



# 5SDD 71X0400

Old part no. DS 808X-7110-04

## Welding diode

### Properties

- High forward current capability
- Low forward and reverse recovery losses
- High operational reliability

### Applications

- Welding equipment
- High current application up to 2000 Hz

### Key parameters

$V_{RRM}$	=	400	V
$I_{FAVm}$	=	7 110	A
$I_{FSM}$	=	55 000	A
$V_{TO}$	=	0.740	V
$r_T$	=	0.026	mΩ

### Types

type	$V_{RRM}$
5SDD 71X0400	400 V
Conditions: $T_j = -40 \div 170 \text{ }^\circ\text{C}$ , half sine waveform, $f = 50 \text{ Hz}$	

### Mechanical data

$F_m$	Mounting force	22 ± 2 kN
$m$	Weight	0.14 kg
$D_s$	Surface creepage distance	4 mm
$D_a$	Air strike distance	4 mm

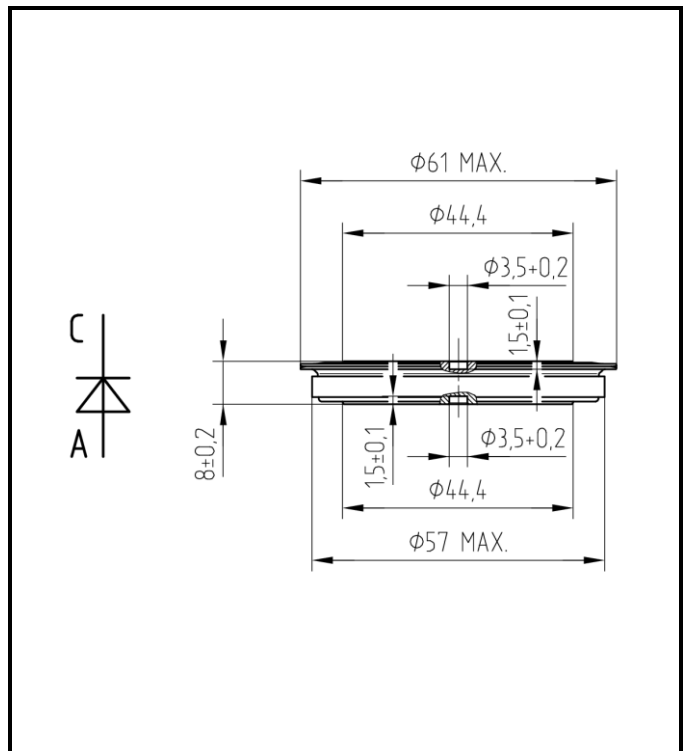


Fig. 1 Case



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<b>Maximum Ratings</b>		<b>Maximum Limits</b>	<b>Unit</b>
$V_{RRM}$	<b>Repetitive peak reverse voltage</b> $T_j = -40 \div 170 \text{ }^\circ\text{C}$	<b>400</b>	<b>V</b>
$I_{FAVm}$	<b>Average forward current</b> $T_c = 85^\circ\text{C}$	<b>7 110</b>	<b>A</b>
$I_{FRMS}$	<b>RMS forward current</b> $T_c = 85^\circ\text{C}$	<b>11 200</b>	<b>A</b>
$I_R$	<b>Repetitive reverse current</b> $V_R = V_{RRM}$	<b>50</b>	<b>mA</b>
$I_{FSM}$	<b>Nonrepetitive peak surge current</b> $t_p = 10 \text{ ms}, V_R = 0 \text{ V}, \text{ half sine pulse}$	<b>55 000</b>	<b>A</b>
$Pt$	<b>Limiting load integral</b> $t_p = 10 \text{ ms}, V_R = 0 \text{ V}, \text{ half sine pulse}$	<b>15 125 000</b>	<b>A<sup>2</sup>s</b>
$T_{jmin} - T_{jmax}$	<b>Operating temperature range</b>	<b>- 40 <math>\div</math> 170</b>	<b>°C</b>
$T_{stgmin} - T_{stgmax}$	<b>Storage temperature range</b>	<b>- 40 <math>\div</math> 170</b>	<b>°C</b>

Unless otherwise specified  $T_j = 170 \text{ }^\circ\text{C}$

<b>Characteristics</b>		<b>Value</b>			<b>Unit</b>
		<b>min</b>	<b>typ</b>	<b>max</b>	
$V_{TO}$	<b>Threshold voltage</b>			<b>0.740</b>	<b>V</b>
$r_T$	<b>Forward slope resistance</b> $I_{F1} = 5\,000 \text{ A}, I_{F2} = 15\,000 \text{ A}$			<b>0.026</b>	<b>m<math>\Omega</math></b>
$V_{FM}$	<b>Maximum forward voltage</b>	$I_{FM} = 5\,000 \text{ A}, T_j = 25 \text{ }^\circ\text{C}$	<b>0.95</b>	<b>1.00</b>	<b>V</b>
				<b>0.87</b>	
$Q_{rr}$	<b>Recovered charge</b> $I_{FM} = 1000 \text{ A}, di/dt = -30 \text{ A}/\mu\text{s}, V_R = 50 \text{ V}$		<b>300</b>		<b><math>\mu\text{C}</math></b>

Unless otherwise specified  $T_j = 170 \text{ }^\circ\text{C}$

<b>Thermal Specifications</b>			<b>Value</b>	<b>Unit</b>
$R_{thjc}$	<b>Thermal resistance junction to case</b>	<i>double side cooling</i>	<b>10</b>	<b>K/kW</b>
		<i>single side cooling</i>	<b>20</b>	<b>K/kW</b>
$R_{thch}$	<b>Thermal resistance case to heatsink</b>	<i>double side cooling</i>	<b>5</b>	<b>K/kW</b>
		<i>single side cooling</i>	<b>10</b>	<b>K/kW</b>

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**Analytical function for transient thermal impedance**

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

$F_m = 22 \pm 2$  kN, Double side cooled

$i$	1	2	3	4
$R_i$ (K/kW)	8.7977	0.6405	0.4702	0.0994
$\tau_i$ (s)	0.1052	0.017	0.0042	0.0002

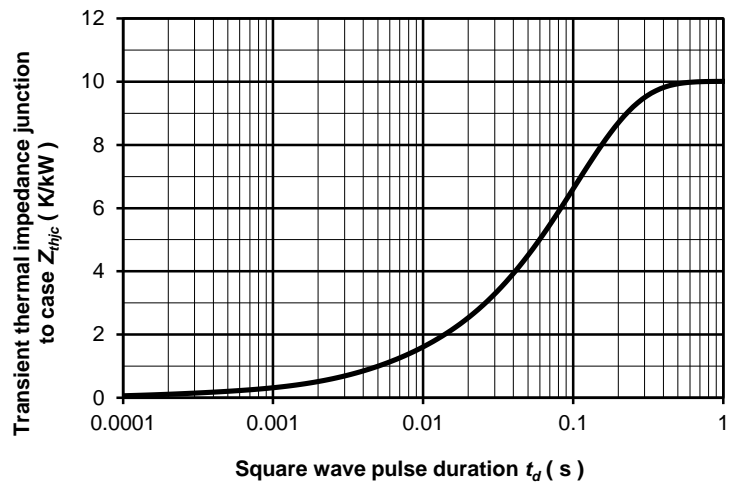


Fig. 2 Dependence transient thermal impedance junction to case on square pulse

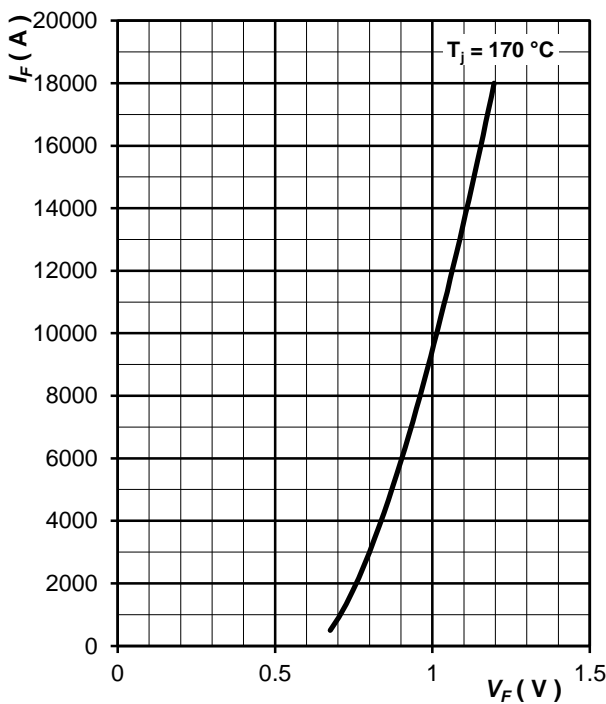


Fig. 3 Maximum forward voltage drop characteristics

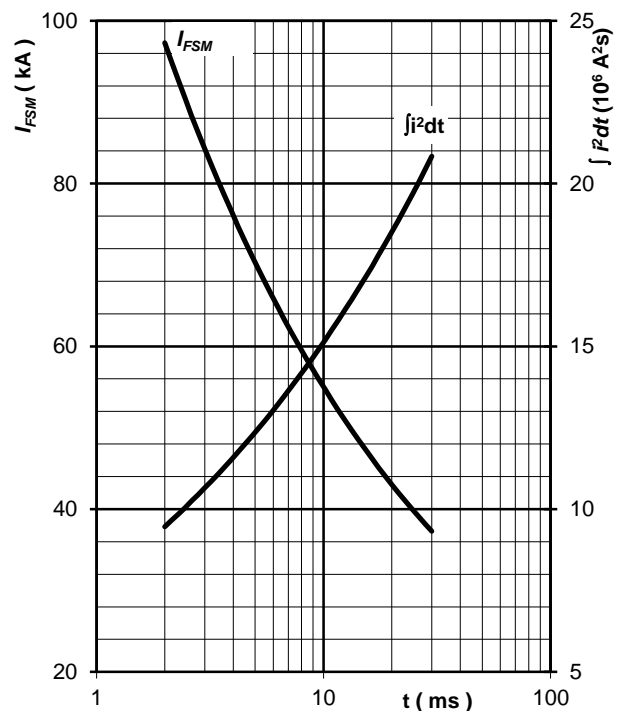


Fig. 4 Surge forward current vs. pulse length, half sine wave, single pulse,  $V_R = 0$  V,  $T_j = T_{jmax}$

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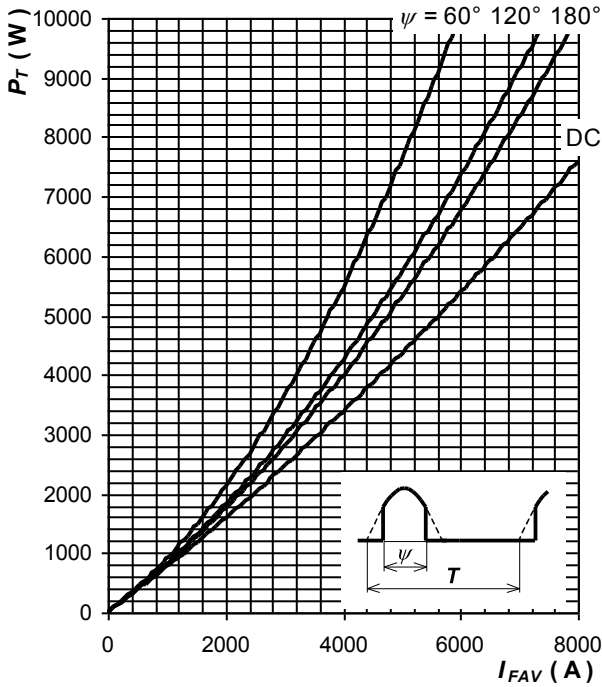


Fig. 5 Forward power loss vs. average forward current, sine waveform,  $f = 50$  Hz

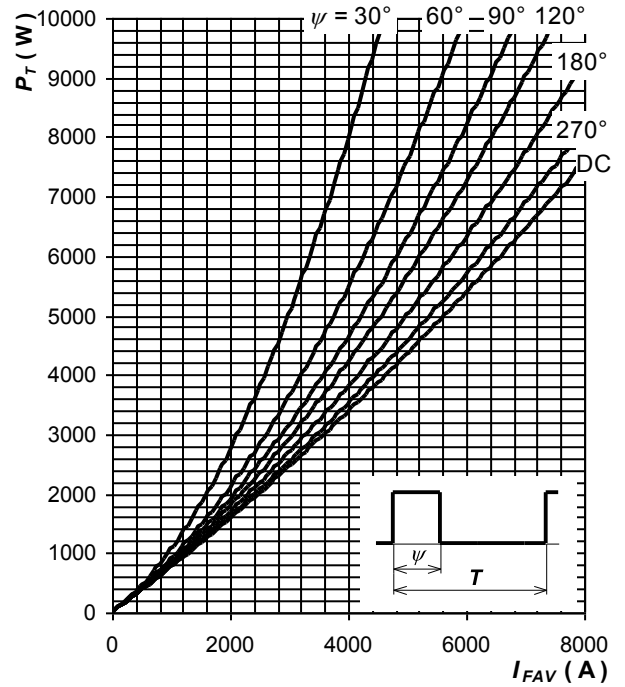


Fig. 6 Forward power loss vs. average forward current, square waveform,  $f = 50$  Hz

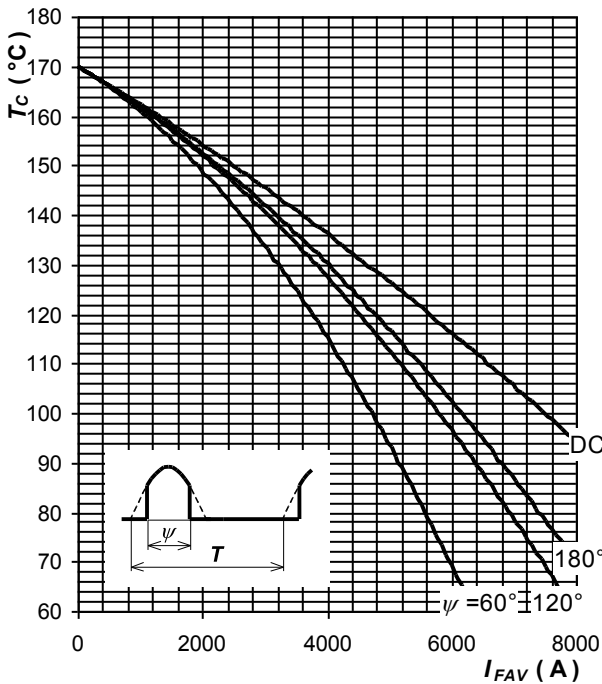


Fig. 7 Max. case temperature vs. aver. forward current, sine waveform,  $f = 50$  Hz

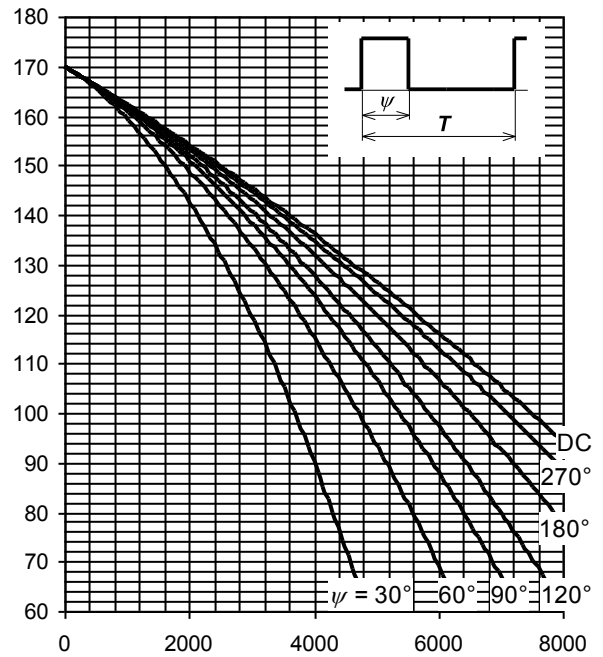


Fig. 8 Max. case temperature vs. aver. forward current, square waveform,  $f = 50$  Hz

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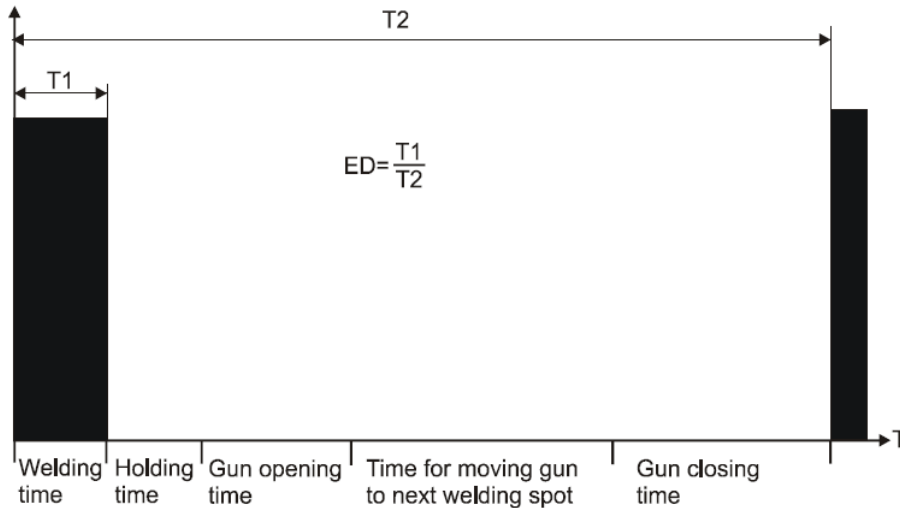


Fig. 9 Definition of ED for typical welding sequence

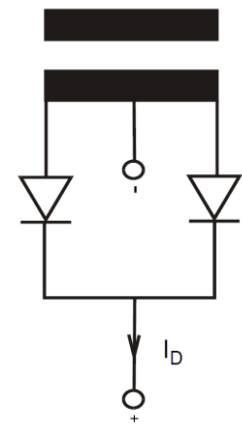


Fig. 10 Definition of  $I_D$  for single-phase centre tap

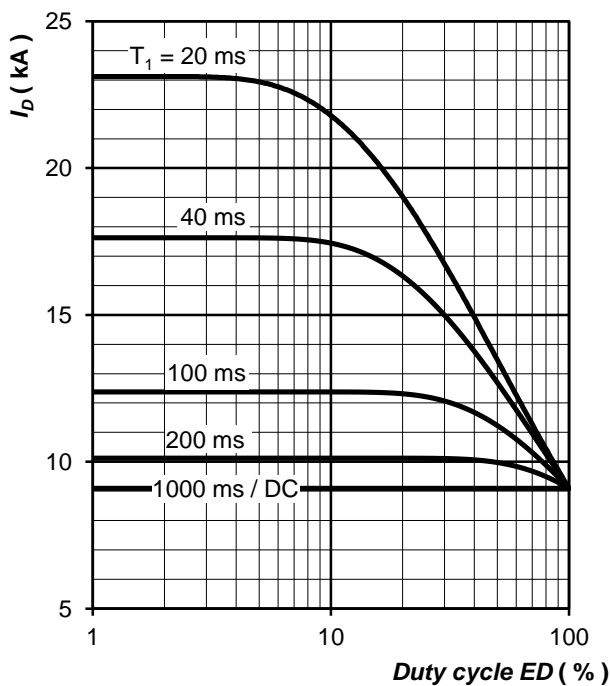


Fig. 11 Current load capacity, cont.,  
DC output welding current with single-phase  
centre tap vs. duty cycle  
 $f = 1000 \text{ Hz}$ , square wave,  $\Delta T_j = 80 \text{ }^\circ\text{C}$

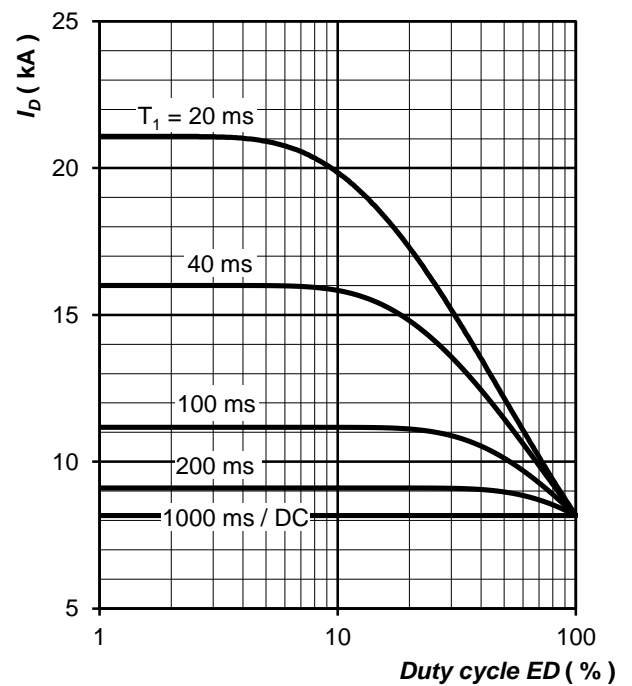


Fig. 12 Current load capacity, cont.,  
DC output welding current with single-phase  
centre tap vs. duty cycle  
 $f = 1000 \text{ Hz}$ , square wave,  $\Delta T_j = 70 \text{ }^\circ\text{C}$

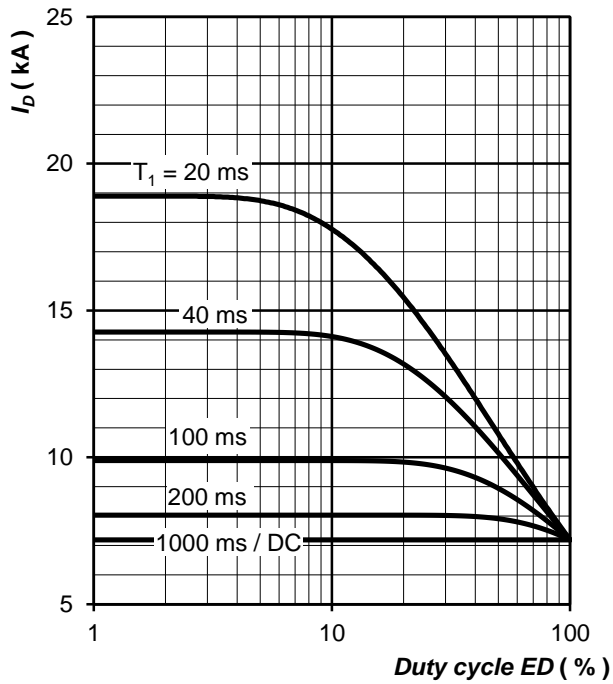


Fig. 13 Current load capacity, cont.,  
DC output welding current with single-phase  
centre tap vs. duty cycle  
 $f = 1000 \text{ Hz}$ , square wave,  $\Delta T_j = 60 \text{ }^\circ\text{C}$

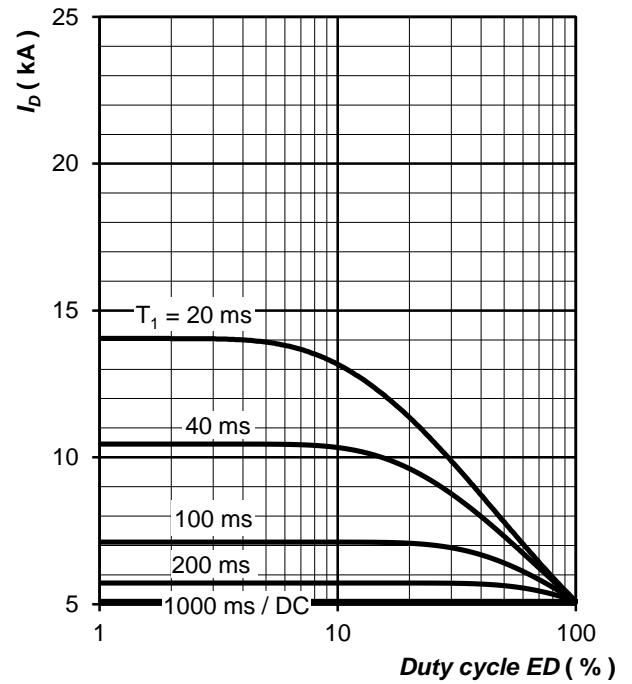


Fig. 14 Current load capacity, cont.,  
DC output welding current with single-phase  
centre tap vs. duty cycle  
 $f = 1000 \text{ Hz}$ , square wave,  $\Delta T_j = 40 \text{ }^\circ\text{C}$

Notes: