



55GN01MA

RF Transistor 10V, 70mA, $f_T=5.5\text{GHz}$, NPN Single MCP

ON Semiconductor®

<http://onsemi.com>

Features

- High cut-off frequency : $f_T=5.5\text{GHz}$ typ
- High gain : $|S_{21e}|^2=10\text{dB}$ typ ($f=1\text{GHz}$)

Specifications

Absolute Maximum Ratings at $T_a=25^\circ\text{C}$

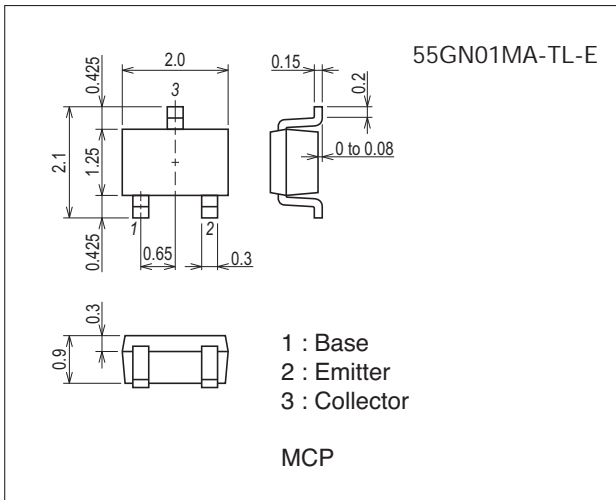
| Parameter | Symbol | Conditions | Ratings | Unit |
|------------------------------|-----------|---|-------------|------|
| Collector-to-Base Voltage | V_{CBO} | | 20 | V |
| Collector-to-Emitter Voltage | V_{CEO} | | 10 | V |
| Emitter-to-Base Voltage | V_{EBO} | | 3 | V |
| Collector Current | I_C | | 70 | mA |
| Collector Dissipation | P_C | When mounted on ceramic substrate (250mm ² ×0.8mm) | 400 | mW |
| Junction Temperature | T_j | | 150 | °C |
| Storage Temperature | T_{stg} | | -55 to +150 | °C |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Package Dimensions

unit : mm (typ)

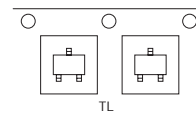
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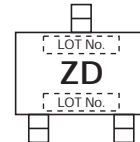
Product & Package Information

- Package : MCP
- JEITA, JEDEC : SC-70, SOT-323
- Minimum Packing Quantity : 3,000 pcs./reel

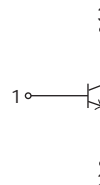
Packing Type: TL



Marking



Electrical Connection



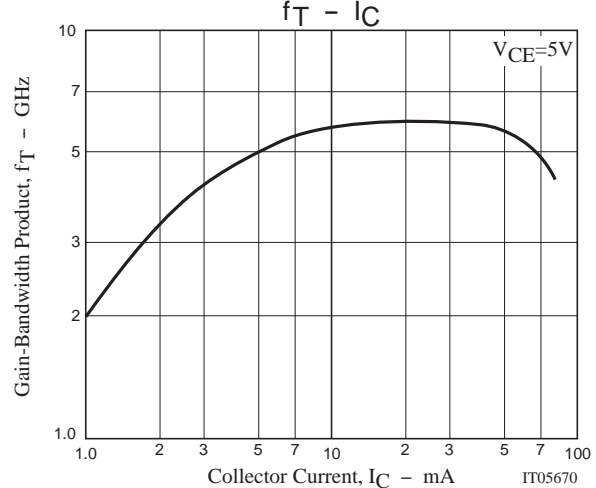
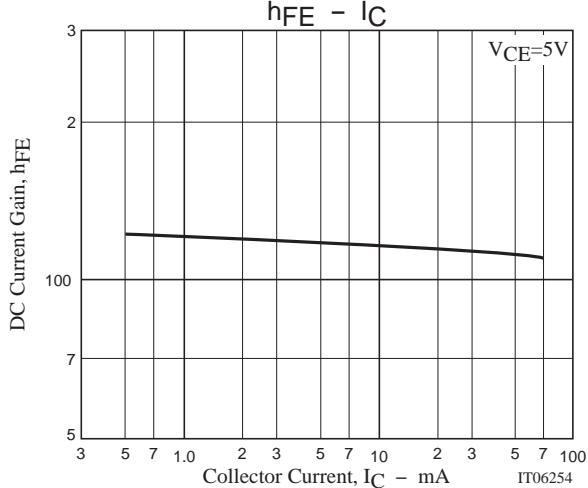
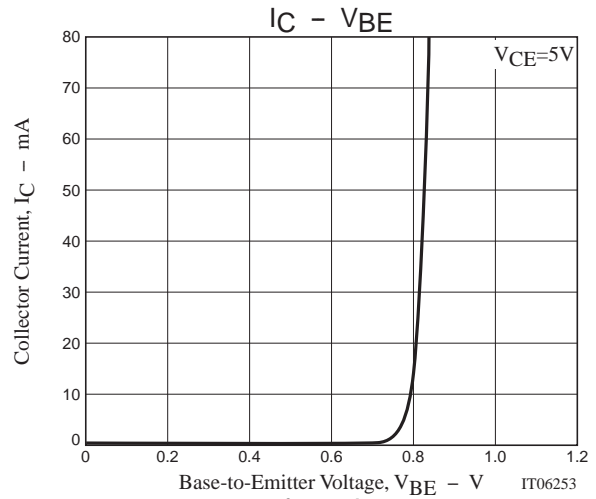
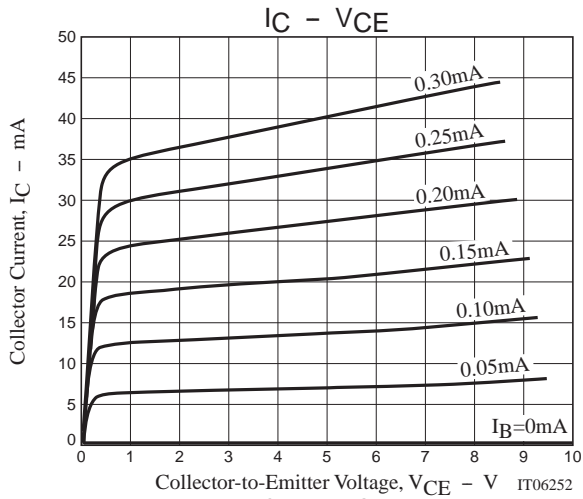
55GN01MA

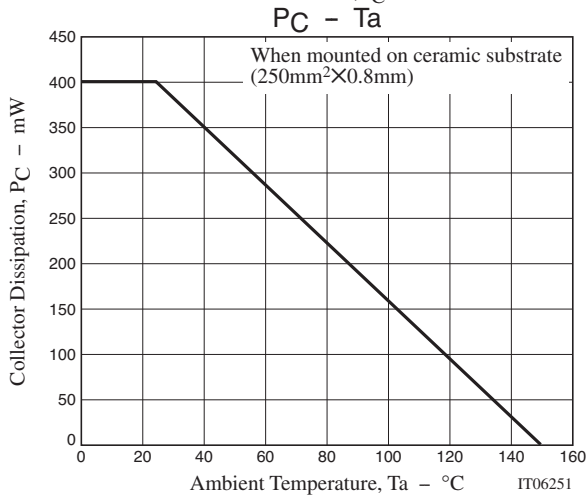
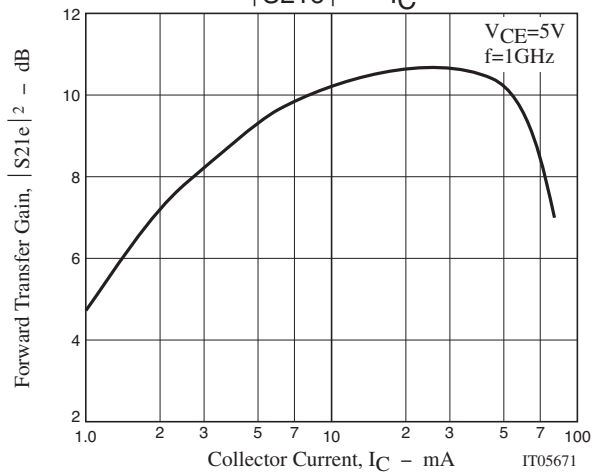
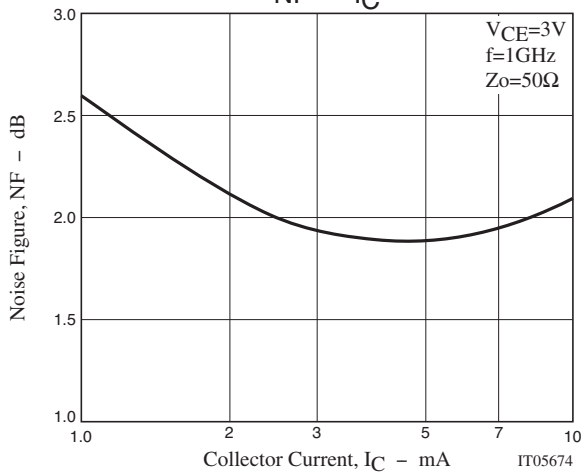
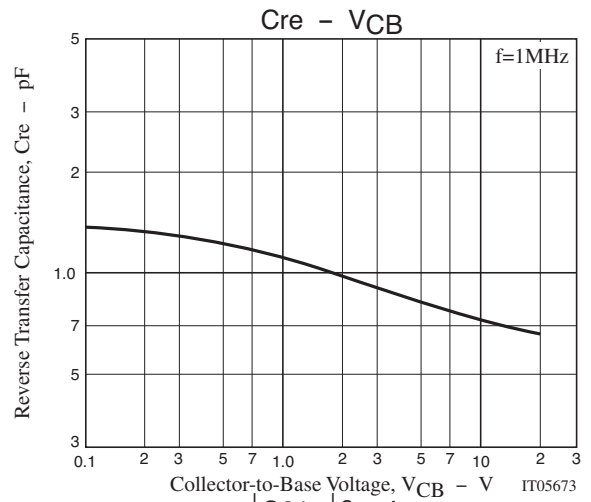
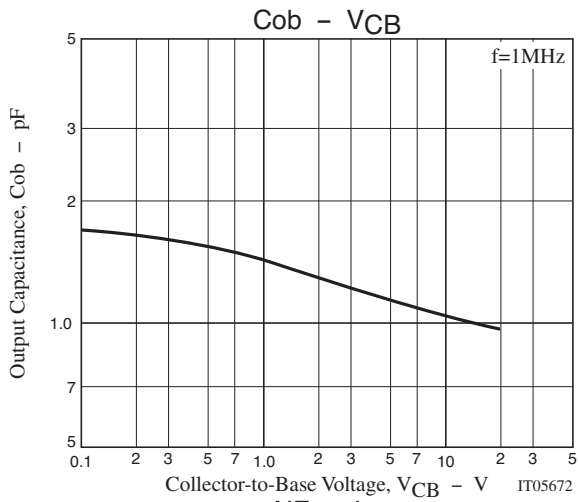
Electrical Characteristics at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|------------------------------|---------------|--|---------|-----|-----|---------|
| | | | min | typ | max | |
| Collector Cutoff Current | I_{CBO} | $V_{CB}=10V, I_E=0A$ | | | 0.1 | μA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB}=2V, I_C=0A$ | | | 1 | μA |
| DC Current Gain | h_{FE} | $V_{CE}=5V, I_C=10mA$ | 100 | | 180 | |
| Gain-Bandwidth Product | f_{T1} | $V_{CE}=3V, I_C=5mA$ | 3.0 | 4.5 | | GHz |
| | f_{T2} | $V_{CE}=5V, I_C=20mA$ | | 5.5 | | GHz |
| Output Capacitance | C_{ob} | $V_{CB}=10V, f=1MHz$ | | 1.0 | 1.3 | pF |
| Reverse Transfer Capacitance | C_{re} | | | 0.6 | | pF |
| Forward Transfer Gain | $ S_{21e} ^2$ | $V_{CE}=5V, I_C=20mA, f=1GHz$ | 7 | 10 | | dB |
| Noise Figure | NF | $V_{CE}=3V, I_C=5mA, f=1GHz, Z_O=50\Omega$ | | 1.9 | 2.8 | dB |

Ordering Information

| Device | Package | Shipping | memo |
|---------------|---------|----------------|---------|
| 55GN01MA-TL-E | MCP | 3,000pcs./reel | Pb Free |





55GN01MA

S Parameters (Common emitter)

$V_{CE}=5V, I_C=5mA, Z_O=50\Omega$

| Freq(MHz) | S11 | $\angle S11$ | S21 | $\angle S21$ | S12 | $\angle S12$ | S22 | $\angle S22$ |
|-----------|-------|--------------|--------|--------------|-------|--------------|-------|--------------|
| 100 | 0.830 | -43.97 | 13.127 | 147.99 | 0.038 | 67.23 | 0.872 | -22.91 |
| 200 | 0.694 | -77.62 | 10.294 | 125.90 | 0.060 | 54.39 | 0.700 | -35.46 |
| 400 | 0.540 | -117.92 | 6.419 | 101.76 | 0.081 | 48.13 | 0.501 | -44.05 |
| 600 | 0.481 | -140.06 | 4.518 | 88.76 | 0.095 | 49.82 | 0.424 | -46.75 |
| 800 | 0.461 | -155.07 | 3.503 | 78.58 | 0.111 | 52.28 | 0.393 | -49.83 |
| 1000 | 0.451 | -165.52 | 2.877 | 70.19 | 0.128 | 54.96 | 0.381 | -53.19 |
| 1200 | 0.445 | -174.34 | 2.452 | 62.66 | 0.146 | 56.81 | 0.375 | -57.17 |
| 1400 | 0.445 | 178.04 | 2.147 | 56.03 | 0.168 | 58.15 | 0.377 | -61.74 |
| 1600 | 0.445 | 171.32 | 1.918 | 49.61 | 0.189 | 58.43 | 0.382 | -66.69 |
| 1800 | 0.445 | 164.86 | 1.737 | 43.71 | 0.211 | 58.38 | 0.386 | -71.55 |
| 2000 | 0.449 | 158.60 | 1.595 | 38.11 | 0.237 | 58.17 | 0.390 | -76.75 |
| 2200 | 0.452 | 152.58 | 1.467 | 32.97 | 0.265 | 57.40 | 0.396 | -82.35 |
| 2400 | 0.450 | 146.68 | 1.363 | 28.29 | 0.289 | 56.02 | 0.399 | -87.23 |
| 2600 | 0.453 | 141.54 | 1.274 | 24.12 | 0.315 | 55.05 | 0.402 | -92.59 |
| 2800 | 0.462 | 136.46 | 1.198 | 20.67 | 0.346 | 53.73 | 0.407 | -98.30 |
| 3000 | 0.472 | 131.80 | 1.143 | 17.49 | 0.377 | 51.74 | 0.405 | -104.52 |

$V_{CE}=5V, I_C=10mA, Z_O=50\Omega$

| Freq(MHz) | S11 | $\angle S11$ | S21 | $\angle S21$ | S12 | $\angle S12$ | S22 | $\angle S22$ |
|-----------|-------|--------------|--------|--------------|-------|--------------|-------|--------------|
| 100 | 0.684 | -64.81 | 20.386 | 135.46 | 0.033 | 61.46 | 0.746 | -32.56 |
| 200 | 0.537 | -103.63 | 13.552 | 113.26 | 0.046 | 54.93 | 0.530 | -42.92 |
| 400 | 0.442 | -139.55 | 7.523 | 93.84 | 0.066 | 56.90 | 0.365 | -45.97 |
| 600 | 0.418 | -156.47 | 5.145 | 83.67 | 0.087 | 60.27 | 0.318 | -46.89 |
| 800 | 0.415 | -167.86 | 3.934 | 75.21 | 0.109 | 62.42 | 0.302 | -49.45 |
| 1000 | 0.412 | -175.67 | 3.211 | 67.90 | 0.131 | 63.30 | 0.299 | -52.76 |
| 1200 | 0.411 | 177.29 | 2.725 | 61.28 | 0.155 | 63.24 | 0.299 | -56.97 |
| 1400 | 0.415 | 171.08 | 2.375 | 55.21 | 0.179 | 62.62 | 0.304 | -61.81 |
| 1600 | 0.418 | 165.63 | 2.121 | 49.25 | 0.203 | 61.52 | 0.311 | -66.89 |
| 1800 | 0.419 | 159.97 | 1.918 | 43.74 | 0.228 | 60.43 | 0.315 | -71.68 |
| 2000 | 0.424 | 154.44 | 1.760 | 38.40 | 0.254 | 58.94 | 0.320 | -76.83 |
| 2200 | 0.429 | 148.97 | 1.619 | 33.44 | 0.281 | 57.20 | 0.326 | -82.56 |
| 2400 | 0.427 | 143.60 | 1.506 | 28.88 | 0.304 | 55.14 | 0.329 | -86.87 |
| 2600 | 0.431 | 139.13 | 1.408 | 24.76 | 0.329 | 53.64 | 0.334 | -92.16 |
| 2800 | 0.441 | 134.54 | 1.327 | 21.16 | 0.358 | 51.96 | 0.339 | -97.67 |
| 3000 | 0.451 | 130.40 | 1.266 | 17.89 | 0.386 | 49.84 | 0.338 | -103.91 |

$V_{CE}=5V, I_C=20mA, Z_O=50\Omega$

| Freq(MHz) | S11 | $\angle S11$ | S21 | $\angle S21$ | S12 | $\angle S12$ | S22 | $\angle S22$ |
|-----------|-------|--------------|--------|--------------|-------|--------------|-------|--------------|
| 100 | 0.527 | -90.16 | 26.224 | 123.28 | 0.026 | 59.94 | 0.598 | -40.43 |
| 200 | 0.438 | -127.59 | 15.340 | 104.33 | 0.037 | 60.44 | 0.396 | -45.63 |
| 400 | 0.399 | -155.68 | 8.065 | 89.00 | 0.060 | 65.69 | 0.282 | -44.29 |
| 600 | 0.393 | -167.56 | 5.453 | 80.60 | 0.084 | 67.76 | 0.256 | -44.57 |
| 800 | 0.397 | -176.18 | 4.149 | 73.14 | 0.109 | 68.31 | 0.250 | -47.52 |
| 1000 | 0.398 | 177.84 | 3.379 | 66.41 | 0.134 | 67.71 | 0.252 | -51.39 |
| 1200 | 0.401 | 172.13 | 2.862 | 60.19 | 0.159 | 66.77 | 0.255 | -55.96 |
| 1400 | 0.406 | 166.95 | 2.491 | 54.45 | 0.186 | 65.32 | 0.262 | -61.04 |
| 1600 | 0.411 | 162.22 | 2.222 | 48.82 | 0.210 | 63.20 | 0.270 | -66.49 |
| 1800 | 0.414 | 157.06 | 2.008 | 43.51 | 0.235 | 61.52 | 0.275 | -71.29 |
| 2000 | 0.419 | 152.07 | 1.840 | 38.32 | 0.261 | 59.51 | 0.282 | -76.53 |
| 2200 | 0.425 | 146.91 | 1.693 | 33.45 | 0.288 | 57.59 | 0.289 | -82.27 |
| 2400 | 0.424 | 141.87 | 1.574 | 29.00 | 0.312 | 55.28 | 0.293 | -86.65 |
| 2600 | 0.429 | 137.61 | 1.472 | 24.92 | 0.336 | 53.54 | 0.298 | -91.76 |
| 2800 | 0.438 | 133.38 | 1.387 | 21.39 | 0.365 | 51.63 | 0.304 | -97.07 |
| 3000 | 0.449 | 129.47 | 1.321 | 18.07 | 0.392 | 49.39 | 0.303 | -103.60 |

55GN01MA

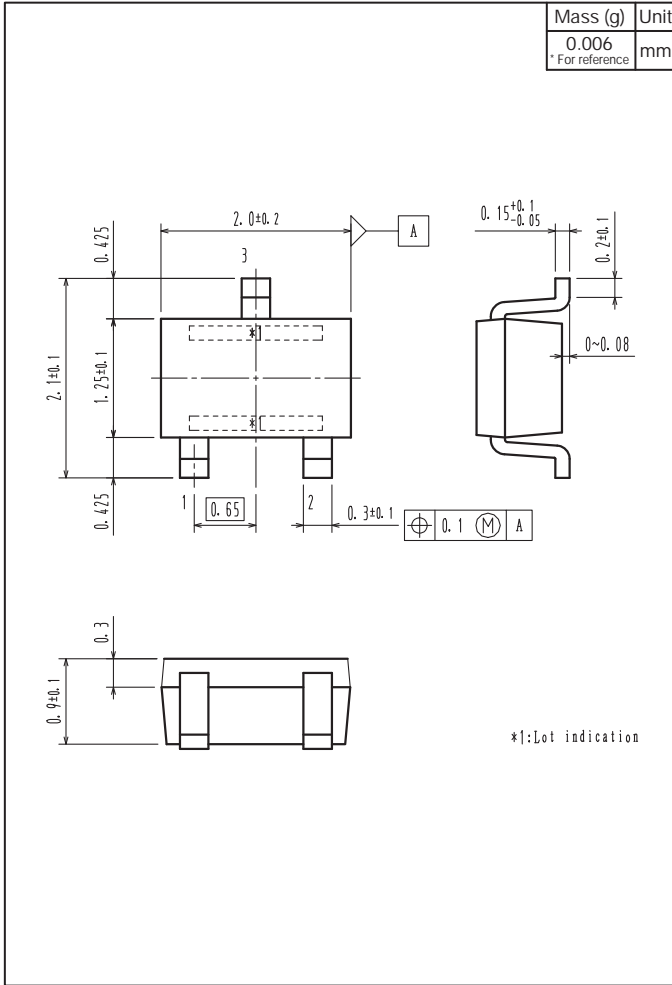
S Parameters (Common emitter)

$V_{CE}=5V$, $I_C=30mA$, $Z_O=50\Omega$

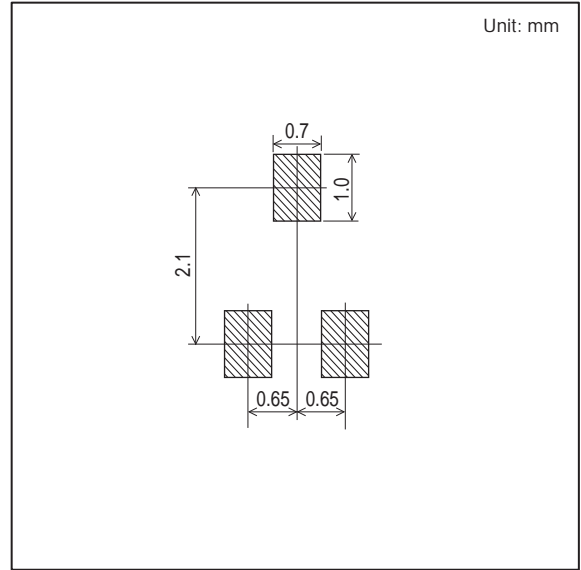
| Freq(MHz) | S11 | $\angle S11$ | S21 | $\angle S21$ | S12 | $\angle S12$ | S22 | $\angle S22$ |
|-----------|-------|--------------|--------|--------------|-------|--------------|-------|--------------|
| 100 | 0.461 | -105.76 | 28.111 | 117.59 | 0.023 | 60.62 | 0.521 | -42.88 |
| 200 | 0.412 | -139.73 | 15.717 | 100.76 | 0.034 | 64.40 | 0.344 | -44.71 |
| 400 | 0.393 | -162.64 | 8.133 | 87.05 | 0.058 | 69.84 | 0.255 | -41.81 |
| 600 | 0.394 | -172.24 | 5.483 | 79.25 | 0.084 | 70.67 | 0.237 | -42.42 |
| 800 | 0.400 | -179.58 | 4.169 | 72.10 | 0.110 | 70.59 | 0.235 | -45.80 |
| 1000 | 0.401 | 175.18 | 3.392 | 65.52 | 0.135 | 69.45 | 0.239 | -49.94 |
| 1200 | 0.405 | 169.95 | 2.870 | 59.47 | 0.161 | 68.00 | 0.244 | -54.75 |
| 1400 | 0.412 | 165.14 | 2.496 | 53.81 | 0.187 | 66.24 | 0.252 | -60.09 |
| 1600 | 0.417 | 160.67 | 2.226 | 48.20 | 0.212 | 64.03 | 0.260 | -65.80 |
| 1800 | 0.422 | 155.72 | 2.010 | 42.96 | 0.237 | 62.33 | 0.267 | -70.89 |
| 2000 | 0.428 | 150.84 | 1.841 | 37.78 | 0.263 | 60.20 | 0.275 | -76.12 |
| 2200 | 0.434 | 145.91 | 1.692 | 32.98 | 0.291 | 58.16 | 0.282 | -81.97 |
| 2400 | 0.433 | 140.96 | 1.574 | 28.60 | 0.314 | 55.69 | 0.286 | -86.52 |
| 2600 | 0.438 | 136.73 | 1.469 | 24.51 | 0.339 | 53.89 | 0.291 | -91.68 |
| 2800 | 0.447 | 132.49 | 1.384 | 21.02 | 0.367 | 52.12 | 0.298 | -97.10 |
| 3000 | 0.459 | 128.65 | 1.319 | 17.72 | 0.395 | 49.72 | 0.298 | -103.63 |

55GN01MA

Outline Drawing 55GN01MA-TL-E



Land Pattern Example



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