

Ti60F225ES功耗测试工程

逻辑详细设计

综合后模块资源分布

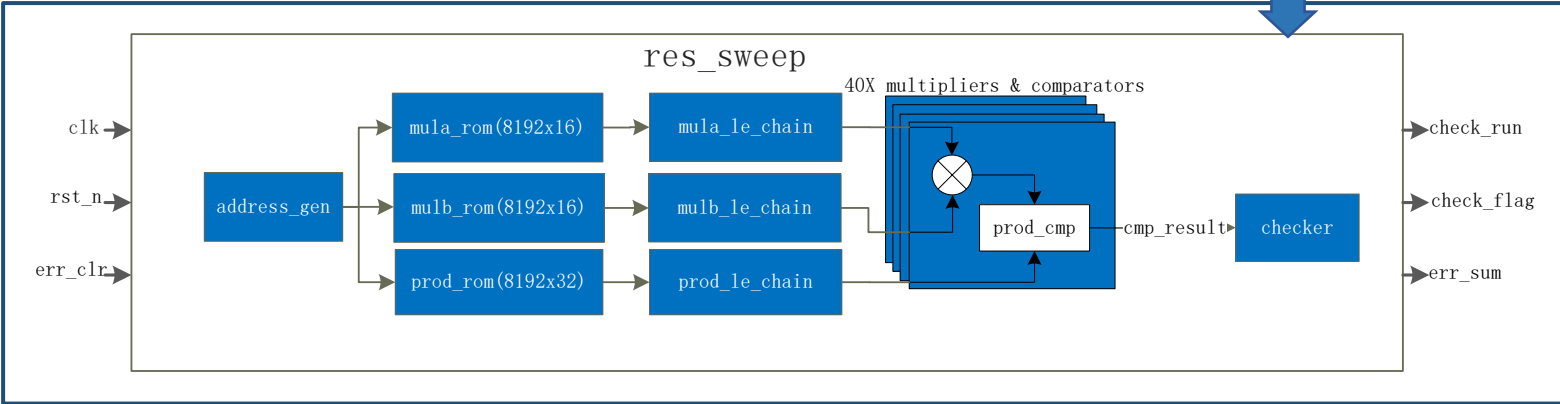
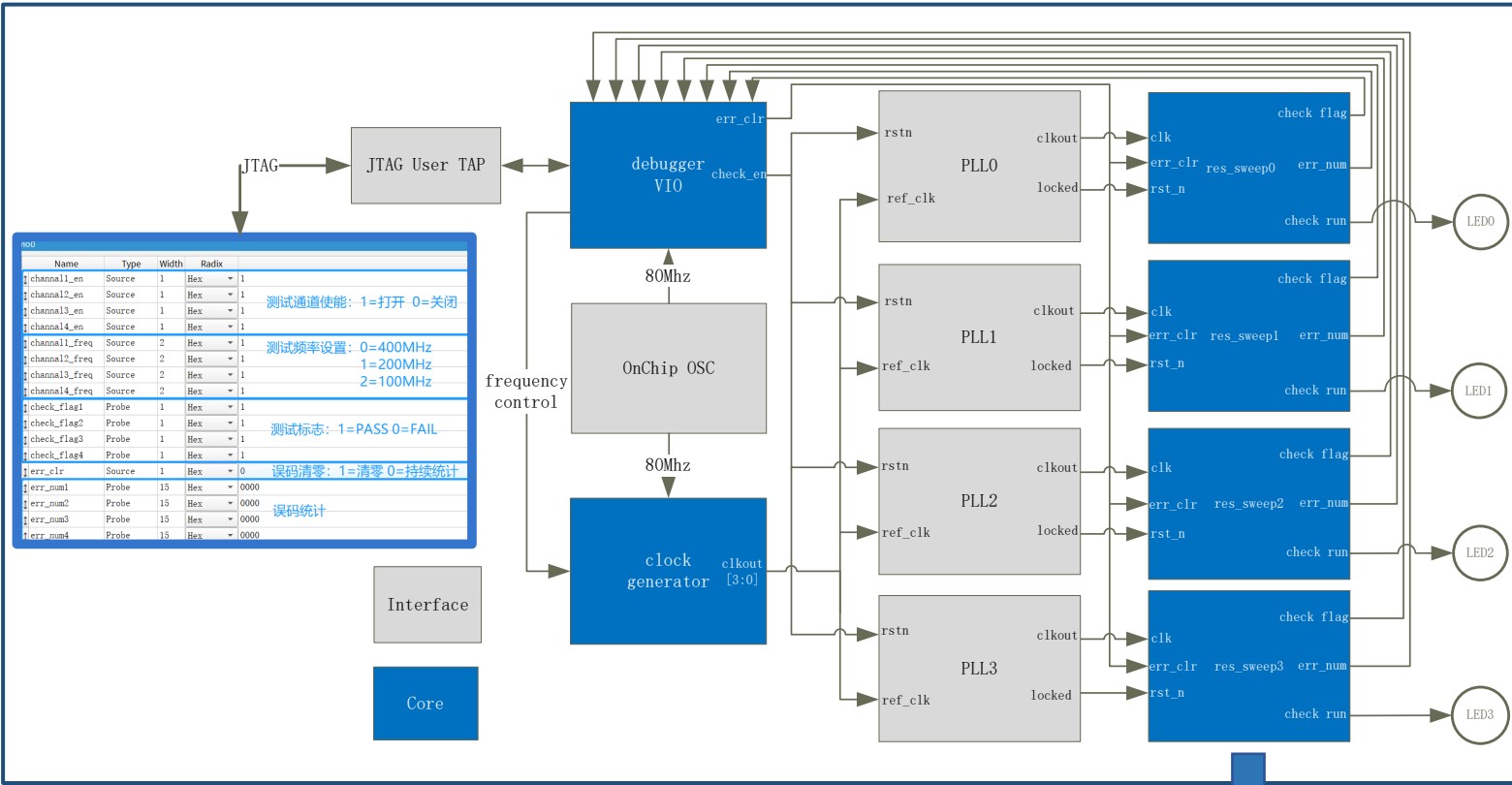
Module	FFs	ADDs	LUTs	RAMs	DSP/MULTs
res_sweep_top:res_sweep_top	56331(7)	220(0)	59161(10)	256(0)	160(0)
▶ edb_top_inst:edb_top	364(0)	24(0)	259(0)	0(0)	0(0)
▶ res_sweep_inst1:res_sweep...	13990(0)	49(0)	14723(0)	64(0)	40(0)
▶ res_sweep_inst2:res_sweep...	13990(0)	49(0)	14723(0)	64(0)	40(0)
▶ res_sweep_inst3:res_sweep...	13990(0)	49(0)	14723(0)	64(0)	40(0)
▶ res_sweep_inst4:res_sweep...	13990(0)	49(0)	14723(0)	64(0)	40(0)

P&R总资源占用

Core Resources	
Inputs	20 / 1411
Outputs	21 / 2252
XLRs	59672 / 60800
Memory Blocks	256 / 256
DSP Blocks	160 / 160

时序报告

Timing	
Least Slack	0.324 ns
jtag_inst1_TCK	191.137 MHz
clk	678.254 MHz
check_clk1	459.494 MHz
check_clk2	470.449 MHz
check_clk3	465.936 MHz
check_clk4	466.582 MHz



5CEFA5FA23功耗测试工程

逻辑详细设计

综合后模块资源分布

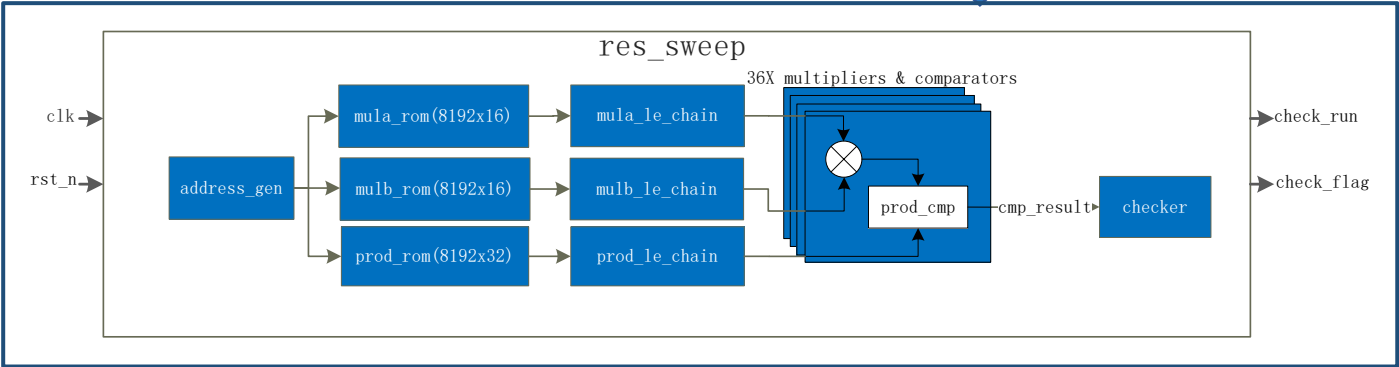
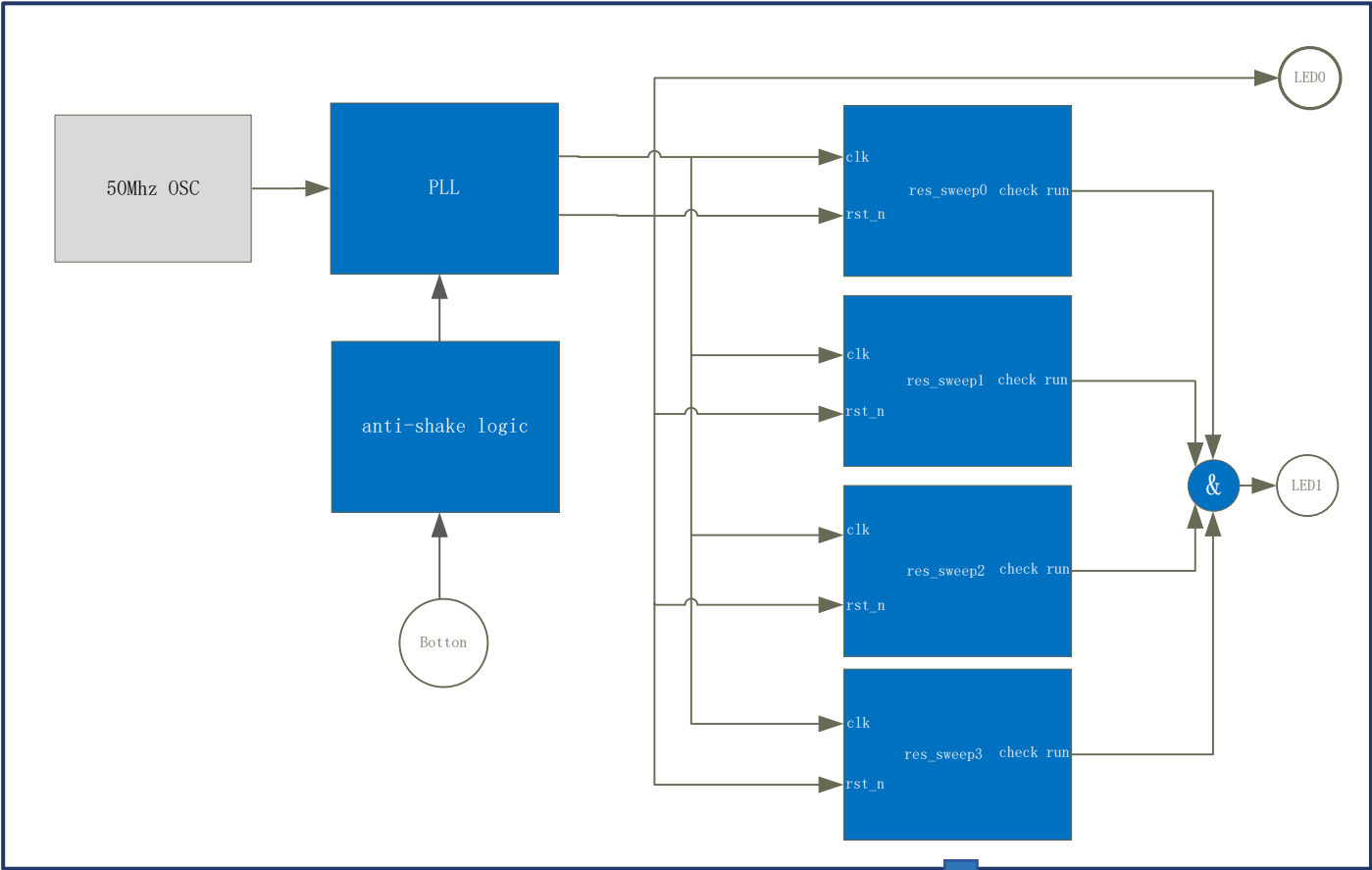
Compilation Hierarchy Node	Combinational ALUTs	Dedicated Logic Registers	Block Memory Bits	DSP Blocks
res_sweep_top	57252 (23)	60634 (45)	2097152	148
> pll_50Min:pll_50Min_inst	0 (0)	0 (0)	0	0
> res_sweep:res_sweep_inst1	14317 (0)	15157 (0)	524288	37
> res_sweep:res_sweep_inst2	14304 (0)	15144 (0)	524288	37
> res_sweep:res_sweep_inst3	14304 (0)	15144 (0)	524288	37
> res_sweep:res_sweep_inst4	14304 (0)	15144 (0)	524288	37

P&R总资源占用

Top-level Entity Name	res_sweep_top
Family	Cyclone V
Device	5CEFA5F23I7
Timing Models	Final
Logic utilization (in ALMs)	28,910 / 29,080 (99 %)
Total registers	55845
Total pins	4 / 240 (2 %)
Total virtual pins	0
Total block memory bits	2,097,152 / 4,567,040 (46 %)
Total RAM Blocks	256 / 446 (57 %)
Total DSP Blocks	148 / 150 (99 %)
Total HSSI RX PCSs	0
Total HSSI PMA RX Deserializers	0
Total HSSI TX PCSs	0
Total HSSI PMA TX Serializers	0
Total PLLs	1 / 6 (17 %)
Total DLLs	0 / 4 (0 %)

时序报告

	Fmax	Restricted Fmax	Clock Name
1	197.63 MHz	197.63 MHz	clk_50M
2	220.07 MHz	220.07 MHz	pll_50Min_inst pll_50min_inst alt...0].gpll~PLL_OUTPUT_COUNTER divclk



测试环境

- 5CEFA5FA23核心板一块
- Ti60F225ES开发板一块
- UT320D双通道热电偶测试仪一台
- Quartus prime 18.1
- EFINITY 2020.2.M.76



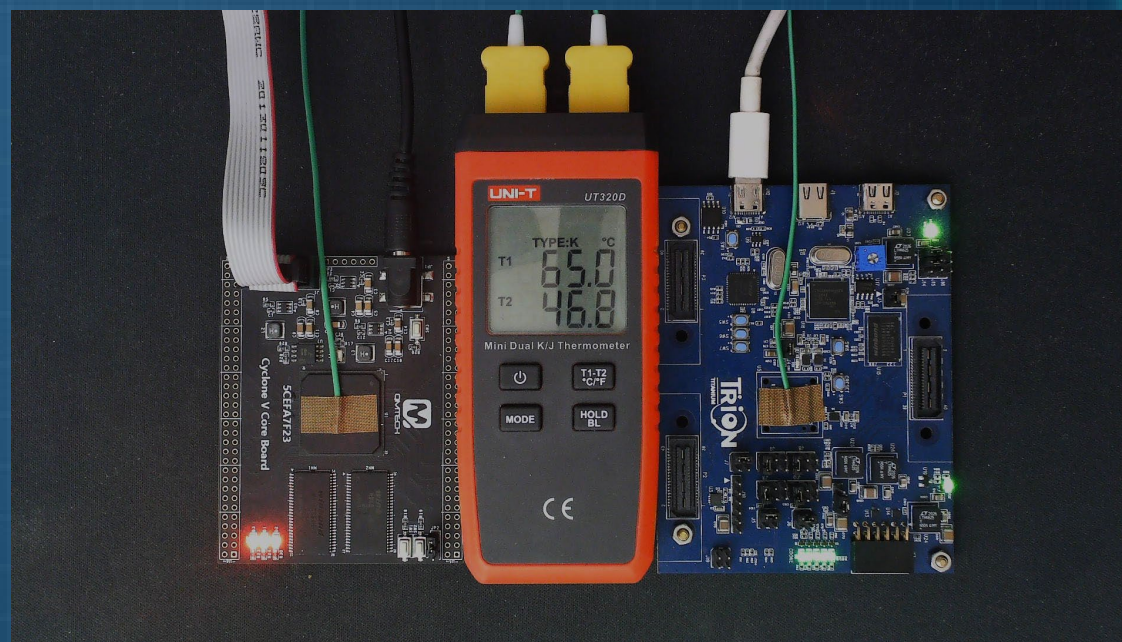
Ti60F225ES VS 5CEFA5FA23

环境温度

5CEFA5FA23	22.4°C
Ti60F225ES	22.6°C

AF≈12.5%@200MHz

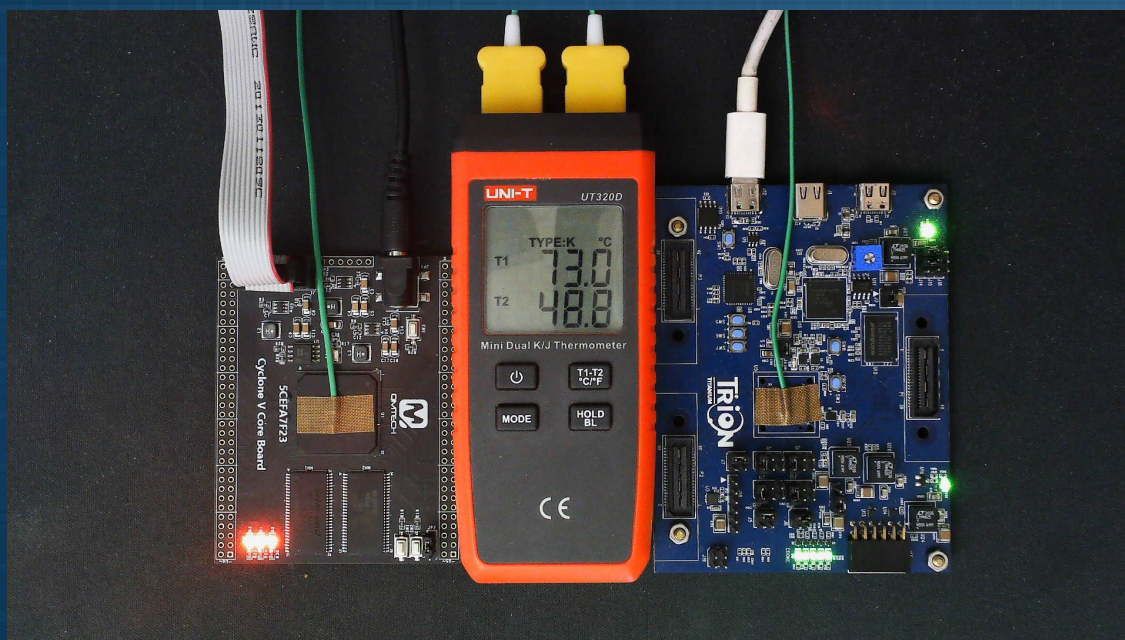
5CEFA5FA23	65.0°C
Ti60F225ES	46.8°C



Ti60F225ES VS 5CEFA5FA23

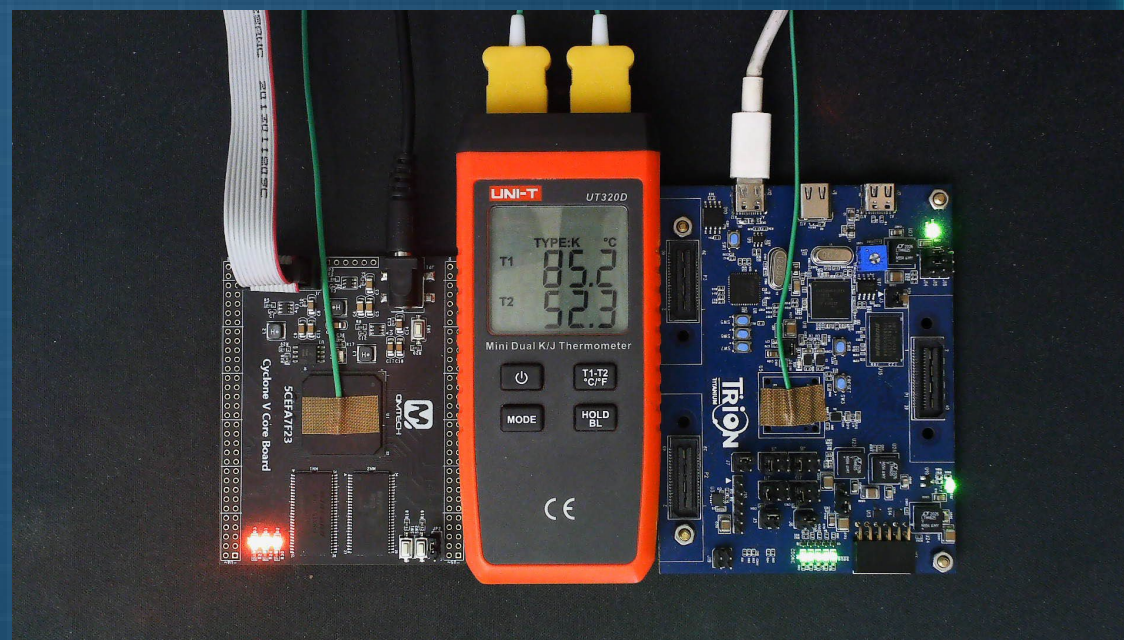
AF≈25%@200MHz

5CEFA5FA23	73.0°C
Ti60F225ES	48.8°C



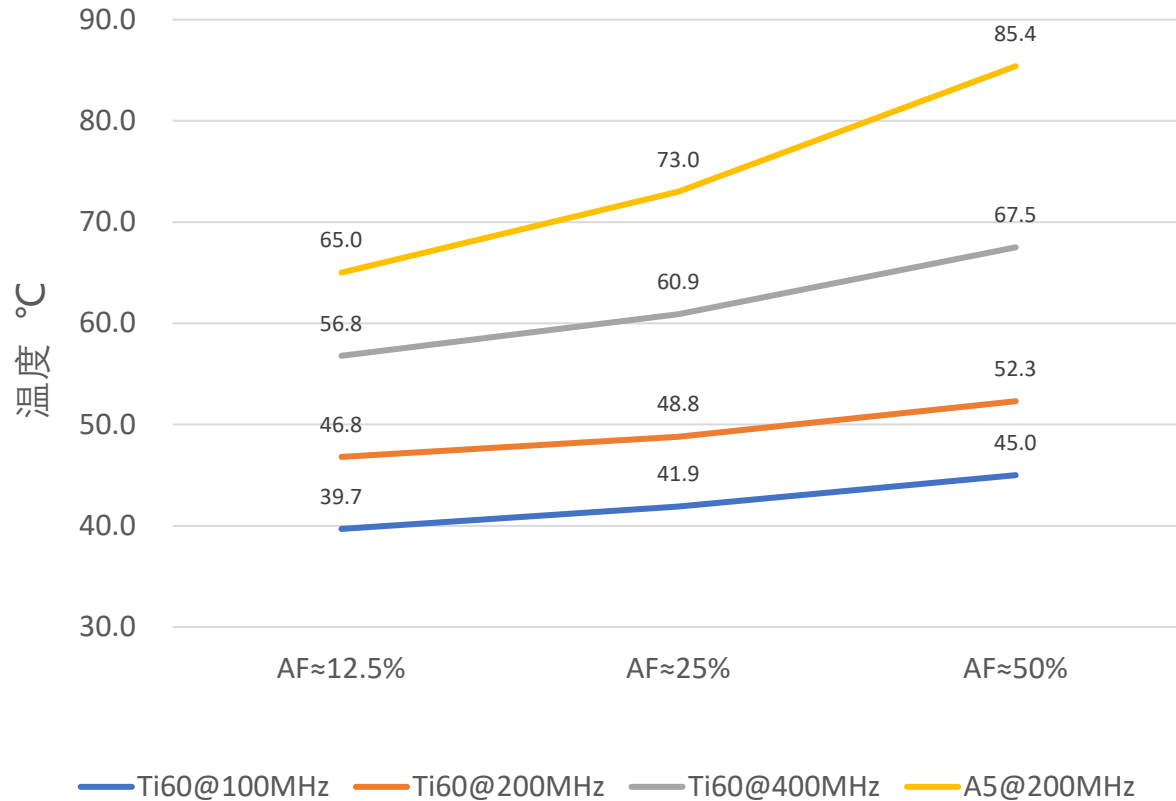
AF≈50%@200MHz

5CEFA5FA23	85.2°C
Ti60F225ES	52.3°C

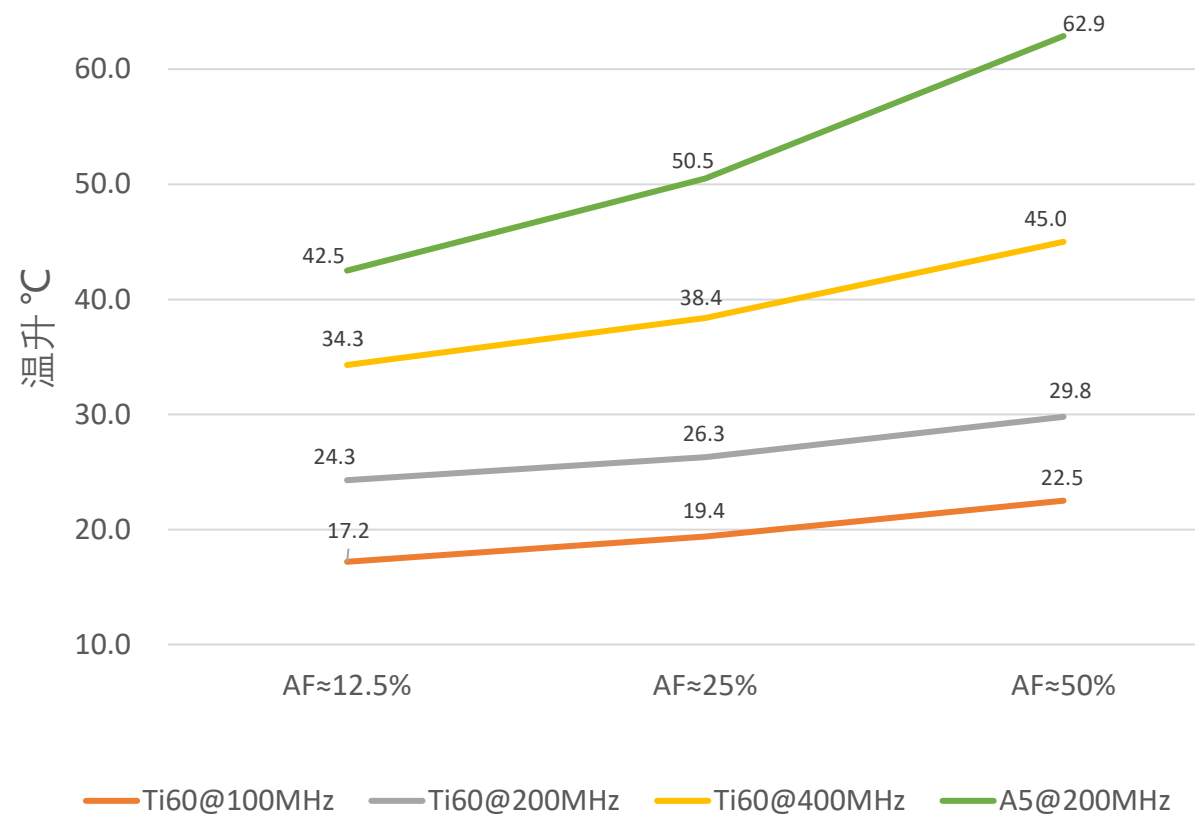


工作频率 & 数据翻转率 VS 温度 & 温升

工作频率 & 数据翻转率 VS 温度



工作频率&数据翻转率 VS 温升



工作频率 & 数据翻转率 VS 功耗

5CEFA5FA23		P=(Tj-Ta)/Theta-JA
Theta-JA(°C/W)	17.2	
Ta(°C)	22.5	
Ti60F225ES		
Theta-JA(°C/W)	38.25①	
Ta(°C)	22.5	

① Ti60F225ES 的 Theta-JA 参照了 T20F169

