
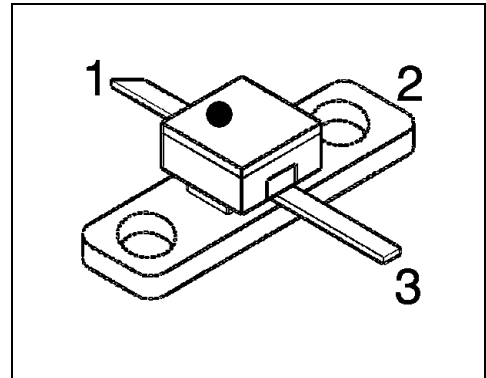


## HiRel X-Band GaAs Power-MESFET

- **HiRel Discrete and Microwave Semiconductor**
- For professional power amplifiers
- For frequencies from 500 MHz to 12.5 GHz
- Hermetically sealed microwave power package
- Low thermal resistance for high voltage application
- Power added efficiency > 54 %
-  **ESA Space Qualification Expected 1998**  
ESA/SCC Detail Spec. No.: 5614/007,  
Type Variant No.s 01 to 03



**ESD:** Electrostatic discharge sensitive device, observe handling precautions!

| Type          | Marking | Ordering Code | Pin Configuration |   |   | Package |
|---------------|---------|---------------|-------------------|---|---|---------|
|               |         |               | 1                 | 2 | 3 |         |
| CLX30-00 (ql) | -       | see below     | G                 | S | D | MWP-25  |
| CLX30-05 (ql) |         |               |                   |   |   |         |
| CLX30-10 (ql) |         |               |                   |   |   |         |

CLX30-nn: specifies output power level (see electrical characteristics)

|                     |                          |                |            |
|---------------------|--------------------------|----------------|------------|
| (ql) Quality Level: | P: Professional Quality, | Ordering Code: | Q62702L115 |
|                     | H: High Rel Quality,     | Ordering Code: | on request |
|                     | S: Space Quality,        | Ordering Code: | on request |
|                     | ES: ESA Space Quality,   | Ordering Code: | Q62702L114 |

(see order instructions for ordering example)

**Maximum Ratings**

| Parameter  | Symbol    | Values   | Unit |
|--|-----------|--|------|
| Drain-source voltage                                 | $V_{DS}$  | 11   | V    |
| Drain-gate voltage                                   | $V_{DG}$  | 13   | V    |
| Gate-source voltage                                  | $V_{GS}$  | - 6  | V    |
| Drain current  | $I_D$     | 840  | mA   |
| Gate forward current                                 | $I_G$     | 10   | mA   |
| Compression Level<br>Operation Range 1 <sup>1)</sup> | $P_C$     | 1.5 at $V_{DS} \leq 8$ V<br>2.5 at $V_{DS} \leq 7$ V<br>3.5 at $V_{DS} \leq 6$ V | dB   |
| Compression Level<br>Operation Range 2 <sup>2)</sup> | $P_C$     | 3.5 at $V_{DS} \leq 6$ V   | dB   |
| Compression Level<br>Operation Range 3 <sup>3)</sup> | $P_C$     | tbd.   | dB   |
| Junction temperature                                 | $T_J$     | 175  | °C   |
| Storage temperature range                            | $T_{stg}$ | - 65...+ 175   | °C   |
| Total power dissipation <sup>4)</sup>                | $P_{tot}$ | 5.4  | W    |
| Soldering temperature <sup>5)</sup>                  | $T_{sol}$ | 230  | °C   |

**Thermal Resistance**

|                          |            |           |     |
|--------------------------|------------|-----------|-----|
| Junction-soldering point | $R_{thJS}$ | $\leq 25$ | K/W |
|--------------------------|------------|-----------|-----|

**Notes.:**

- 1) Operation Range 1:  $160 \text{ mA} \leq I_D \leq 320 \text{ mA}$
- 2) Operation Range 2:  $I_D > 320 \text{ mA}$
- 3) Operation Range 3:  $I_D < 160 \text{ mA}$
- 4) At  $T_S = + 40$  °C. For  $T_S > + 40$  °C derating is required.
- 5) During 15 sec. maximum. The same terminal shall not be resoldered until 3 minutes have elapsed.

**Electrical Characteristics** (at  $T_A=25^\circ\text{C}$ ; unless otherwise specified)

| Parameter  | Symbol       | Values |      |      | Unit          |
|--|--------------|--------|------|------|---------------|
|  |              | min.   | typ. | max. |               |
| <b>DC Characteristics</b>  |              |        |      |      |               |
| Drain-source saturation current<br>$V_{DS} = 2\text{ V}, V_{GS} = 0\text{ V}$  | $I_{DSS}$    | 360    | 600  | 840  | mA            |
| Gate threshold voltage<br>$V_{DS} = 3\text{ V}, I_D = 24\text{ mA}$  | $-V_{Gth}$   | 1.2    | 2.2  | 3.2  | V             |
| Drain current at pinch-off, low $V_{DS}$<br>$V_{DS} = 3\text{ V}, V_{GS} = -3.5\text{ V}$                                | $I_{Dp3}$    | -      | -    | 120  | $\mu\text{A}$ |
| Gate current at pinch-off, low $V_{DS}$<br>$V_{DS} = 3\text{ V}, V_{GS} = -3.5\text{ V}$                                 | $-I_{Gp3}$   | -      | -    | 48   | $\mu\text{A}$ |
| Drain current at pinch-off, high $V_{DS}$<br>$V_{DS} = 9.5\text{ V}, V_{GS} = -3.5\text{ V}$                             | $I_{Dp9.5}$  | -      | -    | 1200 | $\mu\text{A}$ |
| Gate current at pinch-off, high $V_{DS}$<br>$V_{DS} = 9.5\text{ V}, V_{GS} = -3.5\text{ V}$                              | $-I_{Gp9.5}$ | -      | -    | 480  | $\mu\text{A}$ |
| Transconductance<br>$V_{DS} = 3\text{ V}, I_D = 240\text{ mA}$   | $g_m$        | 260    | 320  | -    | mS            |
| Thermal resistance<br>Junction to soldering point<br>$V_{DS} = 8\text{ V}, I_D = 240\text{ mA}, T_s = +25^\circ\text{C}$ | $R_{thJS}$   | -      | 20   | -    | K/W           |

**Electrical Characteristics (continued)**

| Parameter   | Symbol    | Values |      |      | Unit |
|---|-----------|--------|------|------|------|
|   |           | min.   | typ. | max. |      |
| <b>AC Characteristics</b>   |           |        |      |      |      |
| Linear power gain <sup>1)</sup><br>$V_{DS} = 8\text{ V}$ , $I_D = 240\text{ mA}$ , $f = 2.3\text{ GHz}$ ,<br>$P_{in} = 4\text{ dBm}$                        | $G_{ip}$  |        |      |      | dB   |
| CLX30-00  |           | 16.5   | 17.5 | -    |      |
| CLX30-05  |           | 17.0   | 18.0 | -    |      |
| CLX30-10  |           | 17.0   | 18.0 | -    |      |
| Power output at 1dB gain compr. <sup>1)</sup><br>$V_{DS} = 8\text{ V}$ , $I_{D(RF\ off)} = 240\text{ mA}$ , $f = 2.3\text{ GHz}$                            | $P_{1dB}$ |        |      |      | dBm  |
| CLX30-00  |           | -      | 29.5 | -    |      |
| CLX30-05  |           | -      | 30.3 | -    |      |
| CLX30-10  |           | -      | 30.8 | -    |      |
| Output Power <sup>1)</sup><br>$V_{DS} = 8\text{ V}$ , $I_{D(RF\ off)} = 240\text{ mA}$ , $f = 2.3\text{ GHz}$ ,<br>$P_{in} = 14.5\text{ dBm}$               | $P_{out}$ |        |      |      | dBm  |
| CLX30-00  |           | 29.0   | 29.5 | -    |      |
| CLX30-05  |           | 30.0   | 30.3 | -    |      |
| CLX30-10  |           | 30.5   | 30.8 | -    |      |
| Power added efficiency <sup>1), 2)</sup><br>$V_{DS} = 8\text{ V}$ , $I_{D(RF\ off)} = 240\text{ mA}$ , $f = 2.3\text{ GHz}$ ,<br>$P_{in} = 14.5\text{ dBm}$ | PAE       |        |      |      | %    |
| CLX30-00  |           | 43     | 48   | -    |      |
| CLX30-05  |           | 46     | 52   | -    |      |
| CLX30-10  |           | 48     | 54   | -    |      |

**Notes.:**

1) RF Power characteristics given for power matching conditions

2) Power added efficiency:  $PAE = (P_{RFout} - P_{RFin}) / P_{DC}$

**Typical Common Source S-Parameters**

| V <sub>DS</sub> = 3 V, I <sub>D</sub> = 240 mA, Z <sub>0</sub> = 50 Ω |        |         |        |         |        |         |        |         |         |                                  |      |
|---|--------|---------|--------|---------|--------|---------|--------|---------|---------|----------------------------------|------|
| f   | S11    | <S11    | S21    | <S21    | S12    | <S12    | S22    | <S22    | k-Fact. | S <sub>21</sub> /S <sub>12</sub> | MAG  |
| [GHz]   | [magn] | [angle] | [magn] | [angle] | [magn] | [angle] | [magn] | [angle] | [magn]  | [dB]                             | [dB] |
| 0,5   | 0,899  | -94     | 9,640  | 124     | 0,0325 | 40      | 0,410  | -163    | 0,23    | 24,7                             |      |
| 0,6   | 0,882  | -103    | 8,920  | 119     | 0,0342 | 37      | 0,426  | -165    | 0,28    | 24,2                             |      |
| 0,7   | 0,869  | -109    | 8,290  | 115     | 0,0355 | 33      | 0,440  | -167    | 0,31    | 23,7                             |      |
| 0,8   | 0,864  | -115    | 7,684  | 111     | 0,0371 | 30      | 0,452  | -169    | 0,33    | 23,2                             |      |
| 0,9   | 0,863  | -122    | 7,149  | 106     | 0,0382 | 27      | 0,465  | -172    | 0,34    | 22,7                             |      |
| 1,0   | 0,863  | -128    | 6,613  | 102     | 0,0394 | 24      | 0,479  | -174    | 0,36    | 22,2                             |      |
| 1,1   | 0,862  | -135    | 6,127  | 99      | 0,0402 | 21      | 0,488  | -176    | 0,38    | 21,8                             |      |
| 1,2   | 0,862  | -141    | 5,689  | 95      | 0,0407 | 18      | 0,497  | -179    | 0,41    | 21,5                             |      |
| 1,3   | 0,862  | -146    | 5,299  | 92      | 0,0412 | 16      | 0,504  | 179     | 0,43    | 21,1                             |      |
| 1,4   | 0,862  | -151    | 4,951  | 88      | 0,0414 | 14      | 0,511  | 177     | 0,46    | 20,8                             |      |
| 1,5   | 0,862  | -155    | 4,646  | 85      | 0,0415 | 12      | 0,517  | 176     | 0,48    | 20,5                             |      |
| 1,6   | 0,862  | -158    | 4,371  | 82      | 0,0418 | 11      | 0,521  | 175     | 0,50    | 20,2                             |      |
| 1,7   | 0,862  | -162    | 4,121  | 79      | 0,0419 | 9       | 0,526  | 173     | 0,52    | 19,9                             |      |
| 1,8   | 0,862  | -165    | 3,899  | 77      | 0,0420 | 7       | 0,530  | 172     | 0,54    | 19,7                             |      |
| 1,9   | 0,862  | -168    | 3,696  | 74      | 0,0421 | 6       | 0,535  | 171     | 0,56    | 19,4                             |      |
| 2,0   | 0,862  | -170    | 3,512  | 72      | 0,0422 | 5       | 0,538  | 170     | 0,59    | 19,2                             |      |
| 2,1   | 0,862  | -173    | 3,340  | 70      | 0,0424 | 4       | 0,542  | 168     | 0,62    | 19,0                             |      |
| 2,2   | 0,863  | -175    | 3,182  | 68      | 0,0425 | 4       | 0,545  | 167     | 0,64    | 18,7                             |      |
| 2,3   | 0,862  | -177    | 3,036  | 66      | 0,0427 | 3       | 0,549  | 166     | 0,67    | 18,5                             |      |
| 2,4   | 0,863  | -179    | 2,902  | 64      | 0,0428 | 2       | 0,552  | 165     | 0,70    | 18,3                             |      |
| 2,5   | 0,862  | 179     | 2,779  | 62      | 0,0428 | 1       | 0,555  | 164     | 0,73    | 18,1                             |      |
| 2,6   | 0,863  | 177     | 2,669  | 60      | 0,0429 | 1       | 0,558  | 162     | 0,76    | 17,9                             |      |
| 2,7   | 0,863  | 175     | 2,567  | 58      | 0,0431 | 0       | 0,560  | 161     | 0,78    | 17,7                             |      |
| 2,8   | 0,863  | 173     | 2,473  | 56      | 0,0431 | -1      | 0,562  | 160     | 0,80    | 17,6                             |      |
| 2,9   | 0,863  | 172     | 2,389  | 54      | 0,0432 | -1      | 0,565  | 159     | 0,83    | 17,4                             |      |
| 3,0   | 0,863  | 170     | 2,308  | 52      | 0,0432 | -2      | 0,568  | 158     | 0,85    | 17,3                             |      |
| 3,1   | 0,863  | 168     | 2,242  | 50      | 0,0435 | -3      | 0,571  | 157     | 0,87    | 17,1                             |      |
| 3,2   | 0,863  | 167     | 2,172  | 49      | 0,0434 | -3      | 0,573  | 156     | 0,90    | 17,0                             |      |
| 3,3   | 0,863  | 165     | 2,111  | 48      | 0,0436 | -4      | 0,576  | 155     | 0,92    | 16,9                             |      |
| 3,4   | 0,863  | 164     | 2,041  | 46      | 0,0436 | -4      | 0,578  | 154     | 0,95    | 16,7                             |      |
| 3,5   | 0,862  | 162     | 1,985  | 44      | 0,0437 | -5      | 0,581  | 153     | 0,96    | 16,6                             |      |
| 4,0   | 0,862  | 155     | 1,749  | 36      | 0,0440 | -7      | 0,594  | 148     | 1,07    | 16,0                             | 14,4 |
| 4,5   | 0,863  | 148     | 1,561  | 27      | 0,0447 | -9      | 0,607  | 144     | 1,16    | 15,4                             | 13,0 |
| 5,0   | 0,863  | 142     | 1,400  | 19      | 0,0455 | -10     | 0,621  | 139     | 1,23    | 14,9                             | 12,0 |
| 5,5   | 0,863  | 136     | 1,254  | 11      | 0,0466 | -12     | 0,634  | 136     | 1,31    | 14,3                             | 11,0 |
| 6,0   | 0,863  | 131     | 1,140  | 3       | 0,0481 | -13     | 0,647  | 132     | 1,36    | 13,7                             | 10,2 |
| 6,5   | 0,863  | 125     | 1,049  | -4      | 0,0499 | -14     | 0,658  | 128     | 1,40    | 13,2                             | 9,5  |
| 7,0   | 0,863  | 120     | 0,974  | -12     | 0,0524 | -15     | 0,670  | 123     | 1,41    | 12,7                             | 8,9  |
| 7,5   | 0,862  | 114     | 0,910  | -19     | 0,0555 | -17     | 0,680  | 119     | 1,41    | 12,1                             | 8,3  |
| 8,0   | 0,861  | 109     | 0,854  | -26     | 0,0586 | -19     | 0,689  | 114     | 1,40    | 11,6                             | 7,8  |
| 8,5   | 0,861  | 104     | 0,804  | -34     | 0,0618 | -21     | 0,698  | 109     | 1,39    | 11,1                             | 7,4  |
| 9,0   | 0,861  | 98      | 0,758  | -41     | 0,0657 | -24     | 0,707  | 104     | 1,36    | 10,6                             | 7,0  |
| 9,5   | 0,862  | 92      | 0,716  | -48     | 0,0697 | -26     | 0,716  | 100     | 1,32    | 10,1                             | 6,8  |
| 10,0  | 0,864  | 86      | 0,678  | -55     | 0,0742 | -30     | 0,726  | 94      | 1,27    | 9,6                              | 6,5  |
| 10,5  | 0,866  | 81      | 0,643  | -62     | 0,0789 | -33     | 0,735  | 89      | 1,22    | 9,1                              | 6,3  |
| 11,0  | 0,866  | 75      | 0,612  | -69     | 0,0836 | -37     | 0,744  | 85      | 1,16    | 8,6                              | 6,2  |
| 11,5  | 0,865  | 70      | 0,586  | -75     | 0,0895 | -40     | 0,752  | 80      | 1,13    | 8,2                              | 6,0  |
| 12,0  | 0,863  | 64      | 0,564  | -80     | 0,0961 | -43     | 0,757  | 75      | 1,11    | 7,7                              | 5,7  |
| 12,5  | 0,857  | 58      | 0,547  | -86     | 0,1037 | -47     | 0,758  | 71      | 1,12    | 7,2                              | 5,2  |
| 13,0  | 0,849  | 52      | 0,535  | -92     | 0,1128 | -51     | 0,757  | 67      | 1,11    | 6,8                              | 4,8  |
| 13,5  | 0,837  | 46      | 0,531  | -98     | 0,1243 | -54     | 0,753  | 63      | 1,11    | 6,3                              | 4,3  |
| 14,0  | 0,824  | 39      | 0,533  | -104    | 0,1381 | -59     | 0,748  | 59      | 1,10    | 5,9                              | 4,0  |
| 14,5  | 0,809  | 33      | 0,538  | -110    | 0,1538 | -64     | 0,741  | 55      | 1,06    | 5,4                              | 3,9  |
| 15,0  | 0,791  | 26      | 0,547  | -117    | 0,1714 | -70     | 0,732  | 51      | 1,04    | 5,0                              | 3,9  |
| 15,5  | 0,769  | 19      | 0,559  | -123    | 0,1914 | -77     | 0,721  | 47      | 1,01    | 4,7                              | 3,9  |
| 16,0  | 0,745  | 11      | 0,573  | -129    | 0,2135 | -84     | 0,708  | 42      | 1,00    | 4,3                              | 4,0  |
| 16,5  | 0,722  | 4       | 0,590  | -135    | 0,2365 | -91     | 0,696  | 38      | 0,97    | 4,0                              |      |
| 17,0  | 0,702  | -3      | 0,608  | -142    | 0,2607 | -97     | 0,684  | 33      | 0,94    | 3,7                              |      |
| 17,5  | 0,687  | -10     | 0,627  | -147    | 0,2843 | -102    | 0,674  | 29      | 0,91    | 3,4                              |      |
| 18,0  | 0,678  | -16     | 0,642  | -152    | 0,3083 | -106    | 0,667  | 25      | 0,89    | 3,2                              |      |

**Typical Common Source S-Parameters (continued)**

| $V_{DS} = 5\text{ V}, I_D = 240\text{ mA}, Z_0 = 50\ \Omega$ |       |       |        |       |        |       |       |       |         |                                  |      |
|--|-------|-------|--------|-------|--------|-------|-------|-------|---------|----------------------------------|------|
| f  | S11   | <S11  | S21    | <S21  | S12    | <S12  | S22   | <S22  | k-Fact. | S <sub>21</sub> /S <sub>12</sub> | MAG  |
| [GHz]  | [mag] | [ang] | [mag]  | [ang] | [mag]  | [ang] | [mag] | [ang] | [mag]   | [dB]                             | [dB] |
| 0,5  | 0,902 | -93   | 11,260 | 124   | 0,0263 | 42    | 0,244 | -139  | 0,27    | 26,3                             |      |
| 0,6  | 0,885 | -100  | 10,540 | 119   | 0,0270 | 39    | 0,256 | -142  | 0,32    | 25,9                             |      |
| 0,7  | 0,873 | -107  | 9,788  | 114   | 0,0280 | 35    | 0,267 | -144  | 0,36    | 25,4                             |      |
| 0,8  | 0,867 | -113  | 9,193  | 110   | 0,0287 | 32    | 0,278 | -147  | 0,39    | 25,1                             |      |
| 0,9  | 0,865 | -119  | 8,575  | 106   | 0,0296 | 29    | 0,289 | -150  | 0,40    | 24,6                             |      |
| 1,0  | 0,864 | -126  | 8,000  | 102   | 0,0305 | 26    | 0,299 | -153  | 0,42    | 24,2                             |      |
| 1,1  | 0,864 | -132  | 7,397  | 99    | 0,0314 | 23    | 0,307 | -156  | 0,44    | 23,7                             |      |
| 1,2  | 0,864 | -137  | 6,886  | 95    | 0,0319 | 21    | 0,317 | -158  | 0,46    | 23,3                             |      |
| 1,3  | 0,864 | -142  | 6,427  | 91    | 0,0325 | 18    | 0,325 | -161  | 0,48    | 23,0                             |      |
| 1,4  | 0,864 | -147  | 6,015  | 88    | 0,0328 | 16    | 0,332 | -163  | 0,50    | 22,6                             |      |
| 1,5  | 0,864 | -151  | 5,651  | 84    | 0,0329 | 14    | 0,341 | -165  | 0,53    | 22,3                             |      |
| 1,6  | 0,864 | -155  | 5,321  | 81    | 0,0329 | 13    | 0,348 | -167  | 0,55    | 22,1                             |      |
| 1,7  | 0,864 | -159  | 5,019  | 78    | 0,0330 | 12    | 0,356 | -169  | 0,58    | 21,8                             |      |
| 1,8  | 0,864 | -162  | 4,749  | 75    | 0,0330 | 10    | 0,363 | -170  | 0,61    | 21,6                             |      |
| 1,9  | 0,864 | -165  | 4,503  | 72    | 0,0332 | 9     | 0,370 | -172  | 0,64    | 21,3                             |      |
| 2,0  | 0,864 | -168  | 4,276  | 69    | 0,0330 | 8     | 0,378 | -174  | 0,67    | 21,1                             |      |
| 2,1  | 0,864 | -170  | 4,066  | 67    | 0,0332 | 7     | 0,385 | -176  | 0,70    | 20,9                             |      |
| 2,2  | 0,864 | -173  | 3,872  | 64    | 0,0331 | 6     | 0,392 | -178  | 0,73    | 20,7                             |      |
| 2,3  | 0,864 | -175  | 3,695  | 62    | 0,0328 | 5     | 0,399 | -179  | 0,77    | 20,5                             |      |
| 2,4  | 0,864 | -177  | 3,530  | 60    | 0,0328 | 4     | 0,404 | 180   | 0,80    | 20,3                             |      |
| 2,5  | 0,864 | -179  | 3,380  | 57    | 0,0328 | 3     | 0,410 | 179   | 0,83    | 20,1                             |      |
| 2,6  | 0,864 | 179   | 3,243  | 55    | 0,0329 | 2     | 0,415 | 178   | 0,86    | 19,9                             |      |
| 2,7  | 0,864 | 177   | 3,117  | 53    | 0,0328 | 2     | 0,421 | 177   | 0,90    | 19,8                             |      |
| 2,8  | 0,864 | 176   | 2,998  | 51    | 0,0329 | 1     | 0,426 | 176   | 0,93    | 19,6                             |      |
| 2,9  | 0,864 | 174   | 2,891  | 49    | 0,0328 | 1     | 0,432 | 175   | 0,96    | 19,5                             |      |
| 3,0  | 0,864 | 172   | 2,790  | 48    | 0,0327 | 1     | 0,436 | 174   | 0,99    | 19,3                             |      |
| 3,1  | 0,865 | 170   | 2,695  | 45    | 0,0327 | 1     | 0,443 | 173   | 1,02    | 19,2                             | 18,3 |
| 3,2  | 0,865 | 169   | 2,604  | 44    | 0,0327 | 0     | 0,447 | 172   | 1,05    | 19,0                             | 17,6 |
| 3,3  | 0,866 | 167   | 2,511  | 42    | 0,0327 | 0     | 0,453 | 171   | 1,09    | 18,9                             | 17,1 |
| 3,4  | 0,866 | 166   | 2,429  | 40    | 0,0328 | 0     | 0,458 | 170   | 1,11    | 18,7                             | 16,7 |
| 3,5  | 0,866 | 164   | 2,360  | 38    | 0,0327 | 0     | 0,464 | 169   | 1,14    | 18,6                             | 16,3 |
| 4,0  | 0,870 | 156   | 2,073  | 29    | 0,0333 | 0     | 0,492 | 164   | 1,22    | 17,9                             | 15,1 |
| 4,5  | 0,874 | 150   | 1,831  | 20    | 0,0338 | 0     | 0,518 | 157   | 1,30    | 17,3                             | 14,1 |
| 5,0  | 0,878 | 143   | 1,616  | 11    | 0,0352 | 0     | 0,548 | 152   | 1,33    | 16,6                             | 13,2 |
| 5,5  | 0,880 | 138   | 1,438  | 3     | 0,0366 | 0     | 0,574 | 147   | 1,37    | 15,9                             | 12,3 |
| 6,0  | 0,882 | 132   | 1,294  | -5    | 0,0386 | 0     | 0,600 | 142   | 1,38    | 15,3                             | 11,6 |
| 6,5  | 0,882 | 126   | 1,180  | -13   | 0,0409 | 0     | 0,622 | 137   | 1,38    | 14,6                             | 10,9 |
| 7,0  | 0,882 | 120   | 1,078  | -21   | 0,0449 | -1    | 0,641 | 132   | 1,35    | 13,8                             | 10,3 |
| 7,5  | 0,881 | 114   | 0,995  | -29   | 0,0488 | -2    | 0,658 | 127   | 1,31    | 13,1                             | 9,8  |
| 8,0  | 0,881 | 109   | 0,924  | -36   | 0,0533 | -4    | 0,674 | 122   | 1,25    | 12,4                             | 9,4  |
| 8,5  | 0,881 | 103   | 0,859  | -44   | 0,0577 | -6    | 0,690 | 117   | 1,20    | 11,7                             | 9,0  |
| 9,0  | 0,880 | 98    | 0,801  | -52   | 0,0622 | -10   | 0,706 | 113   | 1,14    | 11,1                             | 8,8  |
| 9,5  | 0,881 | 92    | 0,748  | -59   | 0,0673 | -14   | 0,722 | 108   | 1,06    | 10,5                             | 8,9  |
| 10,0   | 0,882 | 86    | 0,699  | -66   | 0,0727 | -17   | 0,737 | 103   | 1,00    | 9,8                              |      |
| 10,5   | 0,883 | 81    | 0,655  | -73   | 0,0774 | -21   | 0,753 | 98    | 0,93    | 9,3                              |      |
| 11,0   | 0,883 | 75    | 0,616  | -80   | 0,0834 | -25   | 0,767 | 94    | 0,86    | 8,7                              |      |
| 11,5   | 0,883 | 70    | 0,582  | -86   | 0,0896 | -29   | 0,781 | 89    | 0,81    | 8,1                              |      |
| 12,0   | 0,882 | 63    | 0,552  | -92   | 0,0974 | -33   | 0,790 | 84    | 0,78    | 7,5                              |      |
| 12,5   | 0,876 | 57    | 0,529  | -98   | 0,1060 | -37   | 0,795 | 80    | 0,77    | 7,0                              |      |
| 13,0   | 0,868 | 51    | 0,509  | -104  | 0,1150 | -41   | 0,798 | 76    | 0,78    | 6,5                              |      |
| 13,5   | 0,857 | 45    | 0,499  | -109  | 0,1275 | -45   | 0,797 | 71    | 0,78    | 5,9                              |      |
| 14,0   | 0,846 | 39    | 0,495  | -116  | 0,1423 | -50   | 0,795 | 67    | 0,76    | 5,4                              |      |
| 14,5   | 0,832 | 33    | 0,494  | -122  | 0,1585 | -56   | 0,792 | 63    | 0,74    | 4,9                              |      |
| 15,0   | 0,815 | 27    | 0,496  | -128  | 0,1776 | -62   | 0,787 | 58    | 0,72    | 4,5                              |      |
| 15,5   | 0,794 | 19    | 0,500  | -133  | 0,1989 | -69   | 0,781 | 53    | 0,72    | 4,0                              |      |
| 16,0   | 0,769 | 12    | 0,510  | -138  | 0,2230 | -76   | 0,773 | 48    | 0,73    | 3,6                              |      |
| 16,5   | 0,745 | 5     | 0,522  | -144  | 0,2518 | -84   | 0,766 | 43    | 0,70    | 3,2                              |      |
| 17,0   | 0,729 | -2    | 0,536  | -148  | 0,2794 | -90   | 0,761 | 39    | 0,69    | 2,8                              |      |
| 17,5   | 0,719 | -8    | 0,548  | -153  | 0,3048 | -97   | 0,757 | 34    | 0,65    | 2,5                              |      |
| 18,0   | 0,714 | -15   | 0,559  | -157  | 0,3320 | -103  | 0,753 | 29    | 0,63    | 2,3                              |      |

**Typical Common Source S-Parameters (continued)**

| $V_{DS} = 8\text{ V}, I_D = 240\text{ mA}, Z_0 = 50\ \Omega$ |       |       |        |       |        |       |       |       |         |                                  |      |
|--|-------|-------|--------|-------|--------|-------|-------|-------|---------|----------------------------------|------|
| f  | S11   | <S11  | S21    | <S21  | S12    | <S12  | S22   | <S22  | k-Fact. | S <sub>21</sub> /S <sub>12</sub> | MAG  |
| [GHz]  | [mag] | [ang] | [mag]  | [ang] | [mag]  | [ang] | [mag] | [ang] | [mag]   | [dB]                             | [dB] |
| 0,5  | 0,899 | -86   | 11,750 | 132   | 0,0191 | 44    | 0,180 | -80   | 0,37    | 27,9                             |      |
| 0,6  | 0,885 | -94   | 11,070 | 125   | 0,0205 | 40    | 0,182 | -88   | 0,42    | 27,3                             |      |
| 0,7  | 0,874 | -102  | 10,327 | 119   | 0,0217 | 36    | 0,186 | -95   | 0,46    | 26,8                             |      |
| 0,8  | 0,869 | -109  | 9,708  | 114   | 0,0226 | 33    | 0,190 | -101  | 0,48    | 26,3                             |      |
| 0,9  | 0,868 | -116  | 9,069  | 109   | 0,0234 | 30    | 0,195 | -107  | 0,50    | 25,9                             |      |
| 1,0  | 0,868 | -123  | 8,435  | 104   | 0,0240 | 26    | 0,202 | -113  | 0,51    | 25,5                             |      |
| 1,1  | 0,868 | -130  | 7,851  | 99    | 0,0247 | 24    | 0,208 | -119  | 0,53    | 25,0                             |      |
| 1,2  | 0,868 | -136  | 7,320  | 94    | 0,0250 | 21    | 0,214 | -123  | 0,55    | 24,7                             |      |
| 1,3  | 0,869 | -141  | 6,840  | 90    | 0,0253 | 19    | 0,223 | -127  | 0,58    | 24,3                             |      |
| 1,4  | 0,869 | -146  | 6,409  | 86    | 0,0255 | 17    | 0,229 | -131  | 0,60    | 24,0                             |      |
| 1,5  | 0,870 | -150  | 6,022  | 82    | 0,0256 | 15    | 0,237 | -133  | 0,63    | 23,7                             |      |
| 1,6  | 0,870 | -154  | 5,670  | 79    | 0,0256 | 13    | 0,245 | -136  | 0,66    | 23,4                             |      |
| 1,7  | 0,870 | -158  | 5,349  | 76    | 0,0256 | 12    | 0,253 | -139  | 0,70    | 23,2                             |      |
| 1,8  | 0,871 | -161  | 5,057  | 72    | 0,0257 | 11    | 0,263 | -141  | 0,73    | 22,9                             |      |
| 1,9  | 0,871 | -164  | 4,790  | 69    | 0,0257 | 10    | 0,272 | -143  | 0,76    | 22,7                             |      |
| 2,0  | 0,871 | -167  | 4,545  | 67    | 0,0257 | 10    | 0,281 | -145  | 0,79    | 22,5                             |      |
| 2,1  | 0,871 | -169  | 4,319  | 64    | 0,0258 | 9     | 0,290 | -147  | 0,83    | 22,2                             |      |
| 2,2  | 0,872 | -172  | 4,112  | 61    | 0,0258 | 9     | 0,299 | -149  | 0,86    | 22,0                             |      |
| 2,3  | 0,872 | -174  | 3,922  | 58    | 0,0258 | 9     | 0,306 | -151  | 0,90    | 21,8                             |      |
| 2,4  | 0,872 | -176  | 3,746  | 56    | 0,0258 | 9     | 0,315 | -153  | 0,94    | 21,6                             |      |
| 2,5  | 0,872 | -178  | 3,588  | 53    | 0,0258 | 9     | 0,324 | -154  | 0,97    | 21,4                             |      |
| 2,6  | 0,873 | 180   | 3,440  | 51    | 0,0259 | 9     | 0,333 | -156  | 1,00    | 21,2                             |      |
| 2,7  | 0,873 | 178   | 3,305  | 48    | 0,0259 | 9     | 0,341 | -157  | 1,03    | 21,1                             | 20,0 |
| 2,8  | 0,873 | 176   | 3,175  | 46    | 0,0259 | 9     | 0,350 | -159  | 1,06    | 20,9                             | 19,4 |
| 2,9  | 0,874 | 174   | 3,058  | 44    | 0,0260 | 9     | 0,359 | -160  | 1,09    | 20,7                             | 18,9 |
| 3,0  | 0,874 | 173   | 2,946  | 42    | 0,0261 | 9     | 0,370 | -162  | 1,11    | 20,5                             | 18,5 |
| 3,1  | 0,875 | 171   | 2,842  | 39    | 0,0262 | 9     | 0,380 | -163  | 1,14    | 20,4                             | 18,1 |
| 3,2  | 0,875 | 170   | 2,742  | 37    | 0,0262 | 10    | 0,388 | -164  | 1,16    | 20,2                             | 17,7 |
| 3,3  | 0,876 | 168   | 2,647  | 35    | 0,0263 | 10    | 0,397 | -165  | 1,19    | 20,0                             | 17,4 |
| 3,4  | 0,876 | 166   | 2,558  | 33    | 0,0264 | 10    | 0,407 | -167  | 1,21    | 19,9                             | 17,1 |
| 3,5  | 0,877 | 165   | 2,475  | 31    | 0,0265 | 10    | 0,416 | -168  | 1,23    | 19,7                             | 16,8 |
| 4,0  | 0,880 | 157   | 2,134  | 20    | 0,0272 | 11    | 0,460 | -175  | 1,30    | 19,0                             | 15,7 |
| 4,5  | 0,884 | 150   | 1,880  | 10    | 0,0284 | 13    | 0,503 | 176   | 1,30    | 18,2                             | 14,9 |
| 5,0  | 0,889 | 144   | 1,639  | 1     | 0,0302 | 14    | 0,545 | 169   | 1,29    | 17,4                             | 14,1 |
| 5,5  | 0,892 | 138   | 1,445  | -8    | 0,0324 | 15    | 0,584 | 163   | 1,25    | 16,5                             | 13,5 |
| 6,0  | 0,894 | 132   | 1,288  | -16   | 0,0358 | 15    | 0,620 | 157   | 1,18    | 15,6                             | 13,0 |
| 6,5  | 0,894 | 127   | 1,159  | -25   | 0,0391 | 15    | 0,650 | 152   | 1,12    | 14,7                             | 12,6 |
| 7,0  | 0,895 | 121   | 1,052  | -32   | 0,0428 | 14    | 0,675 | 146   | 1,07    | 13,9                             | 12,2 |
| 7,5  | 0,894 | 115   | 0,961  | -40   | 0,0476 | 12    | 0,696 | 140   | 1,00    | 13,1                             | 12,7 |
| 8,0  | 0,894 | 109   | 0,883  | -48   | 0,0527 | 9     | 0,715 | 134   | 0,94    | 12,2                             |      |
| 8,5  | 0,894 | 104   | 0,814  | -55   | 0,0584 | 5     | 0,734 | 129   | 0,86    | 11,4                             |      |
| 9,0  | 0,895 | 98    | 0,752  | -62   | 0,0638 | 1     | 0,751 | 123   | 0,80    | 10,7                             |      |
| 9,5  | 0,896 | 92    | 0,695  | -69   | 0,0698 | -4    | 0,768 | 117   | 0,72    | 10,0                             |      |
| 10,0   | 0,897 | 86    | 0,644  | -76   | 0,0763 | -8    | 0,785 | 111   | 0,65    | 9,3                              |      |
| 10,5   | 0,898 | 80    | 0,597  | -83   | 0,0826 | -13   | 0,802 | 106   | 0,57    | 8,6                              |      |
| 11,0   | 0,899 | 75    | 0,555  | -90   | 0,0888 | -18   | 0,818 | 100   | 0,51    | 8,0                              |      |
| 11,5   | 0,898 | 69    | 0,518  | -96   | 0,0960 | -23   | 0,832 | 95    | 0,46    | 7,3                              |      |
| 12,0   | 0,896 | 64    | 0,486  | -102  | 0,1038 | -28   | 0,841 | 90    | 0,42    | 6,7                              |      |
| 12,5   | 0,891 | 58    | 0,460  | -108  | 0,1126 | -33   | 0,845 | 85    | 0,41    | 6,1                              |      |
| 13,0   | 0,883 | 52    | 0,438  | -114  | 0,1228 | -38   | 0,846 | 81    | 0,42    | 5,5                              |      |
| 13,5   | 0,871 | 46    | 0,424  | -119  | 0,1346 | -43   | 0,847 | 75    | 0,44    | 5,0                              |      |
| 14,0   | 0,859 | 41    | 0,416  | -124  | 0,1497 | -48   | 0,847 | 71    | 0,45    | 4,4                              |      |
| 14,5   | 0,847 | 34    | 0,410  | -130  | 0,1669 | -54   | 0,846 | 66    | 0,45    | 3,9                              |      |
| 15,0   | 0,828 | 28    | 0,406  | -134  | 0,1868 | -60   | 0,843 | 61    | 0,48    | 3,4                              |      |
| 15,5   | 0,807 | 20    | 0,407  | -139  | 0,2090 | -66   | 0,840 | 57    | 0,50    | 2,9                              |      |
| 16,0   | 0,786 | 13    | 0,411  | -144  | 0,2349 | -73   | 0,837 | 52    | 0,51    | 2,4                              |      |
| 16,5   | 0,764 | 4     | 0,419  | -149  | 0,2654 | -80   | 0,834 | 47    | 0,52    | 2,0                              |      |
| 17,0   | 0,751 | -4    | 0,427  | -153  | 0,2958 | -86   | 0,831 | 42    | 0,53    | 1,6                              |      |
| 17,5   | 0,747 | -12   | 0,434  | -157  | 0,3251 | -91   | 0,828 | 37    | 0,54    | 1,3                              |      |
| 18,0   | 0,744 | -21   | 0,440  | -161  | 0,3569 | -95   | 0,826 | 33    | 0,56    | 0,9                              |      |

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**Order Instructions:**

Full type variant including quality level must be specified by the orderer. For *HiRel* Discrete and Microwave Semiconductors the ordering code specifies device family and quality level only.

**Ordering Form:**

Ordering Code: Q.....  
CLX30- (nn) (ql)  
                  (nn):                   Output Power Level  
  (ql):   Quality Level

**Ordering Example:**

Ordering Code: Q62702L114  
CLX30-10 ES  
  
For CLX30; Output Power Level 10 ( $P_{out} > 30.5$  dBm)  
in ESA Space Quality Level

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See our WWW-Pages:

- Discrete and RF-Semiconductors (Small Signal Semiconductors)

[www.infineon.de/semiconductor/products/35/35.htm](http://www.infineon.de/semiconductor/products/35/35.htm)

- *HiRel* Discrete and Microwave Semiconductors

[www.infineon.de/semiconductor/products/35/353.htm](http://www.infineon.de/semiconductor/products/35/353.htm)

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