PRELIMINARY DATASHEET AUGUST 2021

5SED 0890T2250

Rectifier diode module

- Insulated baseplate by AIN ceramic
- Precision pressure contacts for high reliability
- Industry standard housing

Applications

- Uncontrolled line frequency bridge arm
- Input rectifiers in AC/AC converters
- DC power supply

Key parameters

- V_{RRM} = 2200 V
- I_{FAVm} = 889 A
- I_{FSM} = 22 000 A
- V_{TO} = 0.782 V
- r_T = 0.209 mΩ

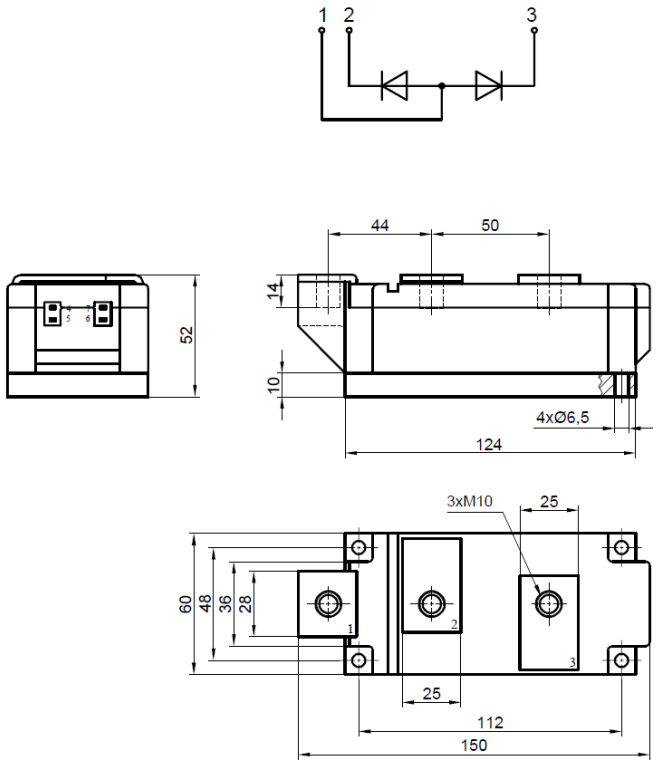
Types

	V_{RRM}
5SED 0890T2250	2 200 V
Conditions	T_j = -40 ÷ 160 °C, half sine waveform, f = 50 Hz

Mechanical data

M_s	Mounting torque (base - heatsink)	6 ± 15 %	Nm
M_t	Mounting torque (main terminals)	12 ± 15 %	Nm
m	Weight	1.4	kg
a	Acceleration resistance	50	m/s^2
	UL recognized, file no.	E500543	

Fig. 1 Case



Maximum ratings			Maximum limits	Unit
V_{RRM}	**Repetitive peak reverse voltage** T_j = -40 ÷ 160 °C		**2200**	V
I_{FAVm}	**Average forward current**	T_c = 85 °C	**889**	A
		T_c = 100 °C	**754**	
		T_c = 110 °C	**656**	
I_{FRMS}	**RMS forward current**	T_c = 85 °C	**1396**	A
		T_c = 100 °C	**1184**	
		T_c = 110 °C	**1031**	
I_{RRM}	**Repetitive reverse current** half sine waveform, f = 50 Hz, peak value	$V_R = V_{RRM}$	**30**	mA
I_{FSM}	**Non repetitive peak surge current** V_R = 0 V, half sine pulse	t_p = 8.3 ms	**23,500**	A
		t_p = 10 ms	**22,000**	
I^2t	**Limiting load integral** V_R = 0 V, half sine pulse	t_p = 8.3 ms	**2,292,000**	A^2s
		t_p = 10 ms	**2,420,000**	
T_{jmin} - T_{jmax}	**Operating temperature range**		**-40 ÷ 160**	°C
T_{STG}	**Storage temperature range**		**-40 ÷ 125**	

Unless otherwise specified Tj = 160 °C

Insulation characteristics		Value			Unit
		min	typ	max	
V_{ISOL}	**Isolation voltage** (base – terminals) RMS, sine waveform, f = 50 Hz, T_j = 25 °C, t = 1 min			**3600**	V

Forward characteristics			Value			Unit
			min	typ	max	
V_{T0}	**Threshold voltage**				**0.782**	V
r_T	**Forward slope resistance** I_{F1} = 1398 A, I_{F2} = 4194 A				**0.209**	mΩ
V_{FM}	**Maximum forward voltage**	I_{FM} = 1 000 A			**0.980**	V
		I_{FM} = 1 500 A			**1.100**	

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Unless otherwise specified Tj = 160 °C

Reverse recovery characteristics		Value			Unit
		min	typ	max	
Q_{rr}	**Recovered charge** I_{FM} = 1000 A, di_F/dt = 10 A/µs, V_R = 100 V		**1400**		µC
I_{rrM}	**Reverse recovery maximum current** the same conditions as at Q_{rr}		**150**		
t_{rr}	**Reverse recovery time** the same conditions as at Q_{rr}		**21**		

Unless otherwise specified Tj = 160 °C

Thermal parameters			Value	Unit
R_{thjc}	**Thermal resistance junction to case**	per arm	65.0	K/kW
		per module	32.5	
R_{thch}	**Thermal resistance case to heatsink**	per arm	20.0	K/kW
		per module	10.0	

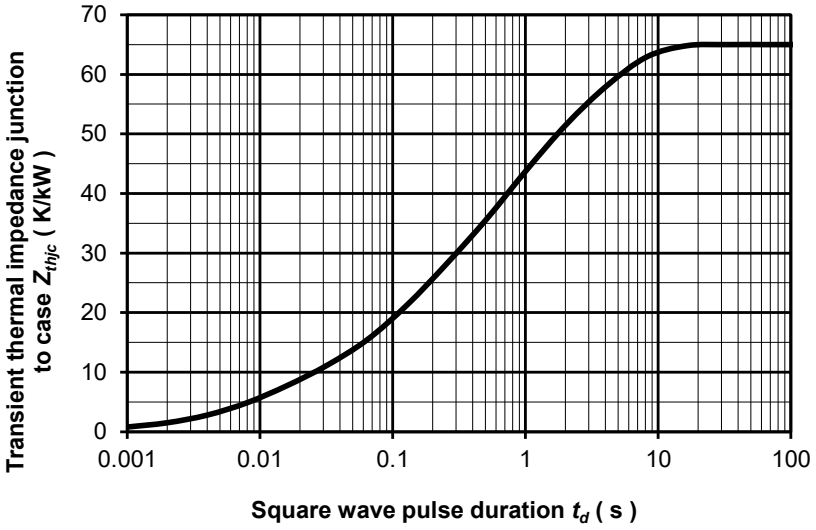
Transient thermal impedance

Analytical function for transient thermal impedance

$$Z_{thjc} = \sum_{i=1}^{4} R_i(1 - exp(-t/\tau_i))$$

i	1	2	3	4
τ_i (s)	3.40	0.60	0.10	0.01
R_i(K/kW)	23.00	22.00	13.70	6.3

Fig. 2 Dependence transient thermal impedance junction to case on square pulse



Correction for periodic waveforms

180°	sine	3.0	K/kW
120°	sine	4.7	K/kW
60°	sine	7.0	K/kW
180°	rectangular	4.8	K/kW
120°	rectangular	7.4	K/kW
60°	rectangular	12.0	K/kW

Forward and surge characteristics

Fig. 3 Maximum forward voltage drop characteristics

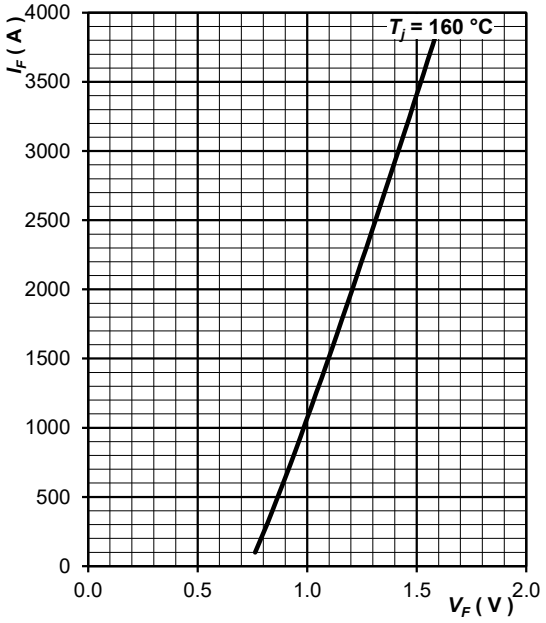
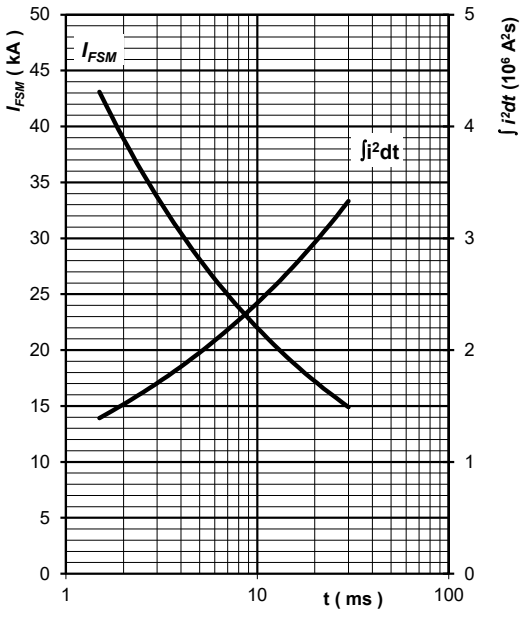


Fig. 4 Surge forward current vs. pulse length, half sine wave, single pulse, V_R = 0 V, T_j = $T_j$max



Power loss and maximum case temperature characteristics per arm

Fig. 5 Forward power loss vs. average forward current, sine waveform, f = 50 Hz, T = 1/f

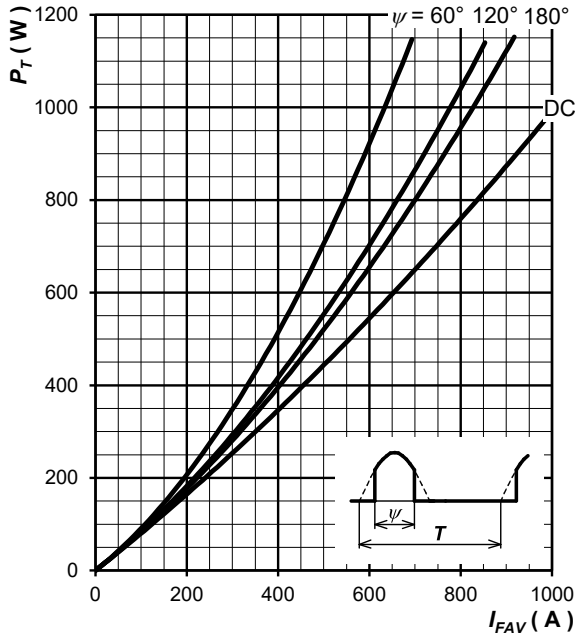


Fig. 6 Forward power loss vs. average forward current, square waveform, f = 50 Hz, T = 1/f

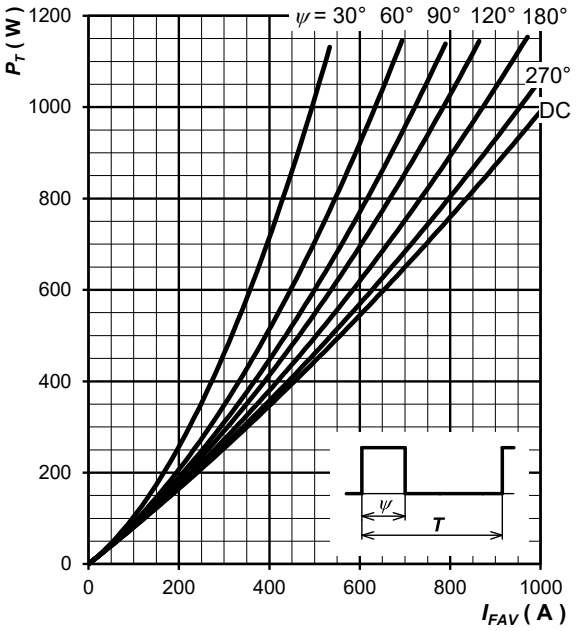


Fig. 7 Max. case temperature vs. aver. forward current, sine waveform, f = 50 Hz, T = 1/f

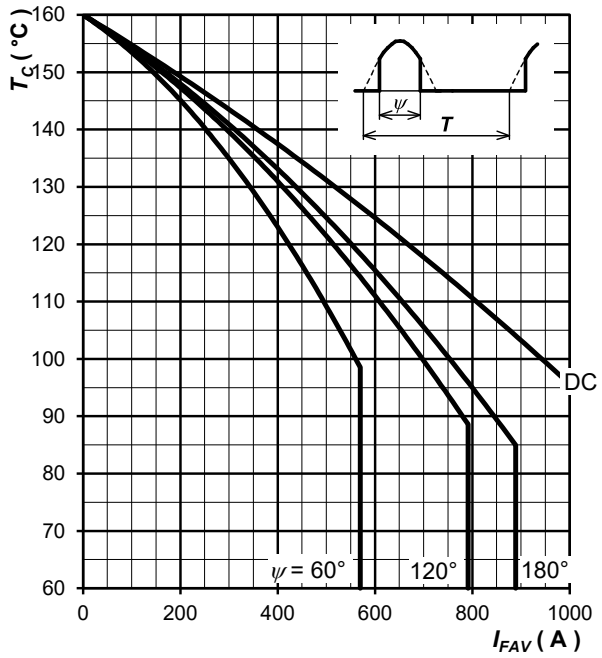
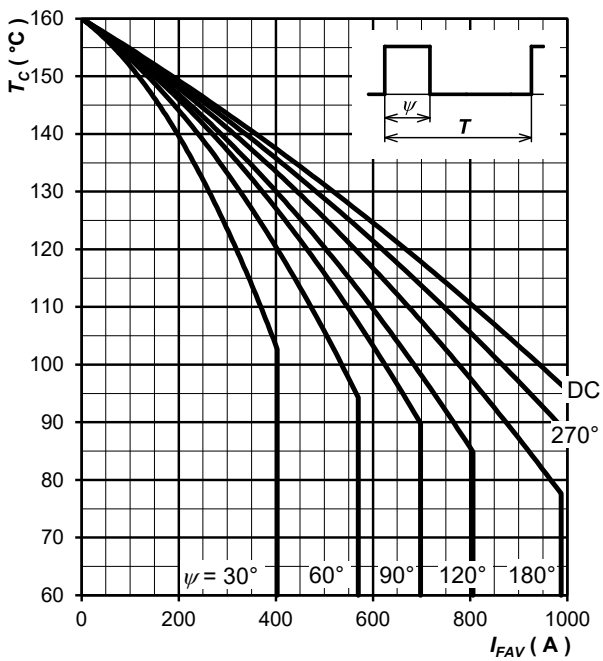


Fig. 8 Max. case temperature vs. aver. forward current, square waveform, f = 50 Hz, T = 1/f



Note: Figures number 5 ÷ 8 have been calculated without considering any forward and reverse recovery losses. They are valid for f = 50 or 60 Hz operation.

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