

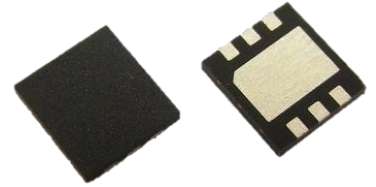
### FEATURES

- High Voltage Operation : VDS=50V
- High Power : 44dBm (typ.) @ Psat
- High Efficiency : 60% (typ.) @ Psat
- Power Gain : 19dB (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 *   |           | 19.4        | 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=15ohm  | ≤ 46   | mA    |
| Reverse Gate Current | IGR    | RG=15ohm  | ≥ -0.7 | mA    |
| Channel Temperature  | Tch    |           | ≤ 200  | deg.C |
| Average Output Power | Pave.  |           | ≤ 41.0 | dBm   |

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

| Item               | Symbol  | Condition                            | Limit |      |      | Unit    |
|--------------------|---------|--------------------------------------|-------|------|------|---------|
|                    |         |                                      | Min.  | Typ. | Max. |         |
| Pinch-Off Voltage  | Vp      | VDS=50V, IDS=5.4mA                   | -1.0  | -1.5 | -2.0 | V       |
| Saturated Power    | Psat *1 | VDS=50V,<br>IDS(DC)≈0mA<br>f=2.65GHz | 43.0  | 44.0 | -    | dBm     |
| Drain Efficiency   | DE *2   | VDS=50V                              | 11.5  | 13.5 | -    | %       |
| Power Gain         | Gp *2   | IDS(DC)≈100mA<br>f=2.65GHz           | 18.0  | 19.0 | -    | dB      |
| Thermal Resistance | Rth *3  | Channel to Case<br>at 16.5W PDC      | -     | 7.0  | 8.0  | deg.C/W |

Note : \*1 : 10%-duty RF pulse ( DC supply constant )

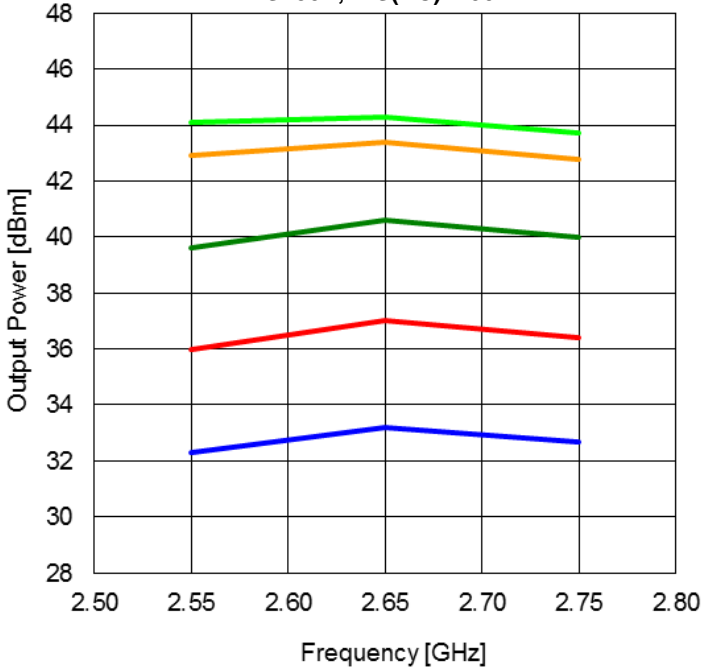
\*2 : Pout=30.5dBm, CW modulation Signal ( W-CDMA )

\*3 : Sampling Test : samples size 10pcs. Criteria(accept / reject)=(0 / 1)

**RoHS COMPLIANCE** Yes

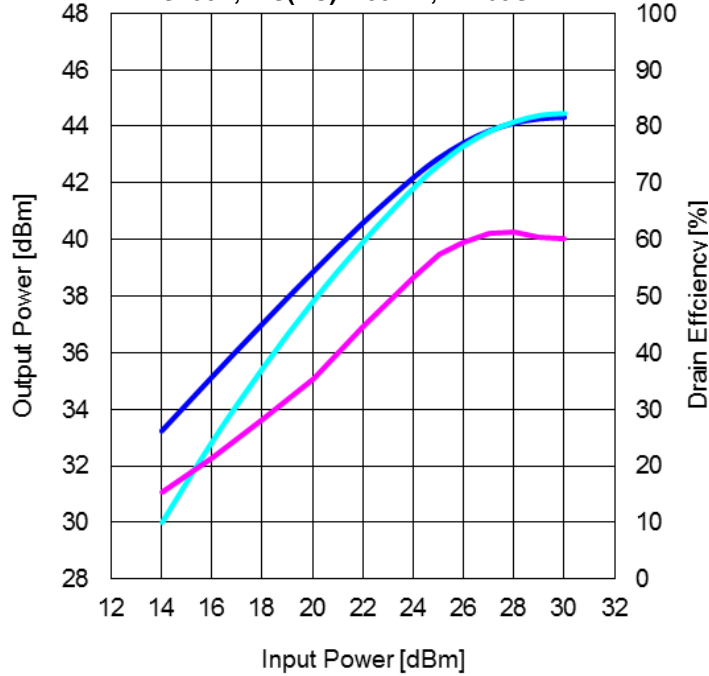
RF characteristics @f=2.65GHz fine tuned

Output Power vs. Frequency  
VDS=50V, IDS(DC)=100mA



Pin=14dBm Pin=18dBm Pin=22dBm  
Pin=26dBm Pin=30dBm

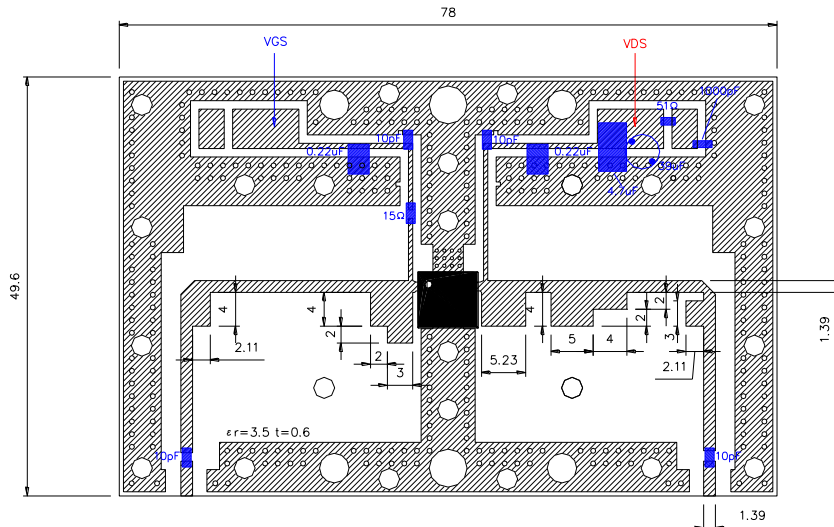
Output Power and Drain Efficiency vs. Input Power  
VDS=50V, IDS(DC)=100mA, f=2.65GHz



Pout (class AB) Pout (class B) DE (class B)

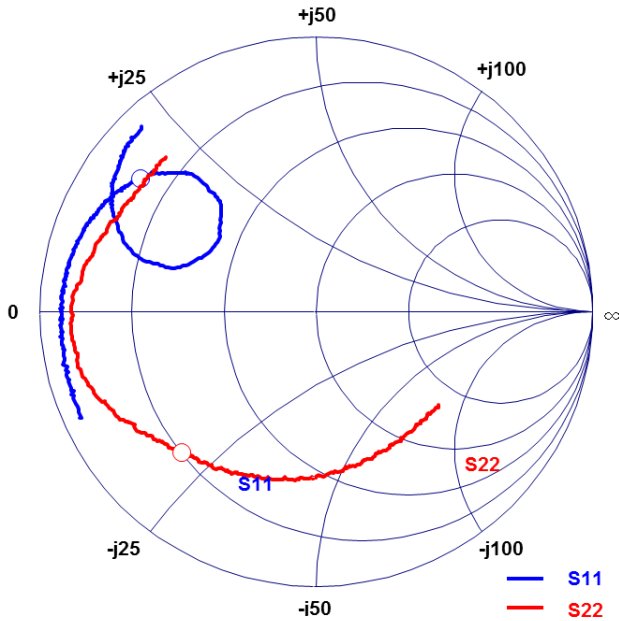
Test Fixture

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

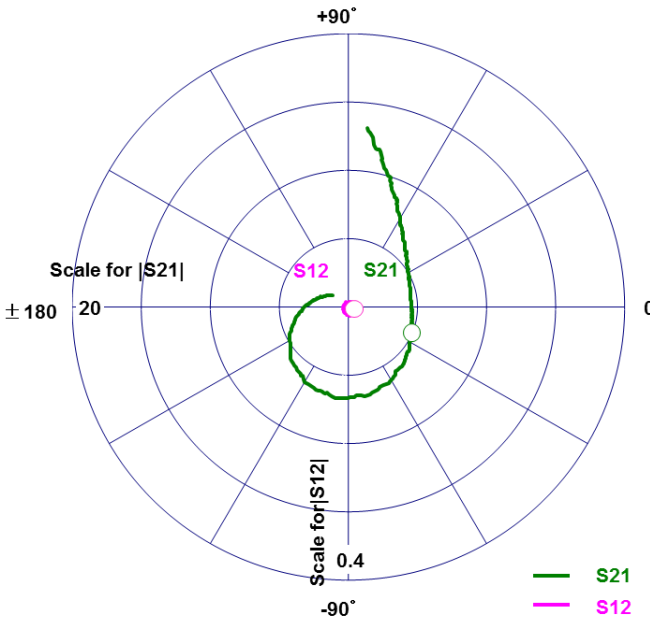


S-Parameters @VDS=50V, IDS(DC)=100mA, f=0.5 to 4.5GHz  
 ZI = Zs = 50ohm      Marker : 2.65GHz

**- Reference DATA -**



| Freq.<br>GHz | S11  |         |       | S21     |       | S12     |      | S22     |     |
|--------------|------|---------|-------|---------|-------|---------|------|---------|-----|
|              | MAG  | ANG     |       | MAG     | ANG   | MAG     | ANG  | MAG     | ANG |
| 0.5          | 0.94 | -155.65 | 13.19 | 84.08   | 0.013 | 16.05   | 0.56 | -37.71  |     |
| 0.6          | 0.92 | -161.75 | 11.14 | 77.41   | 0.010 | -4.13   | 0.55 | -42.44  |     |
| 0.7          | 0.92 | -166.26 | 9.77  | 71.95   | 0.010 | 6.94    | 0.56 | -47.46  |     |
| 0.8          | 0.93 | -171.00 | 8.65  | 66.45   | 0.010 | -5.31   | 0.55 | -52.29  |     |
| 0.9          | 0.93 | -174.34 | 7.80  | 62.45   | 0.010 | -3.85   | 0.56 | -57.00  |     |
| 1.0          | 0.92 | -177.21 | 7.06  | 58.10   | 0.010 | -11.36  | 0.56 | -61.60  |     |
| 1.1          | 0.92 | 179.87  | 6.58  | 53.44   | 0.011 | -13.18  | 0.56 | -67.03  |     |
| 1.2          | 0.92 | 177.54  | 6.15  | 48.44   | 0.009 | -8.62   | 0.57 | -72.04  |     |
| 1.3          | 0.92 | 175.21  | 5.84  | 43.87   | 0.009 | -15.52  | 0.58 | -76.75  |     |
| 1.4          | 0.92 | 172.63  | 5.48  | 39.81   | 0.009 | -14.96  | 0.59 | -81.37  |     |
| 1.5          | 0.91 | 170.64  | 5.23  | 35.86   | 0.009 | -15.25  | 0.59 | -85.92  |     |
| 1.6          | 0.91 | 168.93  | 5.06  | 31.56   | 0.007 | -9.07   | 0.60 | -90.78  |     |
| 1.7          | 0.90 | 166.43  | 4.89  | 26.37   | 0.009 | -9.61   | 0.61 | -95.09  |     |
| 1.8          | 0.90 | 163.95  | 4.78  | 21.88   | 0.008 | -17.19  | 0.62 | -100.11 |     |
| 1.9          | 0.89 | 161.74  | 4.68  | 17.06   | 0.008 | -19.50  | 0.63 | -104.05 |     |
| 2.0          | 0.89 | 159.22  | 4.61  | 12.85   | 0.007 | -17.39  | 0.64 | -108.50 |     |
| 2.1          | 0.88 | 157.06  | 4.54  | 8.33    | 0.008 | -16.51  | 0.64 | -112.09 |     |
| 2.2          | 0.87 | 154.39  | 4.59  | 3.05    | 0.008 | -14.18  | 0.65 | -116.41 |     |
| 2.3          | 0.86 | 152.08  | 4.59  | -2.23   | 0.008 | -16.43  | 0.66 | -120.48 |     |
| 2.4          | 0.85 | 149.72  | 4.63  | -7.30   | 0.009 | -22.65  | 0.68 | -124.37 |     |
| 2.5          | 0.83 | 146.98  | 4.73  | -13.17  | 0.009 | -22.95  | 0.69 | -128.36 |     |
| 2.6          | 0.81 | 144.35  | 4.88  | -18.32  | 0.009 | -25.16  | 0.70 | -131.22 |     |
| 2.7          | 0.78 | 140.65  | 5.06  | -25.53  | 0.009 | -33.27  | 0.72 | -135.52 |     |
| 2.8          | 0.76 | 138.53  | 5.25  | -32.64  | 0.009 | -25.18  | 0.73 | -138.96 |     |
| 2.9          | 0.71 | 135.02  | 5.53  | -41.24  | 0.009 | -27.18  | 0.75 | -142.78 |     |
| 3.0          | 0.66 | 131.86  | 5.84  | -51.46  | 0.011 | -36.72  | 0.78 | -146.98 |     |
| 3.1          | 0.60 | 130.91  | 6.24  | -61.17  | 0.012 | -45.54  | 0.81 | -151.06 |     |
| 3.2          | 0.53 | 131.49  | 6.48  | -73.19  | 0.012 | -58.63  | 0.83 | -156.85 |     |
| 3.3          | 0.46 | 138.97  | 6.66  | -87.66  | 0.011 | -66.22  | 0.87 | -162.43 |     |
| 3.4          | 0.44 | 149.68  | 6.54  | -104.82 | 0.011 | -88.13  | 0.88 | -169.96 |     |
| 3.5          | 0.49 | 159.57  | 6.24  | -121.22 | 0.009 | -106.49 | 0.89 | -176.66 |     |
| 3.6          | 0.59 | 163.50  | 5.69  | -135.92 | 0.010 | -130.49 | 0.88 | 176.41  |     |
| 3.7          | 0.68 | 162.61  | 4.94  | -149.00 | 0.007 | -149.91 | 0.86 | 170.88  |     |
| 3.8          | 0.75 | 158.94  | 4.25  | -161.34 | 0.006 | -171.57 | 0.84 | 165.44  |     |
| 3.9          | 0.81 | 154.62  | 3.58  | -172.62 | 0.006 | 162.44  | 0.82 | 160.03  |     |
| 4.0          | 0.85 | 150.73  | 3.06  | 177.63  | 0.006 | 136.22  | 0.80 | 155.40  |     |
| 4.1          | 0.87 | 147.31  | 2.61  | 170.29  | 0.006 | 121.82  | 0.79 | 150.80  |     |
| 4.2          | 0.90 | 142.44  | 2.25  | 162.91  | 0.006 | 99.45   | 0.78 | 147.26  |     |
| 4.3          | 0.91 | 140.02  | 1.92  | 156.72  | 0.006 | 85.02   | 0.78 | 143.13  |     |
| 4.4          | 0.91 | 136.90  | 1.67  | 149.46  | 0.006 | 81.67   | 0.78 | 138.91  |     |
| 4.5          | 0.92 | 133.30  | 1.45  | 143.74  | 0.008 | 62.08   | 0.78 | 134.21  |     |



**ESD characteristic**

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

**Ordering Information**

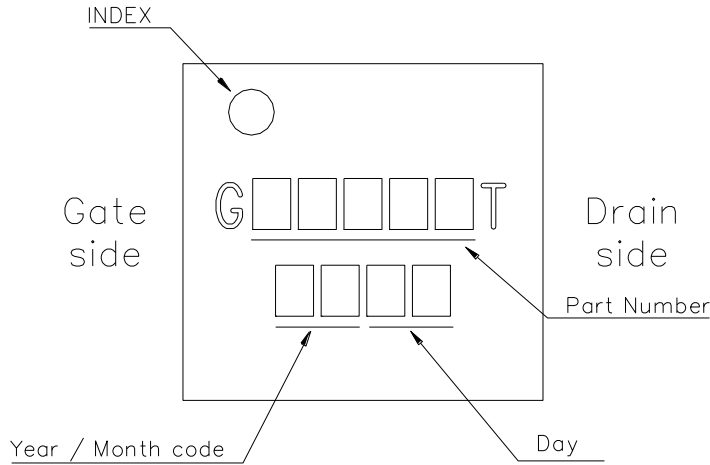
| Part Number  | MOQ      | MOU      | Packing Style                      |
|--------------|----------|----------|------------------------------------|
| SGFCF40T-DT  | 2500pcs. | 2500pcs. | Tape and Reel<br>(16mm width Tape) |
| SGFCF40T-DT1 | 500pcs.  | 500pcs.  | Tape and Reel<br>(16mm width Tape) |
| SGFCF40T-D   | 20pcs.   | 20pcs.   | Tray<br>(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**

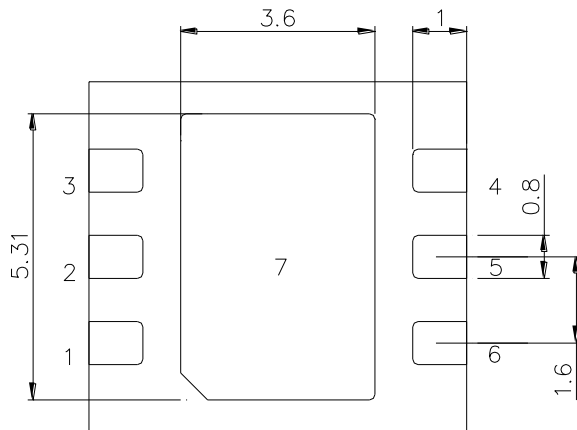
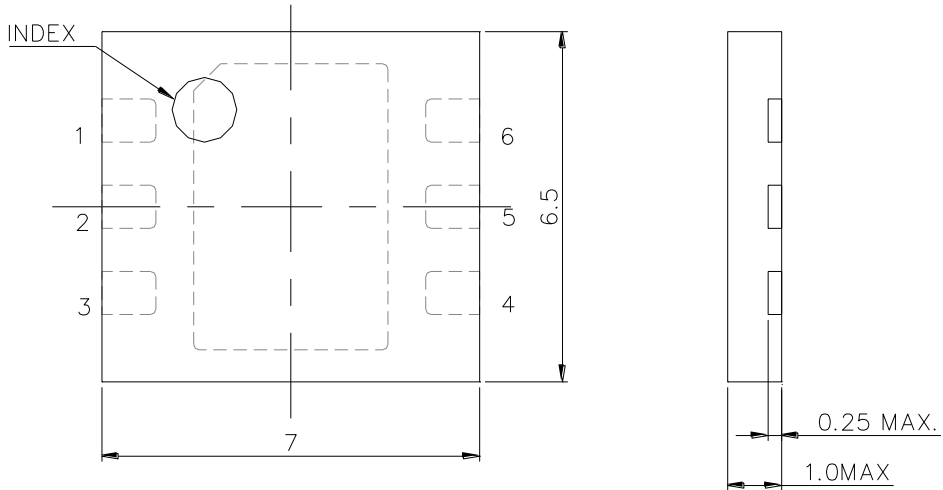
|      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|
| Year | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| Code | X    | Y    | Z    | A    | B    | C    | D    | E    | F    |

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**



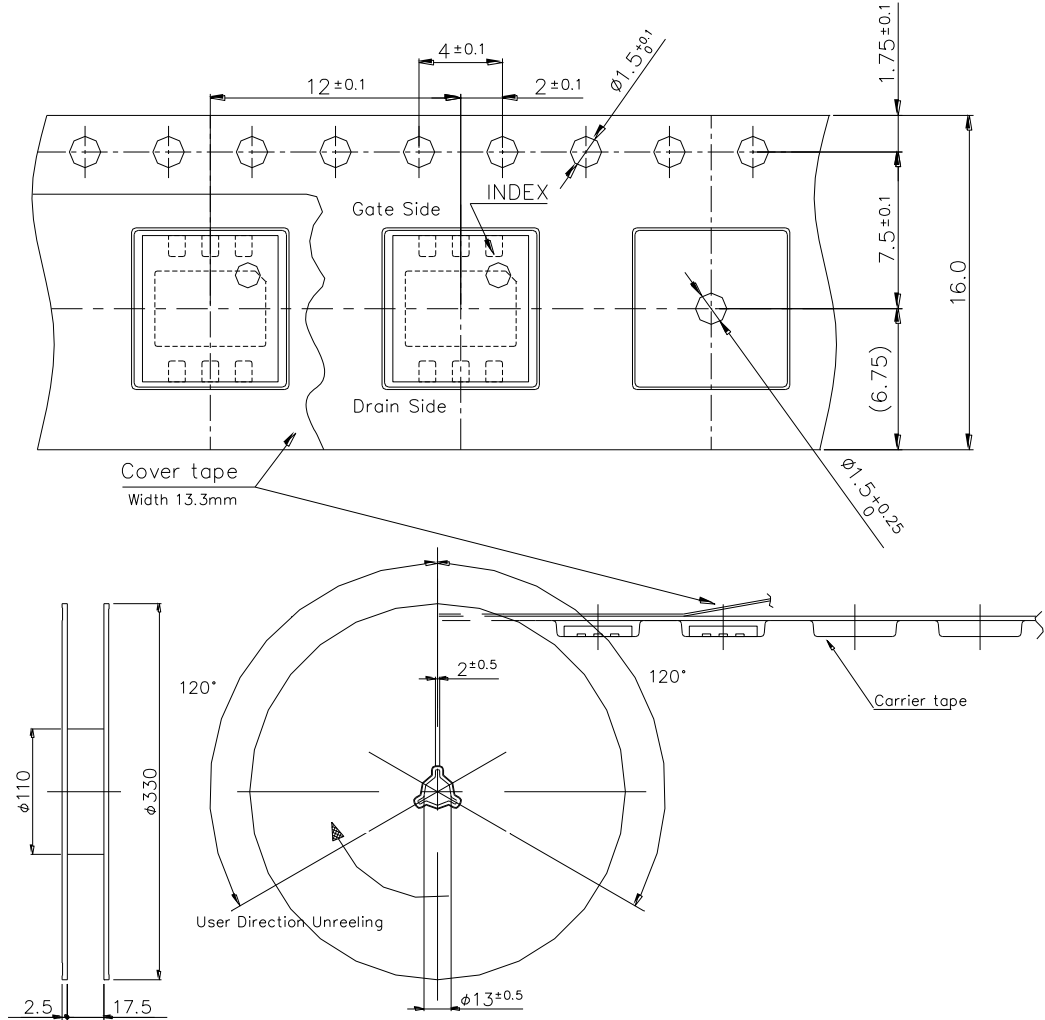
<Twin Type>

- 1 : Gate1
- 2 : NC
- 3 : Gate2
- 4 : Drain2
- 5 : NC
- 6 : Drain1
- 7 : Source

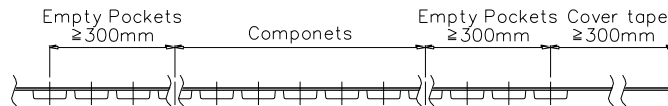
Unit: mm  
Tolerance :  $\pm 0.15$ mm

### Index and Tape / Reel Configuration

(Part Number : SGFCF40T-DT, SGFCF40T-DT1)



(Unit in mm)



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)