

**N-Channel Enhancement Mode MOSFET**

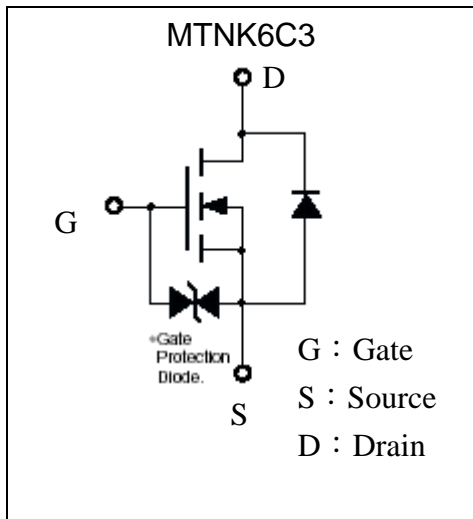
# MTNK6C3

|  |                   |
|--|-------------------|
| <b>BV<sub>DSS</sub></b>  | <b>60V</b>        |
| <b>I<sub>D</sub>@V<sub>GS</sub>=10V, T<sub>A</sub>=25°C</b>        | <b>0.23A</b>      |
| <b>R<sub>DS(ON)</sub>@V<sub>GS</sub>=10V, I<sub>D</sub>=500mA</b>  | <b>1.1Ω (typ)</b> |
| <b>R<sub>DS(ON)</sub>@V<sub>GS</sub>=4.5V, I<sub>D</sub>=200mA</b> | <b>1.2Ω (typ)</b> |

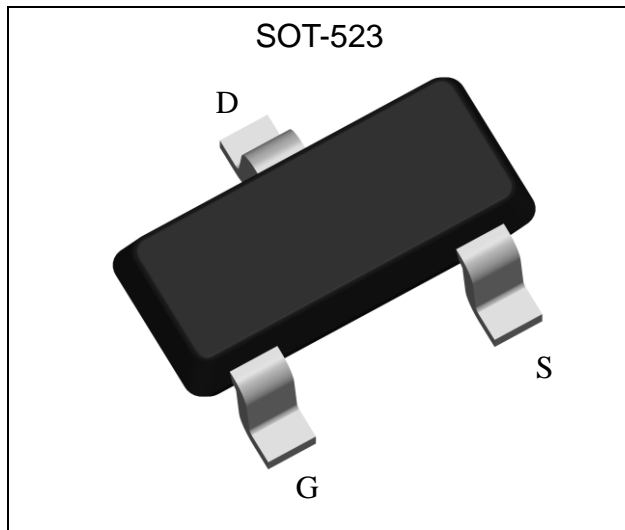
**Features**

- ESD protected gate , ≥2kV (HBM)
- High speed switching
- Pb-free lead plating and halogen-free package
- Easily designed drive circuits
- Low-voltage drive
- Easy to use in parallel

**Symbol**

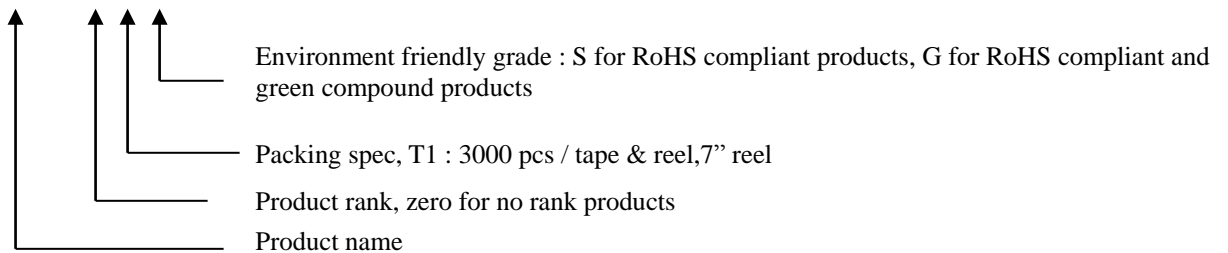


**Outline**



**Ordering Information**

| Device         | Package  | Shipping               |
|----------------|--|------------------------|
| MTNK6C3-0-T1-G | SOT-523<br>(Pb-free lead plating and halogen-free package) | 3000 pcs / tape & reel |





**Absolute Maximum Ratings** (Ta=25°C)

| Parameter   | Symbol           | Limits   | Unit |
|---|------------------|----------|------|
| Drain-Source Voltage  | V <sub>DSS</sub> | 60       | V    |
| Gate-Source Voltage   | V <sub>GSS</sub> | ±20      |      |
| Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>A</sub> =25°C | I <sub>D</sub>   | 230      | mA   |
| Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>A</sub> =70°C |                  | 180      |      |
| Pulsed Drain Current  | I <sub>DM</sub>  | 800 *1   |      |
| Total Power Dissipation   | P <sub>D</sub>   | 150 *2   | mW   |
| ESD susceptibility  | V <sub>ESD</sub> | 2000 *3  | V    |
| Operating Junction Temperature Range                                  | T <sub>j</sub>   | -55~+150 | °C   |
| Storage Temperature Range   | T <sub>stg</sub> | -55~+150 |      |

**Thermal Characteristics**

| Parameter                               | Symbol           | Value  | Unit |
|---|------------------|--------|------|
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub> | 833 *2 | °C/W |

- Note : \*1. Pulse Width ≤ 300μs, Duty cycle ≤ 2%  
 \*2. When the device is mounted on the recommended lands.  
 \*3. Human body model, 1.5kΩ in series with 100pF

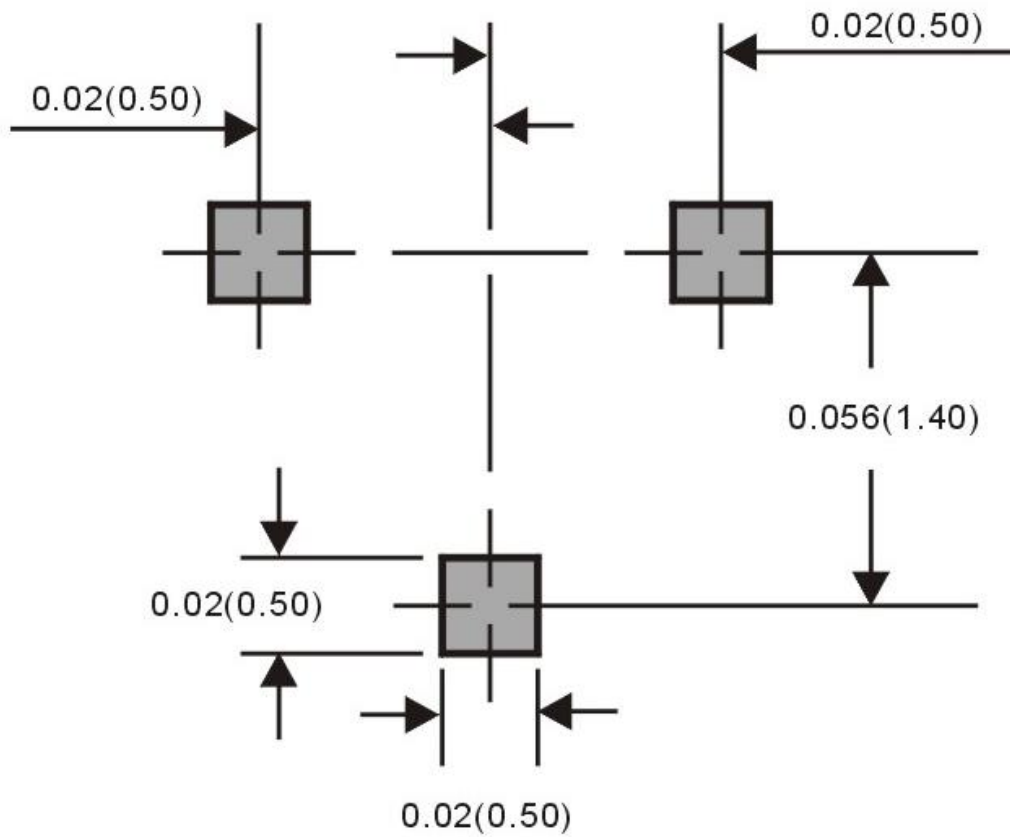
**Electrical Characteristics** (Ta=25°C)

| Symbol                | Min. | Typ. | Max. | Unit | Test Conditions   |
|-----------------------|------|------|------|------|---|
| <b>Static</b>         |      |      |      |      |   |
| BV <sub>DSS</sub> *   | 60   | -    | -    | V    | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA  |
| V <sub>GS(th)</sub>   | 1.0  | -    | 2.5  |      | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                              |
| I <sub>GSS</sub>      | -    | -    | ±10  | μA   | V <sub>GS</sub> =±16V, V <sub>DS</sub> =0V  |
| I <sub>DSS</sub>      | -    | -    | 1    |      | V <sub>DS</sub> =60V, V <sub>GS</sub> =0V   |
|                       | -    | -    | 5    |      | V <sub>DS</sub> =48V, V <sub>GS</sub> =0V, T <sub>j</sub> =55°C                       |
| R <sub>DS(ON)</sub> * | -    | 1.1  | 2    | Ω    | V <sub>GS</sub> =10V, I <sub>D</sub> =500mA   |
|                       | -    | 1.2  | 3    |      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =200mA  |
| G <sub>FS</sub>       | 200  | 530  | -    | mS   | V <sub>DS</sub> =10V, I <sub>D</sub> =500mA   |
| <b>Dynamic</b>        |      |      |      |      |   |
| C <sub>iss</sub>      | -    | 25   | -    | pF   | V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHz                                     |
| C <sub>oss</sub>      | -    | 9    | -    |      |   |
| C <sub>rss</sub>      | -    | 7    | -    |      |   |
| *t <sub>d(ON)</sub>   | -    | 3.6  | -    | ns   | V <sub>DS</sub> =30V, I <sub>D</sub> =0.2A, V <sub>GS</sub> =10V, R <sub>G</sub> =25Ω |
| *t <sub>r</sub>       | -    | 15   | -    |      |   |
| *t <sub>d(OFF)</sub>  | -    | 10   | -    |      |   |
| *t <sub>f</sub>       | -    | 17.8 | -    |      |   |
| *Q <sub>g</sub>       | -    | 1.7  | -    | nC   | V <sub>DS</sub> =30V, I <sub>D</sub> =0.2A, V <sub>GS</sub> =10V                      |
| *Q <sub>gs</sub>      | -    | 0.6  | -    |      |   |
| *Q <sub>gd</sub>      | -    | 0.6  | -    |      |   |

| Body Diode       |   |     |     |    |   |
|------------------|---|-----|-----|----|---|
| *V <sub>SD</sub> | - | 0.8 | 1.2 | V  | I <sub>S</sub> =0.1A                              |
| *trr             | - | 9.4 | -   | ns | I <sub>F</sub> =0.5A, dI <sub>F</sub> /dt=100A/μs |
| *Q <sub>rr</sub> | - | 3.1 | -   | nC |   |

\*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

**Recommended footprint**

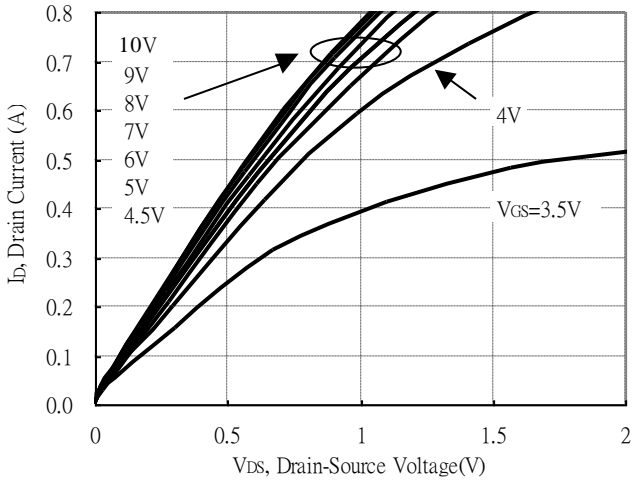


Dimensions in inches and (millimeters)

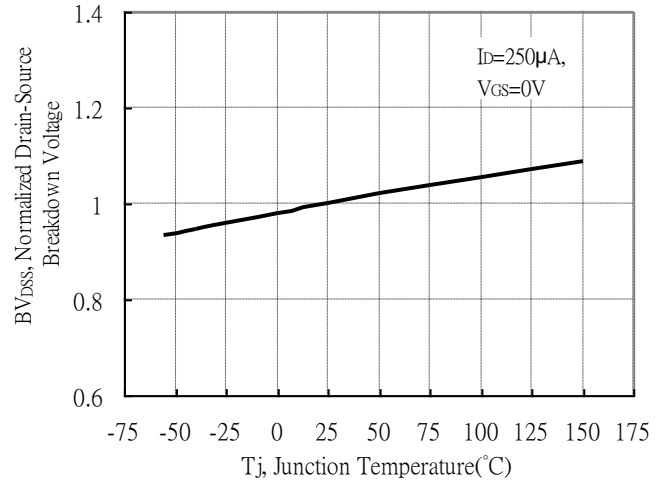


**Typical Characteristics**

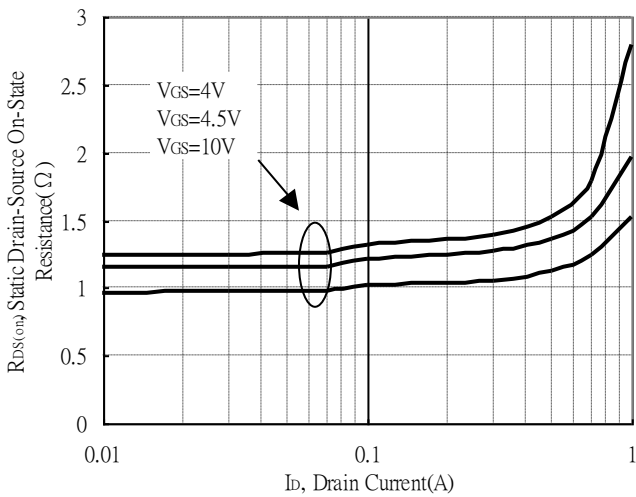
Typical Output Characteristics



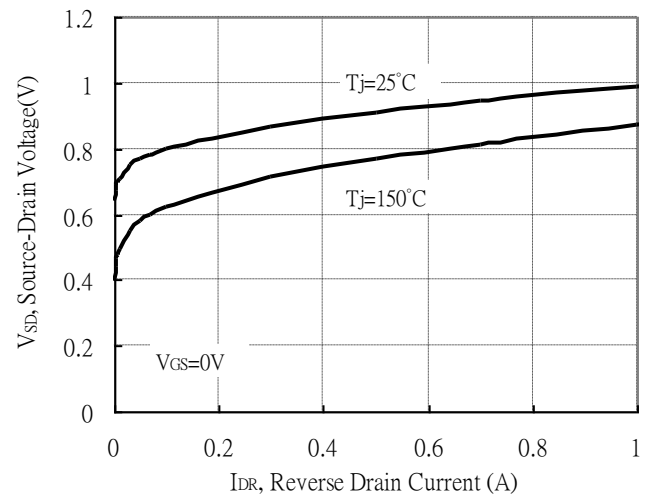
Brekdown Voltage vs Ambient Temperature



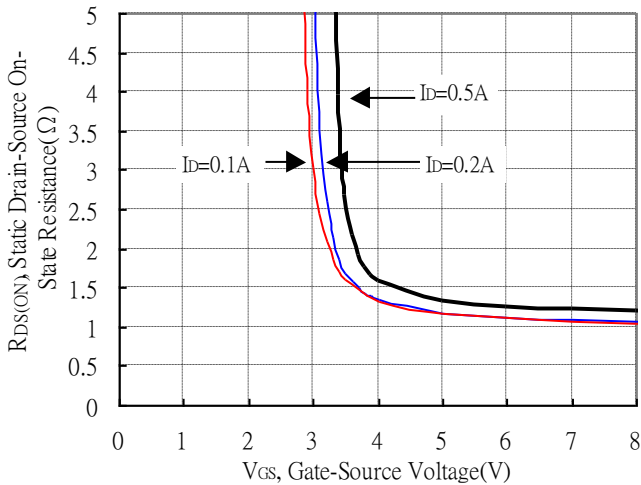
Static Drain-Source On-State resistance vs Drain Current



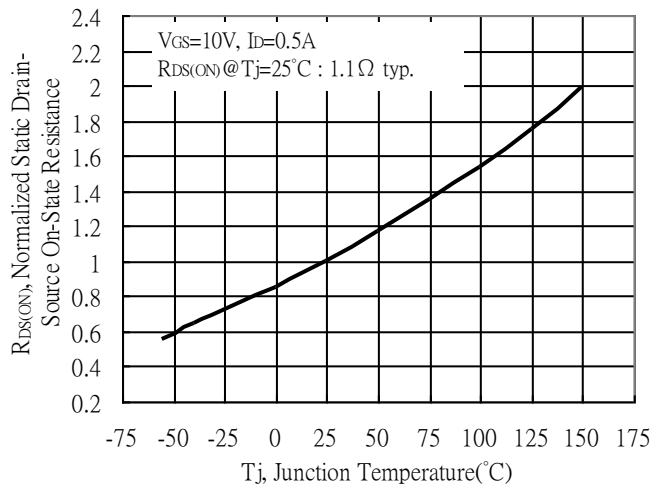
Reverse Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

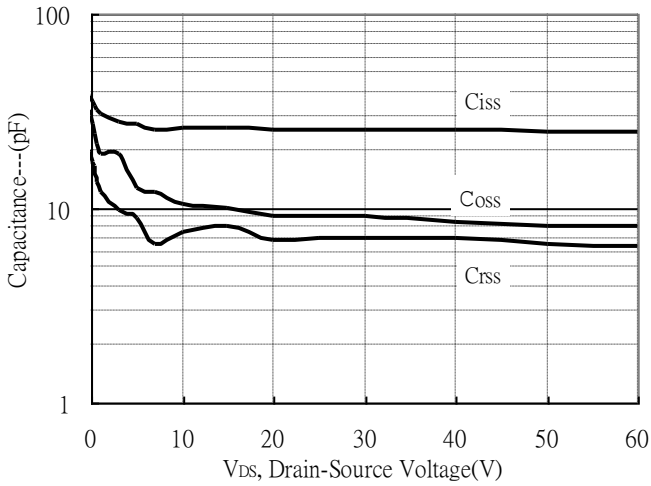


Drain-Source On-State Resistance vs Junction Temperature

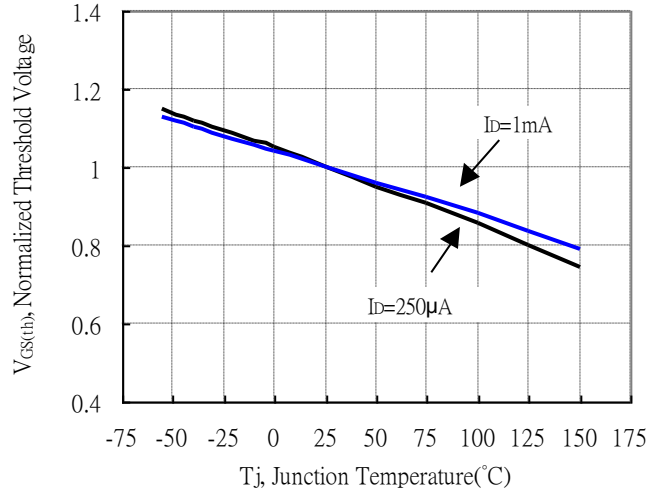


**Typical Characteristics(Cont.)**

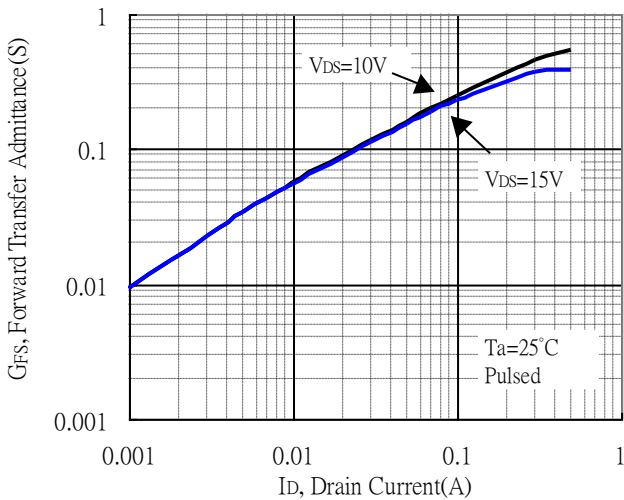
Capacitance vs Drain-to-Source Voltage



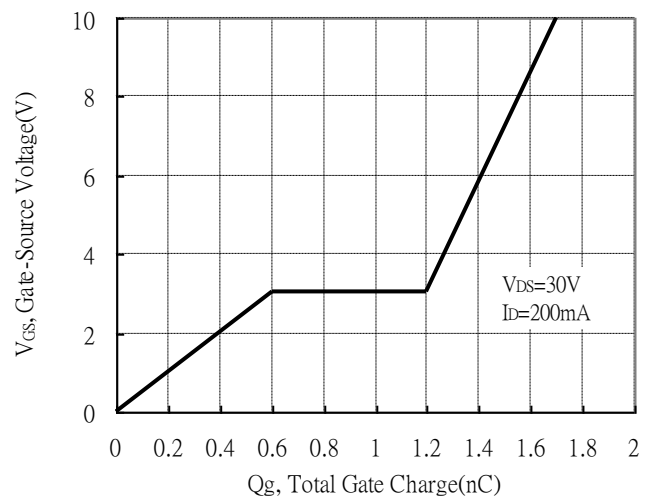
Threshold Voltage vs Junction Temperature



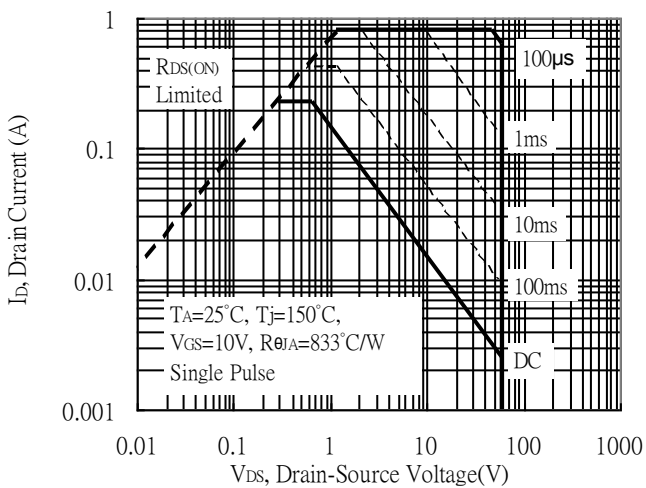
Forward Transfer Admittance vs Drain Current



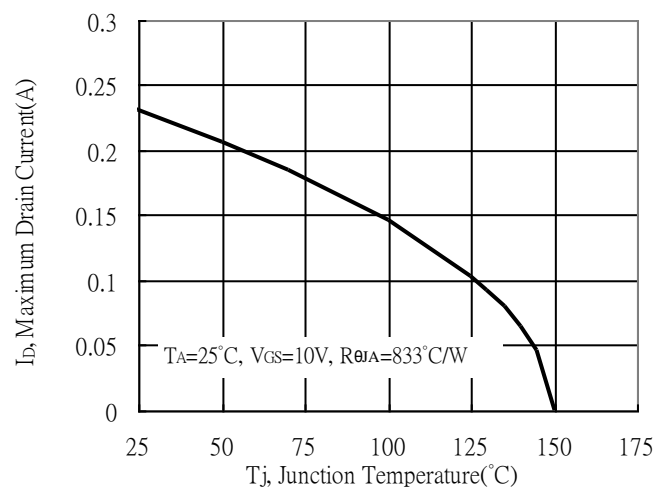
Gate Charge Characteristics



Maximum Safe Operating Area



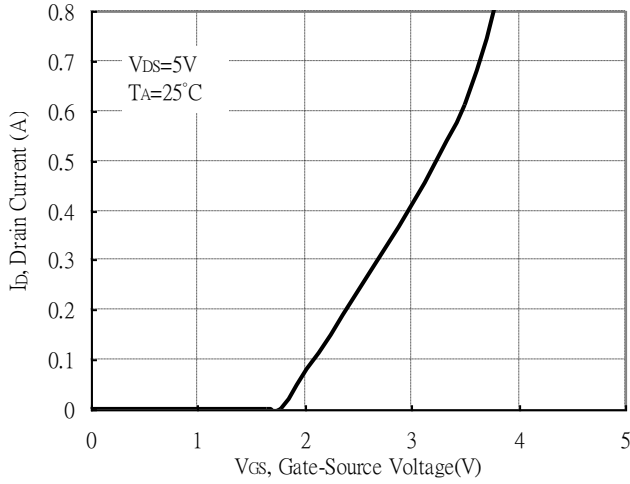
Maximum Drain Current vs Junction Temperature



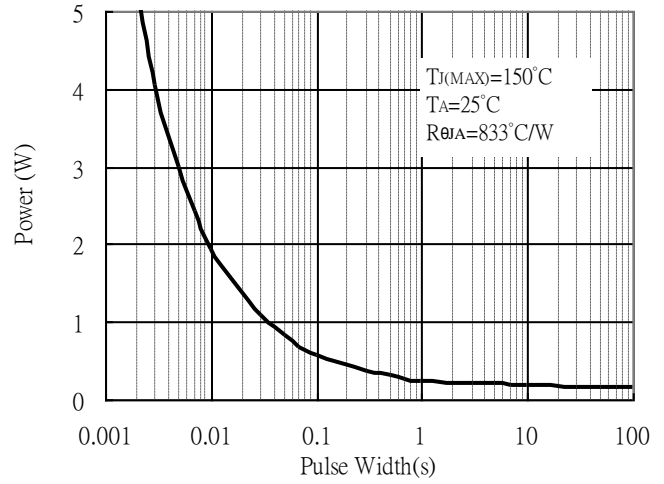


### Typical Characteristics(Cont.)

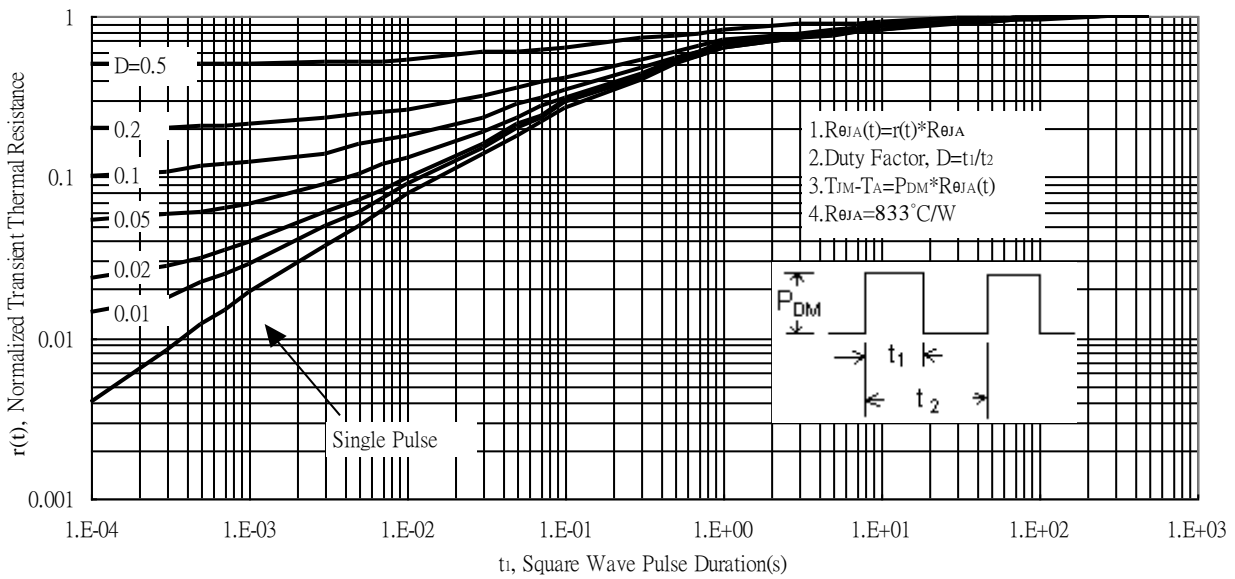
Typical Transfer Characteristics



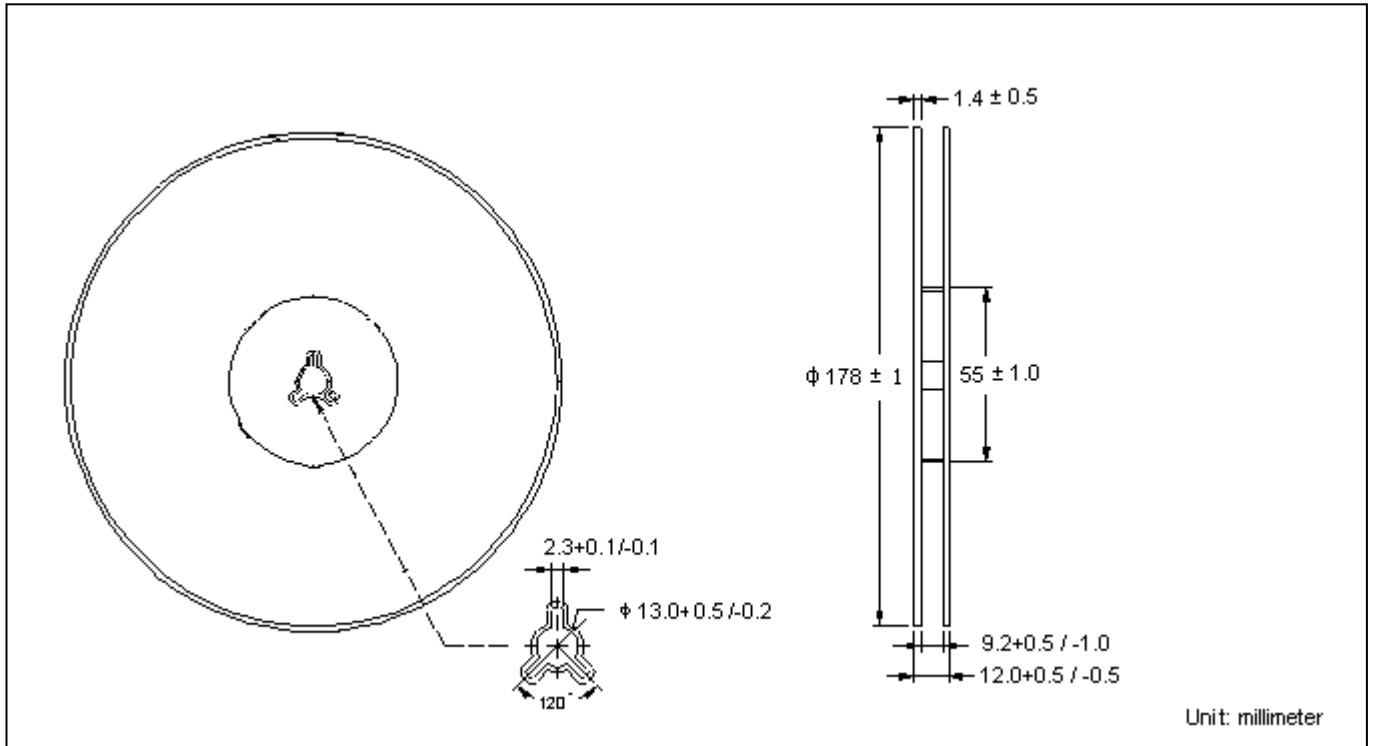
Single Pulse Power Rating, Junction to Ambient  
(Note on page 2)



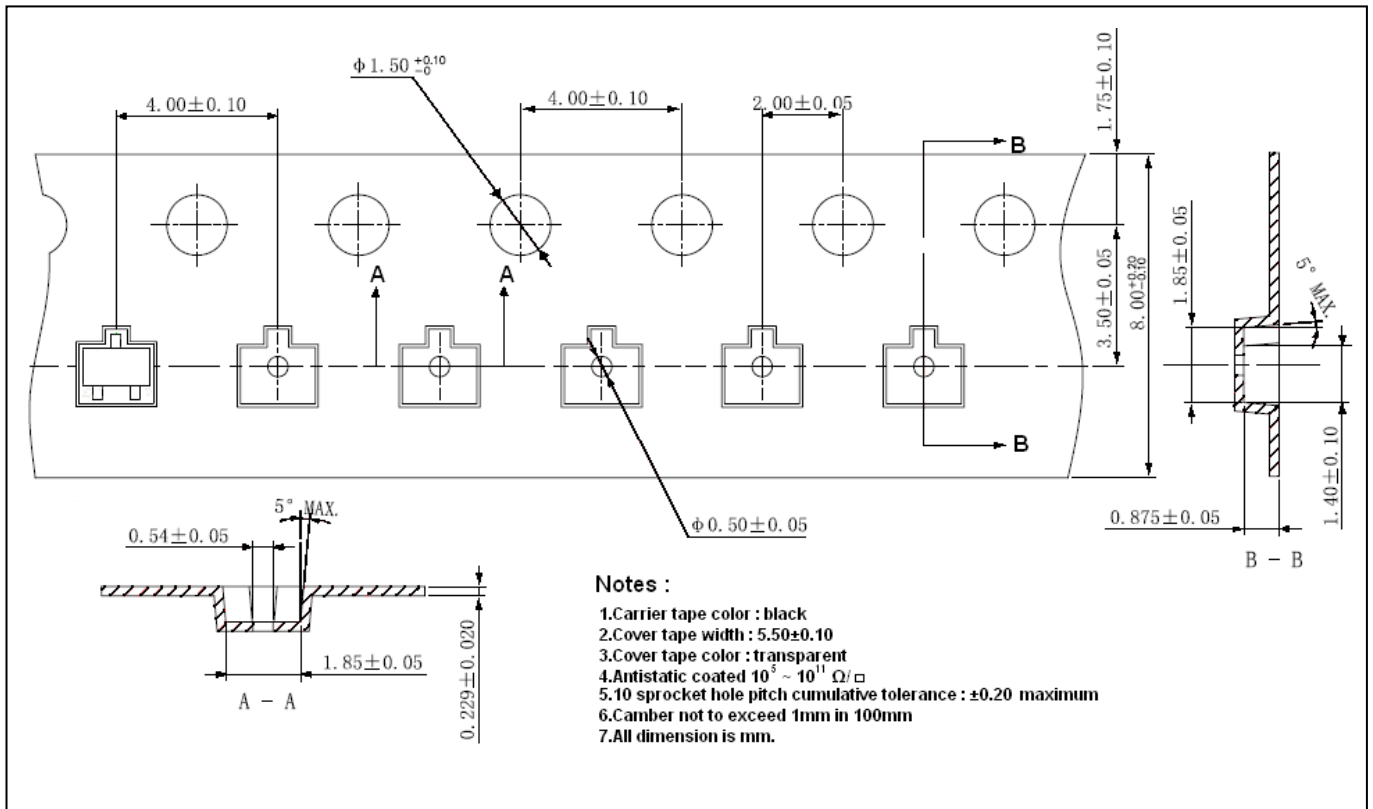
Transient Thermal Response Curves



**Reel Dimension**



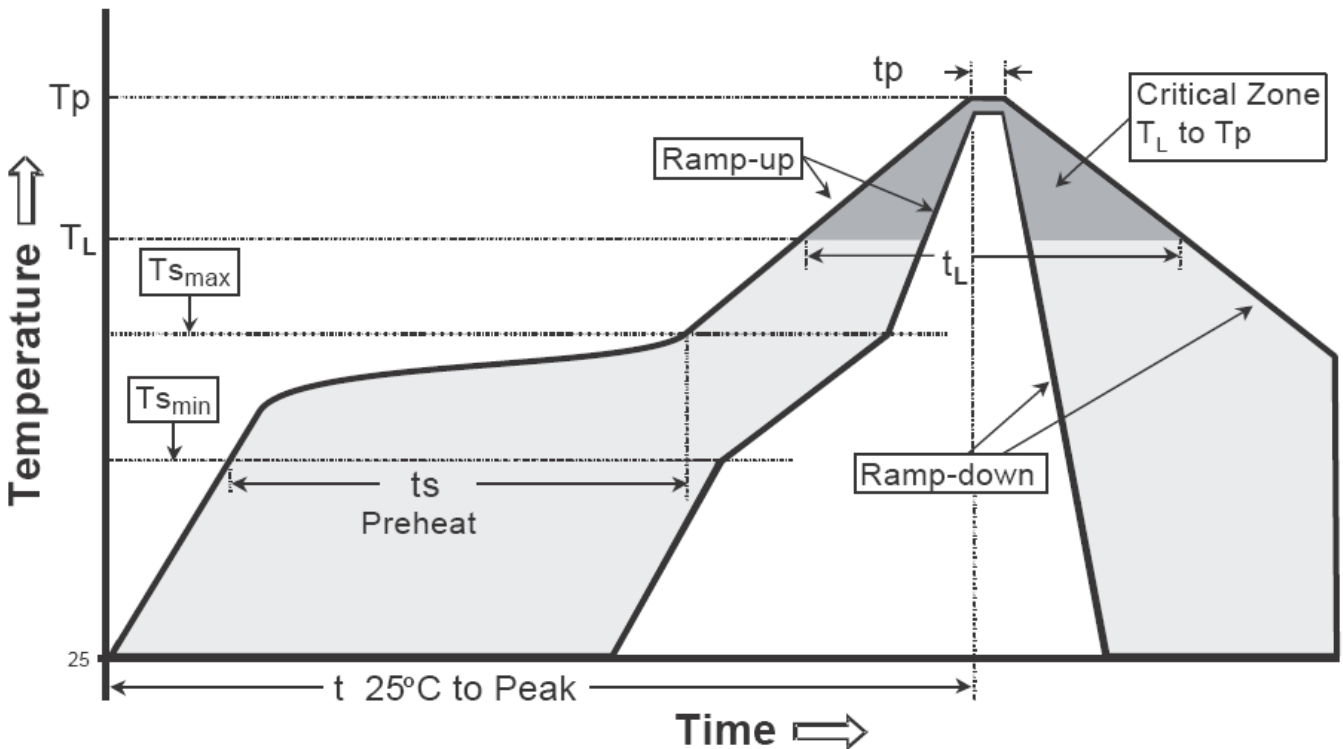
**Carrier Tape Dimension**



**Recommended wave soldering condition**

|                 |                  |                 |
|-----------------|------------------|-----------------|
| Product         | Peak Temperature | Soldering Time  |
| Pb-free devices | 260 +0/-5 °C     | 5 +1/-1 seconds |

**Recommended temperature profile for IR reflow**

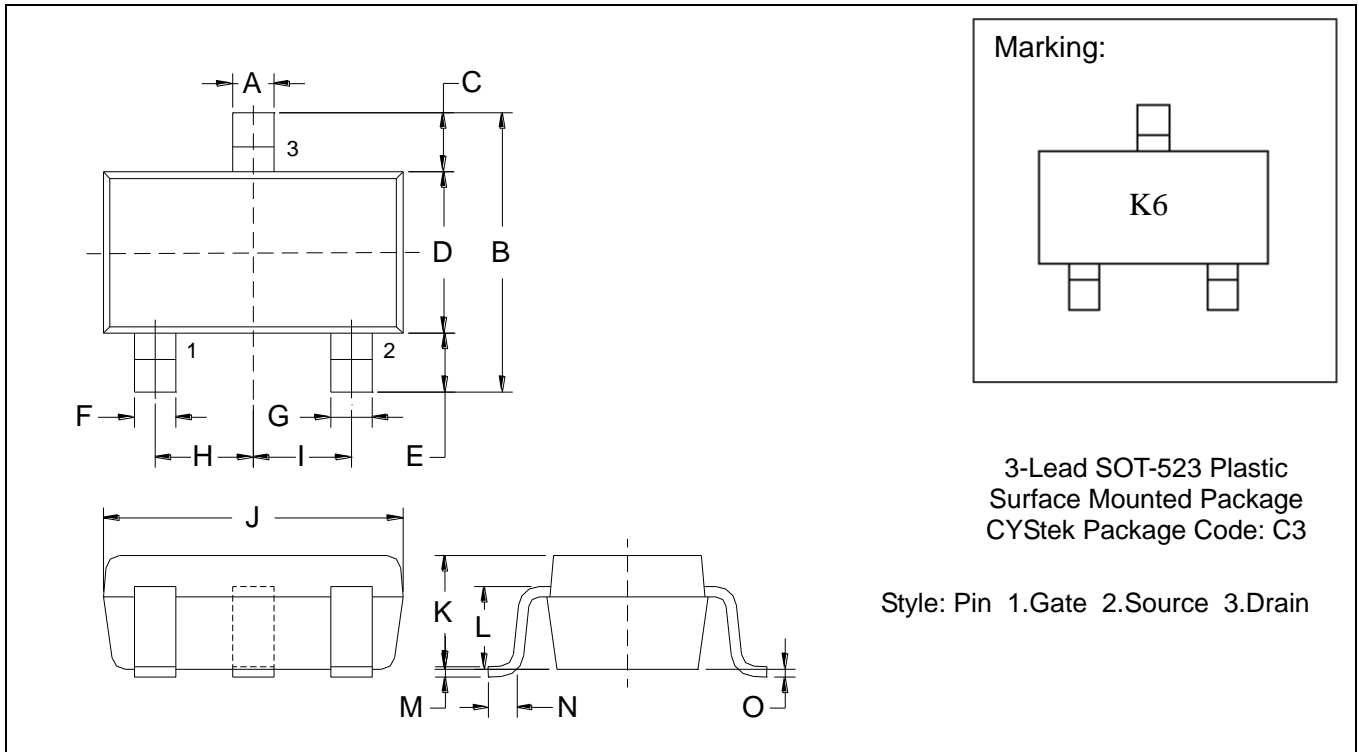


| Profile feature                                | Sn-Pb eutectic Assembly | Pb-free Assembly |
|--|-------------------------|------------------|
| Average ramp-up rate (Tsmax to Tp)             | 3°C/second max.         | 3°C/second max.  |
| Preheat  |                         |                  |
| -Temperature Min(Ts min)                       | 100°C                   | 150°C            |
| -Temperature Max(Ts max)                       | 150°C                   | 200°C            |
| -Time(ts min to ts max)                        | 60-120 seconds          | 60-180 seconds   |
| Time maintained above:                         |                         |                  |
| -Temperature (T <sub>L</sub> )                 | 183°C                   | 217°C            |
| - Time (t <sub>L</sub> )                       | 60-150 seconds          | 60-150 seconds   |
| Peak Temperature(T <sub>P</sub> )              | 240 +0/-5 °C            | 260 +0/-5 °C     |
| Time within 5°C of actual peak temperature(tp) | 10-30 seconds           | 20-40 seconds    |
| Ramp down rate                                 | 6°C/second max.         | 6°C/second max.  |
| Time 25 °C to peak temperature                 | 6 minutes max.          | 8 minutes max.   |

Note : All temperatures refer to topside of the package, measured on the package body surface.



**SOT-523 Dimension**



\*: Typical

| DIM | Inches  |        | Millimeters |      | DIM | Inches  |        | Millimeters |      |
|-----|---------|--------|-------------|------|-----|---------|--------|-------------|------|
|     | Min.    | Max.   | Min.        | Max. |     | Min.    | Max.   | Min.        | Max. |
| A   | 0.0079  | 0.0157 | 0.20        | 0.40 | I   | *0.0197 | -      | *0.50       | -    |
| B   | 0.0591  | 0.0669 | 1.50        | 1.70 | J   | 0.0610  | 0.0650 | 1.55        | 1.65 |
| C   | 0.0118  | 0.0197 | 0.30        | 0.50 | K   | 0.0276  | 0.0315 | 0.70        | 0.80 |
| D   | 0.0295  | 0.0335 | 0.75        | 0.85 | L   | 0.0224  | 0.0248 | 0.57        | 0.63 |
| E   | 0.0118  | 0.0197 | 0.30        | 0.50 | M   | 0.0020  | 0.0059 | 0.05        | 0.15 |
| F   | 0.0039  | 0.0118 | 0.10        | 0.30 | N   | 0.0039  | 0.0118 | 0.10        | 0.30 |
| G   | 0.0039  | 0.0118 | 0.10        | 0.30 | O   | 0       | 0.0031 | 0           | 0.08 |
| H   | *0.0197 | -      | *0.50       | -    |     |         |        |             |      |

Notes: 1.Controlling dimension: millimeters.  
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.  
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

**Material:**

- Lead: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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