2021 RF Product Catalog

pSemi®
A Murata Company

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30+ YEARS
INNOVATORS
IN SEMICONDUCTOR TECHNOLOGY

About pSemi

At pSemi, we design and manufacture innovative semiconductor solutions. We take what "can't be done" and transform it into an industry first. Whether it is a cutting-edge design technique, a transformative architecture or a novel technology platform, our team explores new ways to make electronics smaller, thinner, faster and more efficient.

Our RF, power management and sensor products are designed into devices that are used by millions of people worldwide. You'll find our integrated circuits in your smartphone, your cable modem, your laptop and your neighborhood's new 5G base station.

Headquartered in San Diego, we have offices on three continents and a worldwide sales team to support our customers. Our offices are located in major global tech hubs to support our growing team of talented electrical engineers.

At pSemi, we build intelligent electronics for the connected world.

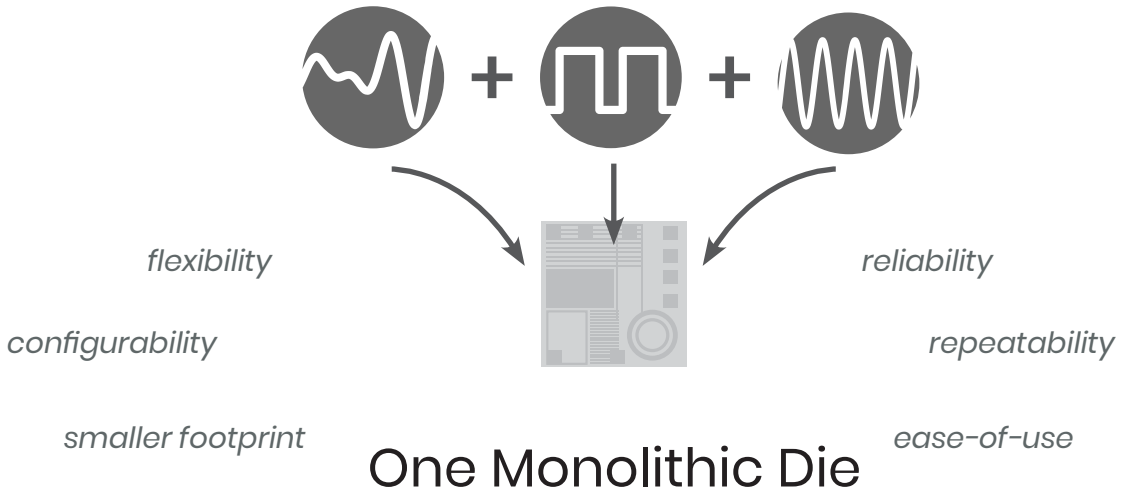
Best-in-Class RF Solutions

Using UltraCMOS® Technology

RF complexity is growing exponentially as more wireless devices compete for signals throughout more frequency bands, and our products continue to achieve several SOI industry firsts that offer RF engineers the widest range of high-performance RF choices. UltraCMOS products allow engineers the flexibility to prioritize attributes—like small form factor, low power consumption, high reliability, radiation tolerance, high ESD ratings, programmability, affordability, reduced board area—based on use case.

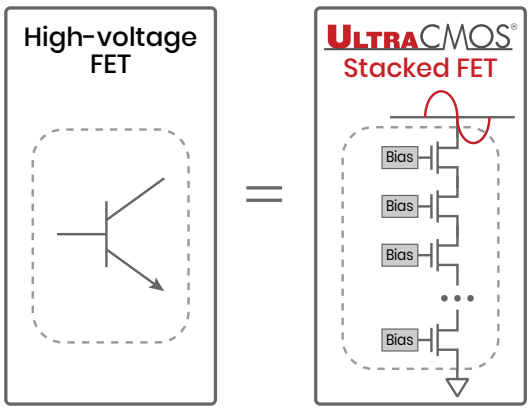
UltraCMOS Technology and Intelligent Integration

UltraCMOS products feature intelligent integration—the ability to integrate RF, digital and analog components on a single die. With intelligent integration, a single chip can integrate features such as RF amplifiers, analog DC tracking, digital logic control, high-performance switching, phase shifters and digital step attenuators.



HaRP™ Technology

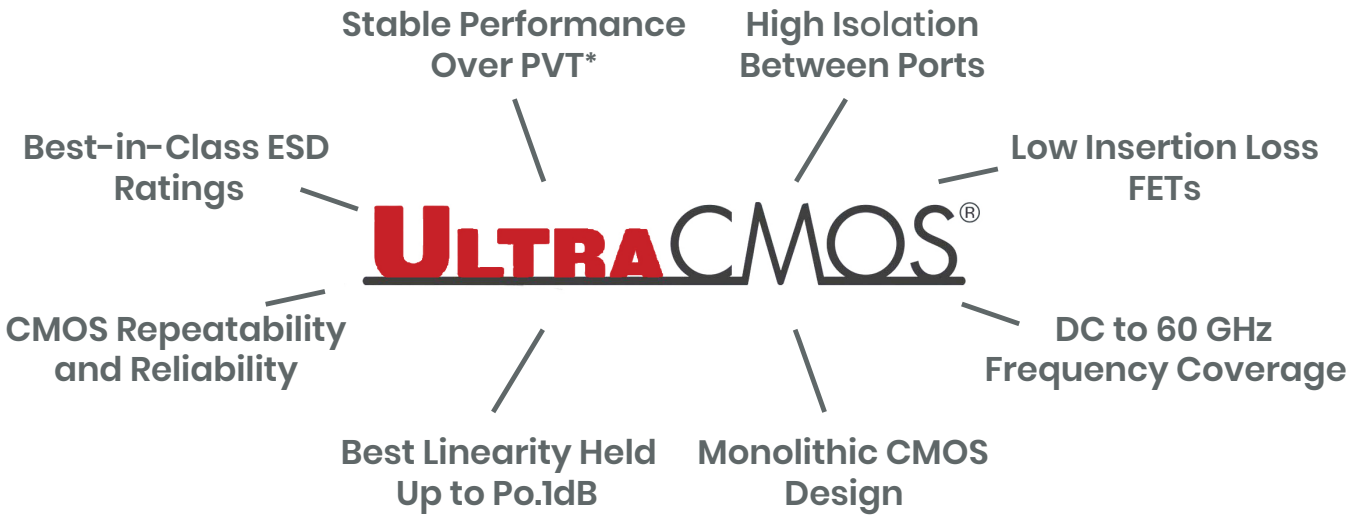
UltraCMOS technology uses stacked field effect transistors (FETs) manufactured on an insulating substrate, providing the ability to pass high-power RF signals. The HaRP invention allows for very linear FETs that when stacked together provide excellent linear performance.



FET stacking is a very efficient way to handle power using low-voltage devices.

Core Technology Benefits

UltraCMOS solutions provide high-performance RF, mixed-signal, passive elements and digital functions on a single device.



* PVT = Process, Voltage & Temperature

RF Switches

General-purpose RF Switches

Our broadband and general-purpose RF switches deliver an industry-leading combination of insertion loss, isolation, linearity and settling time, while routing RF signals to the selected RF port.

General-purpose RF Switches — 50Ω

Product Description[1]	Part Number	Product Highlight	Operating Frequency (MHz)		IIP3 (dBm)	Pmax CW (dBm)	P0.1dB (dBm)	Insertion Loss (dB)		Isolation (dB)		V_{DD} Range (V)	Switching Time (µs)[2]	ESD HBM (V)	Package
			Min	Max				Min	Max	Min	Max				
SPST, OR	PE613010	Tuning Control	100	3000	70	–	38	0.20	0.80	4	11	2.3–5.5	7	2000	10L 2×2 QFN
SPDT, A/OR	PE42020	True DC	0 Hz	8000	62	36	38	0.6	1.1	34	48	11–15[3]	10	1000	20L 4×4 QFN
SPDT, A	PE42420[4]	High Isolation	100	6000	65	30	33	0.95	1.6	50	69	2.7–5.5	0.3	4000	20L 4×4 LGA
SPDT, A	PE42423	High Isolation	100	6000	65	36	39.5	0.8	0.95	41	51	2.3–5.5	0.5	3000	16L 3×3 QFN
SPDT, A	PE4251	Low Insertion Loss	10	4000	59	27	30.5	0.55	1.0	37	62	3.0–3.6	0.15	4000	8L MSOP
SPDT, A	PE42520	Broadband	0.009	13000	66	36	39	0.6	2.0	18	90	2.3–5.5	5.5	4000	16L 3×3 QFN
SPDT, A	PE42521	Broadband	0.009	13000	65	36	38	0.6	1.85	17	90	2.3–5.5	0.5	3000	16L 3×3 QFN
SPDT, A	PE42522	Broadband	0.009	26500	59	30	33	0.7	5.3	22	73	2.3–5.5	3	3500	29L 4×4 LGA
SPDT, A	PE42553	Broadband	0.009	8000	66	36	39	0.6	0.85	41	90	2.3–5.5	5.5	4000	16L 3×3 QFN
SPDT, A	PE4257	High Isolation	5	3000	55	33	31	0.75	1.2	44	64	2.7–3.3	2	1000	20L 4×4 QFN
SPDT, A	PE42822	High Power	700	3800	65	32	39.5	0.6	0.8	44	47	2.3–5.5	0.500	3000	16L 3×3 QFN
SPDT, R	PE423422[4]	Automotive	100	6000	73.5	32	34	0.25	0.9	16	41	2.3–5.5	2	1000	12L 2×2 QFN
SPDT, R	PE42359[4]	Automotive	10	3000	55	34	33.5	0.35	1.1	14	35	1.8–3.3	2	2000	6L SC70
SPDT, R	PE4239	Low Noise	10	3000	45	30	27	0.7	0.9	23	32	2.7-3.3	0.3	1500	6L SC70
SPDT, R	PE42421	Low Insertion Loss	10	3000	55	34	30.5	0.35	0.5	20	30	1.8–3.3	1.5	2000	6L SC70
SPDT, R	PE42422	Low Insertion Loss	5	6000	75	32	34	0.23	0.9	17	68	2.3–5.5	2	4000	12L 2×2 QFN

General-purpose RF Switches (continued)

General-purpose RF Switches — 50Ω

Product Description[1]	Part Number	Product Highlight	Operating Frequency (MHz)		IIP3 (dBm)	Pmax CW (dBm)	P0.1dB (dBm)	Insertion Loss (dB)		Isolation (dB)		V_{DD} Range (V)	Switching Time (µs)[2]	ESD HBM (V)	Package
			Min	Max				Min	Max	Min	Max				
SPDT, R	PE42424[4]	High Isolation, FS[5]	100	8500	61	30	41	0.8	0.95	34	47	2.3–5.5	0.145	2500	6L 1.5×1.5 DFN
SPDT, R	PE42426	High Linearity	5	6000	83	33	40	0.3	0.75	20	33	2.3–5.5	35	3000	12L 3×3 QFN
SPDT, R	PE42427	Low Insertion Loss	5	6000	75	32	34	0.23	0.9	17	68	2.3–5.5	2	4000	12L 2×2 QFN
SPDT, R	PE4245	Low Insertion Loss	10	4000	45	30	27	0.6	0.7	32	42	2.7–3.3	0.2	1500	6L 3×3 DFN
SPDT, R	PE4250	Low Insertion Loss	10	3000	59	27	30.5	0.6	0.75	40	51	3.0–3.6	0.15	4000	8L MSOP
SPDT, R	PE42524	Wideband	10	40000	50	27	32.5	0.6	5.5	33	84	–	0.225	2000	Flip Chip
SPDT, R	PE42525	Wideband, FS5	0.009	60000	46	29	35	0.9	2.7	36	80	–	0.008	1000	Flip Chip
SPDT, R	PE4259	Low Insertion Loss	10	3000	55	34	34	0.35	0.8	20	30	1.8–3.3	1.5	2000	6L SC70
SPDT, R	PE426525	Wideband, FS[5], ET[6]	0.009	60000	46	27	35	0.9	2.7	36	80	–	0.008	1000	Flip Chip
SPDT, R	PE42820	High Power	30	2700	85	43	45.5	0.3	0.7	24	35	2.3–5.5	15	1500	32L 5×5 QFN
SPDT, R	PE42821	High Power	100	2700	82	43	45.5	0.4	0.8	24	35	2.3–5.5	7	1500	32L 5×5 QFN
SPDT, R	PE42823	High Power 7W	700	6000	70	38.5	46	0.35	0.53	22	59	2.3–5.5	0.85	4500	16L 3×3 QFN
SP3T, R	PE42430	Low Insertion Loss	100	3000	66	27	30	0.45	0.55	30	40	3.0–5.5	0.500	4500	8L 1.5×1.5 DFN
SP4T, A	PE42441	Low Insertion Loss	10	8000	58	30	31	0.8	1.2	31	45	3.0–3.55	5	2000	32L 5×5 LGA
SP4T, A	PE42442[4]	High Isolation	30	6000	58	33	35	0.9	1.9	32	61	2.3–5.5	0.255	2000	24L 4×4 QFN
SP4T, A	PE42540	Broadband	0.00001	8000	58	30	33	0.7	1.2	27	84	3.0–3.6	5	2000	32L 5×5 LGA
SP4T, A	PE42542	Broadband	0.009	18000	58	30	33	0.7	3.1	27	90	2.3–5.5	3	3500	29L 4×4 LGA
SP4T, A	PE42543	Broadband	0.009	18000	59	30	33	0.7	3.2	29	90	2.3–5.5	0.5	2500	29L 4×4 LGA
SP4T, OR	PE613050	Tuning Control	5	3000	72	–	–	0.20	0.55	17	28	2.3–5.5	2	2000	12L 2×2 QFN
SP4T, R	PE423641[4]	Automotive	50	3000	68	35	37	0.5	0.95	22	32	2.65–3.3	1	2000	16L 3×3 QFN
SP4T, R	PE42440	Low Insertion Loss	50	3000	67	33	41.5	0.45	0.85	22	34	2.7–3.3	2	2000	16L 3×3 QFN
SP4T, R	PE42641	Low Insertion Loss	100	3000	68	35	–	0.45	0.55	27.5	35	2.65–2.85	2	2000	16L 3×3 QFN
SP5T, A	PE42451	High Isolation	450	4000	58	33	35	1.6	2.25	50	68	2.7–3.3	0.200	3500	24L 4×4 QFN
SP5T, A	PE42452[4]	High Isolation	450	4000	57	33	35	0.95	1.6	44	61	2.3–5.5	0.265	1500	24L 4×4 QFN
SP6T, A	PE42462[4]	Broadband, high ISO	10	8000	60	33	37.5	0.7	1.6	30	68	2.3–5.5	0.210	1000	24L 4x4 QFN
SP6T, A	PE42562[4]	Broadband, low IL	0.009	8000	60	33	37.5	0.7	1.6	30	68	2.3–5.5	0.210	1000	24L 4x4 QFN
SP6T, A	PE426462	Broadband, ET[6]	10	8000	60	31	37.5	0.7	1.6	30	68	2.3–5.5	0.210	1000	24L 4x4 QFN
SP8T, A	PE42482[4]	Broadband, high ISO	10	8000	60	33	37.5	0.7	1.6	30	85	2.3–5.5	0.227	1000	24L 4x4 QFN
SP8T, A	PE42582[4]	Broadband, low IL	0.009	8000	60	33	37.5	0.7	1.6	30	85	2.3–5.5	0.227	1000	24L 4x4 QFN
SP8T, A	PE426482	Broadband, ET[6]	10	8000	60	31	37.5	0.7	1.6	30	85	2.3–5.5	0.227	1000	24L 4x4 QFN
SP12T, A	PE42412[4]	Broadband, high ISO	10	8000	60	33	37.5	0.7	2.4	22	69	2.3–5.5	0.232	1000	32L 5x5 QFN
SP12T, A	PE42512[4]	Broadband, low IL	0.009	8000	60	33	37.5	0.7	2.4	22	69	2.3–5.5	0.232	1000	32L 5x5 QFN
SP12T, A	PE426412	Broadband, ET[6]	10	8000	60	31	37.5	0.7	2.4	22	69	2.3–5.5	0.232	1000	32L 5x5 QFN
SP(3/5)T, R	PE42850	High Power	30	1000	42	42.5	45.5	0.25	0.35	30	36	2.3–5.5	15	1500	32L 5×5 QFN
SP(3/5)T, R	PE42851	High Power	100	1000	42	42.5	45.5	0.25	0.4	30	36	2.3–5.5	6	1500	32L 5×5 QFN
DDSPDT[7], OR	PE42920	Differential	0.01	6000	50	10	13	0.7	3.1	26	30	2.97–3.63	0.270	2000	16L 3×3 QFN

Note 1: Absorptive (A), reflective (R) or open reflective (OR).
Note 2: 50% CTRL to 90% or 10% RF.
Note 3: Requires external negative voltage (V_{SS}, –11V to –15V) for operation. See datasheet for details.
Note 4: Operating temperature up to +105 °C.
Note 5: Fast switching (FS).
Note 6: Extended temperature (ET) range, –55 °C to +125 °C.
Note 7: Dual differential single pole double throw (DDSPDT).

75Ω 50Ω *Our general-purpose reflective 50Ω switches can also be used in a 75Ω environment.*

Test & Measurement Switches

Our RF test and measurement switches offer patented linearity technology enhancements that reduce gate lag and insertion loss drift, while maintaining high linearity and isolation over an extended frequency range up to 60 GHz.

Test and Measurement Switches — 50Ω

Product Description[1]	Part Number	Operating Frequency (MHz)		Linearity IIP3/IIP2 (dBm)	P0.1dB (dBm)	Insertion Loss (dB)		Isolation (dB)		Settling Time (µs)[2]	Switching Time (µs)[3]	ESD HBM (V)	Package
		Min	Max			Min	Max	Min	Max				
SPDT, A	PE42520	0.009	13000	66 / 120	39	0.6	2.0	18	90	15	5.5	4000	16L 3×3 QFN
SPDT, A	PE42521	0.009	13000	65 / 120	38	0.6	1.85	17	90	2	0.5	3000	16L 3×3 QFN
SPDT, A	PE42522	0.009	26500	59 / 121	33	0.7	5.3	22	73	7	3	3500	29L 4×4 LGA
SPDT, A	PE42553	0.009	8000	66 / 120	39	0.6	0.85	41	90	15	5.5	4000	16L 3×3 QFN
SPDT, R	PE42524	10	40000	50 / –	32.5	0.6	5.5	33	84	0.84	0.225	2000	Flip Chip
SPDT, R	PE42525	0.009	60000	46 / 112	35	0.9	2.7	36	80	0.048	0.008	1000	Flip Chip
SP4T, A	PE42540	.00001	8000	58 / 100	33	0.7	1.2	27	84	15	5	2000	32L 5×5 LGA
SP4T, A	PE42542	0.009	18000	58 / 118	33	0.7	3.1	27	90	7	3	3500	29L 4×4 LGA
SP4T, A	PE42543	0.009	18000	59 / 113	33	0.7	3.2	29	90	2	0.5	2500	29L 4×4 LGA
SP6T, A	PE42562	0.009	8000	60 / 105	37.5	0.7	1.6	30	68	0.560	0.210	1000	24L 4x4 QFN
SP8T, A	PE42582	0.009	8000	60 / 105	37.5	0.7	1.6	30	85	0.870	0.227	1000	24L 4x4 QFN
SP12T, A	PE42512	0.009	8000	60 / 105	37.5	0.7	2.4	22	69	0.870	0.232	1000	32L 5x5 QFN

Note 1: Absorptive (A) or reflective (R). **Note 2:** 50% CTRL to 0.05 dB final value. **Note 3:** 50% CTRL to 90% or 10% RF.

Extended Temperature RF Switches

Our extended temperature switches are ideal for applications that require wide temperature range support from –55 °C to +125 °C, such as harsh industrial applications.

Extended Temperature Switches — 50Ω

Product Description[1]	Part Number	Operating Frequency (MHz)		Linearity IIP3/IIP2 (dBm)	P0.1dB (dBm)	Insertion Loss (dB)		Isolation (dB)		Settling Time (µs)[2]	Switching Time (µs)[3]	ESD HBM (V)	Package
		Min	Max			Min	Max	Min	Max				
SPDT, R	PE426525	0.009	60000	46 / 112	35	0.9	2.7	36	80	0.048	0.008	1000	Flip Chip
SP6T, A	PE426462	10	8000	60 / 105	37.5	0.7	1.6	30	68	0.560	0.210	1000	24L 4x4 QFN
SP8T, A	PE426482	10	8000	60 / 105	37.5	0.7	1.6	30	85	0.870	0.227	1000	24L 4x4 QFN
SP12T, A	PE426412	10	8000	60 / 105	37.5	0.7	2.4	22	69	0.870	0.232	1000	32L 5x5 QFN

Note 1: Absorptive (A) or reflective (R). **Note 2:** 50% CTRL to 0.05 dB final value. **Note 3:** 50% CTRL to 90% or 10% RF.

Automotive Switches

Our AEC-Q100 Grade 2-certified automotive switches support operating temperatures up to +105 °C and a wide range of wireless applications such as automotive infotainment and traffic safety applications.

Automotive AEC-Q100 Certified Switches, Up to +105 ˚C

Product Description*	Part Number	Operating Frequency (MHz)		Linearity IIP3/IIP2 (dBm)	P0.1dB (dBm)	Insertion Loss (dB)		Isolation (dB)		Typical I_{DD} (µA @ 3V)	V_{DD} Range (V)	ESD HBM (V)	Package
		Min	Max			Min	Max	Min	Max				
SPDT, R	PE423422	100	6000	73.5 / 115	34	0.25	0.9	16	41	120	2.3–5.5	1000	12L 2×2 QFN
SPDT, R	PE42359	10	3000	55 / –	33.5	0.35	1.1	14	35	9	1.8–3.3	2000	6L SC70
SP4T, R	PE423641	50	3000	68 / 115	37	0.5	0.95	22	32	13	2.65–3.3	2000	16L 3×3 QFN

Note: * Reflective (R).

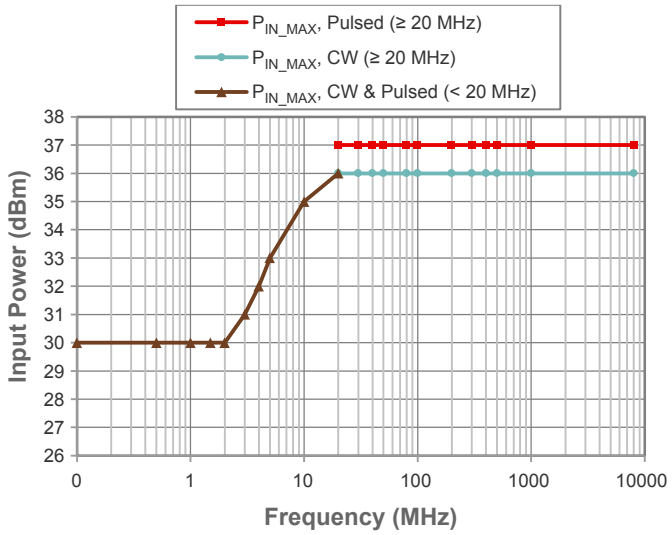
True DC RF Switch

The UltraCMOS PE42020 is the industry's first and only RF integrated switch to operate at zero Hz. This true DC RF switch features high-power handling and maintains excellent RF performance and linearity from DC through 8 GHz.

True DC RF Switch — 50Ω

Product Description	Part Number	Operating Frequency		Linearity IIP3/IIP2 (dBm)	P0.1dB (dBm)	Insertion Loss (dB)		Isolation (dB)		Settling Time (µs)[1]	Switching Time (µs)[2]	ESD HBM (V)	Package
		Min	Max			Min	Max	Min	Max				
SPDT, A & OR[3]	PE42020	0 Hz	8 GHz	62 / 115	38	0.6	1.1	34	48	35	10	1000	20L 4×4 QFN

Note 1: 50% CTRL to 0.05 dB final value.
Note 2: 50% CTRL to 90% or 10% RF.
Note 3: Configurable 50Ω absorptive (A) or open reflective (OR) switch.



PE42020 Power Handling

The PE42020 exhibits high-power handling of 30 dBm at 0 Hz and 36 dBm at 8 GHz. This graph shows the maximum RF input power (P_{IN_MAX}) for pulsed, CW and CW/pulsed at 0 °C to +85 °C ambient temperature, V_{DD} = +15V, and V_{SS} = –15V.

High-power Switches

Our UltraCMOS high-power RF switches deliver a small footprint, monolithic, turnkey design with extremely low power consumption, excellent harmonic performance and high-power handling.

High-power RF Switches — 50Ω

Product Description[1]	Part Number	Operating Frequency (MHz)		P0.1dB (dBm)	Insertion Loss (dB)		Isolation (dB)		RF Input Power, CW (dBm)	Linearity IIP3 (dBm)	ESD HBM (V)	Package
		Min	Max		Min	Max	Min	Max				
SPDT, R	PE42820	30	2700	45.5	0.3	0.7	24	35	43	85	1500	32L 5×5 QFN
SPDT, R	PE42821	100	2700	45.5	0.4	0.8	24	35	43	82	1500	32L 5×5 QFN
SPDT, A	PE42822	700	3800	39.5	0.6	0.8	41	47	32	66	3000	16L 3×3 QFN
SPDT, R	PE42823[2]	700	6000	46	0.35	0.53	22	59	38.5	70	4500	16L 3×3 QFN
SP3T/SP5T, R	PE42850	30	1000	45.5	0.25	0.35	30	36	42.5	80	1500	32L 5×5 QFN
SP3T/SP5T, R	PE42851	100	1000	45.5	0.25	0.4	30	36	42.5	80	1500	32L 5×5 QFN

Note 1: Absorptive (A) or reflective (R).
Note 2: RX protection switch.

75Ω Wired Broadband Switches

Our high-performance UltraCMOS 75Ω switches simplify your next RF design by providing excellent isolation, low insertion loss and a CMOS/TTL-compatible control to address the needs of wired broadband applications.

Wired Broadband Switches — 75Ω[1]

Product Description[2]	Part Number	Product Highlight	Operating Frequency (MHz)		CTB/CSO (dBc)	P0.1dB (dBm)	Insertion Loss (dB)		Isolation (dB)		V_{DD} Range (V)	ESD HBM (V)	Package
			Min	Max			Min	Max	Min	Max			
SPDT, A	PE4256	Low Insertion Loss	5	3000	–90[3]	31	0.5	1.1	52	80	2.7–3.3	1000	20L 4×4 QFN
SPDT, A	PE4280	High Isolation	5	2200	–85[3]	26	0.5	1.1	47	72	2.7–3.3	1000	20L 4×4 QFN
SPDT, A	PE42721	Low Insertion Loss	5	2200	–99 / <–105	27	0.4	0.65	55	85	2.3–5.5	3000	12L 3×3 QFN

Note 1: General-purpose, reflective 50Ω switches can also be used in a 75Ω environment.

Note 2: Absorptive (A) or reflective (R).
Note 3: CTB/CSO measured with 77 and 110 channels; PO = 44 dBmV.

DOCSIS 3.1/3.0 High-linearity Wired Broadband Switches — 75Ω[1]

Product Description[2]	Part Number	Operating Frequency (MHz)		Harmonics, fo = 17 MHz		P0.1dB (dBmV)	Insertion Loss (dB)		Isolation (dB)		V_{DD} Range (V)	ESD HBM (V)	Package
		Min	Max	2fo	3fo		Min	Max	Min	Max			
SPDT, R	PE42422	5	6000	–92	–125	34	0.23	1.25	15	42	2.3–5.5	4000	12L 2×2 QFN
SPDT, R	PE42427	5	6000	–92	–125	34	0.23	1.25	15	42	2.3–5.5	4000	12L 2×2 QFN
SPDT, R	PE42722	5	1794	–118	–140	88	0.2	0.85	29	50	2.3–5.5	1500	32L 5×5 QFN
SPDT, R	PE42723	5	1794	–121	–140	87	0.1	0.4	34	54	2.3–5.5	3000	12L 3×3 QFN
SPDT, R	PE42724	5	1794	–121	–150	87	0.1	0.4	19	39	2.3–5.5	2000	12L 3×3 QFN
SPDT, R	PE42726	5	1794	–121	–150	87	0.1	0.4	19	39	2.3–5.5	2000	12L 3×3 QFN

Note 1: General-purpose, reflective 50Ω switches can also be used in a 75Ω environment.

Note 2: Reflective (R).

Wired Broadband Switches — 75Ω — With Unpowered Operation[1,2]

Product Description[3]	Part Number	Operating Frequency (MHz)		CTB/CSO (dBc)	P1dB[4] PWR/UNPWR (dBm)	Insertion Loss PWR (dB)		Isolation PWR/UNPWR (dB)		V_{DD} Range (V)	ESD HBM (V)	Package
		Min	Max			Min	Max	Min	Max			
SPDT, A	PE42742	5	2200	–90 / –77[5]	32 / 26.5	0.45	1.7	53 / 52.5	94 / 90.5	2.7–3.3	3500	20L 4×4 QFN
SPDT, A	PE42750	5	2200	–81 / –110[6]	23.5	0.7	1.7	57 / 72	84 / 90	2.7–3.6	2000	12L 3×3 QFN

Note 1: Unpowered state: PE42742: RFC–RF1 ON; PE42750: All ports terminated.
Note 2: General-purpose, reflective 50Ω switches can also be used in a 75Ω environment.

Note 3: Absorptive (A).
Note 4: Measured at 1 GHz.
Note 5: CTB/CSO measured with 77 and 110 channels; PO = 44 dBmV.
Note 6: CTB/CSO measured with 159 channels; PO = 42 dBmV.

1000+ Issued & Pending Patents

Our award-winning patent portfolio protects our products and demonstrates our commitment to semiconductor innovation.

RF Attenuators

75Ω Wired Broadband RF Digital Step Attenuators

Our 75Ω wired broadband RF DSAs feature attenuation steps of 0.5 dB to 31.5 dB, low distortion for CATV and multi-carrier applications, and parallel and serial programming interfaces.

75Ω Wired Broadband RF Digital Step Attenuators

Product Description, Part Number	Attenuation (dB) (Range/Min. Step Size	Programming Mode	Operating Frequency (MHz)		Insertion Loss (dB)		Input IP3 (dBm)	Attenuation Accuracy (dB @ 1 GHz)	Switching Time (µs)	ESD HBM (V)	Package
			Min	Max	Min	Max					
6-bit – PE4314[1]	0.5–31.5 / 0.5	Parallel[2], Serial	1	2500	1	1.5	58	±(0.15 + 3% of setting)	370	1500	20L 4×4 QFN
6-bit – PE43665	0–31.5 / 0.5	Parallel[2], Serial	1	2000	1.4	1.8	52	±(0.15 + 4% of setting)	1	500	20L 4×4 QFN

Note 1: External V_{SS} option. **Note 2:** Parallel modes: latched and direct.

Glitch-less RF Digital Step Attenuators

Our glitch-less RF DSAs feature glitch-less attenuation state transitions and an extended operating temperature range to +105 ºC, ideal for many broadband wireless applications.

Glitch-less Digital Step Attenuators (Monolithic) — 50Ω, Up to +105 ˚C

Product Description, Part Number	Attenuation (dB) (Range/Min. Step Size)	Programming Mode	Operating Frequency (MHz)		Insertion Loss (dB)		Input IP3 (dBm)	Attenuation Accuracy (dB @ 2.2 GHz)	Switching Time (ns)	ESD HBM (V)	Package
			Min	Max	Min	Max					
7-bit – PE43711	0.25–31.75 / 0.25	Parallel[1], Serial	0.009	6000	1.3	2.4	57	±(0.15 + 1.5% of setting)	275	3000	24L 4×4 QFN
7-bit – PE43712	0.25–31.75 / 0.25	Parallel[1], Ser-Add[2]	0.009	6000	1.3	2.45	57	±(0.20 + 1.5% of setting)	275	3000	32L 5×5 QFN
7-bit – PE43713[3]	0.25–31.75 / 0.25	Parallel[1], Ser-Add[2]	0.009	6000	1.3	2.45	57	±(0.20 + 1.5% of setting)	275	3000	32L 5×5 QFN

Note 1: Parallel modes: latched and direct. **Note 2:** Serial-addressable mode. **Note 3:** External V_{SS} option.

General-purpose RF Digital Step Attenuators

Our general-purpose RF DSAs feature high linearity, fast switching time with wide bandwidth, and best-in-class attenuation accuracy with fine attenuation steps.

General-purpose RF Digital Step Attenuators (Monolithic) — 50Ω

Product Description, Part Number	Attenuation (dB) (Range/Min. Step Size	Programming Mode	Operating Frequency (MHz)		Insertion Loss (dB)		Input IP3 (dBm)	Attenuation Accuracy (dB @ 1 GHz)	Switching Time (µs)	ESD HBM (V)	Package
			Min	Max	Min	Max					
2-bit – PE43205[1]	6–18 / 6	Parallel	35	6000	0.5	1.05	61	+0.10	0.031	2000	12L 3×3 QFN
2-bit – PE43620	0–18 / 6, 12, and 18	Parallel[3]	50	3000	0.6	0.7	61	±(–0.25/+0.40 of setting)	0.03	2000	12L 3×3 QFN
5-bit – PE43650	0–15.5 / 0.5	Parallel[3], Serial	0.009	6000	2.4	2.9	58	±(0.3/+0.30 of setting)	4	500	24L 4×4 QFN
6-bit – PE4312[1,2]	0.5–31.5 / 0.5	Parallel[3], Serial	1	4000	1.3	2.1	59	±(0.15 + 2% of setting)	0.5	1500	20L 4×4 QFN
6-bit – PE43508[1,2]	0.5–31.5 / 0.5	Par[3], Ser, Ser-Add[4]	0.009	55000	2.2	5.9	50	+(1.00+4.5% of setting) / -1	0.330	1000	Flip Chip
6-bit – PE43610[1,2]	0.5–31.5 / 0.5	Par[3], Ser, Ser-Add[4]	0.009	13000	1.6	3	50	+(1.00+4.5% of setting) / -1	0.330	1000	24L 4×4 LGA
6-bit – PE43614[1,2]	0.5–31.5 / 0.5	Par[3], Ser, Ser-Add[4]	0.009	45000	1.6	5.8	50	+(1.00+4.5% of setting) / -1	0.330	1000	24L 4×4 LGA
7-bit – PE43670	0–31.75 / 0.25	Parallel[3], Ser-Add[4]	0.009	4000	1.9	2.4	59	±(0.2/+0.15 of setting)	4	500	32L 5×5 QFN
7-bit – PE43704[2]	0.25–31.75 / 0.25	Par[3], Ser, Ser-Add[4]	0.009	8000	1.3	2.9	61	+(0.15 + 4.5% of setting) –(0.1 + 2% of setting)	1.1	1500	32L 5×5 QFN
7-bit – PE43705[1,2]	0.25–31.75 / 0.25	Par[3], Ser, Ser-Add[4]	50	8000	1.3	2.4	58	+(0.15 + 1.5% of setting) –(0.1 + 1% of setting)	1	1500	32L 5×5 QFN

Note 1: Operating temperature up to +105 °C.
Note 2: Glitch-safe: negative glitch only.
Note 3: Parallel modes: latched and direct.
Note 4: Serial-addressable mode.

RF Phase & Amplitude Control

Phase Shifters

Our digital phase shifter offers an ideal solution for optimizing transmission phase with its low RMS phase and amplitude error levels, and dual parallel and serial programming options.

Digital Phase Shifter (Monolithic) — 50Ω, Up to +105 ˚C

Part Number	Operating Frequency (GHz)	Bit #	Range (°)	Resolution (°)	Insertion Loss (dB)	RMS Phase Error (°)	RMS Amplitude Error (dB)	Settling Time (ns)	V_{DD} Range (V)	ESD HBM (V)	Package
PE44820*	1.7–2.2	8	358.6	1.4	6	1.0	0.1	365	2.3–5.5	500	32L 5×5 QFN

Note: * With extended frequency support from 1–3 GHz.

Monolithic Phase & Amplitude Controllers (MPACs)

Our MPACs provide an integrated solution for Doherty power amplifier optimization and offer reliable phase and amplitude control of two independent RF paths.

MPAC–Doherty — 50Ω

Part Number	Phase (°) (Range/Steps) 5 bits	Attenuation (dB) (Range/Steps) 4 bits	Programming Mode	Operating Frequency (GHz)		Insertion Loss (dB)	Input IP3 (dBm)	P0.1dB (dBm)	V_{DD} Range (V)	I_{DD} (μA)	ESD HBM (V)	Package
				Min	Max							
PE46120	–87.2 / 2.8	7.5 / 0.5	Serial	1.8	2.2	6.9	60	35	2.3–5.5	350	1000	32L 6×6 QFN
PE46130	–87.2 / 2.8	7.5 / 0.5	Serial	2.3	2.7	7.2	70	35	2.3–5.5	350	1500	32L 6×6 QFN
PE46140	–87.2 / 2.8	7.5 / 0.5	Serial	3.4	3.8	6.5	60	35	2.3–5.5	350	1500	32L 6×6 QFN

Digital Tunable Capacitors (DTCs)

Our DTCs continue a tradition of innovation, high performance and ease-of-use by offering wideband tuning coverage, minimum mismatch losses, excellent linearity and fast switching speed.

Digital Tunable Capacitors

Part Number	Interface	Operating Frequency (MHz)		Min Shunt Capacitance (pF)	Max Shunt Capacitance (pF)	Tuning Ratio (Shunt)	Quality Factor (Shunt, 1 GHz)		Peak Operating Voltage (V_{PK})	V_{DD} Range (V)	ESD HBM (V)	Package
		Min	Max				Cmin	Cmax				
PE64102	SPI	100	3000	1.88	14	7.4:1	50	20	6	2.3–3.6	2000	12L 2×2 QFN
PE64904	SPI	100	3000	1.10	5.10	4.6:1	35	25	30	2.3–3.6	1500	10L 2×2 QFN
PE64906	SPI	100	3000	0.90	4.60	5.1:1	40	29	30	2.3–4.8	2000	10L 2×2 QFN
PE64907	SPI	100	3000	0.85	2.40	2.82:1	40	34	30	2.3–4.8	2000	10L 2×2 QFN
PE64909	SPI	100	3000	0.60	2.35	3.9:1	40	29	30	2.3–4.8	2000	10L 2×2 QFN

RF Mixers & Limiters

Power Limiters

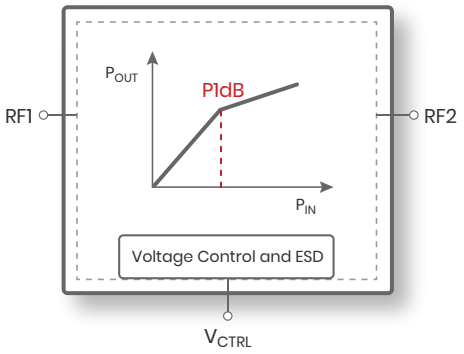
Our power limiters are highly integrated and smaller than PIN diode solutions; they feature an adjustable threshold control, high-power handling and fast response and recovery times.

Power Limiters

Part Number	Operation Modes	Operating Frequency	Adjustable Power Limiting Threshold (dBm)	Max Power Handling (dBm)		Input IP3 (dBm)	Control Voltage Range (V)*	ESD HBM (V)	Package
				Pulsed	CW				
PE45140	Limiting, Reflecting	20–2000 MHz	22–32	47	40	64	–2.5 to –0.5	8000	12L 3×3 QFN
PE45361	Limiting, Reflecting	10 MHz–6 GHz	7–13	50	36	37	0 to 0.3	7000	12L 3×3 QFN
PE45450	Limiting, Reflecting	9 kHz–6 GHz	25–35	47	40	70	–2.5 to –0.5	8000	12L 3×3 QFN

Note: * Limiting mode.

- ✔ *Monolithic drop-in solution*
- ✔ *Voltage control adjustable low-power limiting threshold*
- ✔ *High-power handling to 100W pulsed*
- ✔ *Response time of less than 1 ns*



Prescalers

Our prescalers offer exceptional performance with high-frequency support up to 13.5 GHz, low-phase noise performance and low-power consumption solutions, and bare-die solutions for a wide variety of compact high-performance applications.

Prescalers

Part Number	Type	Description	Operating Frequency (MHz)		ESD HBM (V)	Package
			Min	Max		
PE35400	Divide by 4	Low Power	3000	13500	250	DIE

Mixers

Our UltraCMOS mixers are broadband, quad MOSFET array cores that feature high linearity, image rejection, local oscillator isolation, strong low-frequency performance, monolithic integration and high reliability, making them easier to implement and more dependable than GaAs-based MOSFET arrays.

Mixers

Part Number	Operating Frequency (MHz)			LO Drive (dBm)	Conv Loss (dB)	Isolation (dB, typ)		Input IP3 (dBm, typ)	ESD HBM (V)	Package
	LO	RF	IF, Nom			LO–RF	LO–IF			
PE4140[1,2]	0.01–6000	0.01–6000	0.01–6000	0 to +20	6.5–7.5	25–40	25–40	36	100	6L 3×3 DFN
PE4141[1,2,3]	0.01–1000	0.01–1000	0.01–1000	0 to +20	7.0–8.0	40	40	33	100	8L MSOP
PE4151[1,3]	245–410	136–520	44.85–109.65	–10 to –6	6.5–8.5	43	40	26	1000	10L MSOP
PE4152[1]	245–831	136–941	109.65	–10 to +23	6.5–7.5	30–60	22–58	26	1000	20L 4×4 QFN

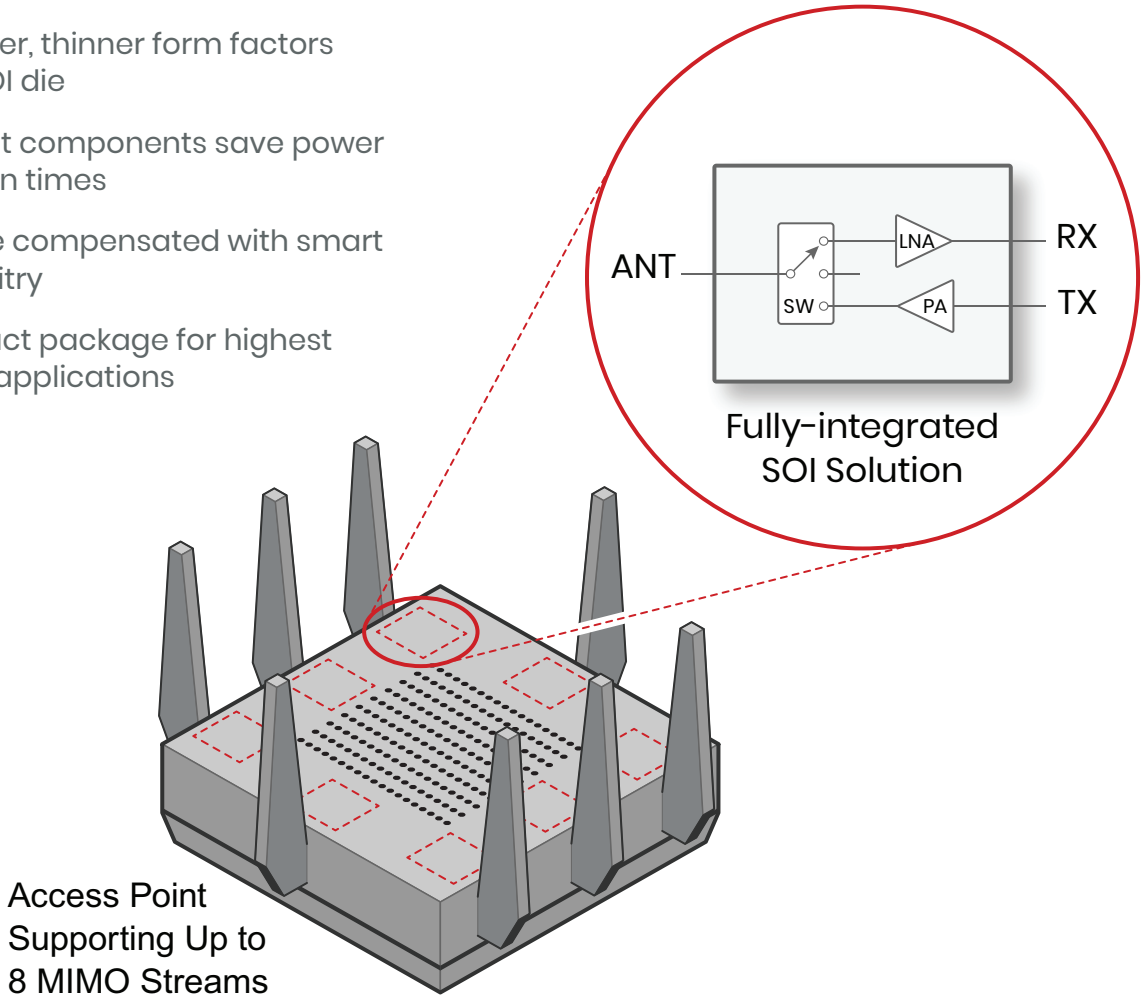
Note 1: Fully differential DC coupled ports. External baluns required.
Note 2: Quad MOSFET array.
Note 3: Low magnetic.

Advanced Wi-Fi FEM Solutions

The evolution of Wi-Fi has taken considerable strides over the last 20 years driving pervasive global adoption. With the newly ratified 6 GHz Wi-Fi 6E standard, devices can now leverage up to 1.2 GHz of unencumbered spectrum with expanded MIMO counts, providing a truly immersive wireless experience.

pSemi's Wi-Fi front-end modules (FEMs) are designed using our advanced SOI process, unique analog and digital design techniques and intelligent control circuitry to offer temperature-compensated, high-linearity transmitters with low-noise receivers in an ultra-compact package footprint.

- ✔ Smaller, lighter, thinner form factors in a single SOI die
- ✔ More efficient components save power and boost run times
- ✔ Temperature compensated with smart control circuitry
- ✔ Ultra-compact package for highest MIMO count applications



Wi-Fi Front-end Modules (FEMs)

Our Wi-Fi FEMs use a smart linear compensation technique to deliver a high-linearity signal and excellent long-packet error vector magnitude (EVM) performance, making it ideal for Wi-Fi home gateways, routers and set-top boxes.

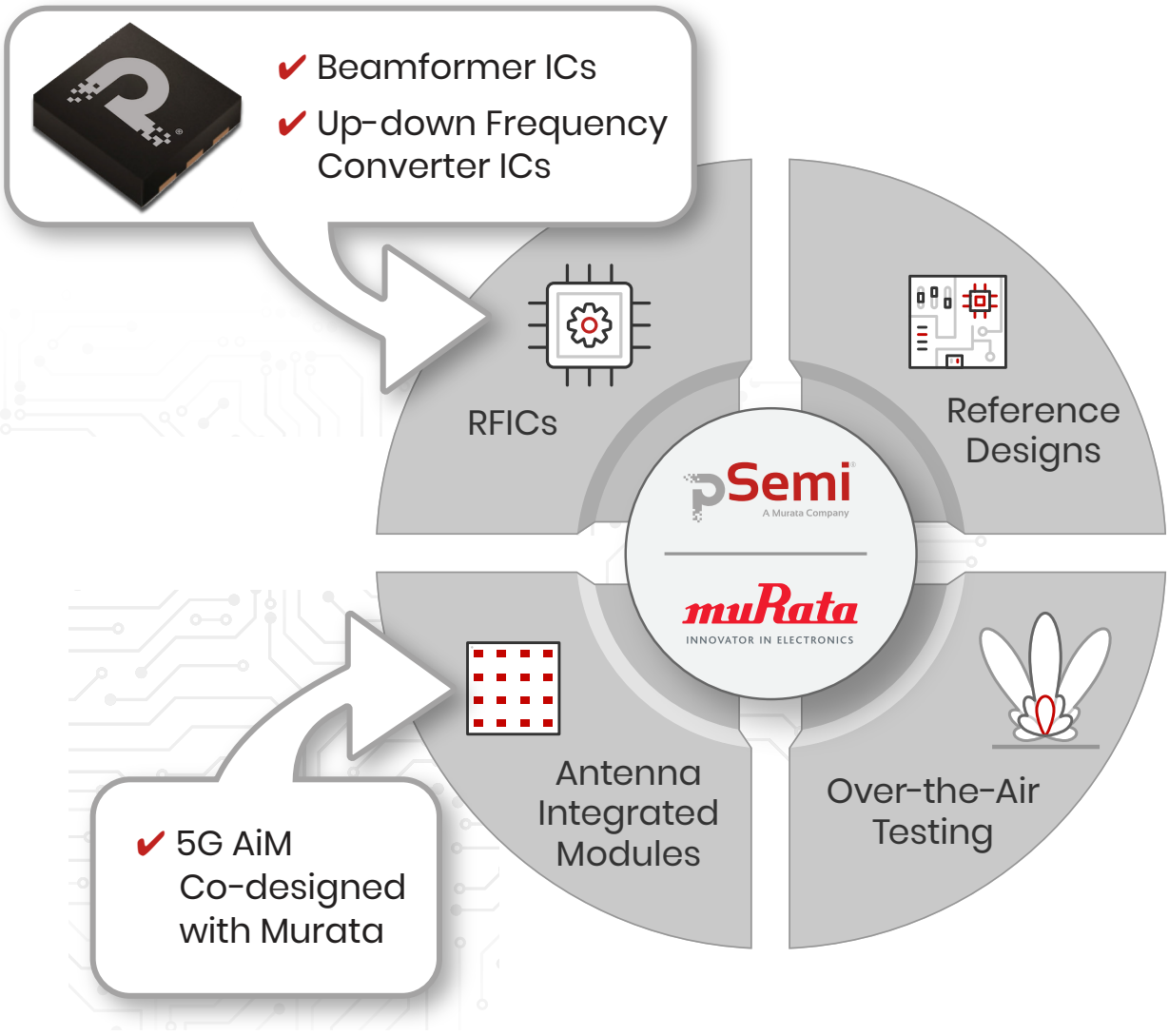
Wi-Fi Front-end Modules (FEMs)						
Part Number	Frequency (GHz)	Transmit Gain (dB)	Receive Gain (dB)	Long-packet EVM Performance	Temperature Range	Package
PE565211	5–7	27	14	-41 dB @ 13.0 dBm POUT (HE80)	-40 to +85 °C	16L 2.5×2.5 LGA

5G mmWave Integrated Solutions

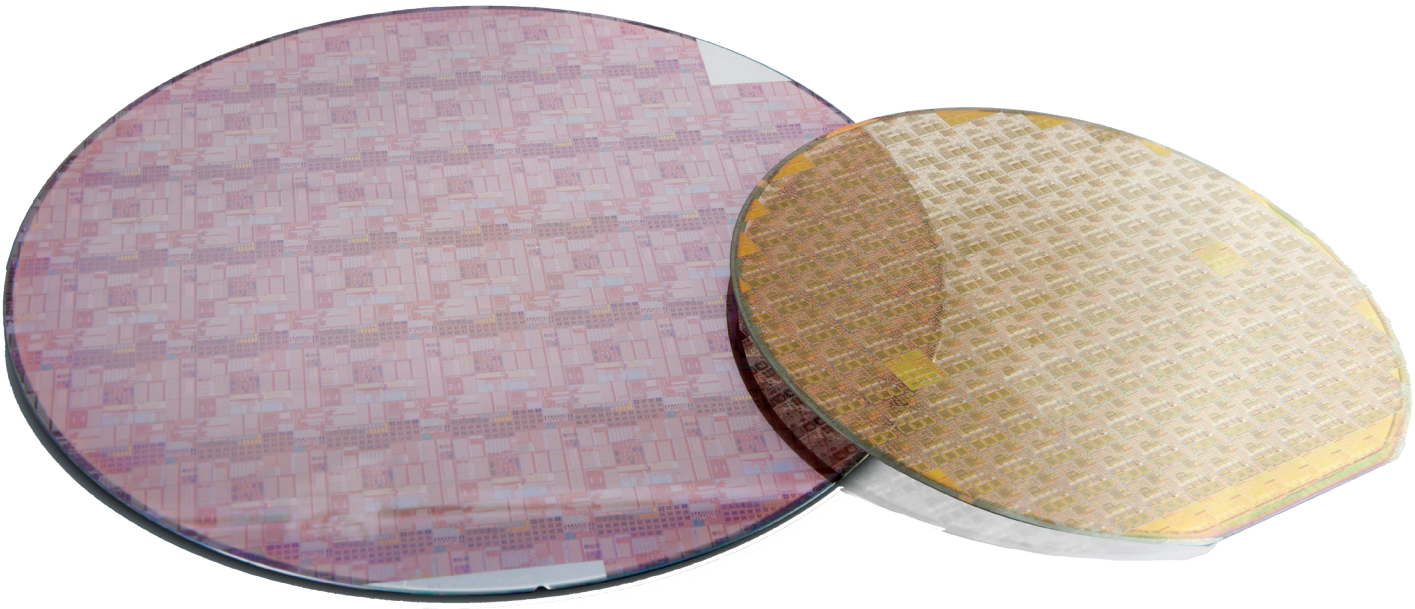
As the rapid growth of consumer data demand exceeds the capacity of 5G sub-6 GHz networks, operators will accelerate worldwide deployments of 5G mmWave networks.

pSemi and Murata have co-designed a mmWave 5G antenna-integrated module (AiM) that incorporates multi-channel, beamforming front-end RFICs by pSemi, offering high-efficiency transmitters and low-noise receivers for advanced mmWave products. Our innovation is critical to enabling 5G wireless communications for base stations, customer premises equipment and smartphone applications.

- ✔ 5G AiM co-designed with Murata
- ✔ High-efficiency 26 GHz, 28 GHz and 39 GHz beamforming front ends supporting bands n257, n258, n261, and n260
- ✔ Advanced, highly integrated package and antenna technology
- ✔ Modular AiM approach for building scalable antenna arrays of any size



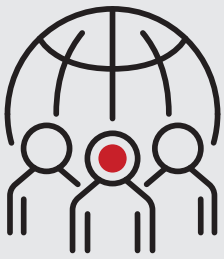
Quality and Reliability



pSemi is committed to providing quality products and services that meet or exceed customers' requirements the first time, every time, by:

- ✔ Fully understanding customers' requirements and expectations
- ✔ Providing products utilizing proven designs and manufacturing processes
- ✔ Developing a highly trained workforce that is motivated, empowered and fully accountable
- ✔ Establishing strong relationships with world-class suppliers
- ✔ Continually improving the efficiency and effectiveness of business processes and quality management system

pSemi's ISO9001:2015, AS9100D and IATF16949:2016 certified quality systems, advanced designs, progressive process technology and excellent product performance enable the company to consistently deliver high-quality, reliable products to customers.



8000+ Customers

Our RF products are trusted by customers in markets ranging from mobile, automotive, communication, communication infrastructure, cable broadband, Internet of Things (IoT), and test and measurement.

Packaging

pSemi offers a variety of RoHS-compliant commercial packaging options.

6L SC70
1.3 × 2.0 × 1.0

8L 1.5×1.5 DFN
1.5 × 1.5 × 0.50

10L 2×2 QFN
2.0 × 2.0 × 0.45

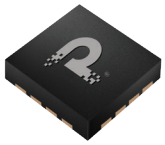
12L 2×2 QFN
2.0 × 2.0 × 0.60

8L MSOP
3.0 × 3.0 × 1.1

10L MSOP
3.0 × 3.0 × 0.86

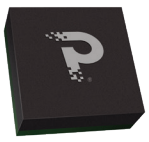
6L DFN
3.0 × 3.0 × 0.9

12L 3×3 QFN
3.0 × 3.0 × 0.75



16L 3×3 QFN
3.0 × 3.0 × 0.75

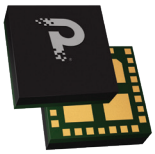
20L 4×4 LGA
4.0 × 4.0 × 0.9



20L 4×4 QFN
4.0 × 4.0 × 0.9

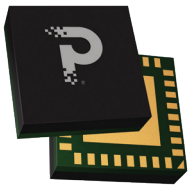
24L 4×4 QFN
4.0 × 4.0 × 0.9

24L 4×4 LGA
4.0 × 4.0 × 0.9



29L 4×4 LGA
4.0 × 4.0 × 0.9

32L 5×5 QFN
5.0 × 5.0 × 0.9



32L 5×5 LGA
5.0 × 5.0 × 0.9

32L 6×6 QFN
6.0 × 6.0 × 0.9

All dimensions are listed in millimeters (width × length × height) and are approximate.
See product datasheets for exact dimensions.

Design and Application Support

Designing for tomorrow's challenging RF applications requires high-performance products and outstanding technical support. From our engineering excellence to streamlined manufacturing and technical sales and applications support, our team is committed to providing a complete product solution. Choose among our comprehensive library of datasheets, application notes, tutorials, reference designs and other engineering resources, all developed to help get your design to market on time.

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