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Electronics

WiMAX Product Solutions June 2006



What's WiMAX?

WiMAX is a standards-based wireless technology that is rapidly becoming synonymous with wireless broadband access. The technology is compliant with the IEEE 802.16 standard that defines a point-to-multipoint architecture. The excitement surrounding WiMAX reflects the growing desire of users to connect to high speed networks "anywhere, anytime." WiMAX systems are envisioned for a variety of applications: providing high-speed access to underserved areas, larger footprint "hotspots", backhaul of Wi-Fi and cellular traffic and business connectivity, to name a few.

a vital part of your world

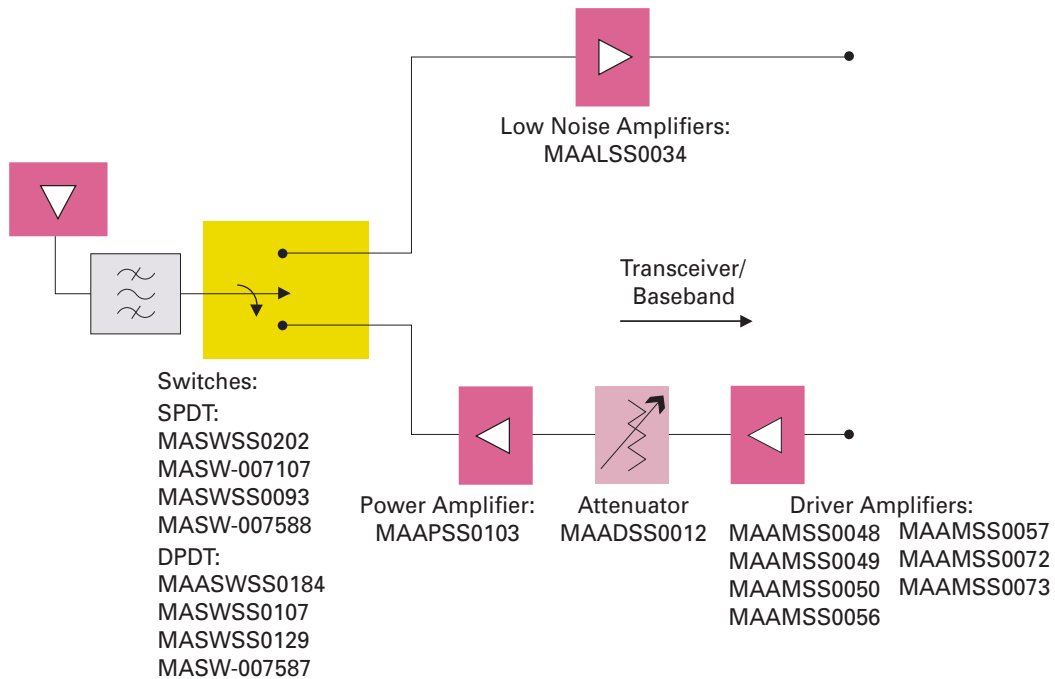
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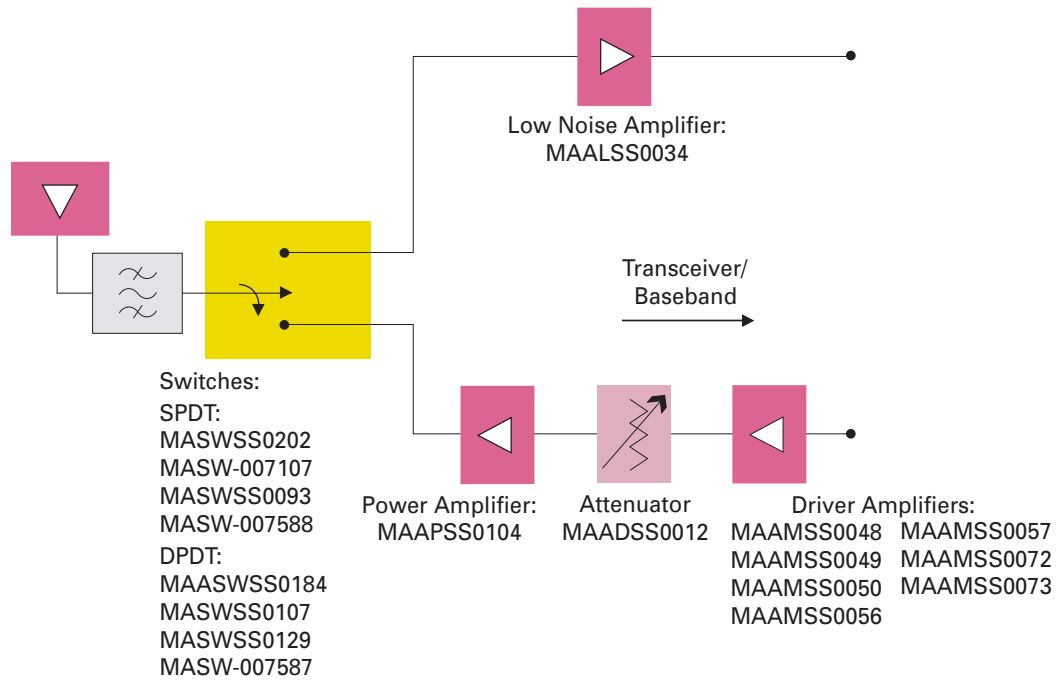
Customer Premises Equipment (CPE) Overview

Whether it is the fixed or mobile version of the WiMAX standard, a large opportunity exists for access equipment at a user's home or business. In the loosest definition, CPE is the physical means by which users will access WiMAX service. These CPE devices may mount indoors or outdoors and may even interface with laptop computers for portable or nomadic applications. These different scenarios may all result in different CPE requirements, so the variety of devices may be large. To satisfy these widely divergent needs, M/A-COM continues to expand the product families that support CPE performance requirements over all the commonly used WiMAX frequency bands.

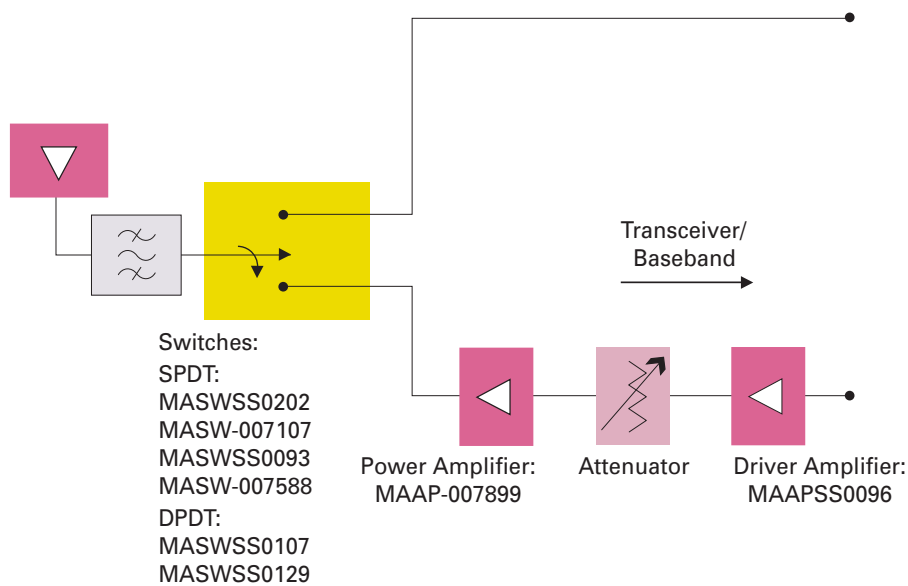
WiMax CPE/2.3–2.8 GHz



WiMAX CPE/3.3–3.8 GHz



WiMAX CPE/4.9–5.9 GHz

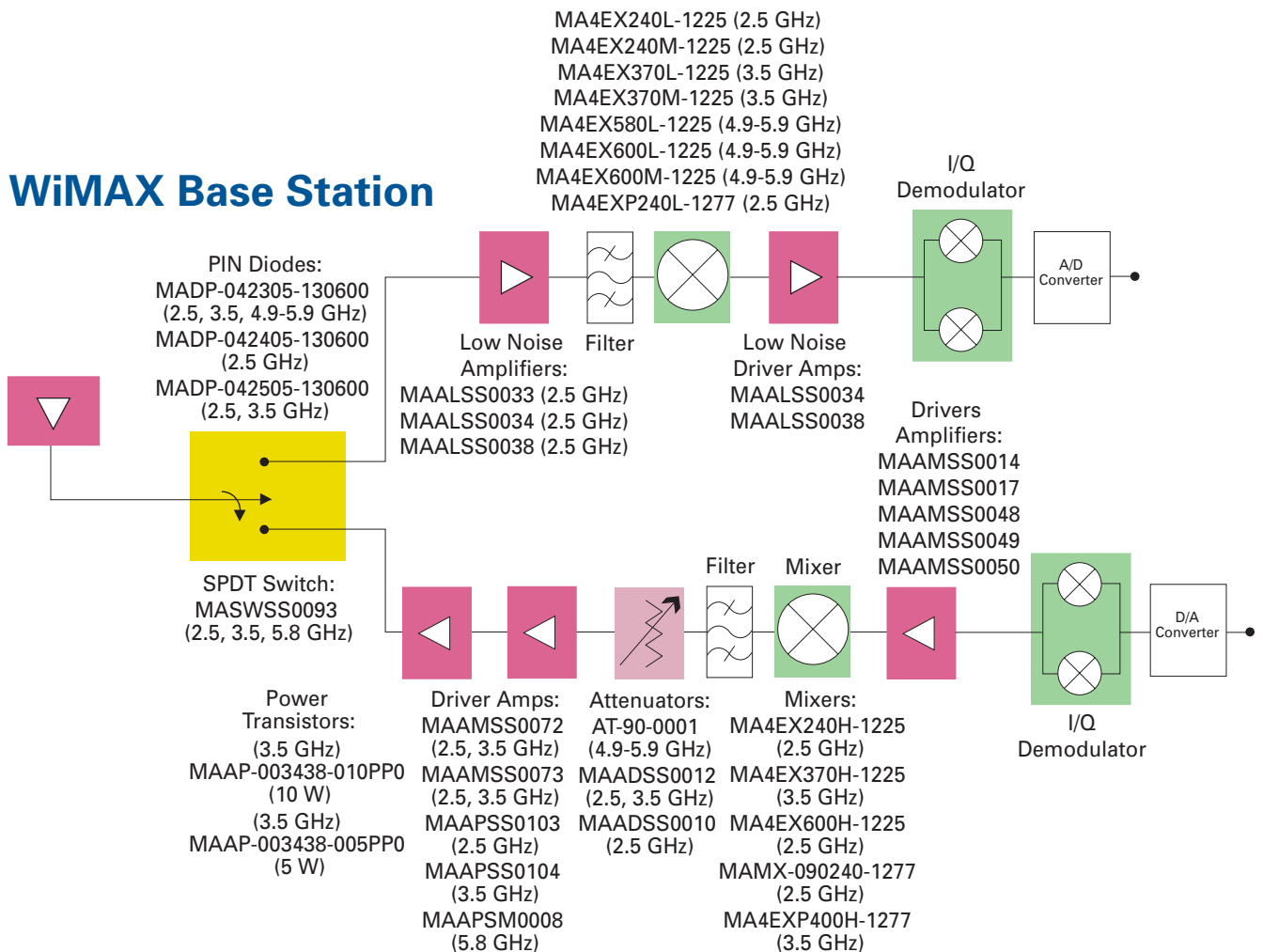




WiMAX Base Station Overview

Similar to any wireless multi-point communications system, the WiMAX base station serves as the central transceiver in the point-to-multi-point network. The base station serves to transmit data downstream to mobile, portable and fixed devices and receive upstream transmissions from these same devices. In mesh or backhaul applications the information will travel between base stations. A base station typically contains multiple sectors and each sector contains multiple transmit-receive channels. The presence of multiple channels results in components having the most stringent performance requirements. M/A-COM has developed a broad array of product families to satisfy these performance requirements.

WiMAX Base Station

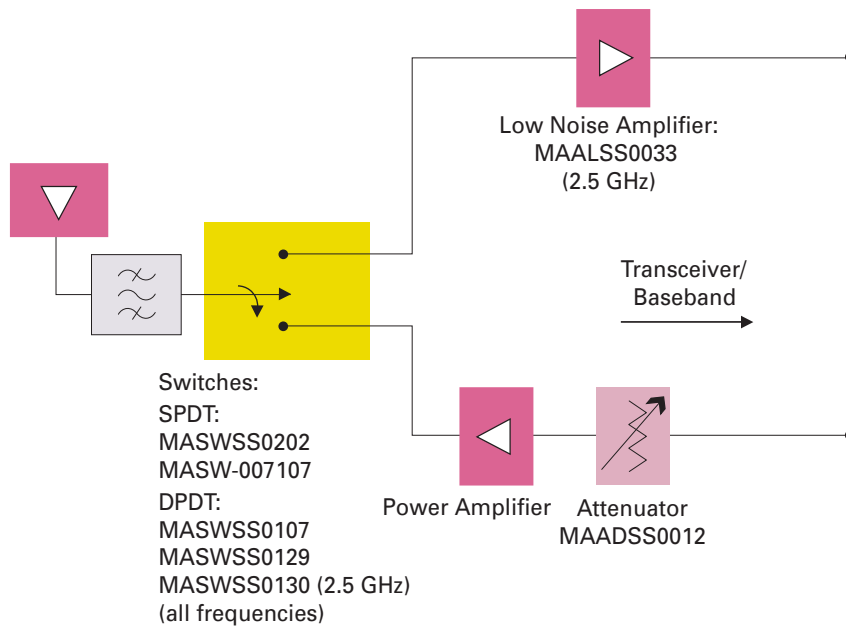




WiMAX Mobile Overview

The newly ratified IEEE 802.16e standard allows manufacturers to begin introducing products for mobile applications. These products will allow users to maintain high speed connectivity in slow speed mobile and portable (devices stationary, but capable of moving within a coverage area) environments. Proponents of mobile WiMAX believe the standard will augment existing wireless telecommunications systems by increasing the sustainable data rate within a coverage area, allowing the service providers to optimize the voice capacity of the network. The 802.16e mobile interface requires additional infrastructure over the previous revision of the standard. This presents opportunities for M/A-COM solutions over all the common WiMAX frequency bands.

WiMAX Mobile/2.3–2.8, 3.3–3.8, 4.9–5.9 GHz



Power/Driver Amplifiers

Frequency (GHz)	Part Number	Gain (dB) (dB)	P1dB (dBm) (dBm)	Linear Pout OFDM (dBm) EVM=2.5%	Ids (mA)	Voltage (V)	Package
0.4	MAAMSS0014	21	24	16	110	5	SOT-89
0.4	MAAMSS0017	32	32	26	70	5	SOT-89
2.5/3.5*	MAAMSS0048	14.5/12.5	27/27	19.5/19	160	5	SOT-89
2.5/3.5*	MAAMSS0049	13/11.5	28.5/28.5	20/19.5	210	5	SOT-89
2.5/3.5*	MAAMSS0050	12/10	30/30	21/20.5	460	5	SOT-89
2.5/3.5*	MAAMSS0056	22/18	27/27	20/20	225	5	SOIC-8EP
2.5/3.5*	MAAMSS0057	21/17	30/30	23/23	450	5	SOIC-8EP
2.5/3.5*	MAAMSS0072	24/22	27/27	20/20	225	5	4mm PQFN
2.5/3.5*	MAAMSS0073	22/20	30/30	23/23	450	5	4mm PQFN
2.3-2.8	MAAPSS0103	34	32	26	550	5	4mm PQFN
3.3-3.8	MAAPSS0104	32	32	26	550	5	4mm PQFN
5.8	MAAPSS0096	20.5	28-29.5	19-21	230	5	4mm PQFN
4.9-5.9*	MAAP-007899	23	31.5	23	490	5	4mm PQFN
5.8	MAAPGM0060	18	37	28.5	1850	5	CR-15

*per 200 MHz bandwidth

Low Noise Amplifiers

Frequency (GHz)	Part Number	Gain (dB)	NF (dB)	IIP3 (dBm)	Ids (mA)	Voltage (V)	Package
2.5	MAALSS0033	16	1	10	26	5	SOT-26
2.5	MAALSS0034	10	1.6	26	88	5	SOT-89
2.5	MAALSS0038	11	1.5	22	87	5	SC-70

GaAs PHEMT Power Transistors

Frequency (MHz)	Part Number	Pout (W)	Gain (dB)	Voltage (V)	Efficiency (%)	Package
3400 - 3800	MAAP-003438-005PP0	5	10.5	12	27 @ 0.5 W avg	3mm PQFN-16
3400 - 3800	MAAP-003438-010PP0	10	10.5	12	20 @ 1 W avg	4mm PQFN-16

Digital Attenuators with Integrated TTL Drivers

Frequency (MHz)	Part Number	Attenuation Steps (bits)	I.L. (dB)	Attenuation Range (dB)	Input IP3 (dBm)	Package
DC-3000	MAATCC0006	4	2.3	30	50	SO-16
DC-3000	MAATCC0008	4	1.7	15	50	SO-16
DC-3000	MAATCC0010	5	3.6	31	48	CSP-1
DC-3000	MAAD-007081-000100	5	2.8	15.5	48	CSP-1
DC-3000	MAATCC0009	6	4.5	31.5	48	CSP-1
DC-3000	MAADCC0006	4	2.5	15	48	CSP-1
DC-3000	MAAD-007083-000100	5	3.3	31	48	CSP-1

Digital Attenuators

Frequency (GHz)	Part Number	I.L. (dB)	IP3 (dBm)	Attenuator Range (dB)	Bits	Package
2.5	MAADSS0010	2.7	48	31	5	QSOP-16
2.5/3.5	MAADSS0012	0.6/0.7	49/49	20/20	1	2mm PDFN
2.5/3.5/4.9-5.9	AT90-0001	3.3	48	31	5	FQFP-N 32L

Drivers

Vcc (V)	Part Number	Types	Rise Time/Fall Time (ns)	Vee (-V)	Package
5	MADRCC0004	Quad	500 max	5	SO-16
5	MADRCC0005	Single	500 max	5	SO-8
5	MADRCC0006	Single	500 max	5	SO-8
5	MADRCC0007	Quad	500 max	5	SOIC-16

Mixers

Frequency (RF/LO) (MHz)	Frequency (IF) (MHz)	Part Number	LO Drive (dBm)	Conversion Loss (dB)	Isol. (LO/RF) (dB)	Input P1dB (dBm)	Package
10 - 2800	10 - 2000	CSM2-10	10	8.5	32.5	20	Surface Mount
10 - 2800	10 - 2000	CSM2-13	13	7.5	35	22	Surface Mount
10 - 2800	160 - 390	CSM2-17	17	8	40	14	Surface Mount
50 - 4800	50 - 3000	CSM5T	10	7.2	35	10	Surface Mount
50 - 4800	50 - 3000	CSM5T17	17	7.8	33	23	Surface Mount
50 - 4800	50 - 3000	CSM5TH	23	7	35	17	Surface Mount

HMIC Monolithic Mixers

Frequency (RF/LO) (MHz)	Frequency (IF) (MHz)	Part Number	LO Drive (dBm)	Conversion Loss (dB)	Isol. (LO/RF) (dB)	Input P1dB (dBm)	Package
1700 - 2500	0 - 400	MA4EX240L-1225	5	7	17.5	1	SOT-25
1700 - 2500	0 - 500	MA4EX240M-1225	10	5.5	17	5.3	SOT-25
1700 - 2500	0 - 500	MA4EX240H-1225	15	5.4	17	8.5	SOT-25
3000 - 4000	0 - 1050	MA4EX370L-1225	5	7.5	14	2	SOT-25
3000 - 4000	0 - 1050	MA4EX370M-1225	10	6.3	27	5	SOT-25
3000 - 4000	0 - 1050	MA4EX370H-1225	15	6.8	27.5	8	SOT-25
4700 - 6000	0 - 1050	MA4EX580L-1225	5	7.6	23	1.5	SOT-25
4200 - 6000	0 - 2000	MA4EX600L-1225	5	6.4	26	0.3	SOT-25
4200 - 6000	0 - 2000	MA4EX600M-1225	10	6.5	27	2.7	SOT-25
4200 - 6000	0 - 2000	MA4EX600H-1225	15	5.8	28	6.9	SOT-25

High IP3/High Isolation Monolithic Mixers

Frequency (RF/LO) (MHz)	Frequency (IF) (MHz)	Part Number	LO Drive (dBm)	Conversion Loss (dB)	Isol. (LO/RF) (dB)	Input P1dB (dBm)	Package
2300 - 2800	0 - 200	MA4EXP240L-1277	7	8.3	51	4.8	3mm 16-lead PQFN
2300 - 2800	0 - 500	MAMX-090240-1277	15	9.0	61	9.4	3mm 16-lead PQFN
3500 - 4500	0 - 2000	MA4EXP400H-1277	17	7.7	44	13	3mm 16-lead PQFN

Passives: Circulators

Frequency (MHz)	Part Number	# of Junctions	I.L. (dB max)	Isol. (dB)	Return Loss	Circ	Op. Temp. Range (°C)	Package
2500 - 2700	MAFR-000050-5S4C1T	1	0.25	20	20.8	CW	-40 to +85	Surface Mount, Gull Wing
2500 - 2700	MAFR-000131-5S4C1T	1	0.25	20	20.8	CCW	-40 to +85	Surface Mount, Gull Wing
3400 - 3600	MAFR-000159-5S4C1T	1	0.25	20	20.8	CW	-40 to +85	Surface Mount, Gull Wing
2496 - 2690	MAFR-000121-5D4S1T	2	0.5	46	20.8	CCW	-33 to +85	Drop-in
3400 - 3600	MAFR-000127-WD3S1T	2	0.5	47	19.1	CCW	-33 to +85	Drop-in
2300 - 2400	MAFR-000128-WD3S1T	2	0.5	48	19.1	CCW	-33 to +85	Drop-in

Switches with ASIC Driver

Frequency (MHz)	Part Number	Type	VCC (V)	I.L. (dB)	Isol. (dB)	P1dB (dBm)	Input IP3	Package
DC-3000	MASW-007076-000100	SPST	5	1.8	42	CW	46	SOW-24
DC-4000	MASW-007070-000100	SPST	5	0.85 max	25 min	CW	48	(CSP-1) 4x6 32-lead PQFN
DC-3000	MASW-007075-000100	SPDT	5	1.8	36	CCW	46	SOW-24
DC-4000	MASW-007071-000100	SPDT	5	1.8 max	30 min	CCW	46	(CSP-1) 4x6 32-lead PQFN
DC-4000	MASWSS0006	SPDT	2.5	0.5 typ	20 typ	CCW	39	Drop-in
DC-3000	MASW-007074-000100	SP3T	5	2	32	CCW	46	SOW-24
DC-3000	MASW-007073-000100	SP4T	5	1.6	33	CCW	46	SOW-24
DC-4000	MASWCC0010	SP4T	5	2.3 max	38 min	CCW	40	(CSP-2) 4x7 36-lead PQFN

PIN Diodes

Frequency (MHz)	Part Number	Rs @ 20mA (Ohms)	Ct @ 5V (pF)	RF CW Incident Power (dBm)	Package
50 - 3000	MADP-042405-130600	0.6	0.62	44	0402 style Surmount Die
50 - 4000	MADP-042505-130600	0.8	0.30	43	0402 style Surmount Die
50 - 6000	MADP-042305-130600	1.3	0.15	40	0402 style Surmount Die

Switches

Frequency (GHz)	Part Number	Type	I.L. (dB)	Isolation (dB)	P1dB (dBm)	Linear Pout OFDM (dBm) EVM=2%	Package
2.5/3.5/5.8	MASWSS0202	SPST	0.55/0.55/0.75	28/29/25	32/31/29	27/27/25	3mm PQFN
2.5/3.5/5.8	MASW-007107	SPST	0.50/0.50/0.70	28/29/25	32/31/29	27/27/25	2mm PQFN
2.5/3.5/5.8	MASWSS0093	SPDT	0.70/0.85/0.85	29/28/26	40/36/37	33/29/30	3mm PQFN
2.5/3.5/5.8	MASW-007588	SPDT	0.70/0.85/0.85	29/28/26	40/36/37	33/29/30	3mm PQFN
2.5	MASWSS0130	DPDT	0.60/0.85	25/20	35/35	22/22	3mm PQFN
2.5/3.5/5.8	MASWSS0107	DPDT	1.00/1.10/1.20	32/32/25	33/33/32	26/26/25	3mm PQFN
2.5/3.5/5.8	MASWSS0129	DPDT	0.75/0.75/1.00	44/35/30	33/32/31	26/25/24	3mm PQFN
2.5	MASWSS0184	DPDT	0.90/1.20	34/30	40/40	33/33	3mm PQFN
2.5/3.5	MASW-007587	DPDT	0.90/1.20	34/30	40/40	33/33	3mm PQFN