

Engineering Development Model

Frequency Mixer

LRMS-ED6953/1

Level 13 (LO Power +13 dBm)

Important Note

This model has been designed, built and tested in our engineering department. Performance data represents model capability. At present it is a non-catalog model. On request, we can supply a final specification sheet, part number and price/delivery information.



Please click "Back", and then click "Contact Us" for Applications support.

CASE STYLE : QQQ130

ELECTRICAL SPECIFICATIONS 50Ω @ +25°C					
Parameter		Min.	Typ.	Max.	Units
Frequency	LO (fL to fU)	1		1035	MHz
	RF (fL to fU)	1		1035	MHz
	IF	1		500	MHz
Conversion Loss	mid band		7.2		dB
	Total Range		7.6		dB
LO-RF Isolation	Low Range		-		dB
	Mid Range		61		dB
	Upper Range		38		dB
LO-IF Isolation	Low Range		-		dB
	Mid Range		36		dB
	Upper Range		34		dB

Note: Low Range = [fL to 10fL] Mid Range = [10fL to fU/2] Upper Range = [fU/2 to fU]
 mid band = [2fL to fU/2]

MAXIMUM RATINGS	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C

PIN CONNECTIONS	
LO	1
RF	4
IF	5
GROUND	2, 3, 6



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Typical Performance Data

RF (MHz)	LO (MHz)	CONVERSION LOSS (dB)			LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
		@LO (dBm)				@LO (dBm)			@LO (dBm)		
		+10	+13	+16		+10	+13	+16	+10	+13	+16
0.8	30.8	9.32	8.62	8.32	30.8	82.2	73.3	68.6	48.2	44.8	43.0
1.0	31.0	9.04	8.34	8.04	31.0	81.5	73.3	68.6	48.2	44.7	43.0
5.0	35.0	7.48	6.98	6.68	35.0	80.5	71.5	67.0	47.2	43.7	41.9
10.0	40.0	7.44	6.84	6.64	40.0	80.4	70.1	65.6	46.3	42.6	40.9
73.9	103.9	7.49	6.99	6.69	103.9	73.0	57.8	55.2	40.2	36.2	34.4
147.5	177.5	7.79	6.99	6.69	177.5	70.9	55.5	51.5	39.5	33.5	30.1
221.2	251.2	7.65	7.15	6.85	251.2	72.3	54.9	48.1	38.0	31.0	27.9
294.9	324.9	7.69	7.19	6.99	324.9	60.9	53.9	46.6	34.7	29.8	27.0
368.6	398.6	7.94	7.34	7.14	398.6	51.9	53.6	47.5	31.8	28.9	26.3
442.2	472.2	8.07	7.47	7.27	472.2	51.7	49.2	44.5	29.8	28.0	26.0
515.9	545.9	8.34	7.84	7.44	545.9	53.2	46.9	42.9	28.9	28.1	26.5
589.6	619.6	8.29	7.69	7.39	619.6	49.3	46.0	42.6	28.7	28.7	27.5
663.3	693.3	8.34	7.64	7.24	693.3	44.9	42.5	39.6	28.4	29.3	28.1
736.9	766.9	8.32	7.62	7.32	766.9	41.0	40.3	37.6	27.9	30.0	28.8
810.6	840.6	8.08	7.68	7.38	840.6	37.8	37.6	35.6	28.8	31.4	30.0
884.3	914.3	8.02	7.62	7.42	914.3	35.5	34.9	33.9	30.7	35.1	31.7
958.0	988.0	8.44	7.74	7.54	988.0	33.9	33.2	32.2	34.6	41.6	32.6
970.0	1000.0	8.49	7.79	7.49	1000.0	33.6	32.6	31.5	35.8	40.5	31.9
1000.0	1030.0	8.64	7.94	7.64	1030.0	33.0	32.1	31.0	39.5	37.5	30.7
1031.6	1061.6	8.87	8.17	7.77	1061.6	32.5	32.7	31.7	41.4	35.4	29.7

Frequency Mixer

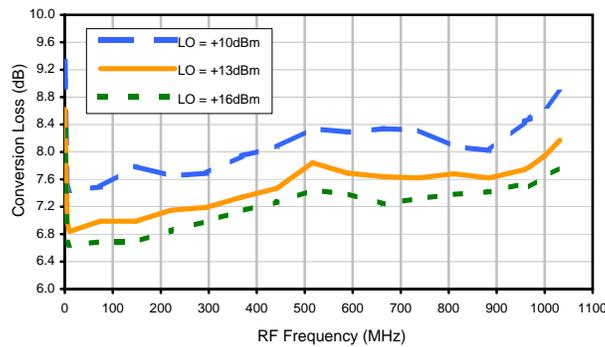
LRMS-ED6953/1

Typical Performance Data

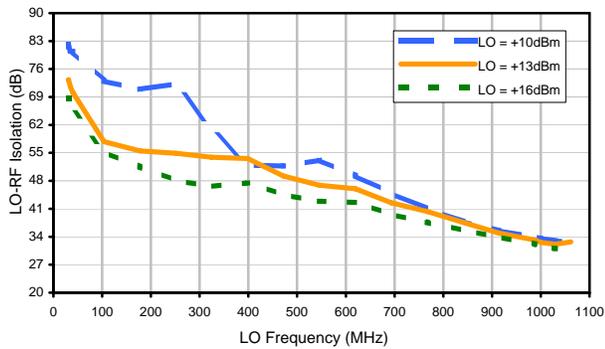
RF/LO (MHz)	RF VSWR (:1)			LO VSWR (:1)			IF (MHz)	IF VSWR (:1)		
	@LO (dBm)			@LO (dBm)				@LO (dBm)		
	+10	+13	+16	+10	+13	+16		+10	+13	+16
30.8	2.12	2.06	2.03	1.14	1.58	2.37	1.0	1.96	1.56	1.38
31.0	1.99	1.94	1.89	1.14	1.59	2.37	5.0	1.89	1.53	1.36
35.0	1.65	1.54	1.46	1.13	1.59	2.37	10.0	1.92	1.54	1.36
40.0	1.68	1.54	1.45	1.14	1.57	2.40	47.2	1.87	1.51	1.35
103.9	1.59	1.44	1.35	1.20	1.59	2.32	50.0	1.87	1.51	1.35
177.5	1.63	1.50	1.45	1.30	1.65	2.43	94.4	1.87	1.53	1.35
251.2	1.63	1.52	1.48	1.34	1.68	2.52	100.0	1.88	1.53	1.36
324.9	1.65	1.58	1.53	1.37	1.75	2.58	141.5	1.87	1.53	1.35
398.6	1.66	1.59	1.54	1.40	1.81	2.61	188.7	1.88	1.53	1.35
472.2	1.66	1.60	1.55	1.44	1.89	2.68	235.8	1.85	1.51	1.34
545.9	1.66	1.60	1.56	1.51	2.06	2.84	282.9	1.84	1.50	1.32
619.6	1.56	1.51	1.48	1.65	2.25	3.01	330.1	1.81	1.47	1.30
693.3	1.48	1.42	1.39	1.80	2.49	3.26	377.2	1.82	1.46	1.27
766.9	1.35	1.33	1.33	1.91	2.65	3.50	424.3	1.80	1.43	1.25
840.6	1.29	1.29	1.32	2.12	2.80	3.71	470.0	1.75	1.39	1.21
914.3	1.31	1.36	1.41	2.25	3.01	3.79	518.6	1.71	1.36	1.18
988.0	1.39	1.51	1.59	2.49	3.21	3.95	565.8	1.65	1.31	1.14
1000.0	1.41	1.54	1.64	2.49	3.26	4.12	612.9	1.59	1.26	1.10
1030.0	1.44	1.59	1.73	2.61	3.44	4.22	660.0	1.50	1.19	1.06
1061.6	1.47	1.61	1.76	2.65	3.50	4.22	707.2	1.41	1.13	1.07

Typical Performance Curves

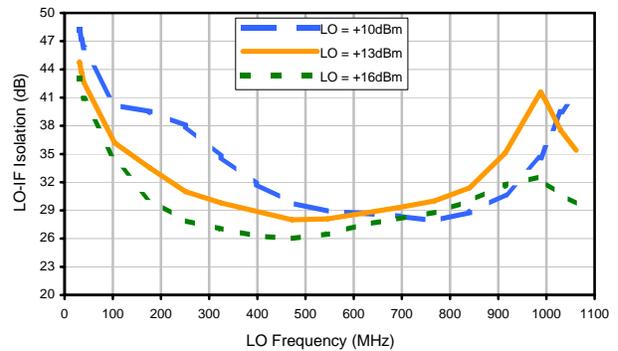
Conversion Loss



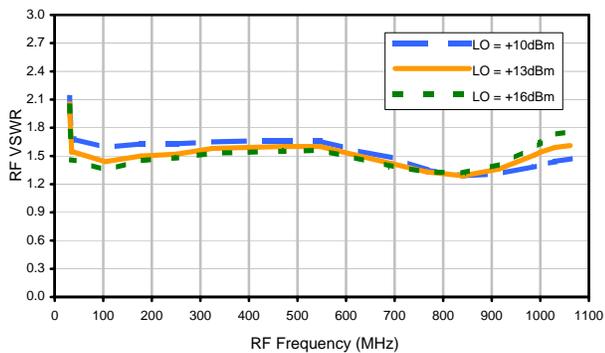
LO-RF Isolation



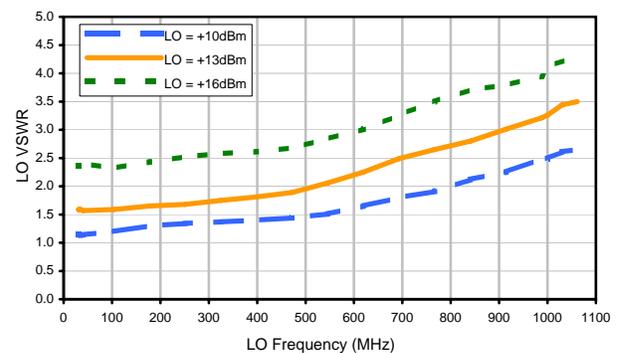
LO-IF Isolation



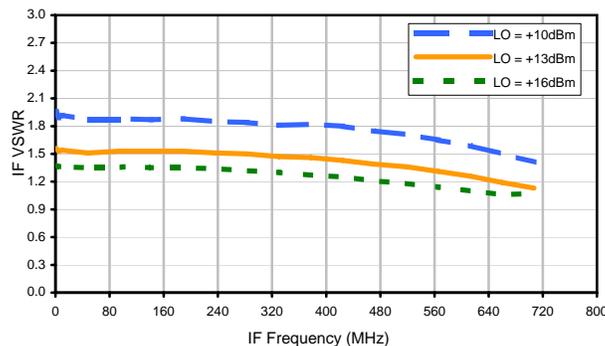
RF VSWR



LO VSWR



IF VSWR

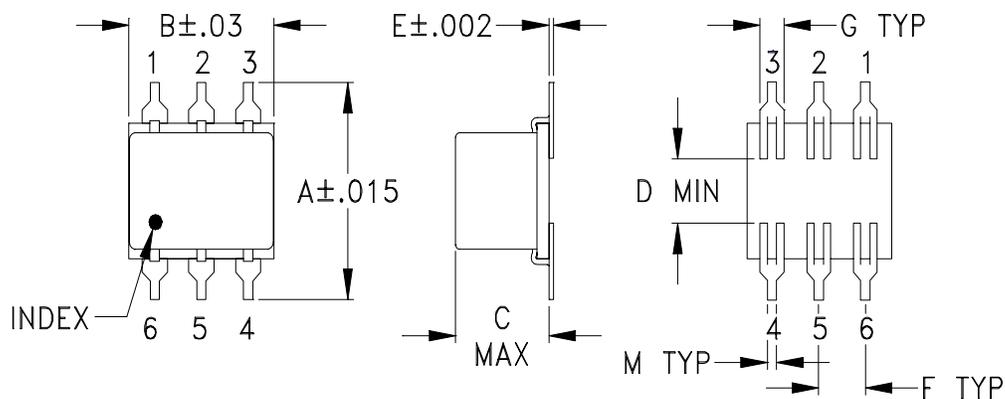


Case Style

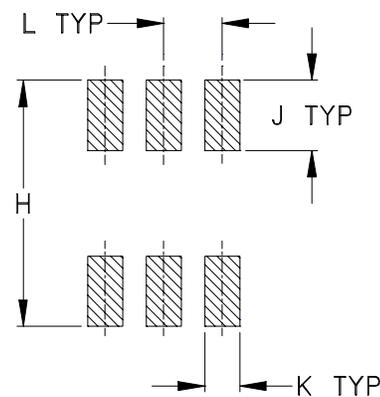
QQQ

QQQ130 (non-waterproof)
QQQ828 (washable)

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm .002$

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	WT, GRAM
QQQ130	.400 (10.16)	.31 (7.87)	.200 (5.08)	.10 (2.54)	.010 (.25)	.100 (2.54)	.050 (1.27)	.420 (10.67)	.120 (3.05)	.060 (1.52)	.100 (2.54)	.020 (.51)	.55
QQQ828			.050 (1.27)										.20

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .01$; 3 Pl. $\pm .005$

Notes:

- Case material: Ceramic.
- Termination finish:
 - For RoHS Case Styles: Tin plate over Nickel plate.
 - For RoHS-5 Case Styles: Tin-Lead plate.



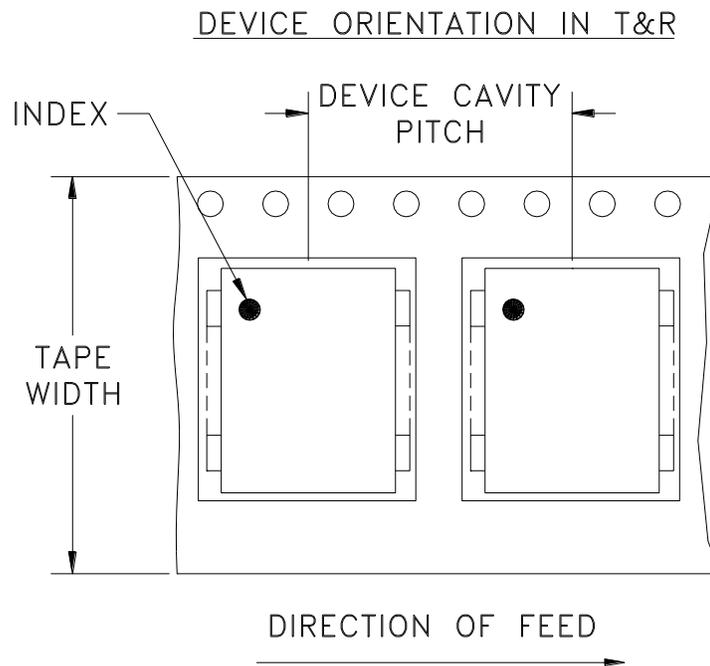
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Tape & Reel Packaging TR-F10



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
24	16	7	10,20,50,100
		13	200,500

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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Note: Please consult individual model data sheet to determine device per reel availability.



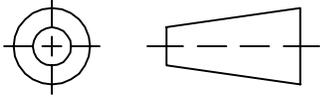
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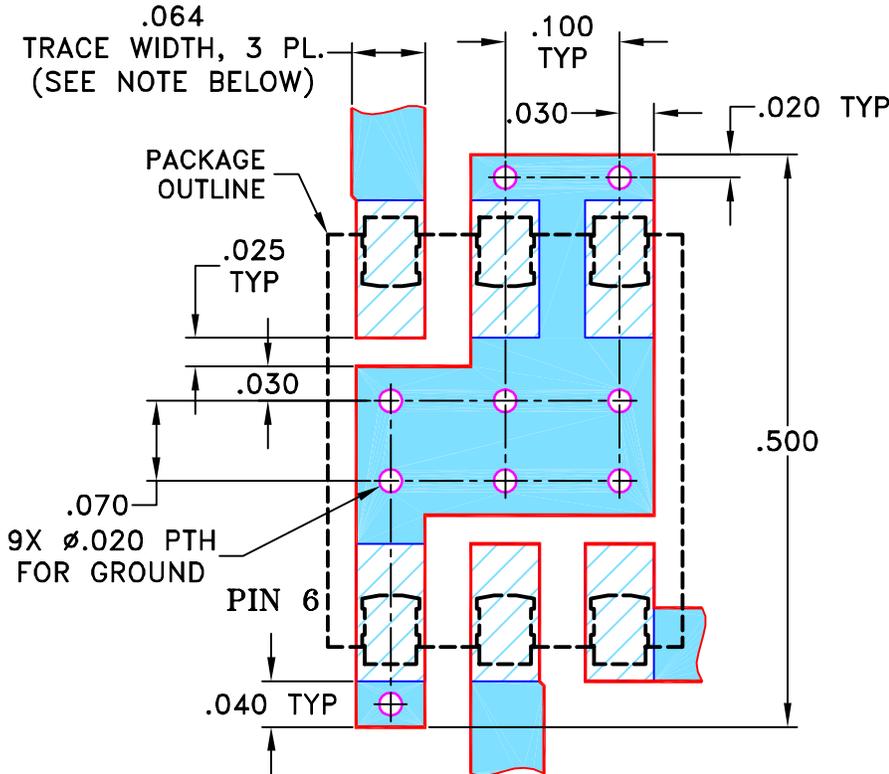
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82272	NEW RELEASE	08/02/02	AV	DJ
A	M102713	UPDATED NOTES	01/14/06	GF	IL

SUGGESTED MOUNTING CONFIGURATION FOR QQQ569 CASE STYLE, "w" PIN CONNECTION



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.030" ± 0.002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.

2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED

INITIALS DATE

DIMENSIONS ARE IN INCHES

DRAWN AV 07/19/02

TOLERANCES ON:
2 PL DECIMALS ±
3 PL DECIMALS ± .005
ANGLES ±
FRACTIONS ±

CHECKED WL 08/02/02

APPROVED DJ 08/02/02



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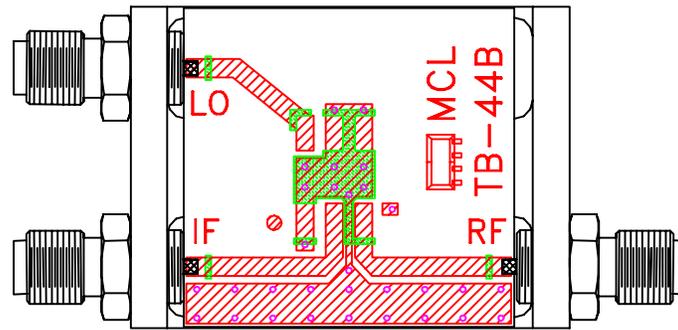
PL, w, QQQ569, LRMS-J, TB-44

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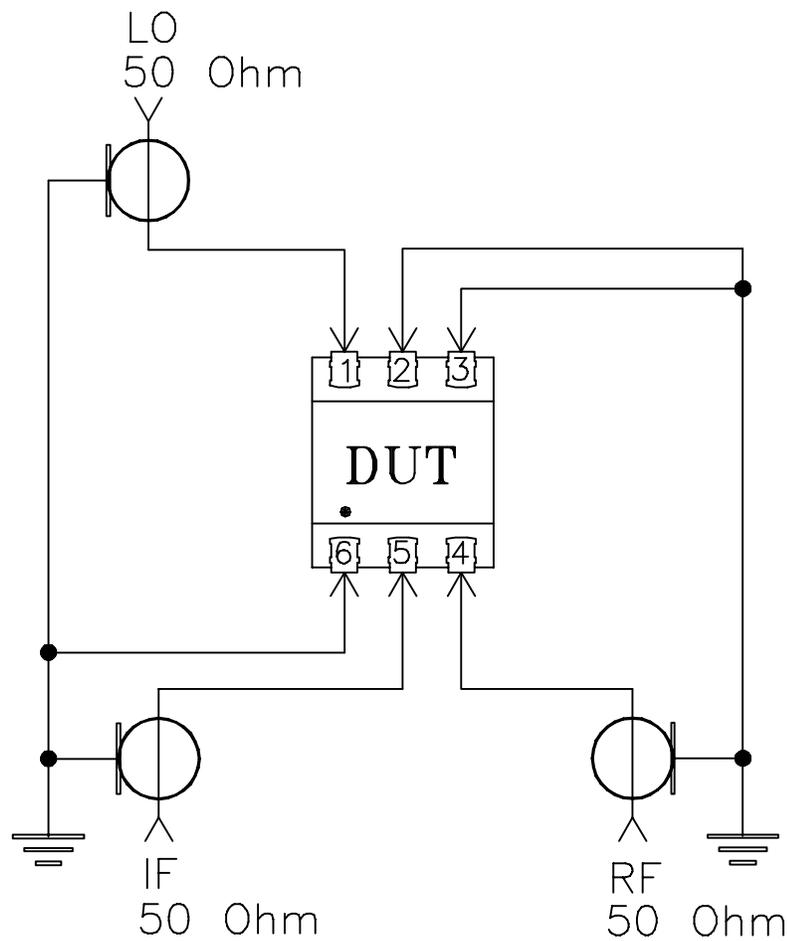
SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-083	REV: A
FILE: 98PL083	SCALE: 6:1	SHEET: 1 OF 1	

ASHEETA1.DWG REV:A DATE:01/12/95

Evaluation Board and Circuit



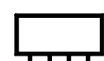
TB-44+



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.030 inch.

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All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215