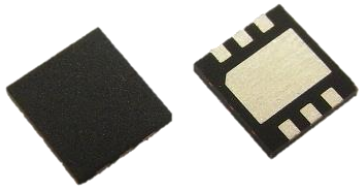
# SGFCF20T-D

## Twin Path Device (Single Path Specification)

***High Voltage - Plastic Mold GaN-HEMT***

### FEATURES

- High Voltage Operation : VDS=50V
- High Power : 41dBm (typ.) @ Psat
- High Efficiency : 60% (typ.) @ Psat
- Power Gain : 19.5dB (typ.) @ f=2.65GHz
- Proven Reliability



### DESCRIPTION

Sumitomo's GaN-HEMT offers high efficiency, ease of matching, greater consistency and broad bandwidth for high power amplifiers with 50V operation, and gives you higher gain.
This new product is ideally suited for use up to 3.8GHz W-CDMA & LTE design requirements as it offers high gain, long term reliability and ease of use. This device target applications are driver stage and final stage of micro cell base transceiver stations.

### ABSOLUTE MAXIMUM RATINGS

| Item | Symbol | Condition | Rating | Unit |
|---|---|---|---|---|
| Operating Voltage | VDS | | 55 | V |
| Drain-Source Voltage | VDS * | VGS=-8V | 160 | V |
| Gate-Source Voltage | VGS * | | -15 | V |
| Total Power Dissipation | Pt * | | 13.5 | W |
| Storage Temperature | Tstg | | -40 to +125 | deg.C |
| Channel Temperature | Tch | | 250 | deg.C |

* : Case Temperature Tc=25deg.C

### RECOMMENDED OPERATING CONDITION

| Item | Symbol | Condition | Limit | Unit |
|---|---|---|---|---|
| DC Input Voltage | VDS | | ≦ 55 | V |
| Forward Gate Current | IGF | RG=51ohm | ≦ 23 | mA |
| Reverse Gate Current | IGR | RG=51ohm | ≧ -0.3 | mA |
| Channel Temperature | Tch | | ≦ 200 | deg.C |
| Average Output Power | Pave. | | ≦ 38.0 | dBm |

### ELECTRICAL CHARACTERISTICS ( Case Temperature Tc=25deg.C )

| Item | Symbol | Condition | Limit | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Pinch-Off Voltage | Vp | VDS=50V, IDS=2.7mA | -1.0 | -1.5 | -2.0 | V |
| Saturated Power | Psat *1 | VDS=50V,<br>IDS(DC)≈0mA<br>f=2.65GHz | 40.0 | 41.0 | - | dBm |
| Drain Efficiency<br>Power Gain | DE *2<br>Gp *2 | VDS=50V<br>IDS(DC)≈50mA<br>f=2.65GHz | 11.5<br>18.5 | 13.5<br>19.5 | -<br>- | %<br>dB |
| Thermal Resistance | Rth *3 | Channel to Case<br>at 12W PDC | - | 10.0 | 11.5 | deg.C/W |

Note : *1 : 10%-duty RF pulse ( DC supply constant )
*2 : Pout=27.5dBm, CW modulation Signal ( W-CDMA )
*3 : Sampling Test : samples size 10pcs. Criteria(accept / reject)=(0 / 1)

| RoHS COMPLIANCE | Yes |
|---|---|

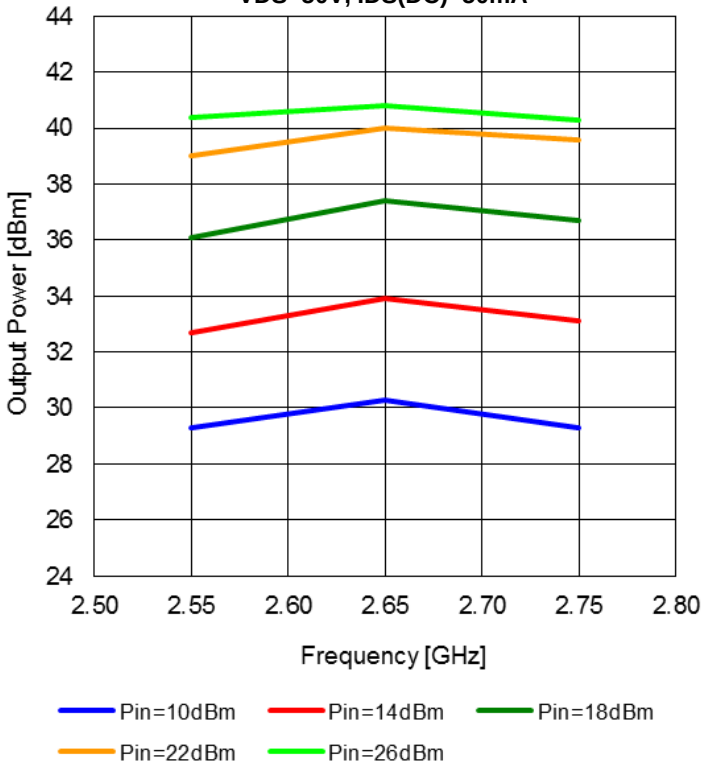
SUMITOMO ELECTRIC

## Twin Path Device (Single Path Specification)

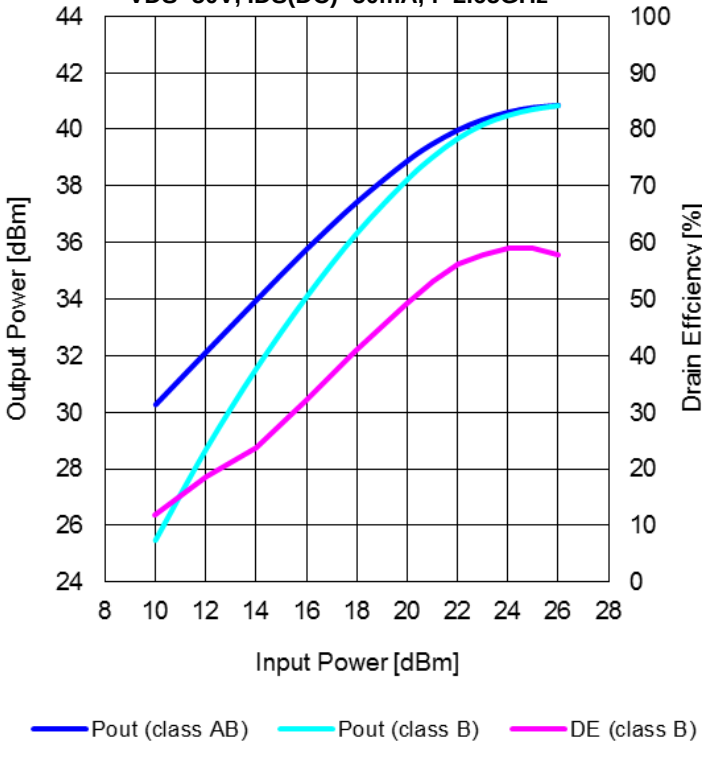
*High Voltage - Plastic Mold GaN-HEMT*

**RF characteristics @f=2.65GHz fine tuned**

**Output Power vs. Frequency**
**VDS=50V, IDS(DC)=50mA**

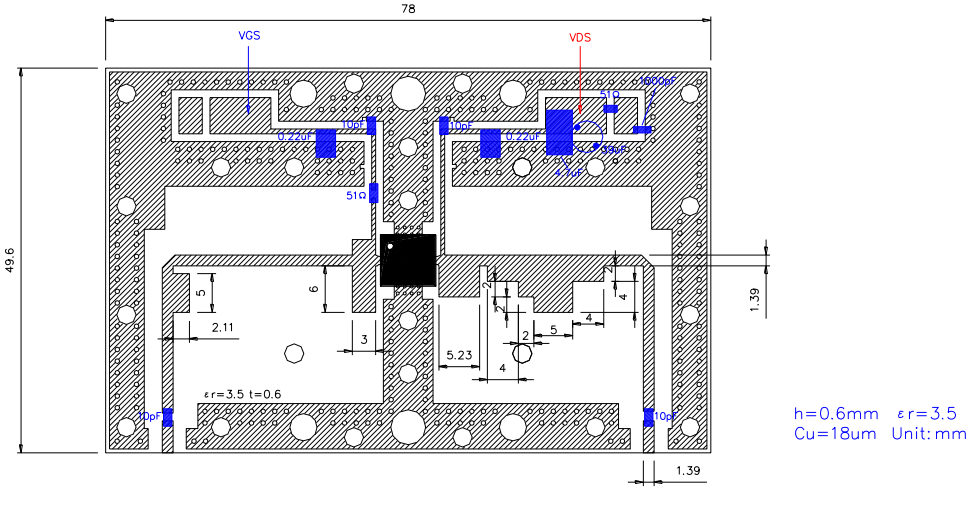



**Output Power and Drain Efficiency vs. Input Power**
**VDS=50V, IDS(DC)=50mA, f=2.65GHz**




**Pulse Signal (10%-duty, DC : constant)**

**Test Fixture**

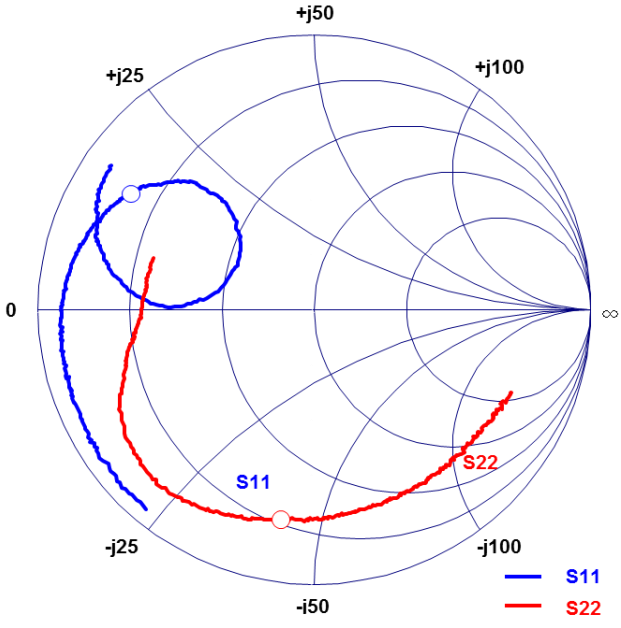


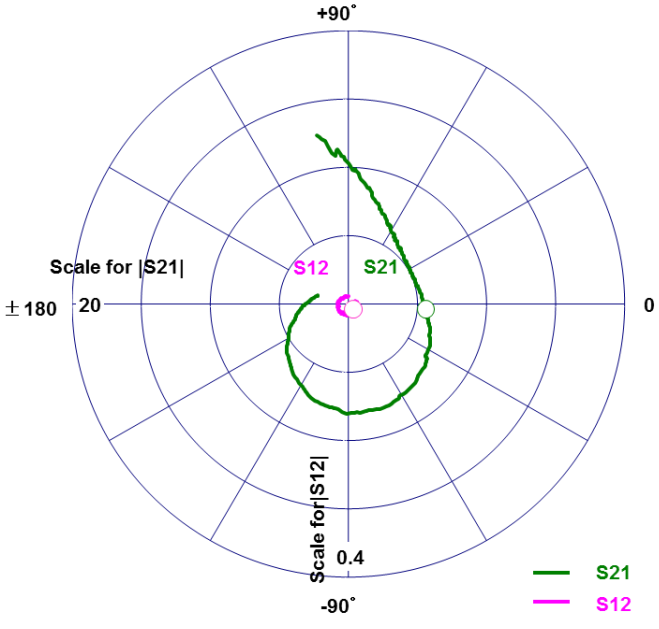
# SGFCF20T-D

*High Voltage - Plastic Mold GaN-HEMT*

**- Reference DATA -**

**S-Parameters @VDS=50V, IDS(DC)=50mA, f=0.5 to 4.5GHz**
**Zl = Zs = 50ohm Marker : 2.65GHz**




| Freq. | S11 | | S21 | | S12 | | S22 | |
|---|---|---|---|---|---|---|---|---|
| GHz | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.5 | 0.95 | -129.93 | 12.58 | 100.49 | 0.011 | 28.60 | 0.77 | -22.89 |
| 0.6 | 0.94 | -139.93 | 10.90 | 92.90 | 0.012 | 8.88 | 0.76 | -26.00 |
| 0.7 | 0.93 | -147.32 | 9.75 | 86.55 | 0.010 | 9.98 | 0.76 | -29.84 |
| 0.8 | 0.93 | -153.24 | 8.63 | 80.91 | 0.011 | 3.22 | 0.75 | -32.91 |
| 0.9 | 0.93 | -158.83 | 7.94 | 76.82 | 0.012 | 5.31 | 0.75 | -35.81 |
| 1.0 | 0.93 | -162.89 | 7.31 | 72.03 | 0.010 | -2.88 | 0.74 | -39.01 |
| 1.1 | 0.93 | -166.82 | 6.88 | 67.41 | 0.010 | -6.63 | 0.74 | -42.92 |
| 1.2 | 0.92 | -170.50 | 6.48 | 62.59 | 0.011 | -4.70 | 0.74 | -46.13 |
| 1.3 | 0.92 | -173.92 | 6.12 | 57.97 | 0.010 | -10.91 | 0.74 | -49.89 |
| 1.4 | 0.92 | -177.21 | 5.82 | 54.41 | 0.010 | -8.83 | 0.74 | -52.97 |
| 1.5 | 0.92 | -179.73 | 5.60 | 50.55 | 0.010 | -11.20 | 0.74 | -56.43 |
| 1.6 | 0.91 | 177.77 | 5.47 | 46.29 | 0.010 | -15.35 | 0.74 | -60.46 |
| 1.7 | 0.90 | 175.05 | 5.35 | 41.47 | 0.010 | -15.16 | 0.74 | -63.58 |
| 1.8 | 0.90 | 171.96 | 5.22 | 37.55 | 0.010 | -25.32 | 0.74 | -67.64 |
| 1.9 | 0.89 | 169.48 | 5.14 | 33.16 | 0.011 | -27.51 | 0.75 | -70.65 |
| 2.0 | 0.89 | 166.66 | 5.10 | 29.06 | 0.009 | -28.32 | 0.75 | -74.61 |
| 2.1 | 0.87 | 164.09 | 5.07 | 24.37 | 0.009 | -31.76 | 0.75 | -78.62 |
| 2.2 | 0.87 | 161.09 | 5.16 | 19.61 | 0.010 | -28.63 | 0.75 | -82.05 |
| 2.3 | 0.85 | 158.26 | 5.18 | 14.77 | 0.010 | -33.80 | 0.76 | -85.63 |
| 2.4 | 0.84 | 155.74 | 5.22 | 10.05 | 0.011 | -39.35 | 0.76 | -89.55 |
| 2.5 | 0.82 | 152.57 | 5.35 | 4.78 | 0.011 | -43.81 | 0.77 | -93.43 |
| 2.6 | 0.80 | 149.29 | 5.52 | -0.67 | 0.012 | -44.46 | 0.77 | -96.84 |
| 2.7 | 0.77 | 145.30 | 5.76 | -7.17 | 0.012 | -48.98 | 0.78 | -100.93 |
| 2.8 | 0.75 | 142.65 | 5.99 | -13.89 | 0.012 | -53.11 | 0.79 | -104.93 |
| 2.9 | 0.70 | 138.52 | 6.32 | -21.78 | 0.012 | -58.62 | 0.80 | -109.14 |
| 3.0 | 0.65 | 134.48 | 6.70 | -29.82 | 0.015 | -64.80 | 0.82 | -114.06 |
| 3.1 | 0.58 | 131.80 | 7.14 | -38.89 | 0.015 | -73.40 | 0.83 | -118.67 |
| 3.2 | 0.50 | 129.47 | 7.52 | -50.19 | 0.016 | -85.87 | 0.84 | -124.99 |
| 3.3 | 0.41 | 133.84 | 7.86 | -62.79 | 0.015 | -96.18 | 0.85 | -131.14 |
| 3.4 | 0.33 | 144.39 | 7.91 | -78.91 | 0.016 | -111.28 | 0.84 | -138.75 |
| 3.5 | 0.34 | 162.93 | 7.90 | -93.35 | 0.016 | -129.03 | 0.83 | -145.71 |
| 3.6 | 0.43 | 176.07 | 7.53 | -107.26 | 0.017 | -145.72 | 0.79 | -152.74 |
| 3.7 | 0.54 | 178.95 | 6.81 | -121.37 | 0.017 | -163.59 | 0.74 | -158.90 |
| 3.8 | 0.64 | 175.75 | 6.04 | -134.54 | 0.015 | -179.75 | 0.71 | -164.16 |
| 3.9 | 0.73 | 170.46 | 5.23 | -147.15 | 0.014 | 170.23 | 0.68 | -169.36 |
| 4.0 | 0.78 | 165.99 | 4.58 | -157.41 | 0.013 | 150.22 | 0.65 | -173.92 |
| 4.1 | 0.83 | 161.90 | 3.96 | -165.60 | 0.013 | 139.85 | 0.63 | -178.26 |
| 4.2 | 0.86 | 155.92 | 3.45 | -174.11 | 0.012 | 124.46 | 0.62 | 177.42 |
| 4.3 | 0.88 | 152.82 | 2.97 | 178.69 | 0.012 | 116.26 | 0.61 | 173.04 |
| 4.4 | 0.89 | 149.73 | 2.61 | 170.76 | 0.011 | 109.13 | 0.61 | 167.98 |
| 4.5 | 0.90 | 144.53 | 2.29 | 164.51 | 0.011 | 89.46 | 0.61 | 162.12 |

**ESD characteristic**

| Test Methodology | Class |
|---|---|
| Human Body Model (per JESD22-A114) | 1C |
| Machine Model (per JESD22-A115) | A |
| Charged-Device Model (per JESD22-C101) | C3 |

**Ordering Information**

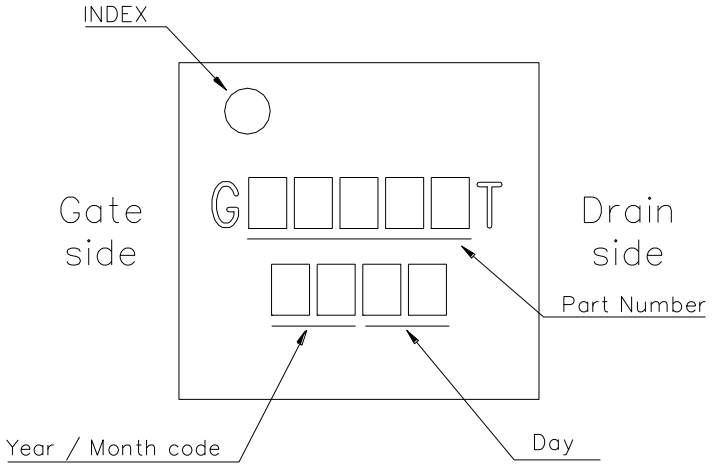
| Part Number | MOQ | MOU | Packing Style |
|---|---|---|---|
| SGFCF20T-DT | 2500pcs. | 2500pcs. | Tape and Reel (16mm width Tape) |
| SGFCF20T-DT1 | 500pcs. | 500pcs. | Tape and Reel (16mm width Tape) |
| SGFCF20T-D | 20pcs. | 20pcs. | Tray (4-inch) |

Note : *MOQ stands for Minimum Order Quantity.
*MOU stands for Minimum Order Unit size.

**Moisture Sensitivity Level**

| Level | Floor Life | |
|---|---|---|
| | Time | Condition |
| 2a | 4weeks after open the package | ≤30deg.C/60%RH |

**Package Markings**




**Year code**

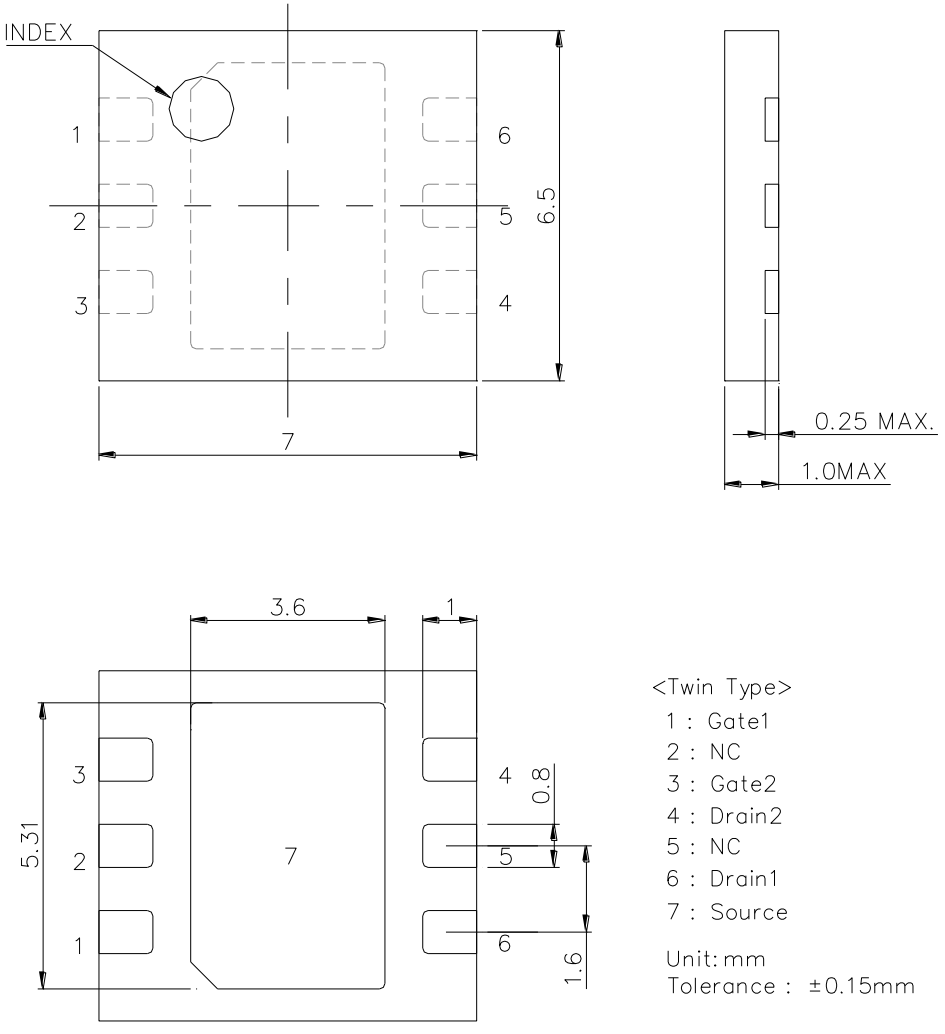
| Year | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|
| Code | X | Y | Z | A | B | C | D | E | F |

Note: Code letter is cycling 25 alphabet without Q.

**Month code**

| Month | Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | H | M | N | P | R | S | T | U | W | X | Y | Z |

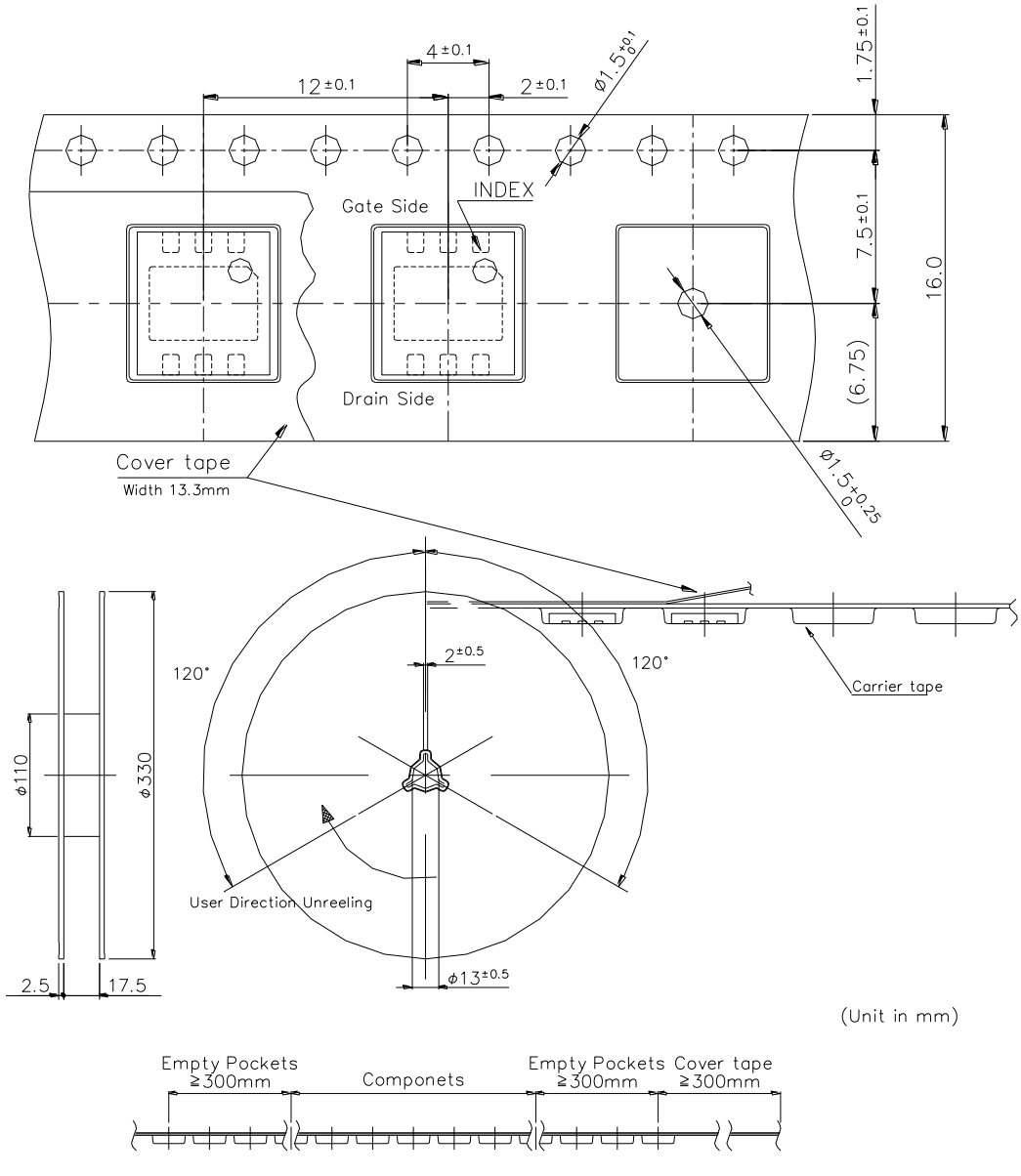
**Z2D Package Outline**
**Full Mold Plastic Package**




<Twin Type>
1 : Gate1
2 : NC
3 : Gate2
4 : Drain2
5 : NC
6 : Drain1
7 : Source

Unit: mm
Tolerance : ±0.15mm

**Index and Tape / Reel Configuration**
**(Part Number : SGFCF20T-DT, SGFCF20T-DT1)**




Note : Baking of Tape & Reel is possible by following condition.
1. Recommended Baking Condition : 125deg.C, 8hous
2. Upper limit number of times : 5 times

* Reference standard : JIS standard(JIS C 0806-3)