REPLACEMENT PART REFERENCE GUIDE, M3SW-2-50DR+ AN-80-025

ORIGINAL PART: M3SW-2-50DR+
REPLACEMENT PART: M3SW-2-50DRA+

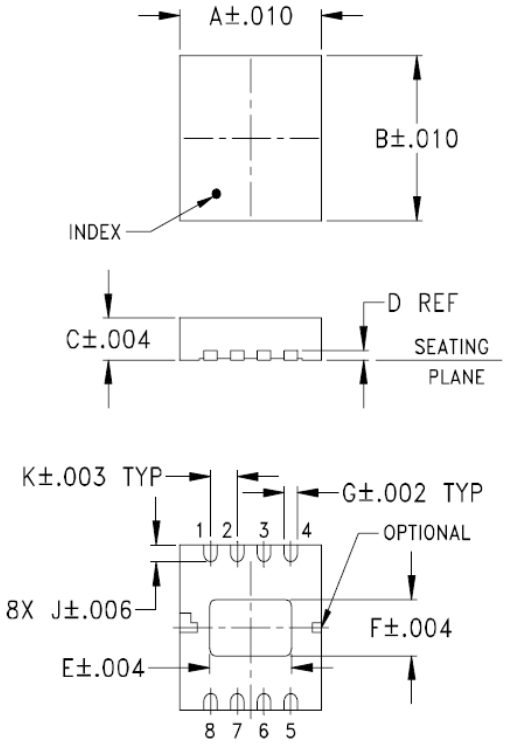
Replacement Part has been judged by Mini-Circuits Engineering as a close replacement to Original Part[a]

MECHANICAL DIMENSIONS & PCB LAND PATTERN

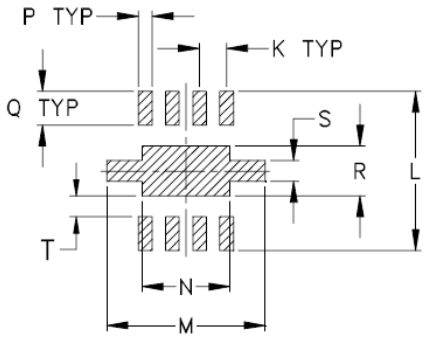
ORIGINAL PART: M3SW-2-50DR+	REPLACEMENT PART: M3SW-2-50DRA+

Case Style DL805 (No Change)

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

Marking	Marking
3SW	3SW

Notes:
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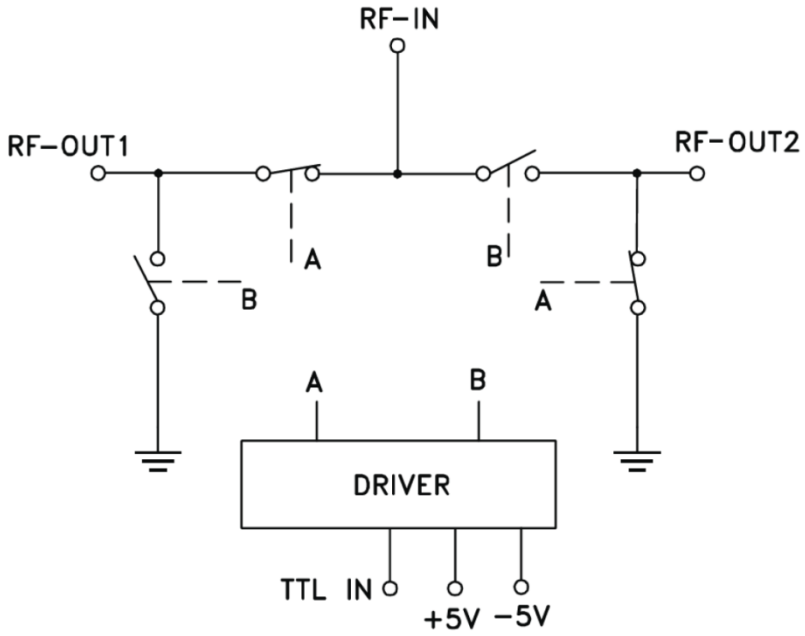

Application Circuit

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

Pin Connections

Function	Pin
RF IN	6
RF OUT 1	1
RF OUT 2	4
TTL IN	2
+5V	5
-5V	7
TTL GND	3
GND	8
GND	PADDLE

Pin Connections

Function	Pin
RF-IN	6
RF-OUT 1	1
RF-OUT 2	4
TTL IN	2
VDD(+5V)	5
VEE(-5V)	7
TLL GND	3
GND	8,Paddle

Note:
We rename Pin 5 from '+5V' to 'VDD(+5V)'.
We rename Pin 7 from '-5V' to 'VEE(-5V)'.

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CONCLUSIONS:

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

Replacement part is Form, Fit compatible. Following is a summary of changes/improvements:

Typical performance: See Paragraphs 2 and 3

Min/Max Specifications seen below,

Parameter	Original Part (M3SW-2-50DR+)	Replacement Part (M3SW-2-50DRA+)
Positive Power Supply (V_{DD})	+4.8 to +5.25V over -40 to 85°C +4.9to +5.25V over -55 to 100°C	+4.75 to +5.25V over -55 to 100°C
Negative Power Supply(V_{EE})	-5.25V to -4.8V over -40 to 85°C -5.25V to -4.9V over -55 to 100°C	-5.25 to -4.75V over -55 to 100°C
Control Input Low Voltage	0V Min, 0.8V Max	0V Typ., 0.8V Max
Control Input High Voltage	2V Min, 5V Max	2.1V Min, 2.3V Typ. 5V Max
Positive Supply Current (I_{DD}) Negative Supply Current (I_{EE})	9 mA max 9 mA max	5mA Typ. & 9mA Max. 3mA Typ. & 9mA Max.
Control Current Low	0.2mA max	0mA Typ. & 0.2mA Max.
Control Current High	5mA max	0.4mA Typ. & 5mA Max.
Rise Time (10 to 90%RF)	5ns typ. & 10ns max.	3.3ns Typ.
Fall Time (90 to 10%RF)	5ns typ. & 10ns max.	4.6ns Typ.
ON Time (50% Control to 90% RF)	10ns typ. & 15ns max	14.4ns typ.
OFF Time(90% Control to 50% RF)	10ns typ. & 15ns max	11.3ns Typ.
Video Leakage	30mV Typ.	42.5mV Typ.
ESD HBM	Class 1C (1000 to <2000V)	Class 0 (Pass 100V)
Electrical Specification:		
Insertion Loss Spec Max	1.9dB @2000-4500MHz	2.1dB @2000-4000MHz 2.5dB @4000-4500MHz
Isolation Min Btw Port-S & Output Ports	53dB @100-1000MHz 44dB @1000-2000MHz	49dB @100-1000MHz 41dB @1000-2000MHz

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2) PERFORMANCE COMPARISON CURVES: Original Part (VDD = 5V & VEE =-5V, Vctrl = 0 & 2.3V)
Replacement Part (VDD = 5 &VEE=-5V, Vctrl = 0 & 2.3V)

RF Performance Comparison	Freq (MHz)		M3SW-2-50DRA+ (Replacement Model) Data of 20 Units			M3SW-2-50DR+ (Original Model) Data of 1 Unit		
	From	To	Min.	Avg.	Max.	Min.	Avg.	Max.
INSERTION LOSS Max(S-1,S-2) (ON STATE) (dB)	10	100	0.4	0.5	0.5	0.5	0.6	0.6
	100	1000	0.5	0.6	0.7	0.6	0.6	0.6
	1000	2000	0.7	0.8	0.9	0.6	0.6	0.6
	2000	4000	0.8	1.1	1.85	0.6	0.8	1.1
	4000	4500	1.7	2.0	2.2	1.1	1.2	1.3
ISOLATION LOSS Min(S-1,S-2) (OFF STATE) (dB)	10	100	72.9	79.2	97.3	47.9	69.7	91.9
	100	1000	53.0	60.8	74.3	54.0	61.5	76.5
	1000	2000	44.4	48.7	53.7	45.3	49.2	54.0
	2000	4000	36.2	39.6	44.7	36.7	40.3	45.3
	4000	4500	35.0	35.6	36.7	35.0	35.8	36.9
ISOLATION (1-2)	10	100	69.8	76.0	94.3	47.6	68.0	81.5
	100	1000	51.8	58.8	71.0	52.2	58.6	67.8
	1000	2000	44.4	48.2	52.5	44.9	48.2	52.2
	2000	4000	33.8	39.6	44.8	34.4	39.7	44.9
	4000	4500	31.5	32.7	34.1	33.1	33.7	34.4
RETURN LOSS PORT -S (dB)	10	100	27.9	29.6	30.5	26.7	27.2	27.7
	100	1000	26.4	27.8	30.2	26.6	28.0	32.0
	1000	2000	24.9	33.4	48.8	22.6	27.8	34.0
	2000	4000	22.5	25.5	33.8	22.3	26.5	30.7
	4000	4500	18.5	24.1	29.2	16.9	20.1	23.2
RETURN LOSS (ON STATE) (dB)	10	100	28.1	29.7	30.8	26.2	27.1	28.0
	100	1000	29.0	30.9	33.4	23.5	25.4	26.7
	1000	2000	18.9	24.0	31.4	18.0	20.2	23.5
	2000	4000	16.1	18.6	20.0	16.1	18.3	19.8
	4000	4500	14.4	15.5	17.1	14.4	15.2	16.1
RETURN LOSS (OFF STATE) (dB)	10	100	3.2	3.4	3.6	3.1	3.1	3.1
	100	1000	3.2	3.4	3.7	3.1	3.1	3.2
	1000	2000	3.3	3.6	4.3	3.1	3.2	3.4
	2000	4000	3.5	3.9	4.4	3.0	3.2	3.4
	4000	4500	3.5	3.7	4.0	3.1	3.2	3.3
INPUT IP3 Min(LSB,USB @ Port 1&2) (dBm) @Pout =0dBm/Tone	10	100	34.7	39.7	43.9	34.3	39.0	43.5
	100	1000	42.1	44.7	48.1	42.8	44.4	47.0
	1000	2000	42.1	46.5	49.1	42.8	45.3	46.7
	2000	4000	39.1	44.0	49.0	34.2	41.5	46.7
	4000	4500	39.1	40.1	41.6	34.2	34.3	34.5
INPUT P1dB (Min of Port 1&2) (dBm)	10	100	12.1	18.0	23.7	16.7	21.0	25.4
	100	1000	22.8	25.1	26.8	25.4	27.4	28.6
	1000	2000	25.4	26.2	27.2	28.6	28.7	28.8
	2000	4000	23.8	25.6	27.2	23.5	26.5	28.8
	4000	4500	23.8	24.7	25.6	23.5	23.7	23.8

Notes:
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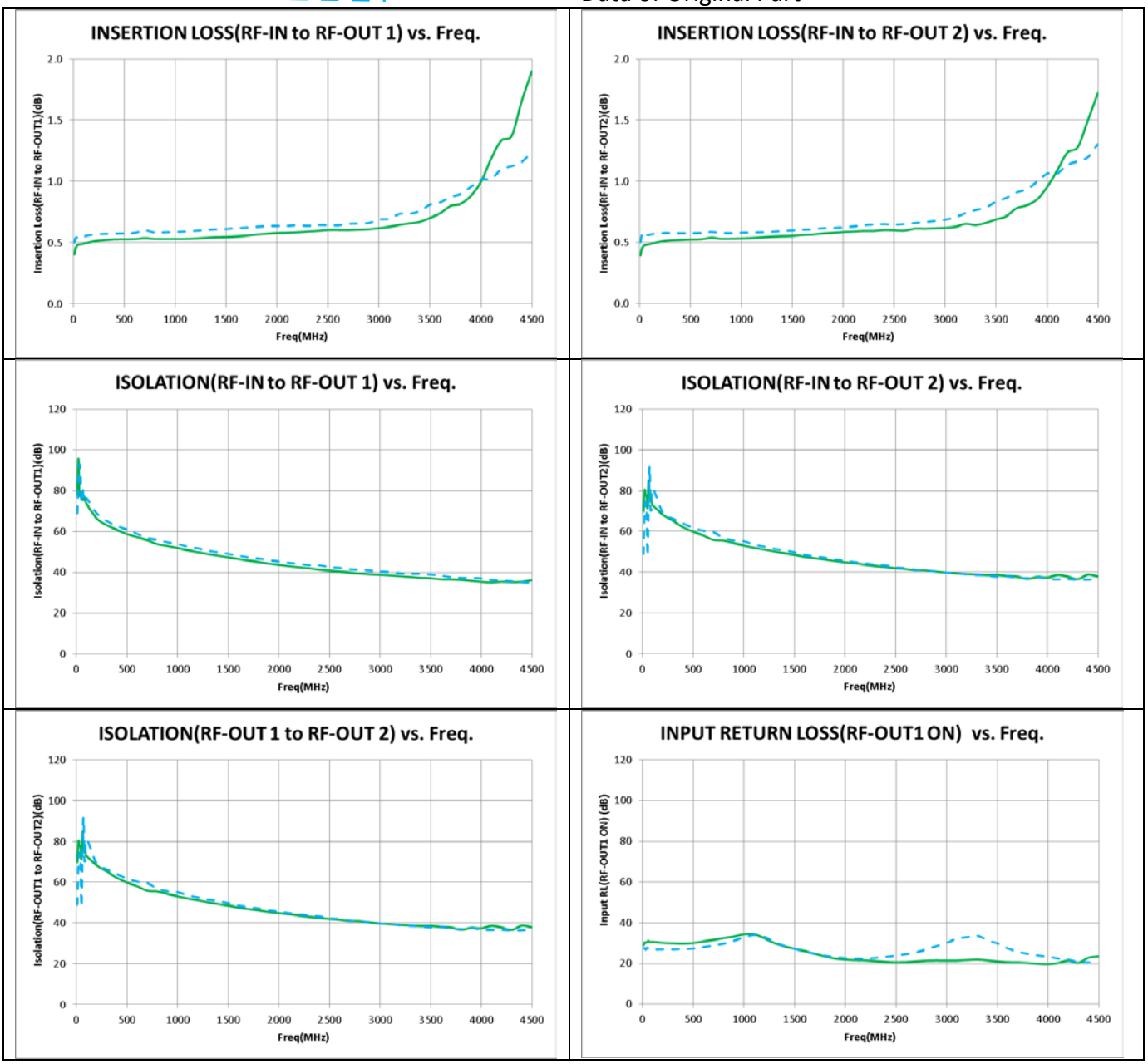
3) PERFORMANCE COMPARISON CURVES: Original Part (Vdd = 5 &-5V, Vctrl = 0 & 2.3V)
Replacement Part (Vdd =5 & -5V, Vctrl = 0 & 2.3V)

Data of Replacement Part
Data of Original Part



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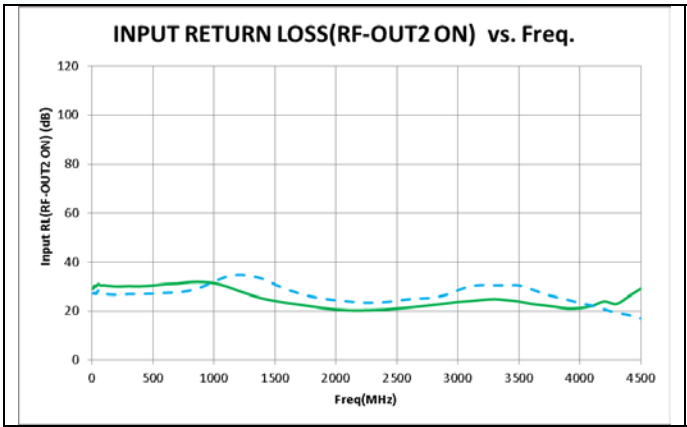

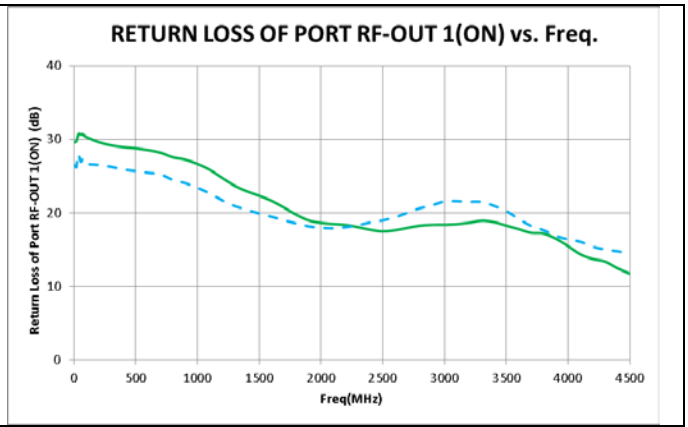

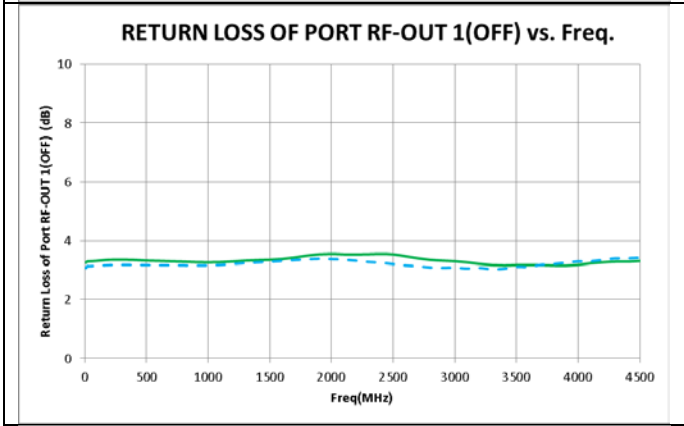

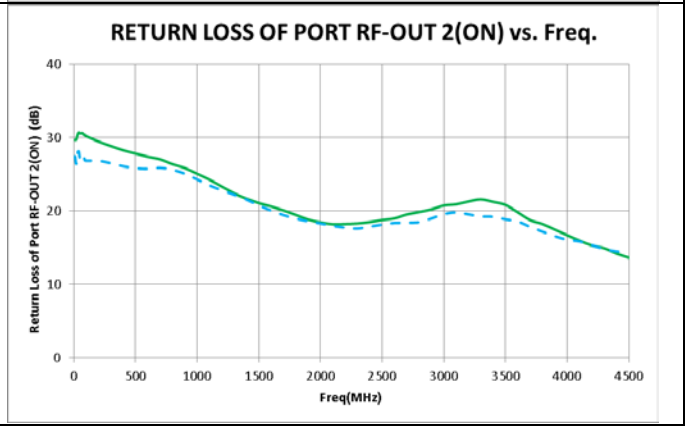

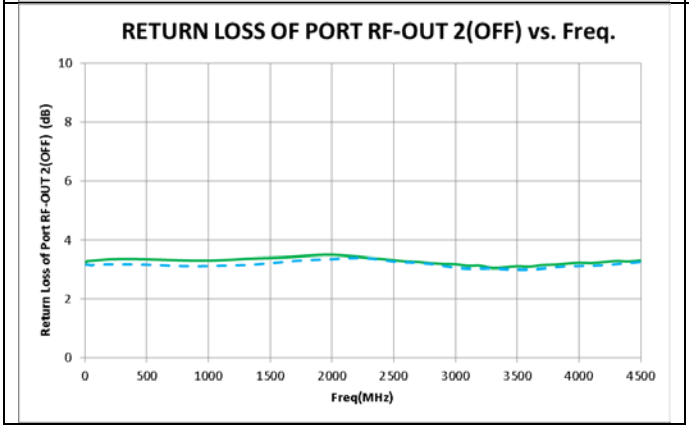

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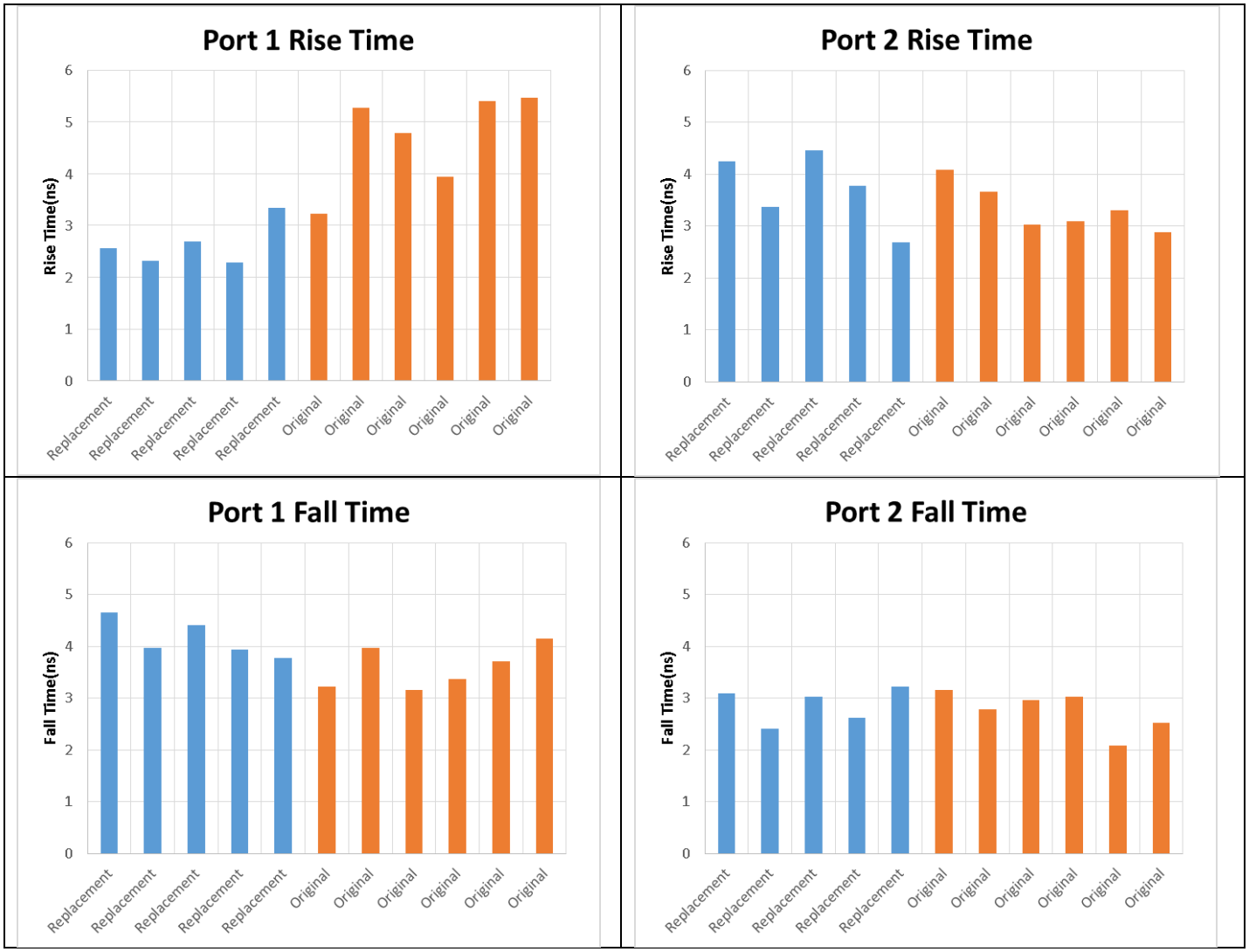
1) **SWITCHING/RISE/FALL TIME COMPARISON (Original Part (Vdd = 5 &-5V, Vctrl = 0 & 3.7V)**
Replacement Part (Vdd =5 & -5V, Vctrl = 0 & 2.3V)

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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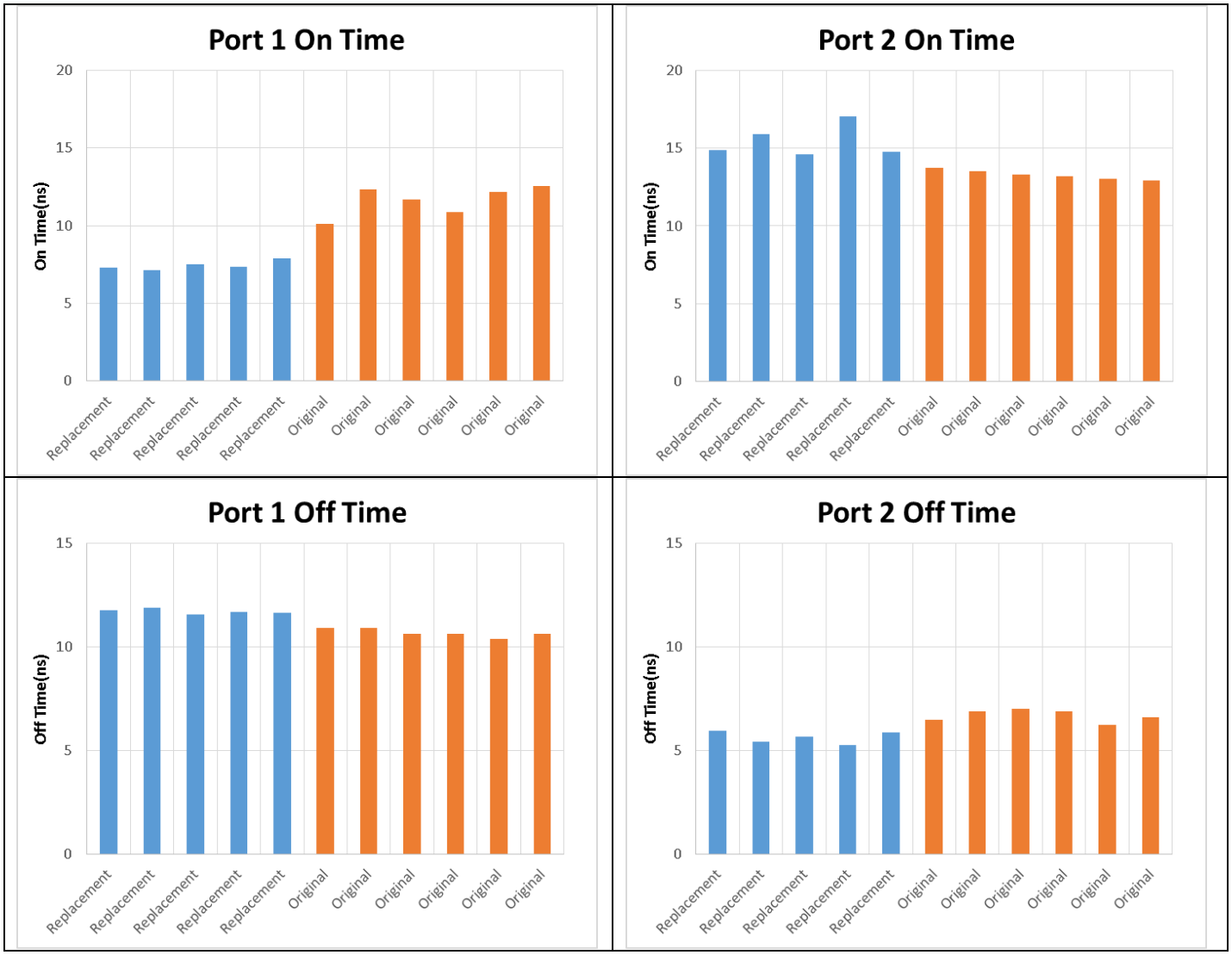

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