

Dual N-Channel Logic Level Enhancement Mode Power MOSFET

MTB22A04Q8

| | |
|--------------------|--------------|
| BV_{DSS} | 40V |
| I_D | 8A |
| $R_{DS(ON)(MAX.)}$ | 22m Ω |

Description

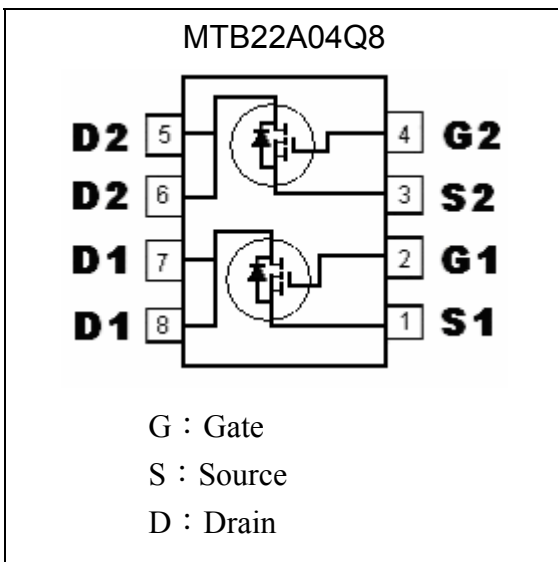
The MTB22A04Q8 provides the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness.

The SOP-8 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

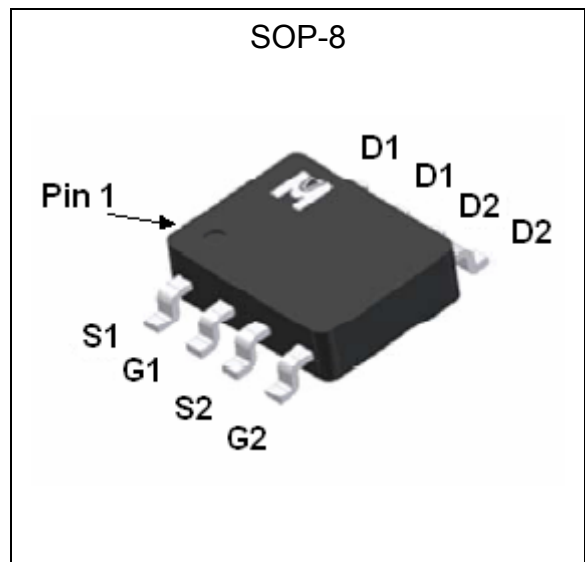
Features

- $R_{DS(ON)}=22m\Omega @ V_{GS}=10V, I_D=8A$
- Simple drive requirement
- Low on-resistance
- Fast switching speed
- Dual N-ch MOSFET package
- Pb-free lead plating and Halogen-free package

Equivalent Circuit



Outline





Absolute Maximum Ratings (Ta=25°C)

| Parameter | Symbol | Limits | Unit | |
|--|-----------------------------------|-----------------------|------|---|
| Drain-Source Voltage | V _{DS} | 40 | V | |
| Gate-Source Voltage | V _{GS} | ±20 | | |
| Continuous Drain Current @ T _C =25°C | I _D | 8 | A | |
| Continuous Drain Current @ T _C =100°C | | 7 | | |
| Pulsed Drain Current | I _{DM} | 32 *1 | | |
| Total Power Dissipation | P _D | T _A =25°C | 2.4 | W |
| | | T _A =100°C | 1.3 | |
| Operating Junction and Storage Temperature Range | T _j , T _{stg} | -55~+175 | °C | |

Thermal Data

| Parameter | Symbol | Value | Unit |
|--|---------------------|---------|------|
| Thermal Resistance, Junction-to-case, max | R _{th,j-c} | 25 | °C/W |
| Thermal Resistance, Junction-to-ambient, max | R _{th,j-a} | 62.5 *2 | °C/W |

Note : 1. Pulse width limited by maximum junction temperature
 2. Surface mounted on 1 in² copper pad of FR-4 board, 125°C/W when mounted on minimum copper pad

Characteristics (Tc=25°C, unless otherwise specified)

| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|--------------------------------|------|------|------|------|--|
| Static | | | | | |
| B _V D _{SS} | 40 | - | - | V | V _{GS} =0V, I _D =250μA |
| V _{GS(th)} | 1 | 1.7 | 3 | V | V _{DS} = V _{GS} , I _D =250μA |
| I _{GS} | - | - | ±100 | nA | V _{GS} =±20 |
| I _{DSS} | - | - | 1 | μA | V _{DS} =32V, V _{GS} =0V |
| | - | - | 25 | | V _{DS} =30V, V _{GS} =0V, T _j =125°C |
| I _{D(ON)} *1 | 8 | - | - | A | V _{DS} =5V, V _{GS} =10V |
| R _{DS(ON)} *1 | - | 20 | 22 | mΩ | V _{GS} =10V, I _D =8A |
| | - | 30 | 37 | mΩ | V _{GS} =4.5V, I _D =5A |
| G _{FS} *1 | - | 20 | - | S | V _{DS} =5V, I _D =8A |
| Dynamic | | | | | |
| C _{iss} | - | 1205 | - | pF | V _{GS} =0V, V _{DS} =20V, f=1MHz |
| C _{oss} | - | 80 | - | | |
| C _{rss} | - | 57 | - | | |
| Q _g *1, 2 | - | 11 | - | nC | V _{DS} =20V, V _{GS} =10V, I _D =7A |
| Q _{gs} *1, 2 | - | 1.8 | - | | |
| Q _{gd} *1, 2 | - | 4.1 | - | | |



Characteristics (Tc=25°C, unless otherwise specified)

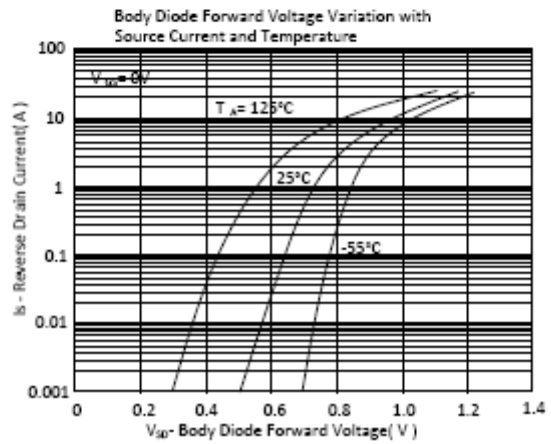
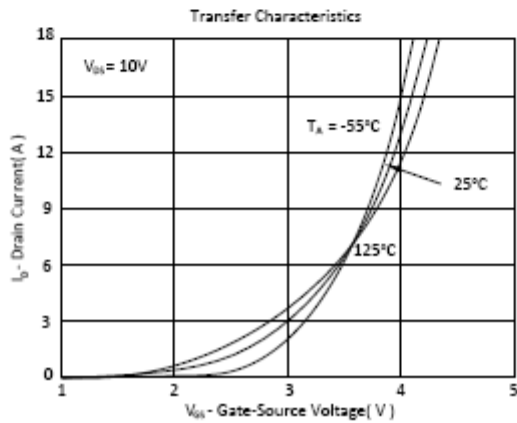
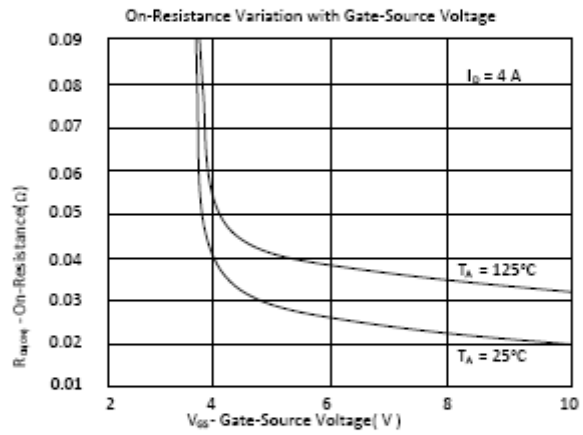
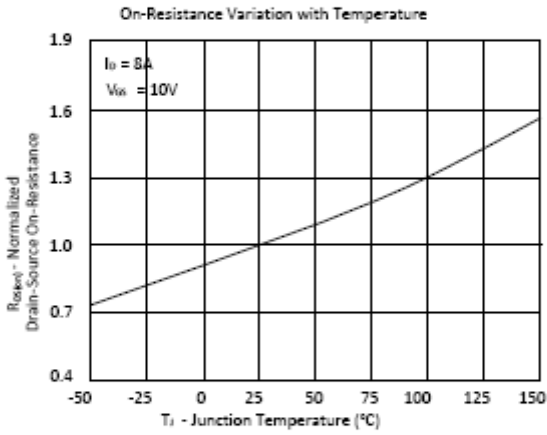
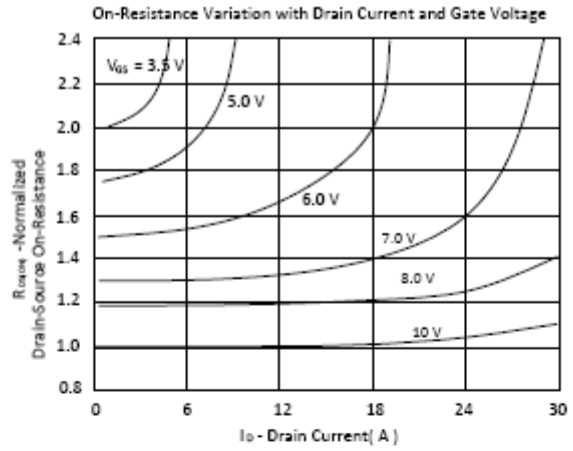
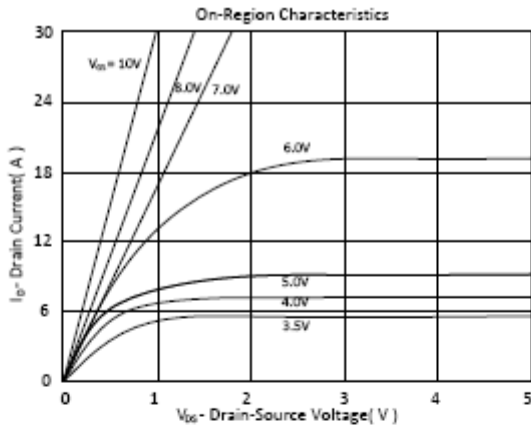
| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---------------------------|------|------|------|------|---|
| $t_{d(ON)}$ *1, 2 | - | 3.5 | - | ns | $V_{DS}=20V, I_D=1A, V_{GS}=10V,$ $R_{GS}=6\Omega$ |
| t_r *1, 2 | - | 9.5 | - | | |
| $t_{d(OFF)}$ *1, 2 | - | 15 | - | | |
| t_f *1, 2 | - | 6 | - | | |
| Source-Drain Diode | | | | | |
| I_S *1 | - | - | 8 | A | |
| I_{SM} *3 | - | - | 24 | | |
| 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

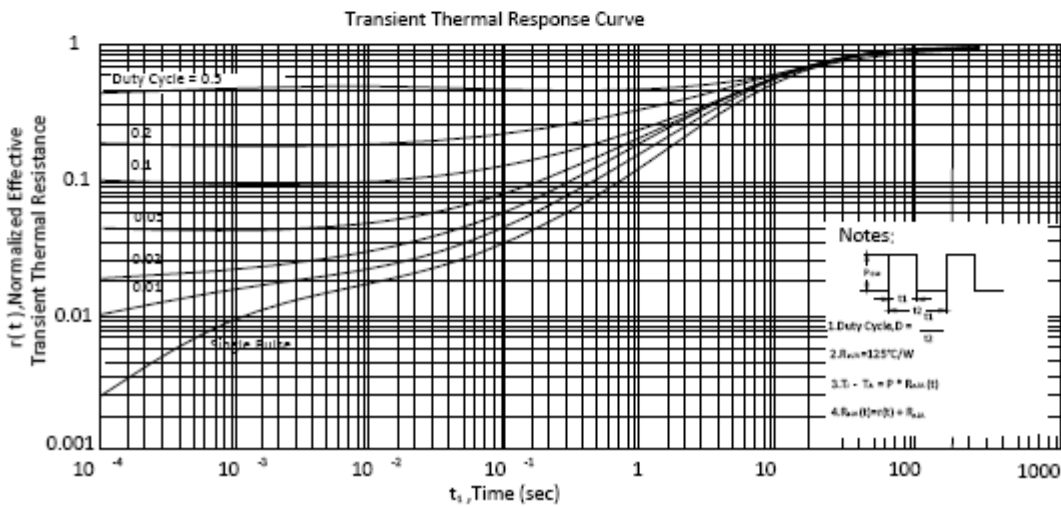
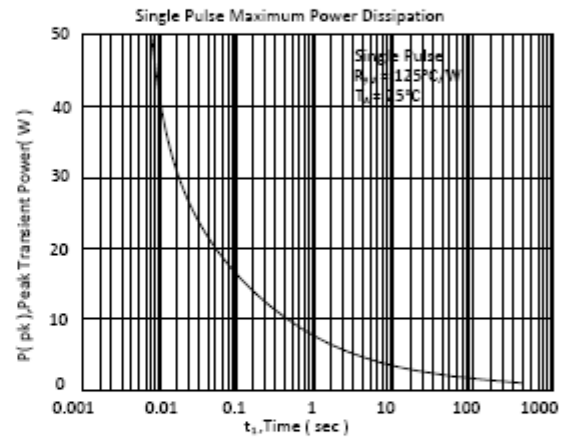
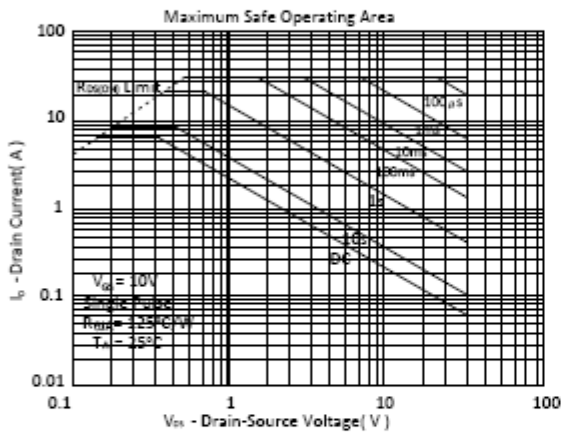
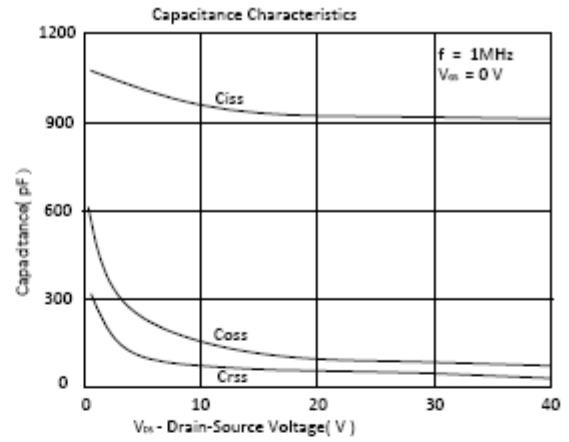
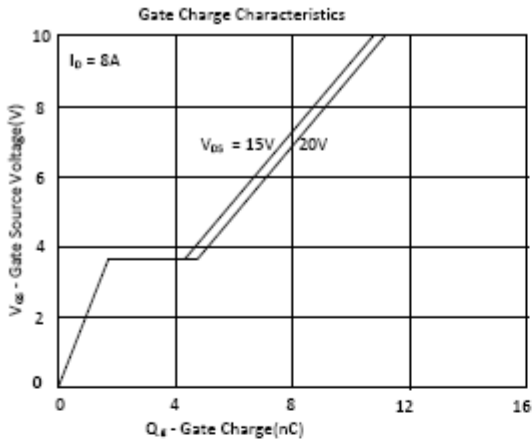
| Device | Package | Shipping | Marking |
|------------|---|------------------------|---------|
| MTB22A04Q8 | SOP-8 (Pb-free & Halogen-free package) | 2500 pcs / Tape & Reel | B22A04 |

Typical Characteristics

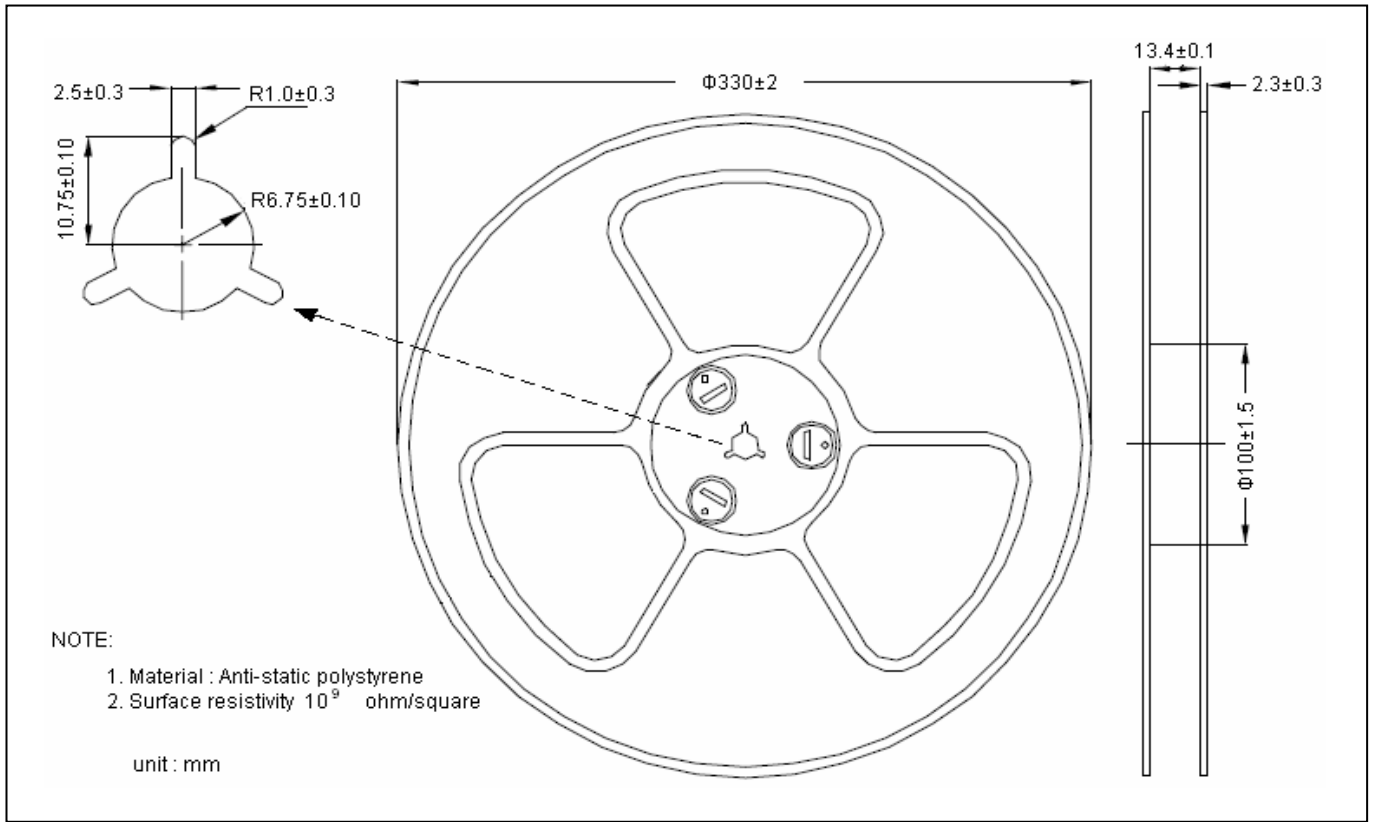




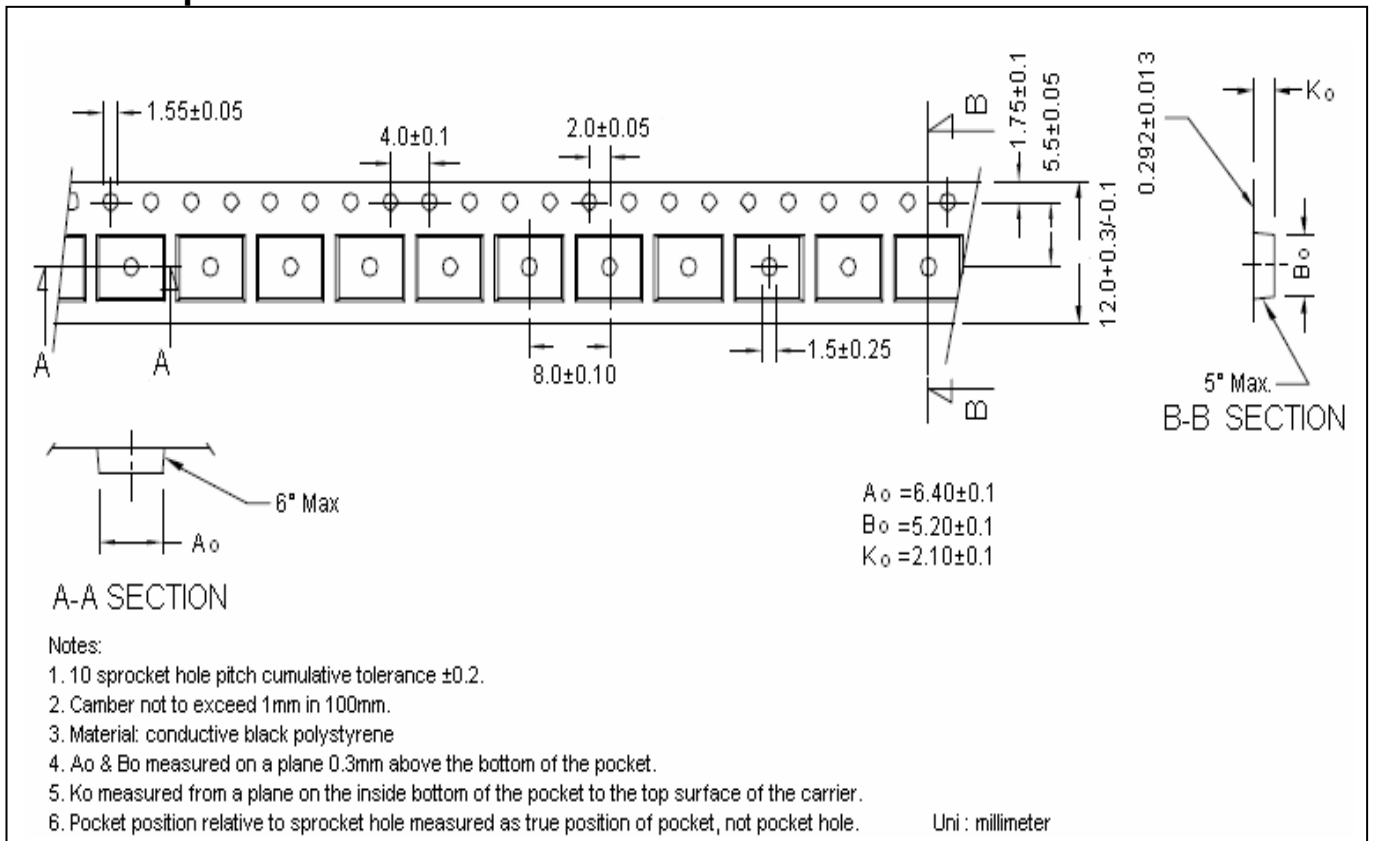
Characteristic Curves(Cont.)



Reel Dimension



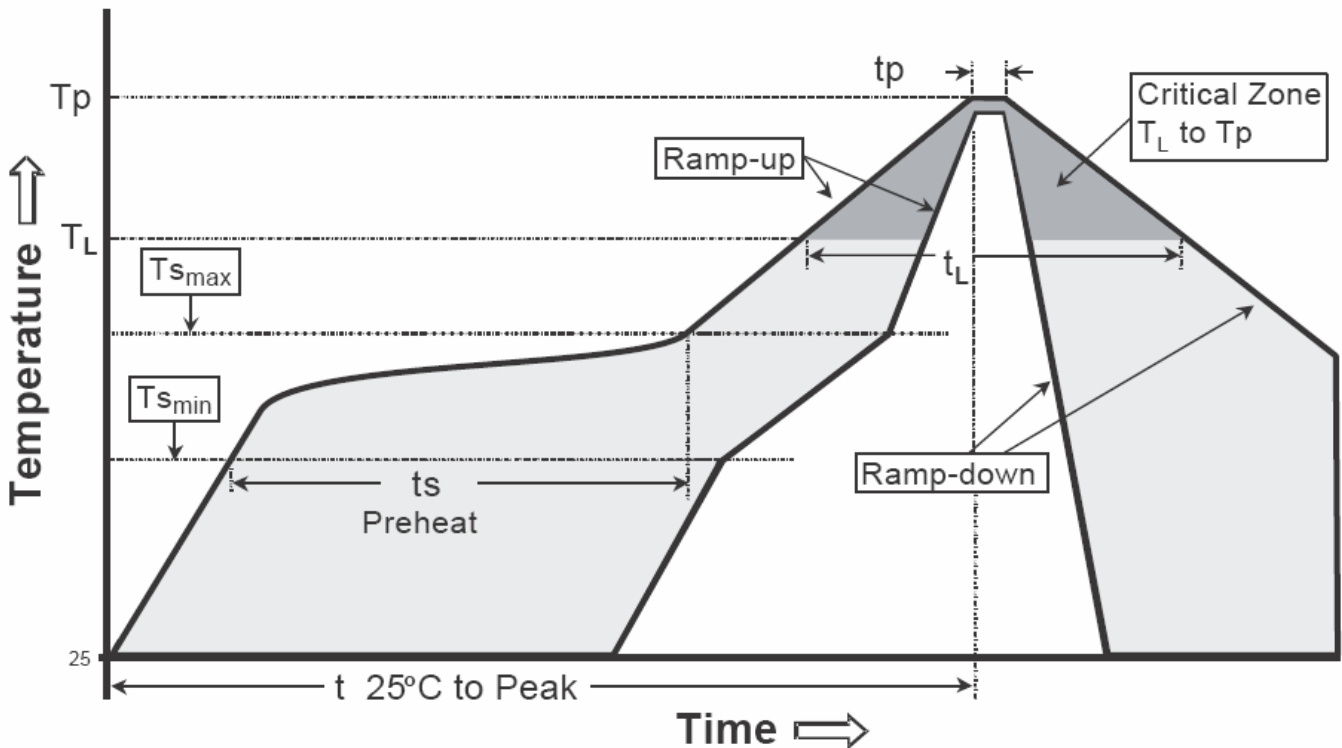
Carrier Tape Dimension



Recommended wave soldering condition

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

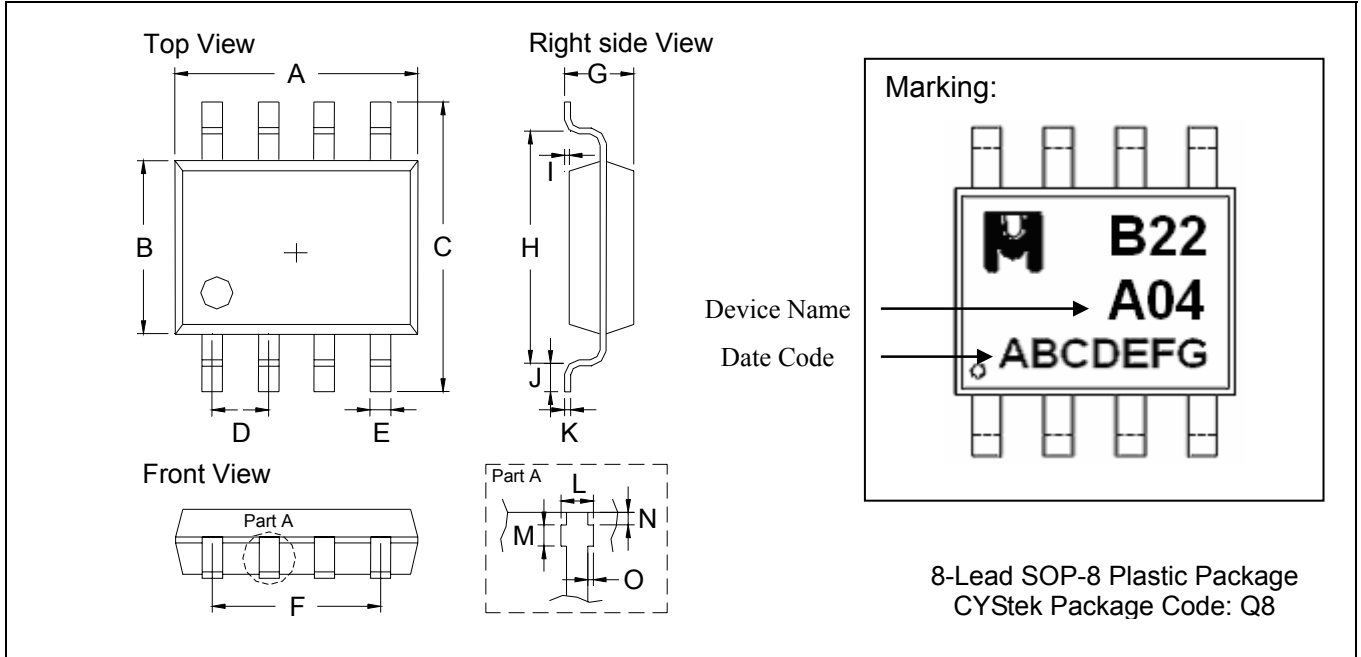
Recommended temperature profile for IR reflow



| Profile feature | Sn-Pb eutectic Assembly | Pb-free Assembly |
|---|-------------------------|------------------|
| Average ramp-up rate (T _{smax} to T _p) | 3°C/second max. | 3°C/second max. |
| Preheat | | |
| -Temperature Min(T _{s min}) | 100°C | 150°C |
| -Temperature Max(T _{s max}) | 150°C | 200°C |
| -Time(t _{s min} to t _{s max}) | 60-120 seconds | 60-180 seconds |
| Time maintained above: | | |
| -Temperature (T _L) | 183°C | 217°C |
| - Time (t _L) | 60-150 seconds | 60-150 seconds |
| Peak Temperature(T _P) | 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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