

SILICON TRANSISTOR NE58219 / 2SC5004

NPN SILICON EPITAXIAL TRANSISTOR 3 PINS ULTRA SUPER MINI MOLD

DESCRIPTION

The NE58219 / 2SC5004 is a low supply voltage transistor designed for UHF OSC/MIX.

It is suitable for a high density surface mount assembly since the transistor has been applied ultra super mini mold package.

FEATURES

- High f_T : 5.0 GHz TYP. (@ VcE = 5 V, Ic = 5 mA, f = 1 GHz)
- Low Cre: 0.9 pF TYP. (@ VcB = 5 V, IE = 0, f = 1 MHz)
- Ultra Super Mini Mold Package. (1.6 mm × 0.8 mm)

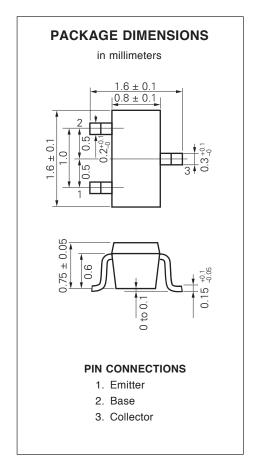
ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
NE58219 2SC5004	50 pcs./unit	Embossed tape 8 mm wide. Pin 3 (Collector) face to
NE58219-T1 2SC5004-T1	3 kpcs./Reel	perforation side of the tape.

* Please contact with responsible NEC person, if you require evaluation sample. Unit sample quantity shall be 50 pcs.

ABSOLUTE MAXIMUM RATINGS (TA = 25 °C)

Collector to Base Voltage	Vсво	20	V
Collector to Emitter Voltage	VCEO	12	V
Emitter to Base Voltage	VEBO	3	V
Collector Current	Ic	60	mA
Total Power Dissipation	Рт	100	mW
Junction Temperature	T_{j}	125	°C
Storage Temperature	Tstg	-55 to +125	°C



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ELECTRICAL CHARACTERISTICS (TA = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Collector Cutoff Current	Ісво			0.1	μΑ	Vcb = 15 V, IE = 0
Emitter Cutoff Current	Ієво			0.1	μΑ	V _{EB} = 1 V, I _C = 0
Collector Saturation Voltage	VCE (sat)			0.5	V	hfe = 10, Ic = 5 mA
DC Current Gain	hfe	60		120		VcE = 5 V, Ic = 5 mA *1
Gain Bandwidth Product	fτ	3.0	5.0		GHz	VcE = 5 V, Ic = 5 mA
Feed-back Capacitance	Cre		0.9	1.2	pF	Vcb = 5 V, IE = 0, f = 1 MHz *2
Insertion Power Gain	IS ₂₁ el ²	5.0			dB	VcE = 5 V, Ic = 5 mA, f = 1 GHz

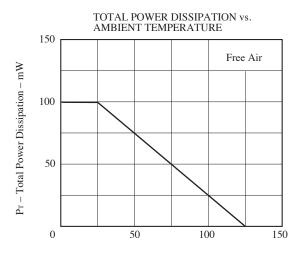
^{*1} Pulse Measurement PW \leq 350 μ s, Duty Cycle \leq 2 %

h_{FE} Classification

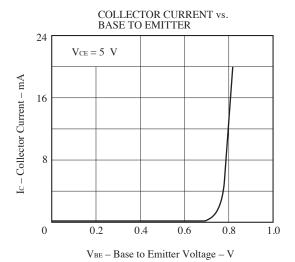
Rank	FB
Marking	77
hfe	60 to 120

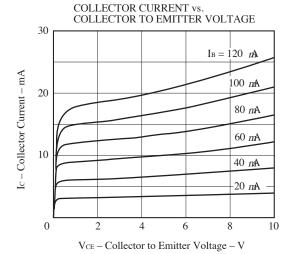
^{*2} The emitter terminal and the case shall be connected to the guard terminal of the three-terminal capacitance bridge.

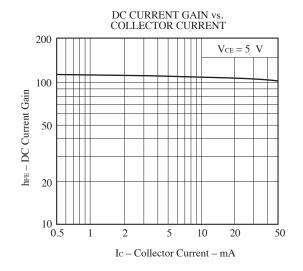
TYPICAL CHARACTERISTICS (TA = 25 °C)

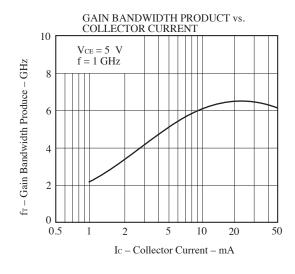


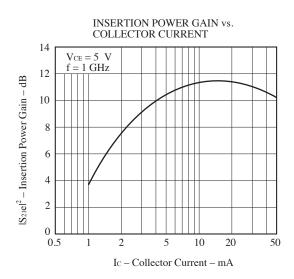
T_A – Ambient Temperature – °C

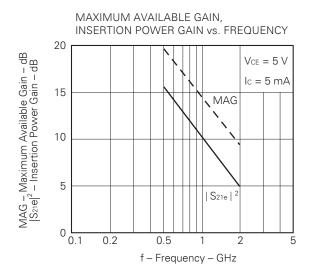


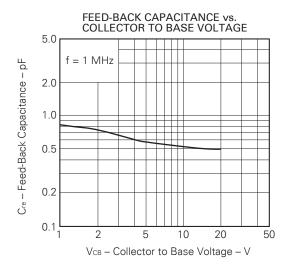












S-PARAMETER

3-PANAIVIE I EN								
$V_{CE} = 5 \text{ V}, \text{ Ic} = 1 \text{ m}$	$A, Z_0 = 5$	0 Ω						
FREQUENCY		S ₁₁	S	21	S	12	S	22
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00 2800.00 2900.00 3000.00	.992 .949 .912 .862 .821 .774 .732 .698 .667 .644 .614 .603 .593 .596 .592 .594 .599 .600 .621 .620 .636 .641 .636 .641 .636 .641 .636 .641 .636 .641 .636 .641 .636 .641 .636 .641 .636 .641	-15.7 -32.2 -47.8 -63.1 -77.5 -90.6 -103.0 -115.2 -126.1 -136.5 -145.4 -154.2 -161.6 -168.6 -175.4 178.7 172.6 162.0 157.2 152.4 148.5 144.2 140.2 136.9 132.9 130.0 126.5 123.5 120.6	1.958 2.005 2.0034 1.954 1.939 1.780 1.733 1.665 1.607 1.549 1.475 1.415 1.340 1.287 1.218 1.174 1.129 1.083 1.043 1.003 .973 .934 .913 .875 .851 .825 .802 .777 .752 .735	161.4 144.3 129.7 116.5 104.7 92.7 82.1 71.5 62.3 53.0 44.7 36.4 28.8 21.5 14.2 7.6 .5 -5.8 -12.4 -18.4 -24.6 -30.4 -36.2 -41.8 -47.0 -52.6 -57.5 -62.8 -67.6 -72.5	.036 .066 .093 .110 .125 .135 .141 .144 .146 .147 .146 .144 .142 .142 .141 .141 .141 .141 .151 .151 .156 .163 .171 .182 .193 .204 .217 .229 .245	76.2 62.4 50.4 40.2 30.8 22.4 15.5 9.1 4.4 8 -4.3 -8.3 -11.1 -13.7 -15.8 -17.1 -19.1 -19.8 -20.3 -20.8 -21.8 -23.1 -24.1 -26.2 -28.3 -30.7 -36.8	.987 .956 .906 .864 .822 .786 .757 .728 .705 .685 .671 .656 .647 .637 .628 .621 .611 .606 .597 .595 .588 .577 .573 .566 .558 .557 .558	-7.1 -13.9 -19.4 -23.7 -27.7 -30.8 -33.7 -36.4 -38.7 -41.3 -43.6 -46.2 -48.8 -51.8 -54.6 -57.6 -60.8 -63.9 -67.5 -71.1 -74.9 -78.9 -83.0 -87.4 -91.6 -96.5 -101.4 -106.5 -111.6 -116.9
$V_{CE} = 3 \text{ V}, \text{ Ic} = 5 \text{ m}$	A, Zo = 5	0 Ω						
FREQUENCY		S ₁₁	S	21	S	12	S	22
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1500.00 1600.00 1700.00 1800.00 1900.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00 2800.00 2900.00 2900.00	.830 .705 .615 .548 .508 .483 .471 .462 .460 .459 .461 .464 .468 .475 .475 .491 .500 .507 .516 .525 .532 .544 .548 .559 .567 .574 .585 .592 .604	-30.0 -61.3 -88.8 -111.0 -128.6 -141.3 -152.1 -161.0 -168.4 -175.2 179.2 173.5 168.8 164.3 160.0 156.1 152.0 148.8 145.2 141.9 138.7 136.1 132.8 130.2 127.8 124.8 122.7 120.1 118.1 115.7	8.873 8.192 7.362 6.349 5.561 4.779 4.244 3.773 3.421 3.114 2.875 2.664 2.325 2.175 2.076 1.957 1.869 1.783 1.703 1.642 1.569 1.522 1.459 1.417 1.368 1.283 1.241 1.212	149.7 127.6 110.0 96.2 84.3 74.6 66.0 57.9 50.4 43.4 36.9 30.1 23.7 17.3 11.3 5.1 -1.0 -6.6 -12.7 -18.3 -24.1 -29.6 -35.3 -40.8 -46.0 -51.6 -56.7 -62.2 -67.1 -72.3	.035 .056 .071 .078 .086 .093 .100 .107 .115 .123 .130 .138 .147 .156 .163 .172 .180 .190 .198 .207 .218 .226 .237 .245 .255 .264 .274 .284 .293 .304	67.5 51.3 42.2 37.2 33.3 30.4 28.4 25.7 23.6 20.4 18.7 15.8 13.2 10.2 7.2 4.1 .9 -2.2 -5.5 -8.8 -12.4 -16.0 -19.6 -23.4 -26.8 -31.2 -34.7 -38.8 -42.6 -46.7	.900 .738 .604 .516 .457 .411 .383 .356 .337 .319 .305 .296 .283 .275 .263 .255 .247 .238 .232 .225 .220 .213 .208 .203 .199 .200 .196 .199 .200	-20.9 -34.1 -41.4 -44.4 -47.2 -48.4 -49.6 -51.0 -52.1 -54.3 -55.4 -58.1 -60.0 -63.3 -66.1 -69.0 -72.8 -75.6 -80.3 -84.2 -89.2 -94.2 -98.8 -105.2 -110.7 -117.4 -124.1 -130.9 -137.8 -143.7

S-PARAMETER

$V_{CE} = 5 \text{ V}, \text{ Ic} = 5 \text{ mA},$	$Z_0 = 50 \Omega$
FREQUENCY	S ₁₁

FREQUENCY	11111, 20 - 0	S ₁₁	S	21	S ₁	2	S	22
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00 2200.00 2300.00 2400.00 2500.00 2500.00 2500.00 2800.00 2900.00 2900.00	.840 .719 .624 .549 .503 .472 .454 .443 .440 .436 .437 .441 .443 .449 .453 .465 .473 .481 .491 .499 .506 .518 .523 .535 .541 .549 .568 .582	-29.2 -57.1 -83.3 -104.8 -122.6 -135.8 -147.1 -156.5 -164.4 -171.5 -177.2 176.7 171.7 167.0 162.5 158.5 154.3 150.9 147.1 143.7 140.4 137.6 134.5 131.7 129.3 126.4 124.3 121.6 119.6 117.1	8.993 8.284 7.527 6.560 5.797 4.992 4.460 3.972 3.601 3.284 3.029 2.815 2.608 2.452 2.303 2.184 2.075 1.974 1.883 1.795 1.730 1.661 1.608 1.543 1.497 1.446 1.402 1.360 1.312 1.282	151.3 129.5 112.2 98.3 86.3 76.6 68.0 59.8 52.4 45.2 38.6 31.8 25.5 19.3 13.1 7.2 1.0 -4.6 -10.5 -16.0 -21.9 -27.3 -33.2 -38.7 -43.8 -49.5 -60.1 -65.1 -70.4	.031 .050 .062 .070 .077 .084 .091 .097 .104 .111 .119 .127 .135 .142 .149 .158 .166 .175 .184 .193 .202 .211 .220 .229 .239 .250 .259 .269	68.1 52.7 44.8 39.1 35.1 32.4 30.3 27.5 25.5 23.0 20.8 18.0 15.8 12.9 9.9 7.1 4.0 1.1 -2.3 -5.4 -9.0 -12.3 -15.9 -19.3 -22.8 -27.0 -30.5 -34.3 -38.2 -42.2	.915 .771 .648 .565 .508 .467 .440 .415 .399 .381 .370 .359 .348 .340 .328 .321 .312 .304 .297 .290 .283 .274 .269 .260 .254 .250 .244 .242 .236 .237	-17.9 -29.5 -35.5 -38.1 -40.2 -41.0 -42.1 -43.3 -44.2 -46.1 -46.9 -49.4 -50.9 -53.6 -56.0 -58.2 -61.3 -63.8 -67.5 -70.4 -74.4 -78.3 -82.1 -87.0 -102.0 -107.8 -113.8 -119.5
$V_{CE} = 5 V$, $I_{C} = 3$								
FREQUENCY		S ₁₁		21	S ₁			22
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00 2800.00 2900.00 2900.00	.907 .825 .747 .673 .615 .569 .535 .511 .497 .483 .482 .481 .485 .486 .494 .497 .502 .510 .517 .525 .543 .548 .558 .566 .573 .585 .590 .590 .590 .590 .590 .590 .590 .59	-23.5 -45.3 -67.1 -86.6 -104.4 -118.5 -131.4 -142.6 -152.1 -160.2 -167.4 -174.5 179.7 174.3 168.9 164.3 159.7 155.7 151.5 147.5 143.9 140.9 137.4 134.2 131.7 128.2 126.1 120.7 118.2	5.717 5.461 5.224 4.779 4.452 3.938 3.630 3.298 3.039 2.798 2.590 2.420 2.250 2.133 2.001 1.906 1.805 1.728 1.654 1.578 1.525 1.460 1.418 1.360 1.320 1.276 1.236 1.199 1.158 1.132	154.7 135.7 119.6 105.9 93.4 82.6 72.9 63.7 55.6 47.7 40.7 33.4 26.8 20.2 13.8 7.5 1.0 -4.6 -11.0 -16.7 -22.6 -28.3 -34.0 -39.7 -44.9 -50.7 -61.4 -66.4 -71.7	.033 .056 .074 .083 .092 .097 .102 .106 .112 .116 .121 .126 .132 .137 .143 .150 .157 .163 .171 .178 .188 .196 .206 .214 .224 .235 .244 .256 .263 .278	70.9 56.2 45.2 36.9 31.0 26.2 22.8 19.5 17.1 14.9 12.5 10.6 8.0 6.0 3.9 1.6 -1.0 -3.1 -5.8 -8.2 -10.9 -13.8 -16.9 -20.5 -23.4 -27.0 -29.9 -33.7 -37.0 -40.9	.953 .855 .752 .676 .616 .570 .538 .509 .491 .471 .456 .444 .433 .424 .412 .405 .396 .389 .381 .374 .368 .360 .355 .347 .341 .338 .322 .328	-13.3 -23.5 -30.1 -33.8 -36.9 -38.7 -40.2 -41.9 -43.3 -45.1 -46.5 -48.7 -50.6 -53.4 -55.9 -58.4 -61.1 -63.9 -67.3 -70.6 -74.0 -78.0 -81.7 -86.4 -90.5 -100.4 -110.9 -116.4

S-PARAMETER

S-PARAMETER								
$V_{CE} = 3 \text{ V}, \text{ Ic} = 3 \text{ r}$	mA, Zo = 50							
FREQUENCY		S ₁₁	S	21	S ₁	2	S	22
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00 2300.00 2400.00 2500.00 2600.00 2800.00 2800.00 2900.00	.910 .815 .737 .664 .609 .569 .539 .521 .510 .502 .498 .499 .505 .516 .522 .531 .538 .547 .552 .563 .568 .580 .585 .593 .604	-23.7 -48.0 -70.9 -91.2 -109.6 -123.6 -136.4 -147.1 -156.1 -164.3 -171.1 -177.7 176.7 171.4 166.5 162.0 157.3 153.7 149.5 145.8 142.2 139.3 135.7 132.8 130.1 126.9 124.7 121.8 119.5 117.0	5.615 5.419 5.156 4.674 4.337 3.814 3.496 3.165 2.913 2.676 2.473 2.310 2.152 2.032 1.906 1.817 1.725 1.646 1.577 1.504 1.449 1.391 1.350 1.293 1.257 1.214 1.177 1.141 1.102 1.077	154.6 134.2 117.7 103.8 91.1 80.2 70.6 61.6 53.5 45.6 38.6 31.4 24.6 18.0 11.6 5.2 -1.1 -7.1 -13.4 -19.0 -24.9 -30.6 -36.4 -42.0 -47.2 -53.0 -58.1 -63.6 -68.6 -73.8	.038 .065 .084 .094 .102 .108 .113 .119 .124 .129 .134 .139 .145 .152 .157 .164 .170 .178 .186 .194 .202 .210 .221 .229 .238 .248 .258 .270 .278 .289	70.8 53.8 42.7 34.8 28.8 24.3 20.9 17.4 15.1 12.0 10.1 7.3 5.4 2.8 -1.8 -4.5 -6.8 -9.6 -12.2 -15.1 -18.1 -21.1 -24.4 -27.7 -31.2 -34.6 -38.4 -45.8	.943 .832 .718 .635 .571 .520 .486 .455 .434 .414 .398 .386 .373 .363 .352 .345 .328 .321 .313 .307 .301 .297 .291 .287 .285 .282 .283 .281 .285	-15.4 -27.0 -34.6 -38.8 -42.4 -44.4 -46.3 -48.2 -49.7 -52.0 -53.4 -56.1 -57.9 -61.1 -63.9 -66.8 -70.1 -73.1 -77.3 -81.0 -85.4 -89.8 -94.2 -99.7 -104.4 -115.7 -121.9 -127.9 -133.6
$V_{CE} = 3 V$, $I_{C} = 1 r$	mA, Zo = 50	Ο Ω						
FREQUENCY		S ₁₁		21	S ₁			22
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00 2800.00 2900.00 3000.00	.985 .945 .908 .855 .812 .766 .726 .693 .664 .647 .617 .607 .604 .600 .604 .600 .604 .608 .611 .620 .622 .631 .632 .642 .647 .652 .664 .652	-16.6 -33.5 -49.9 -65.6 -80.4 -93.7 -106.2 -118.6 -129.4 -139.6 -148.2 -157.0 -164.2 -171.0 -177.5 176.6 170.6 165.7 160.5 155.8 151.0 147.2 143.0 139.2 135.9 132.0 129.1 125.6 122.9 119.9	1.985 1.998 2.025 1.942 1.913 1.755 1.705 1.635 1.571 1.509 1.438 1.375 1.299 1.247 1.183 1.140 1.093 1.048 1.012 .973 .942 .905 .884 .846 .824 .799 .774 .752 .726 .709	159.3 142.9 127.8 114.4 102.3 90.0 79.4 68.7 59.3 50.0 41.7 33.4 25.8 18.5 11.1 4.4 -2.6 -8.9 -15.5 -21.4 -27.7 -33.3 -39.3 -44.9 -50.0 -55.6 -60.5 -65.8 -70.5 -75.2	.041 .077 .106 .127 .143 .152 .159 .162 .163 .165 .163 .162 .159 .158 .157 .157 .157 .158 .160 .165 .170 .165 .170 .176 .183 .192 .202 .214 .226 .238 .254	75.7 60.9 49.0 37.8 28.8 20.1 13.3 6.9 1.9 -3.7 -7.4 -11.0 -14.3 -17.1 -19.6 -21.5 -23.4 -23.7 -25.0 -25.4 -26.5 -26.9 -28.0 -29.2 -30.0 -32.3 -34.4 -36.9 -39.7 -42.7	.985 .947 .892 .842 .795 .754 .722 .692 .667 .645 .630 .616 .603 .593 .583 .575 .566 .561 .553 .549 .543 .537 .532 .528 .528 .528 .523 .522 .519 .518	-8.0 -15.6 -21.8 -26.7 -31.0 -34.5 -37.6 -40.4 -42.9 -45.8 -48.3 -51.3 -53.9 -57.3 -60.3 -63.7 -67.2 -70.6 -74.5 -82.7 -87.0 -91.5 -96.4 -101.0 -106.4 -111.8 -117.2 -122.5 -128.2

[MEMO]

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While NEC Corporation has been making continuous effort to enhance the reliability of its semiconductor devices, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC semiconductor device, customer must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features.

NEC devices are classified into the following three quality grades:

"Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.

Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

The quality grade of NEC devices in "Standard" unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact NEC Sales Representative in advance.

Anti-radioactive design is not implemented in this product.

M4 94.11