APPLICATION NOTE

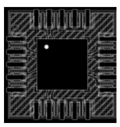
REPLACEMENT PART REFERENCE GUIDE, YSW-2-50DR+ AN-80-016

ORIGINAL PART: YSW-2-50DR+
REPLACEMENT PART: M3SWA-2-50DRA+

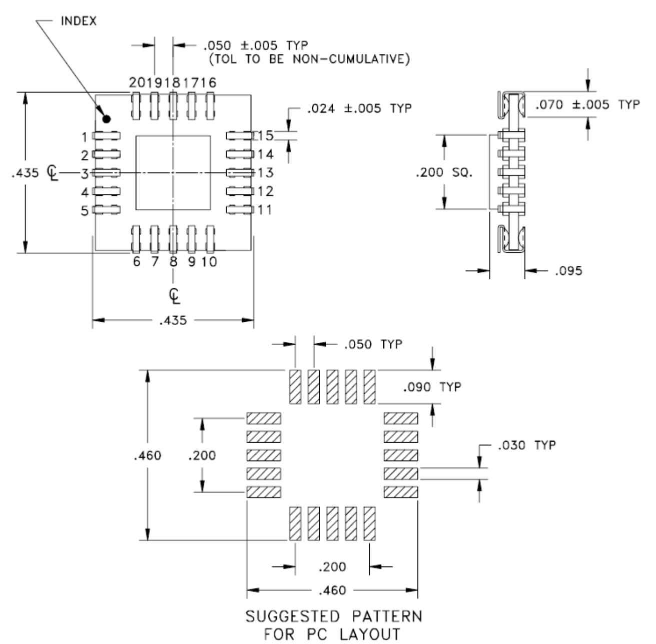
Replacement Part has been judged by Mini-Circuits Engineering as a close replacement to Original Part[a]

MECHANICAL DIMENSIONS & PCB LAND PATTERN

ORIGINAL PART: YSW-2-50DR+



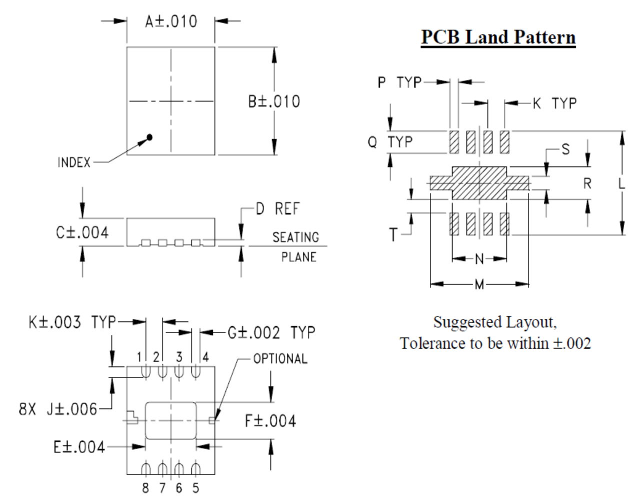
Case Style 99-01-560



REPLACEMENT PART: M3SWA-2-50DRA+

Case Style DL805

Outline Dimensions



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K
0.128	0.128	0.035	0.008	0.080	0.047	0.013	–	0.014	0.026
3.25	3.25	0.89	0.20	2.03	1.19	0.33	--	0.36	0.66

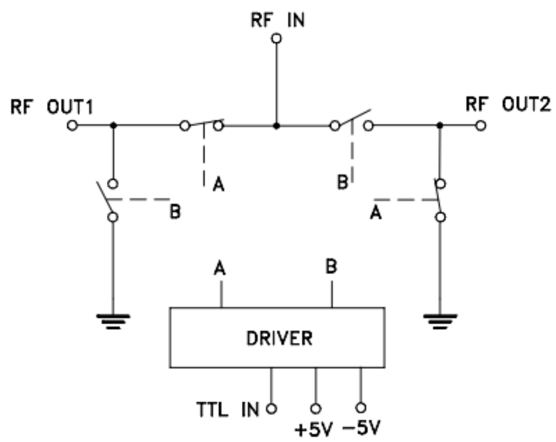
L	M	N	P	Q	R	S	T	wt grams
0.158	0.158	0.084	0.013	0.030	0.048	0.020	0.025	
4.01	4.01	2.13	0.33	0.76	1.22	0.51	0.64	0.02

Original Part Marking	Replacement Part Marking
• WYW	•
+	3SWA
MCL	WYW
YSW	MCL

Notes:
a. Suitability for model replacement within a particular system must be determined by and is solely the responsibility of the customer based on, among other things, electrical performance criteria, stimulus conditions, application, compatibility with other components and environmental conditions and stresses.

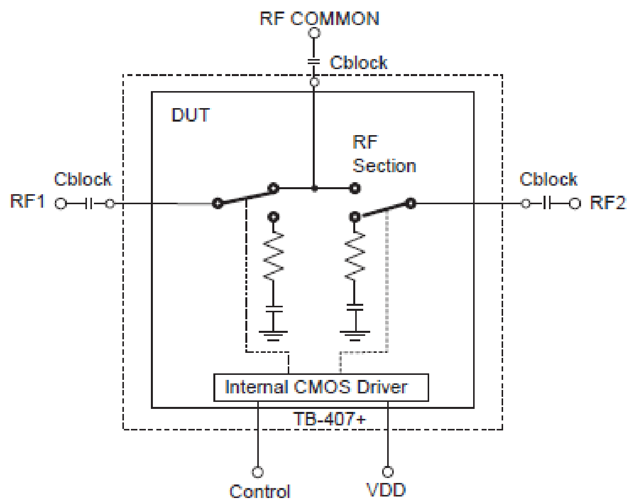
ORIGINAL PART: YSW-2-50DR+	REPLACEMENT PART: M3SWA-2-50DRA+

Application Circuit (Original Part: YSW-2-50DR+)



All RF connections must be DC blocked or held at 0V DC.

Application Circuit (Replacement Part: M3SWA-2-50DRA+)



Needs external blocking Capacitors on all RF ports

(Suggested value: 47 pF)

Pin Connections (Original Part: YSW-2-50DR+)

Function	Pin
RF IN	4
RF OUT 1	12
RF OUT 2	14
Control	2
+5V	19
-5V	7
NOT USED	9,17
GND EXT	ALL OTHER

Pin Connections (Replacement Part: M3SWA-2-50DRA+)

Function	Pin
RF IN	6
RF OUT 1	1
RF OUT 2	4
CMOS IN (Note 1)	2
VDD (+3 to +5V)	5
No Connection (Note 2)	7
CMOS GND (Note 1)	3
GND	8
GND	PADDLE

Notes: Pin Connections are same as in original part, except Pin 7 has no internal connection

1) Driver is CMOS compatible instead of TTL
2) In replacement situations, -5V can be applied to Pin 7 with no impact on performance

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CONCLUSIONS:

1) **FORM-FIT-FUNCTION COMPATIBLE[a]**:

Replacement part is not Form-Fit compatible. Customer PCB layout need to change plus external blocking Capacitors on RF ports are needed.
Following is a summary of Electrical changes/improvements:

Typical performance: See Paragraphs 2

Min/Max Specifications seen below,

Parameter	Original Part (YSWA-2-50DR+)	Replacement Part (M3SWA-2-50DRA+)
Positive Power Supply (V_{DD})	4.9 to 5.5V	+3V to +5.0V
Negative Power Supply(V_{SS})	-5.5 to -4.9V	Not Required
Control Input Low Voltage	0V Min, 0.8V Max	0V Min, 0.5 Max
Control Input High Voltage	3.5V Min, 5.5VMax	$0.7V_{DD}$ to V_{DD}
+5V Positive Supply Current (I_{DD}) -5V Negative Supply Current (I_{SS})	16mA Typ. 20mA Max. 14mA Typ. 20mA Max	50 µA typ. , 200 µA max ---
Control Current	High V, 5mA Max, Low V, 0.2mA Max	0.2uA typ., 10 uA max
Rise/Fall Time (10 to 90%)	6ns typ. 12ns Max	16 ns Typ.
Switching Time (turn on/off) 50% Control to 90% RF/10% RF	20ns typ. 40ns Max	29 ns Typ.
P1dB (dBm) at V_{DD}=5V typ. Over	DC to 500MHz 20 Typ. 15Min. 500-2000MHz 23 Typ. 19Min. 2000-5000MHz 21 Typ. 18 Min	100- 1000MHz 23 Typ. 1000-2000MHz 30 Typ. 2000- 4500MHz 26 Typ.
ESD HBM	Class1C (1000 to <2000V)	Class 1A (250 to < 500V)
Absorptive	No	Yes, from 500-4500 MHz (See Paragraph 3)
DC Blocking Caps on RF ports	All RF connections must be DC blocked or held at 0V DC.	Needs external blocking Capacitors on all RF ports (Suggested value: 47 pF)

Notes:
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2) PERFORMANCE COMPARISON CURVES: Original Part (Vdd = 4.6 &-4.6V, Vctrl = 0 & 5V) Replacement Part (Vdd =5V, Vctrl = 0 & 3.7V)

Replacement Guide	Freq (MHz)		M3SWA-2-50DRA+ 5 Units @Vdd = 5V @Vctrl = 0V & 3.7V			YSW-2-50DR+ 20 Units @Vdd = -4.6V&4.6V @Vctrl = 0,5V		
	From	To	Min.	Avg.	Max.	Min.	Avg.	Max.
INSERTION LOSS S-1 (dB)	10	10	0.6	0.6	0.6	0.5	0.6	0.6
	100	100	0.7	0.7	0.7	0.6	0.6	0.6
	1000	1000	0.8	0.8	0.8	0.8	0.8	0.8
	2000	2000	1.0	1.0	1.1	1.0	1.1	1.1
	4500	4500	1.4	1.5	1.6	1.5	1.5	1.5
INSERTION LOSS S-2 (dB)	10	10	0.6	0.6	0.6	0.5	0.5	0.6
	100	100	0.6	0.6	0.7	0.6	0.6	0.6
	1000	1000	0.8	0.8	0.8	0.7	0.8	0.8
	2000	2000	1.0	1.0	1.0	0.9	0.9	0.9
	4500	4500	1.3	1.4	1.4	1.4	1.4	1.5
ISOLATION S-1 (dB)	10	10	75.4	76.4	77.1	78.0	79.4	81.7
	100	100	65.9	66.0	66.2	60.8	61.3	62.0
	1000	1000	55.5	59.1	72.8	41.0	41.3	41.5
	2000	2000	42.1	43.5	48.2	33.7	34.0	34.2
	4500	4500	27.2	30.4	37.9	39.8	41.3	42.6
ISOLATION S-2 (dB)	10	10	69.9	70.3	70.9	76.8	78.6	80.8
	100	100	59.3	59.3	59.4	60.1	60.7	61.2
	1000	1000	61.0	62.6	65.9	40.2	40.6	41.0
	2000	2000	44.6	46.4	51.8	34.8	34.9	35.1
	4500	4500	27.7	30.9	38.3	38.0	39.2	39.6
RETURN LOSS S(ON1) (dB)	10	10	24.5	24.5	24.6	24.8	25.0	25.2
	100	100	24.6	24.7	24.7	25.2	25.4	25.7
	1000	1000	26.6	26.9	27.5	19.9	20.2	20.4
	2000	2000	21.5	22.1	23.4	15.8	16.0	16.4
	4500	4500	15.6	16.9	17.9	16.9	17.7	18.6
RETURN LOSS S(ON2) (dB)	10	10	23.5	24.0	24.3	25.0	25.2	25.4
	100	100	23.3	23.9	24.1	25.5	25.7	26.0
	1000	1000	23.7	24.3	24.7	25.3	25.7	26.1
	2000	2000	23.0	23.5	24.0	20.9	21.3	22.0
	4500	4500	16.2	17.4	18.3	17.2	18.1	19.4
RETURN LOSS 1(ON) (dB)	10	10	24.4	24.4	24.4	24.7	24.9	25.1
	100	100	24.5	24.6	24.6	25.4	25.6	25.9
	1000	1000	21.8	21.9	21.9	29.9	30.9	31.7
	2000	2000	17.9	18.1	18.4	14.0	14.3	14.7
	4500	4500	20.5	22.1	24.4	16.6	17.3	17.9
RETURN LOSS 2(ON) (dB)	10	10	23.2	23.8	24.0	24.8	25.0	25.2
	100	100	23.1	23.6	23.8	25.5	25.7	26.0
	1000	1000	22.6	23.1	23.3	27.8	28.5	29.3
	2000	2000	17.6	17.9	18.1	18.8	19.4	20.1
	4500	4500	23.4	25.4	28.1	16.9	17.8	18.7
RETURN LOSS 1(OFF) (dB)	10	10	0.1	0.1	0.1	3.1	3.2	3.3
	100	100	2.2	2.2	2.2	3.2	3.3	3.4
	1000	1000	20.8	21.2	21.5	3.0	3.1	3.2
	2000	2000	20.4	21.0	21.7	3.7	3.9	4.0
	4500	4500	13.3	13.7	14.2	4.0	4.2	4.4
RETURN LOSS 2(OFF) (dB)	10	10	0.1	0.1	0.1	3.1	3.2	3.3
	100	100	2.1	2.1	2.1	3.2	3.3	3.4
	1000	1000	20.3	20.5	20.9	3.3	3.4	3.5
	2000	2000	22.7	23.3	23.7	3.5	3.6	3.8
	4500	4500	14.3	14.9	15.4	4.0	4.2	4.4

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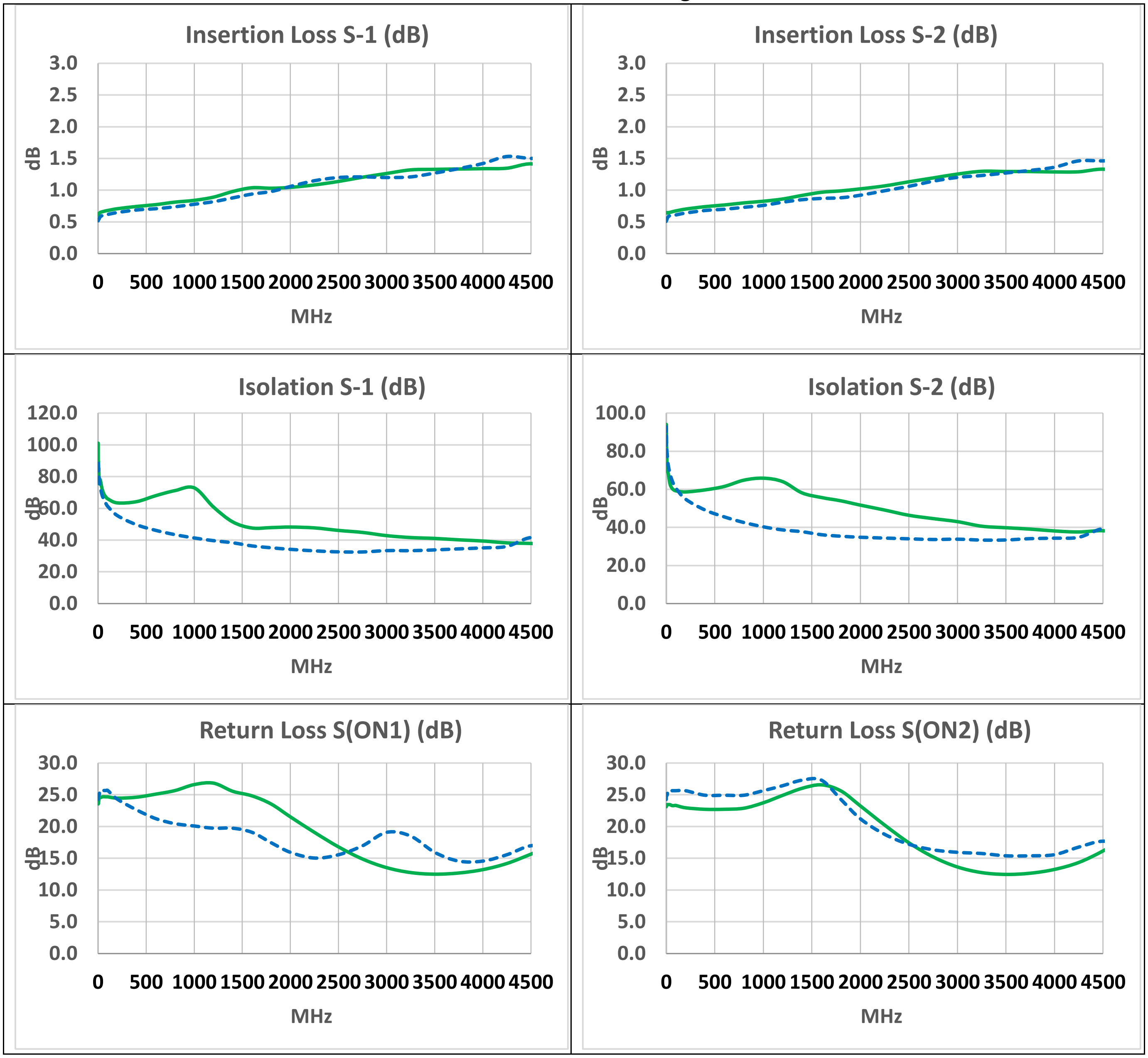
3) PERFORMANCE COMPARISON CURVES: Original Part (Vdd = 4.6 &-4.6V, Vctrl = 0 & 5V)
Replacement Part (Vdd =5V, Vctrl = 0 & 3.7V)

Data of Replacement Part
Data of Original Part



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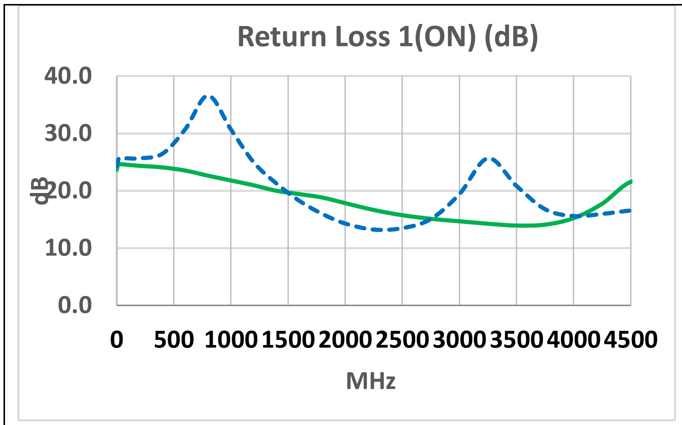

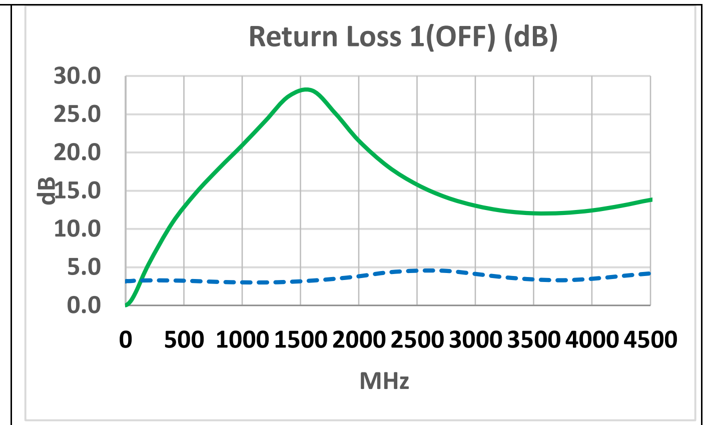

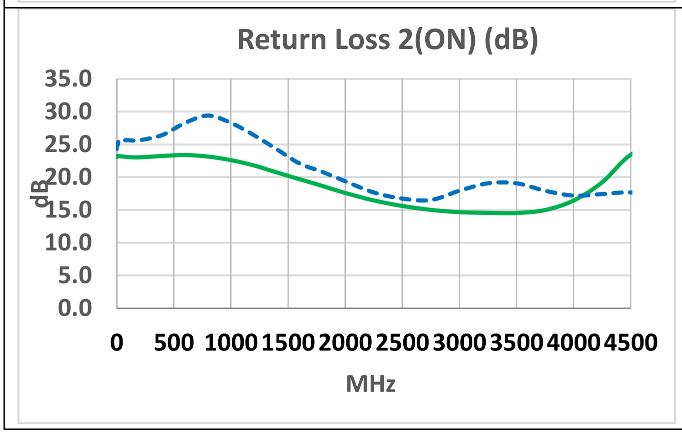

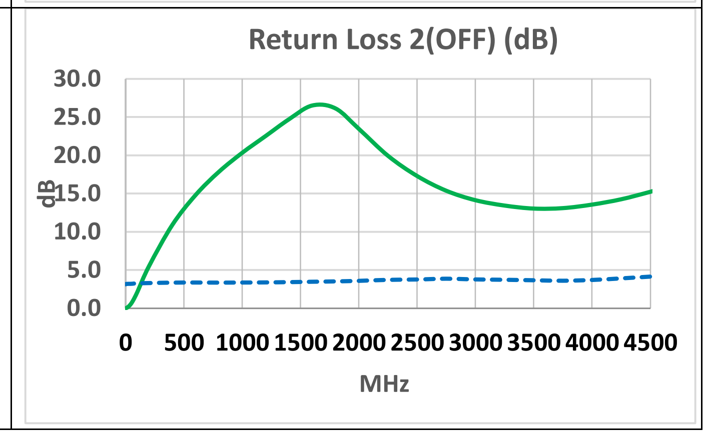

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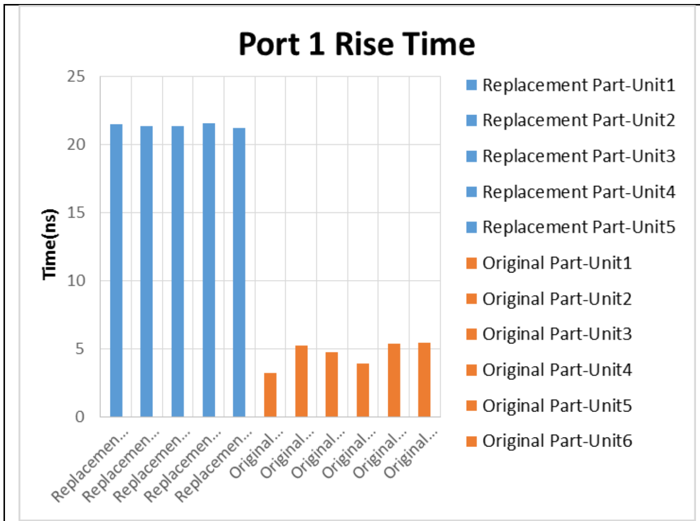
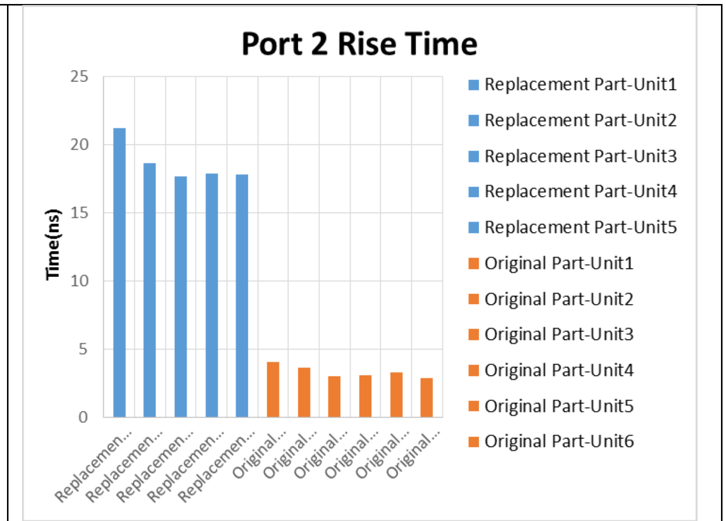
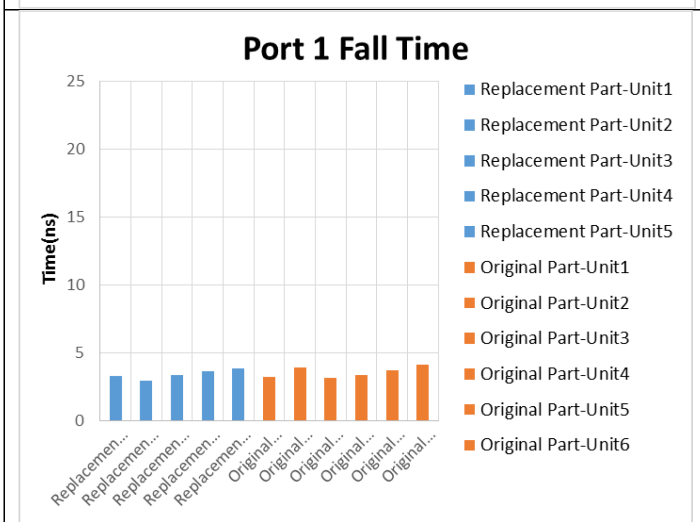
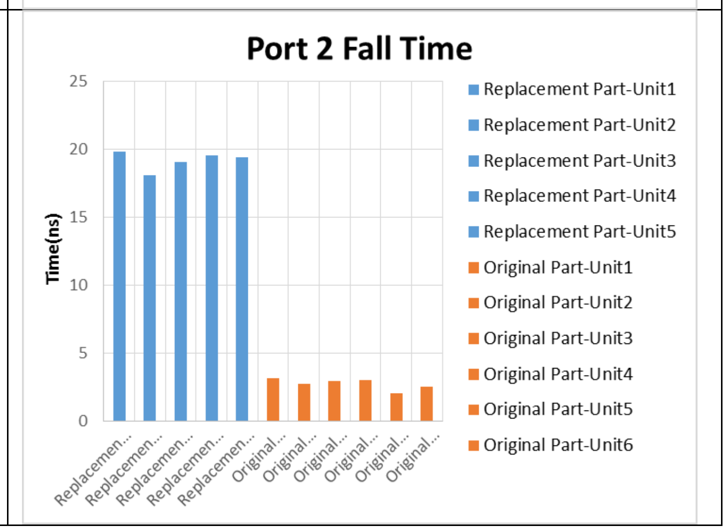
1) SWITCHING/RISE/FALL TIME COMPARISON (Original Part (Vdd = 5 &-5V, Vctrl = 0 & 3.7V)
Replacement Part (Vdd =5V, Vctrl = 0 & 3.7V)

Rise Time: 10 to 90% RF, Fall Time: 90% to 10% RF
Switching Time:
On Time 50% Control to 90%/10% RF, Fall Time 50% Control to 10% RF









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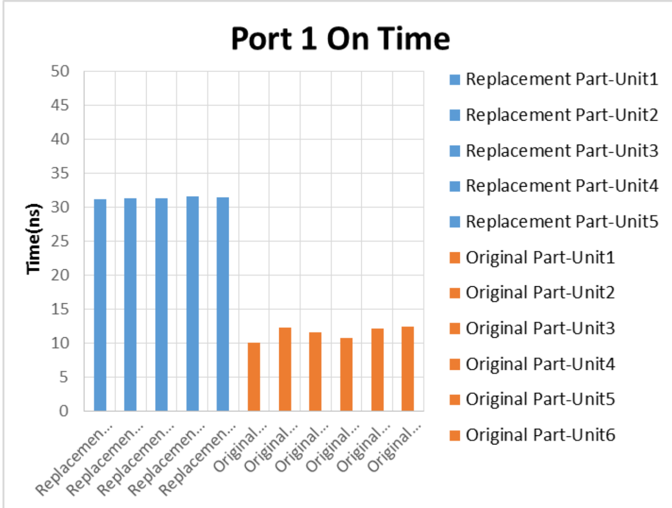

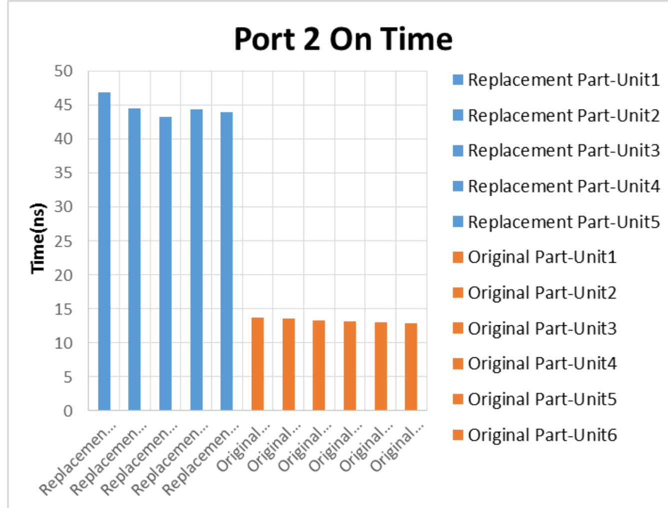

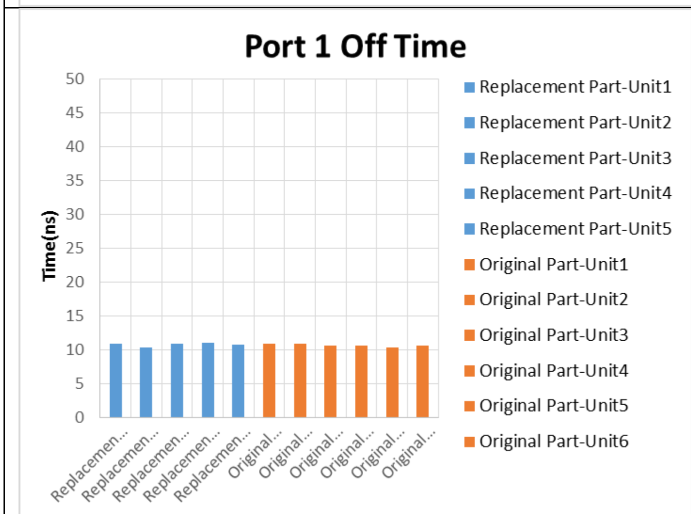

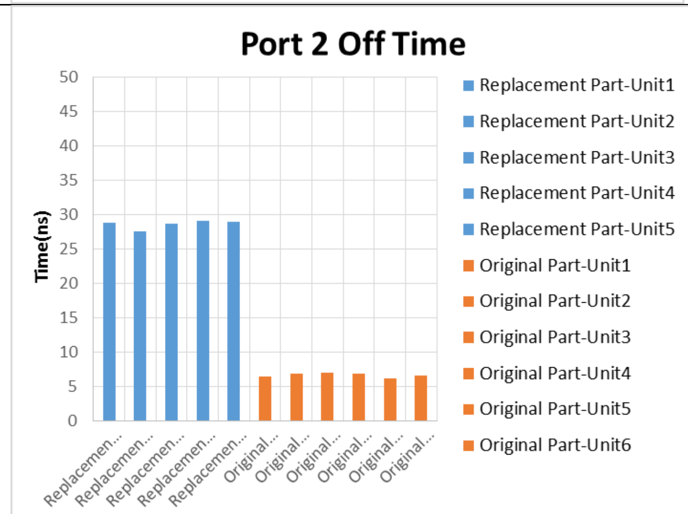

IMPORTANT NOTICE

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