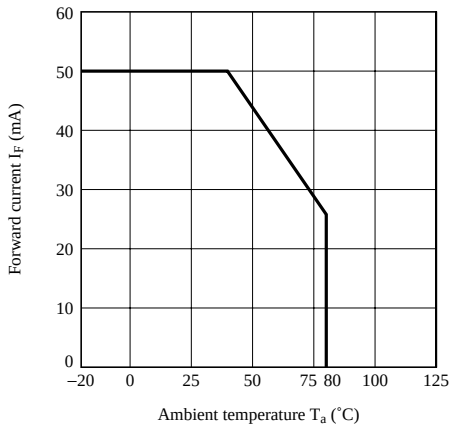
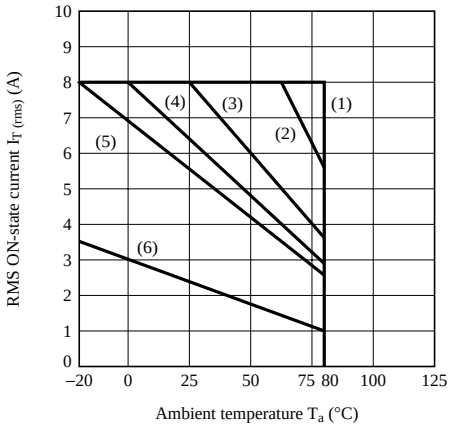


Fig.2 RMS ON-state Current vs. Ambient Temperature



(1) With infinite heat sink
(2) With heat sink (200×200×2mm Al plate)
(3) With heat sink (100×100×2mm Al plate)
(4) With heat sink (75×75×2mm Al plate)
(5) With heat sink (50×50×2mm Al plate)
(6) Without heat sink
(Note) With the Al heat sink set up vertically, tighten the device with a torque of 0.4N•m and apply thermal conductive silicone grease on the mounting face of heat sink. Forced cooling shall not be carried out. (Please use an isolation sheet if necessary.)

Fig.3 RMS ON-state Current vs. Case Temperature

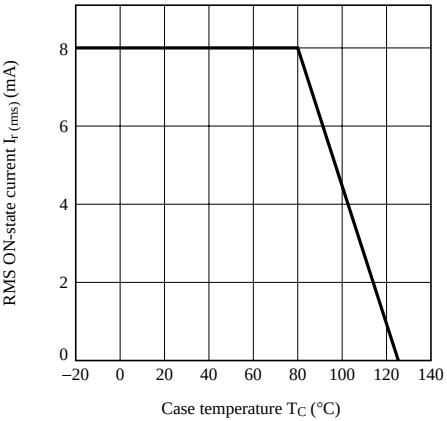


Fig.4 Forward Current vs. Forward Voltage (Typical Value)

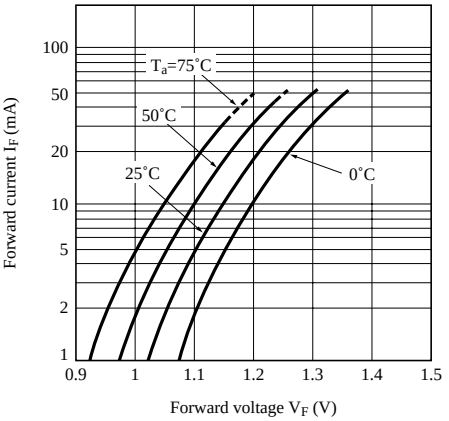


Fig.5 Surge Current vs. Power-on Cycle

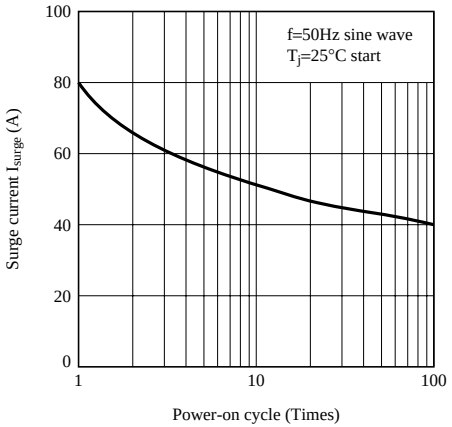


Fig.6 Minimum Trigger Current vs. Ambient Temperature (Typical Value) (PR308S31ESU)

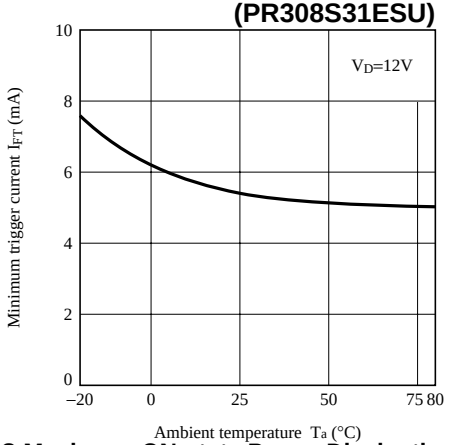


Fig.7 Minimum Trigger Current vs. Ambient Temperature (Typical Value) (PR308S41ESU)

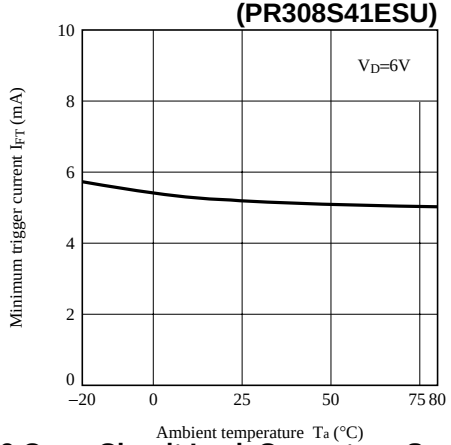


Fig.8 Maximum ON-state Power Dissipation vs. RMS ON-state Current (Typical Value)

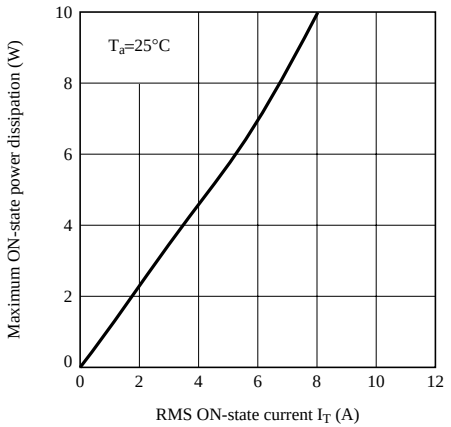
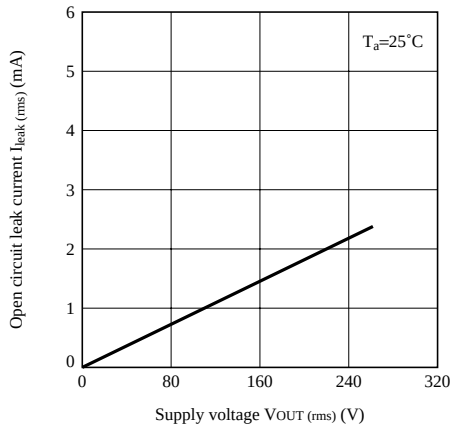


Fig.9 Open Circuit Leak Current vs. Supply Voltage (Typical Value)



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