

# Dual P-Channel Logic Level Enhancement Mode Power MOSFET

## MTBB5B10Q8

|                   |               |
|-------------------|---------------|
| $BV_{DSS}$        | -100V         |
| $I_D$             | -2.5A         |
| $R_{DS(ON)(MAX)}$ | 250m $\Omega$ |

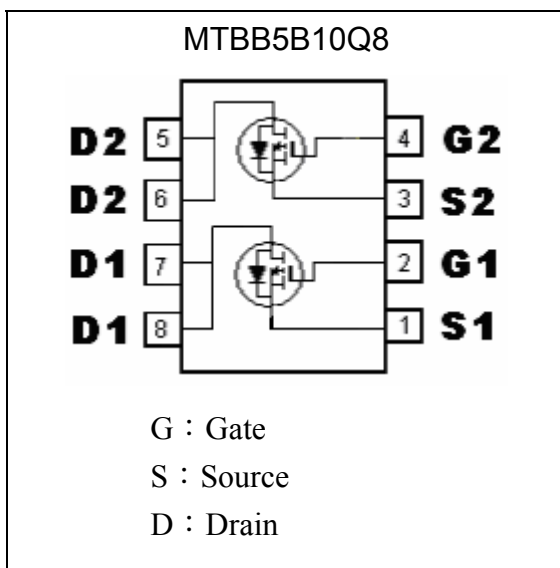
### Description

The MTBB5B10Q8 provides the designer with the best combination of fast switching, ruggedized device design, ultra low on-resistance and cost effectiveness.  
 The SOP-8 package is universally preferred for all commercial-industrial surface mount applications.

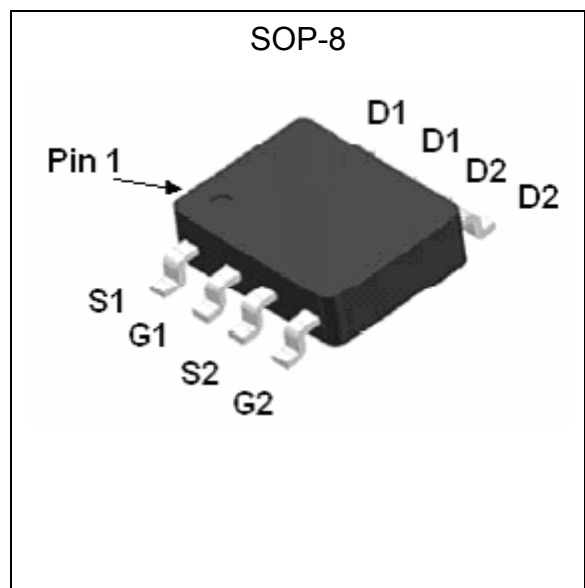
### Features

- $R_{DS(ON)}=250m\Omega(max.)@V_{GS}=-10V, I_D=-1.5A$
- Simple drive requirement
- Low on-resistance
- Fast switching speed
- Dual P-ch MOSFET package
- Pb-free lead plating & Halogen-free package

### Equivalent Circuit



### Outline





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

| Parameter  | Symbol                            | Limits                        | Unit |   |
|--|-----------------------------------|-------------------------------|------|---|
| Drain-Source Voltage                             | V <sub>DS</sub>                   | -100                          | V    |   |
| Gate-Source Voltage                              | V <sub>GS</sub>                   | ±20                           |      |   |
| Continuous Drain Current, T <sub>C</sub> =25 °C  | I <sub>D</sub>                    | -2.5                          | A    |   |
| Continuous Drain Current, T <sub>C</sub> =100 °C | I <sub>D</sub>                    | -1.8                          |      |   |
| Pulsed Drain Current (Note 1)                    | I <sub>DM</sub>                   | -10                           |      |   |
| Power Dissipation                                | P <sub>D</sub>                    | T <sub>A</sub> =25°C (Note 3) | 2.4  | W |
|  |                                   | T <sub>A</sub> =100°C         | 1.3  |   |
| Operating Junction and Storage Temperature Range | T <sub>j</sub> ; T <sub>stg</sub> | -55~+175                      | °C   |   |

**Thermal Data**

| Parameter                                    | Symbol              | Value   | Unit |
|--|---------------------|---------|------|
| Thermal Resistance, Junction-to-case, max    | R <sub>th,j-c</sub> | 25      | °C/W |
| Thermal Resistance, Junction-to-ambient, max | R <sub>th,j-a</sub> | 62.5 *3 | °C/W |

- Note : 1. Pulse width limited by maximum junction temperature  
 2. Duty cycle ≤ 1%  
 3. Surface mounted on 1 in<sup>2</sup> copper pad of FR-4 board, 125°C/W when mounted on minimum copper pad

**Characteristics (T<sub>j</sub>=25°C, unless otherwise specified)**

| Symbol                    | Min. | Typ. | Max. | Unit | Test Conditions   |
|---------------------------|------|------|------|------|---|
| <b>Static</b>             |      |      |      |      |   |
| BV <sub>DSS</sub>         | -100 | -    | -    | V    | V <sub>GS</sub> =0, I <sub>D</sub> =-250μA  |
| V <sub>GS(th)</sub>       | -1   | -1.5 | -3   | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =-250μA                            |
| G <sub>FS</sub> *1        | -    | 7    | -    | S    | V <sub>DS</sub> = -5V, I <sub>D</sub> =-1.5A  |
| I <sub>GSS</sub>          | -    | -    | ±100 | nA   | V <sub>GS</sub> =±20  |
| I <sub>DSS</sub>          | -    | -    | -1   | μA   | V <sub>DS</sub> = -80V, V <sub>GS</sub> = 0   |
|                           | -    | -    | -25  |      | V <sub>DS</sub> = -70V, V <sub>GS</sub> = 0, T <sub>j</sub> =125°C                    |
| I <sub>D(ON)</sub> *1     | -2.5 | -    | -    | A    | V <sub>DS</sub> = -5V, V <sub>GS</sub> = -10V   |
| *R <sub>DSS(ON)</sub> *1  | -    | 210  | 250  | mΩ   | V <sub>GS</sub> = -10V, I <sub>D</sub> =-1.5A   |
|                           | -    | 280  | 375  |      | V <sub>GS</sub> = -5V, I <sub>D</sub> =-1A  |
| <b>Dynamic</b>            |      |      |      |      |   |
| Q <sub>g</sub> *1, 2      | -    | 31   | -    | nC   | I <sub>D</sub> =-1.5A, V <sub>DS</sub> =-80V, V <sub>GS</sub> =-10V                   |
| Q <sub>gs</sub> *1, 2     | -    | 6.3  | -    |      |   |
| Q <sub>gd</sub> *1, 2     | -    | 4.5  | -    |      |   |
| t <sub>d(ON)</sub> *1, 2  | -    | 12   | -    | ns   | V <sub>DS</sub> =-50V, I <sub>D</sub> =-1A, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω |
| t <sub>r</sub> *1, 2      | -    | 55   | -    |      |   |
| t <sub>d(OFF)</sub> *1, 2 | -    | 40   | -    |      |   |
| t <sub>f</sub> *1, 2      | -    | 40   | -    |      |   |
| C <sub>iss</sub>          | -    | 1066 | -    | pF   | V <sub>GS</sub> =0V, V <sub>DS</sub> =-20V, f=1MHz                                    |
| C <sub>oss</sub>          | -    | 365  | -    |      |   |
| C <sub>rss</sub>          | -    | 55   | -    |      |   |



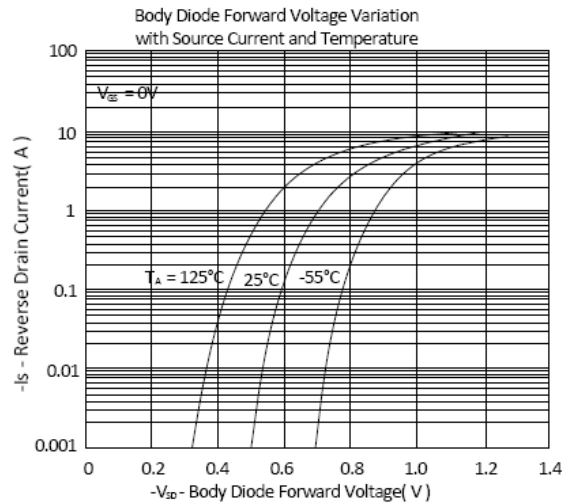
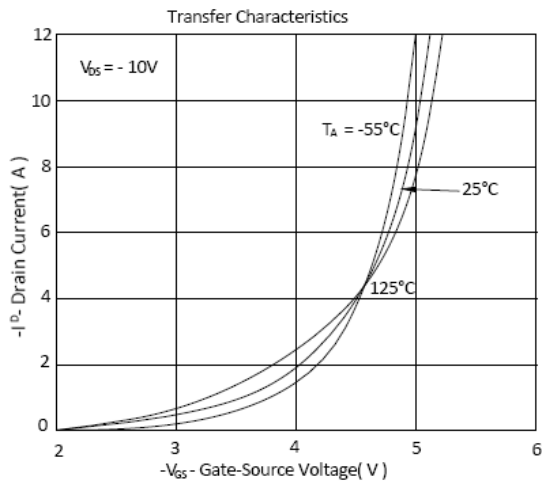
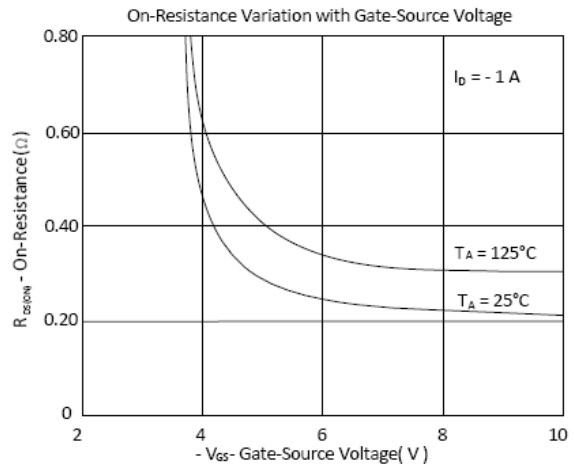
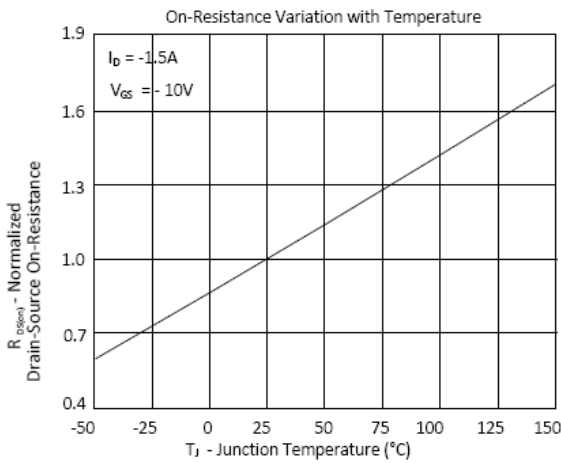
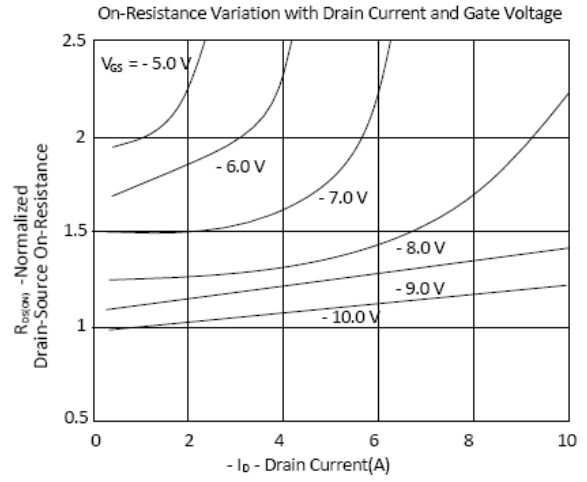
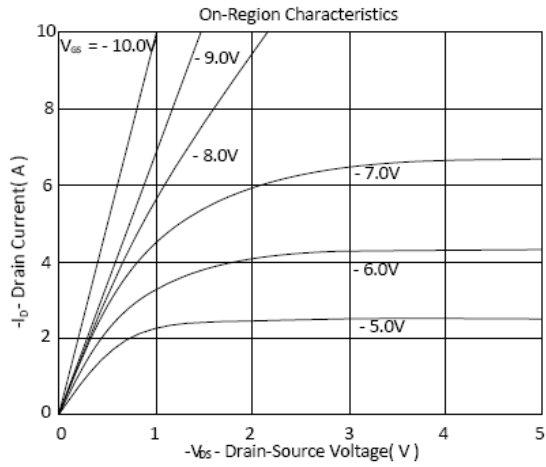
| <b>Source-Drain Diode</b> |   |   |      |   |                          |
|---------------------------|---|---|------|---|--------------------------|
| $I_S$ *1                  | - | - | -2.5 | A |                          |
| $I_{SM}$ *3               | - | - | -10  |   |                          |
| $V_{SD}$ *1               | - | - | -1.3 | V | $I_F = I_S, V_{GS} = 0V$ |

Note : \*1.Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$   
\*2.Independent of operating temperature  
\*3.Pulse width limited by maximum junction temperature.

### Ordering Information

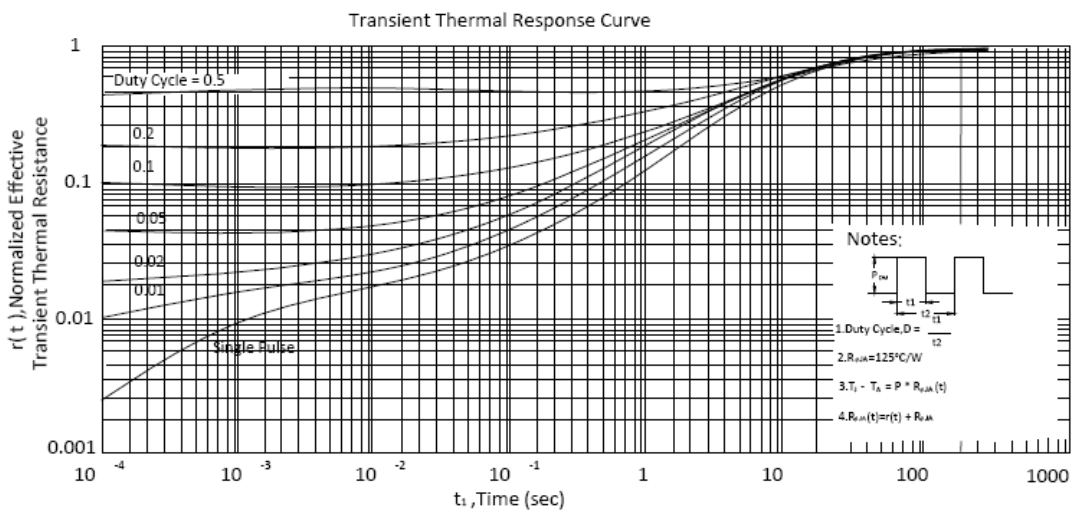
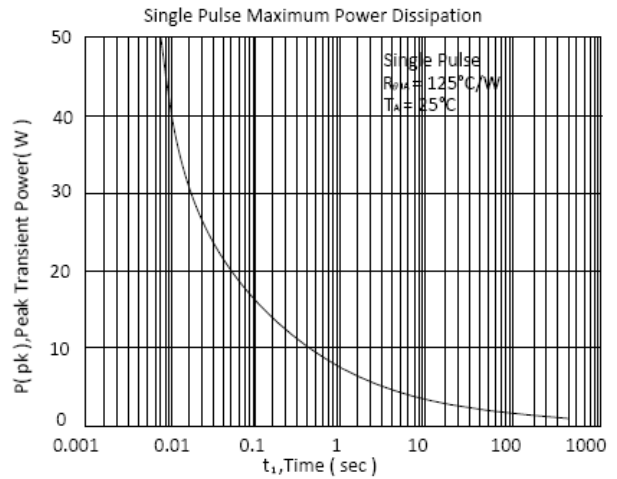
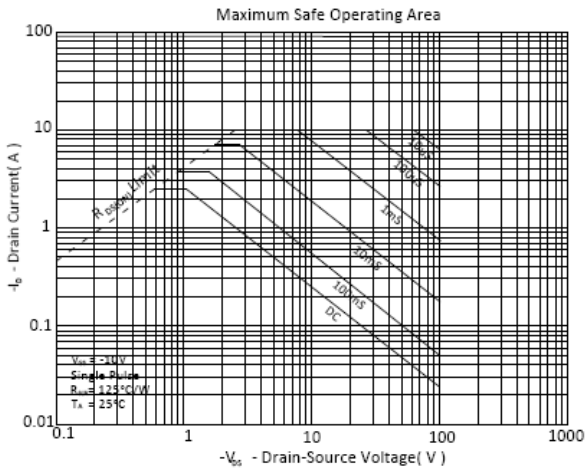
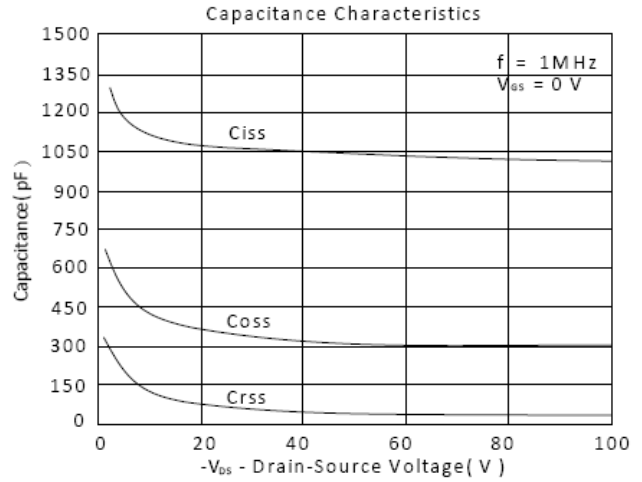
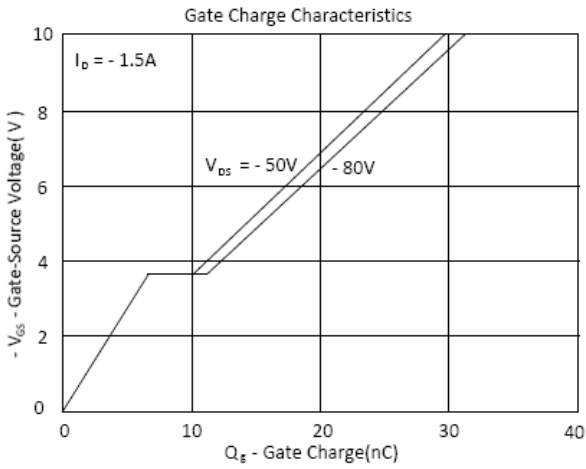
| Device     | Package  | Shipping               | Marking |
|------------|--|------------------------|---------|
| MTBB5B10Q8 | SOP-8<br>(Pb-free lead plating & Halogen-free package) | 2500 pcs / Tape & Reel | BB5B10  |

**Typical Characteristics**

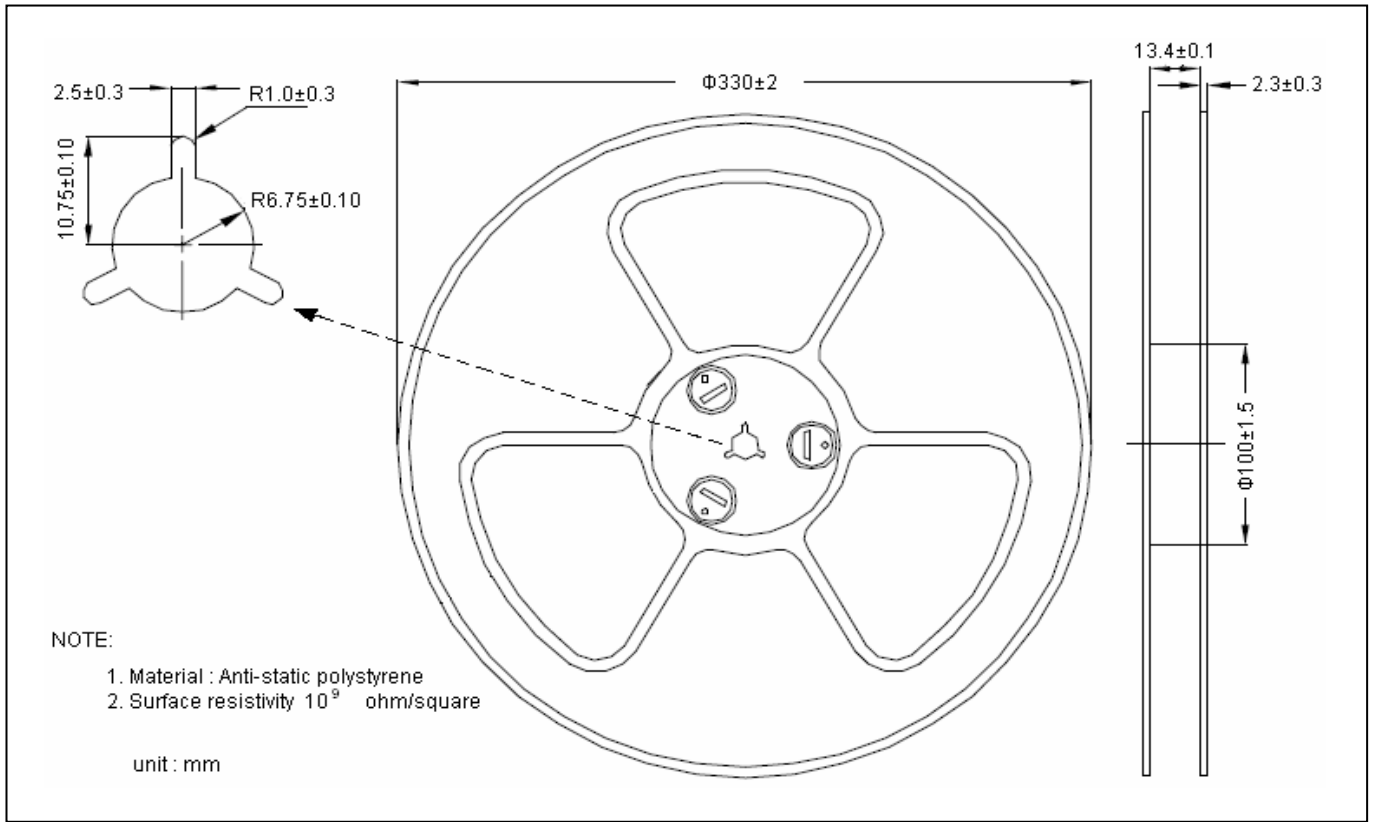




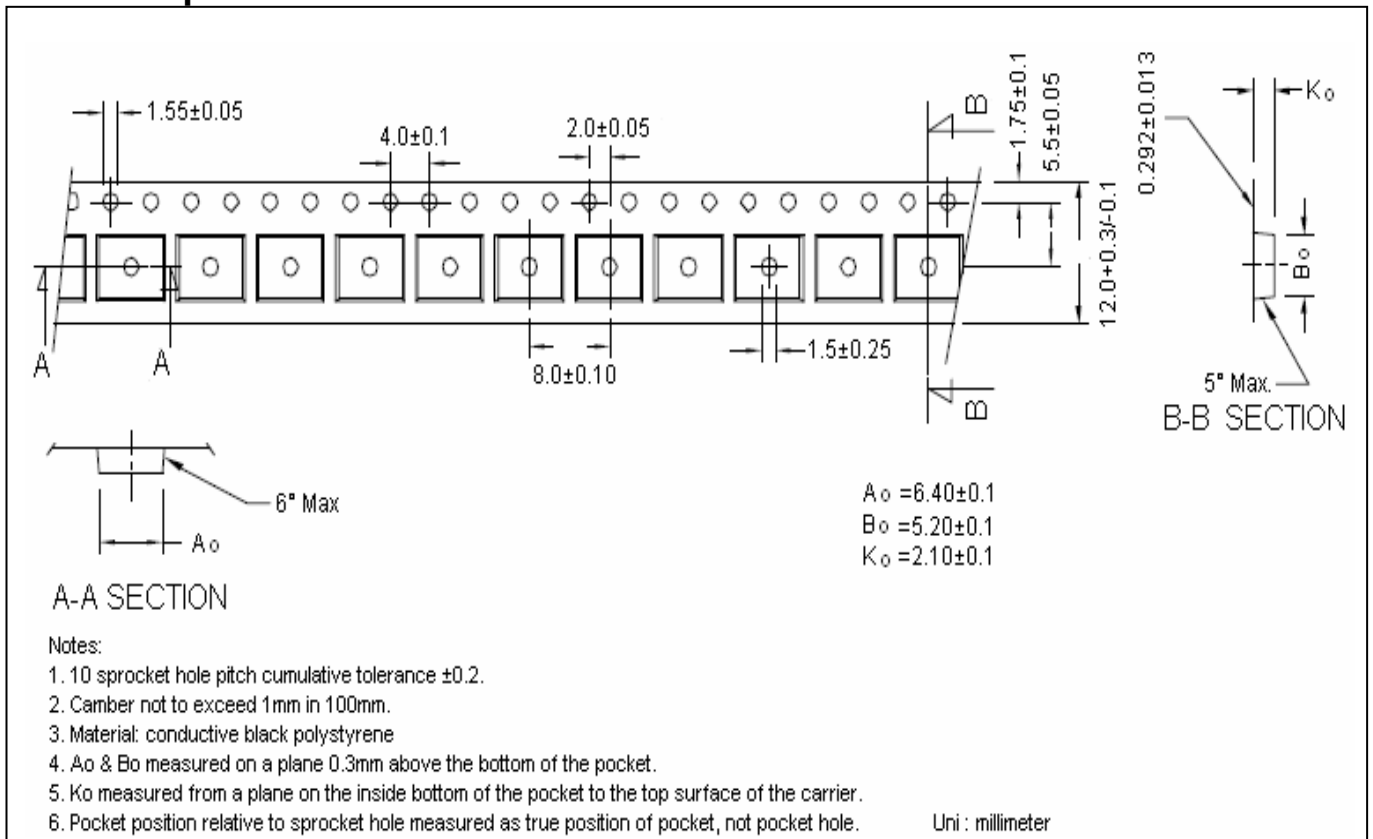
**Typical Characteristics(Cont.)**



**Reel Dimension**



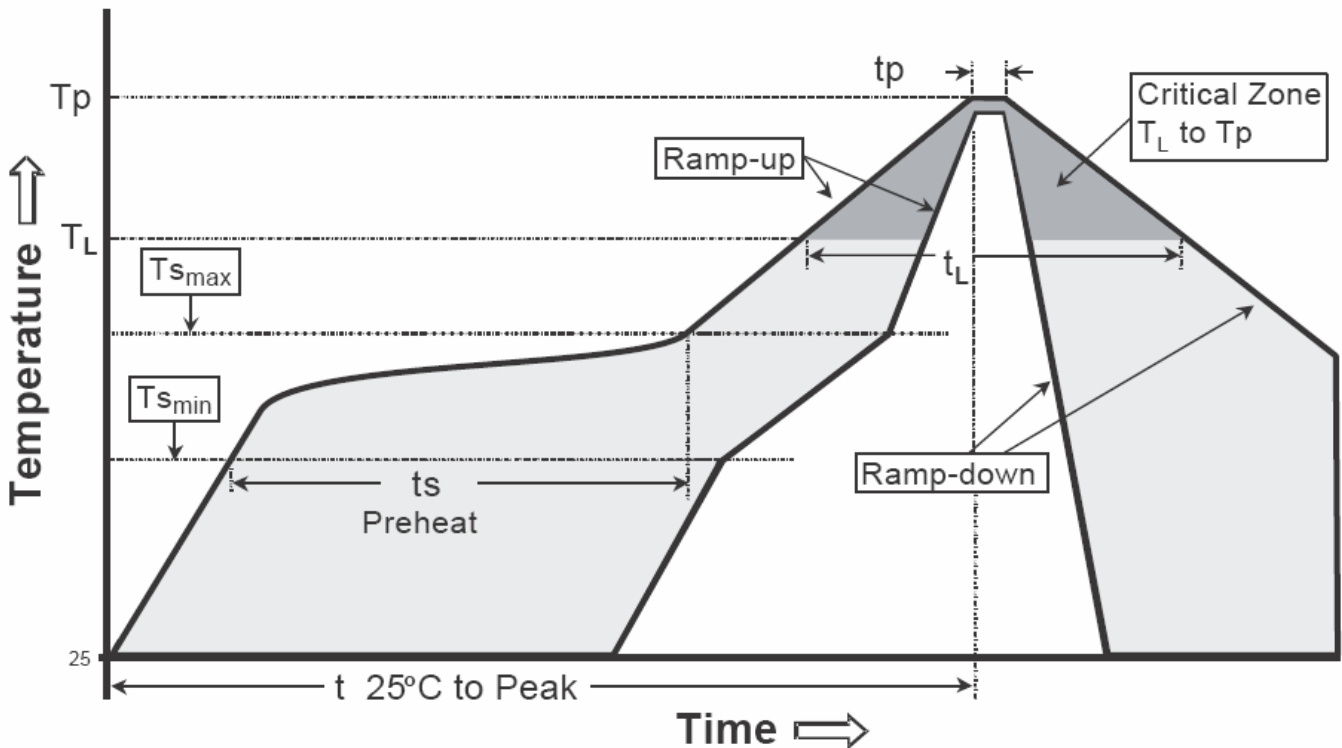
**Carrier Tape Dimension**



**Recommended wave soldering condition**

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

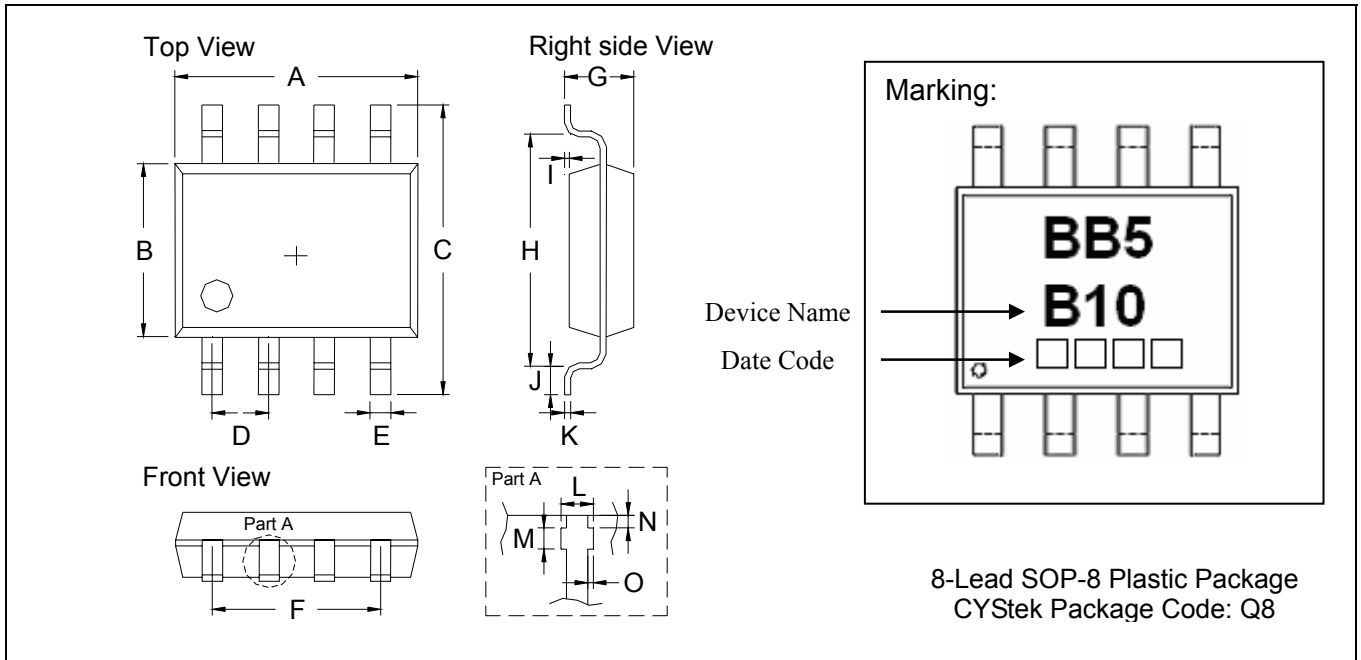
**Recommended temperature profile for IR reflow**



| 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 (TL)                              | 183°C                   | 217°C            |
| - Time (tL)                                    | 60-150 seconds          | 60-150 seconds   |
| Peak Temperature(Tp)                           | 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.

**SOP-8 Dimension**



\*: Typical

| DIM | Inches  |        | Millimeters |      | DIM | Inches |        | Millimeters |      |
|-----|---------|--------|-------------|------|-----|--------|--------|-------------|------|
|     | Min.    | Max.   | Min.        | Max. |     | Min.   | Max.   | Min.        | Max. |
| A   | 0.1850  | 0.2007 | 4.70        | 5.10 | I   | 0.0031 | 0.0110 | 0.08        | 0.28 |
| B   | 0.1457  | 0.1614 | 3.70        | 4.10 | J   | 0.0157 | 0.0323 | 0.40        | 0.83 |
| C   | 0.2283  | 0.2441 | 5.80        | 6.20 | K   | 0.0074 | 0.0102 | 0.19        | 0.26 |
| D   | 0.0500* |        | 1.27*       |      | L   | 0.0145 | 0.0204 | 0.37        | 0.52 |
| E   | 0.0130  | 0.0201 | 0.33        | 0.51 | M   | 0.0118 | 0.0197 | 0.30        | 0.50 |
| F   | 0.1472  | 0.1527 | 3.74        | 3.88 | N   | 0.0031 | 0.0051 | 0.08        | 0.13 |
| G   | 0.0472  | 0.0638 | 1.20        | 1.62 | O   | 0.0000 | 0.0059 | 0.00        | 0.15 |
| H   | 0.1889  | 0.2007 | 4.80        | 5.10 |     |        |        |             |      |

**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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