

N-Channel Enhancement Mode Power MOSFET

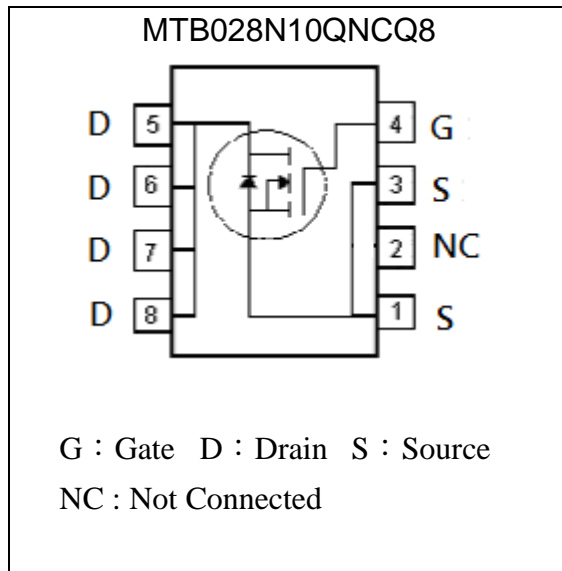
MTB028N10QNCQ8

Features

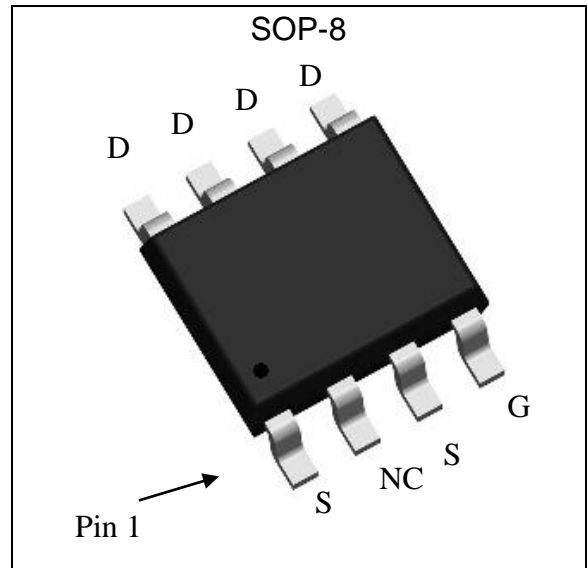
- Single Drive Requirement
- Low On-resistance
- Fast Switching Characteristic
- Repetitive Avalanche Rated
- Pb-free & Halogen-free package

| | |
|---|--------------------|
| BV_{DSS} | 100V |
| I_D @ T_A=25°C, V_{GS}=10V | 6.6A |
| R_{DS(ON)}@V_{GS}=10V, I_D=4A | 25 mΩ (typ) |
| R_{DS(ON)}@V_{GS}=4.5V, I_D=3A | 37 mΩ (typ) |

Symbol

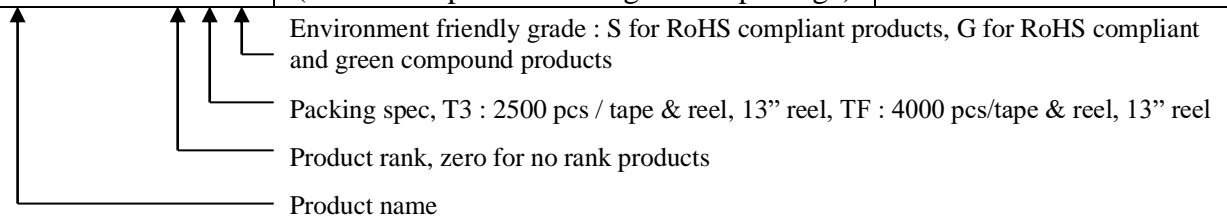


Outline



Ordering Information

| Device | Package | Shipping |
|-----------------------|--|------------------------|
| MTB028N10QNCQ8-0-T3-G | SOP-8 (RoHS compliant & Halogen-free package) | 2500 pcs / Tape & Reel |
| MTB028N10QNCQ8-0-TF-G | SOP-8 (RoHS compliant & Halogen-free package) | 4000 pcs / Tape & Reel |





Absolute Maximum Ratings (Tc=25°C, unless otherwise noted)

| Parameter | Symbol | Limits | Unit | |
|---|-----------------------------------|-----------------------|------|---|
| Drain-Source Voltage | V _{DS} | 100 | V | |
| Gate-Source Voltage | V _{GS} | ±20 | | |
| Continuous Drain Current @ T _A =25°C, V _{GS} =10V | I _D | 6.6 | A | |
| Continuous Drain Current @ T _A =70°C, V _{GS} =10V | | 5.3 | | |
| Pulsed Drain Current | I _{DM} | 30 *1 | | |
| Avalanche Current @ L=0.1mH (Typical) | I _{AS} | 18 | | |
| Avalanche Energy @ L=0.5mH | E _{AS} | 25 | mJ | |
| Total Power Dissipation | P _D | T _A =25 °C | 3.1 | W |
| | | T _A =70 °C | 2 | |
| Operating Junction and Storage Temperature | T _j , T _{stg} | -55~+150 | °C | |

Note : *1. Pulse width limited by maximum junction temperature

*2. Duty cycle ≤ 1%

Thermal Data

| Parameter | Symbol | Value | Unit |
|--|------------------|-------|------|
| Thermal Resistance, Junction-to-case | R _{θJC} | 20 | °C/W |
| Thermal Resistance, Junction-to-ambient (Note) | R _{θJA} | 40 | |

Note : 40°C / W when mounted on a 1 in² pad of 2 oz copper, t≤10s; 125°C/W when mounted on minimum pad.

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

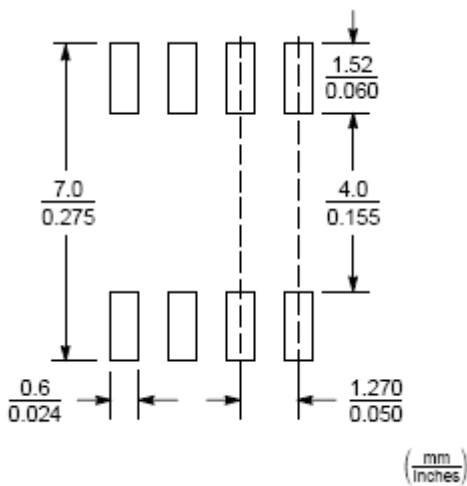
| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|-----------------------|------|------|------|------|--|
| Static | | | | | |
| BV _{DSS} | 100 | - | - | V | V _{GS} =0V, I _D =250μA |
| V _{GS(th)} | 1.2 | - | 2.7 | | V _{DS} = V _{GS} , I _D =250μA |
| G _{FS} | - | 9.6 | - | S | V _{DS} =10V, I _D =5A |
| I _{GSS} | - | - | ±100 | nA | V _{GS} =±20V, V _{DS} =0V |
| I _{DSS} | - | - | 1 | μA | V _{DS} =80V, V _{GS} =0V |
| | - | - | 25 | | V _{DS} =80V, V _{GS} =0V, T _j =125°C |
| *R _{DS(ON)} | - | 25 | 35 | mΩ | V _{GS} =10V, I _D =4A |
| | - | 37 | 52 | | V _{GS} =4.5V, I _D =3A |
| Dynamic | | | | | |
| Q _g *1, 2 | - | 28 | - | nC | V _{DS} =80V, V _{GS} =10V, I _D =4A |
| Q _{gs} *1, 2 | - | 2.2 | - | | |
| Q _{gd} *1, 2 | - | 13.6 | - | | |
| C _{iss} | - | 730 | - | pF | V _{DS} =50V, V _{GS} =0V, f=1MHz |
| C _{oss} | - | 91 | - | | |
| C _{rss} | - | 86 | - | | |

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

| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|------|------|------|------|---|
| Dynamic | | | | | |
| t _{d(ON)} *1, 2 | - | 10.4 | - | ns | V _{DS} =50V, I _D =1A, V _{GS} =10V, R _{GS} =6Ω |
| t _r *1, 2 | - | 22.8 | - | | |
| t _{d(OFF)} *1, 2 | - | 40.4 | - | | |
| t _f *1, 2 | - | 23.2 | - | | |
| R _g | - | 0.6 | - | Ω | f=1MHz |
| Source-Drain Diode Ratings and Characteristics | | | | | |
| I _S *1 | - | - | 6.6 | A | |
| I _{SM} *3 | - | - | 30 | | |
| V _{SD} *1 | - | 0.76 | 1.2 | V | I _S =2A, V _{GS} =0V |
| t _{rr} | - | 27.1 | - | ns | I _F =2A, dI _F /dt=100A/μs |
| Q _{rr} | - | 23.5 | - | nC | |

Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
 *2.Independent of operating temperature
 *3.Pulse width limited by maximum junction temperature.

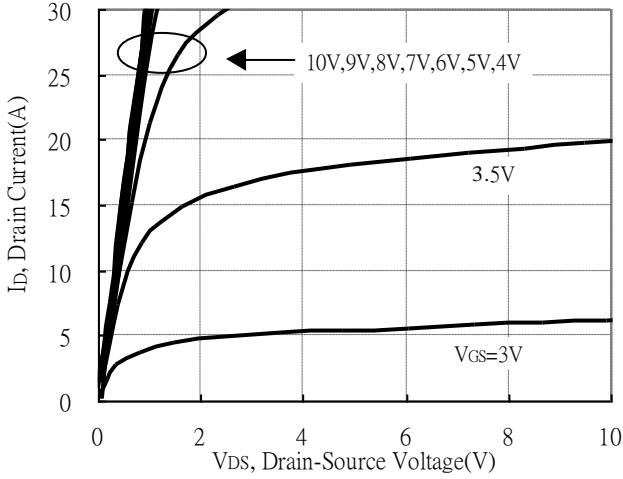
Recommended Soldering Footprint



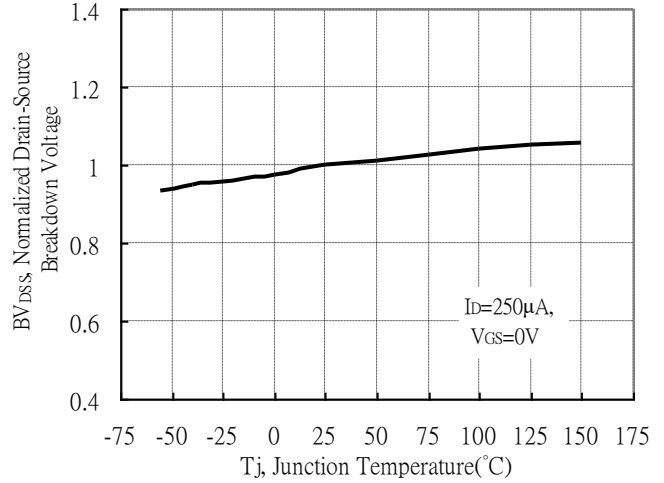


Typical Characteristics

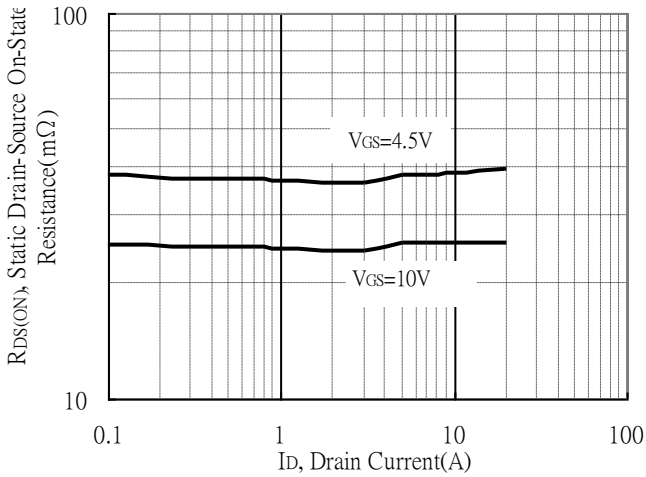
Typical Output Characteristics



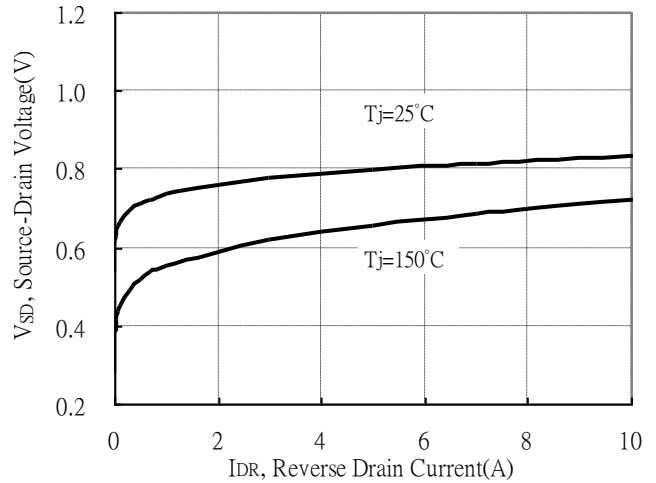
Brekdown Voltage vs Ambient Temperature



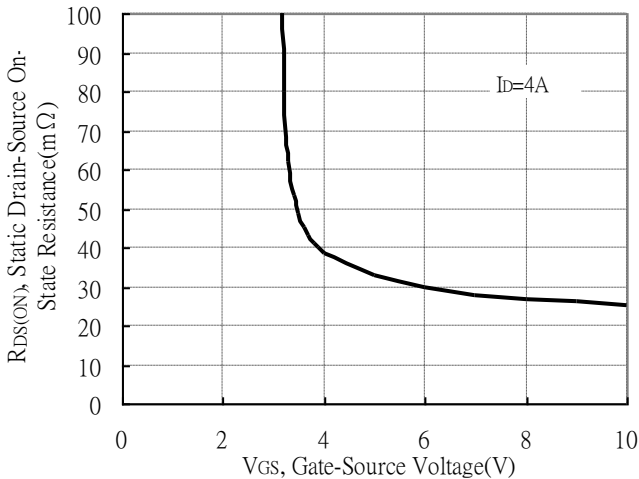
Static Drain-Source On-State resistance vs Drain Current



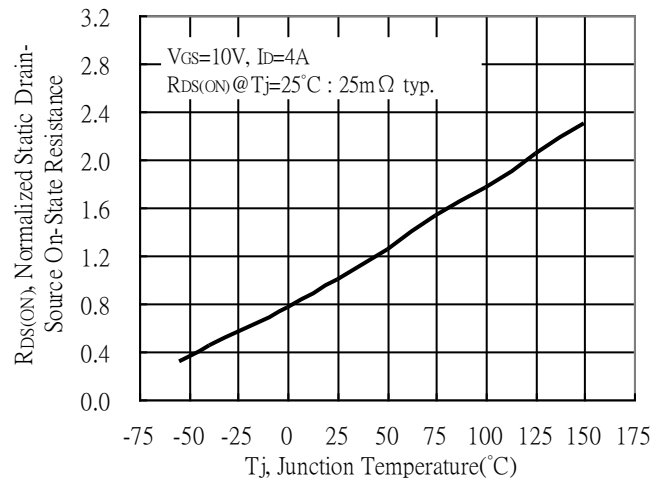
Reverse Drain Current vs Source-Drain Voltage



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

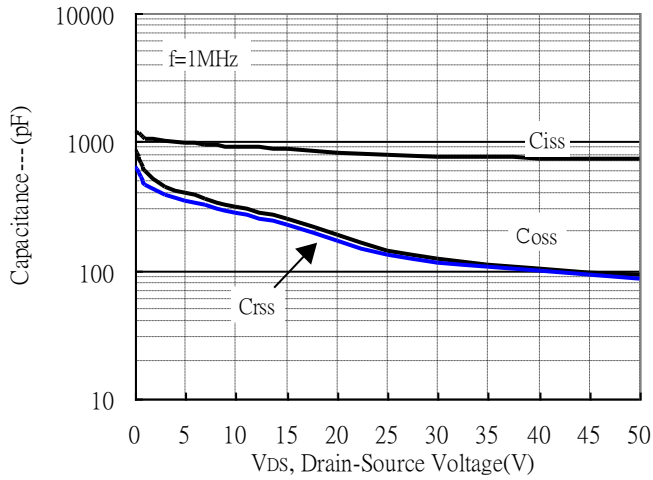


Drain-Source On-State Resistance vs Junction Temperature

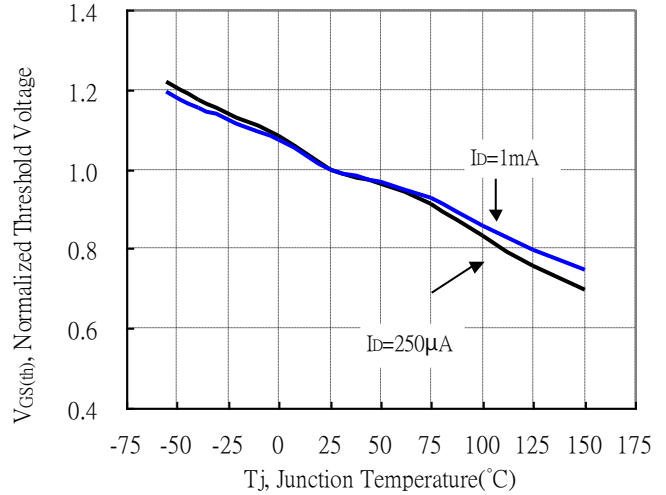


Typical Characteristics(Cont.)

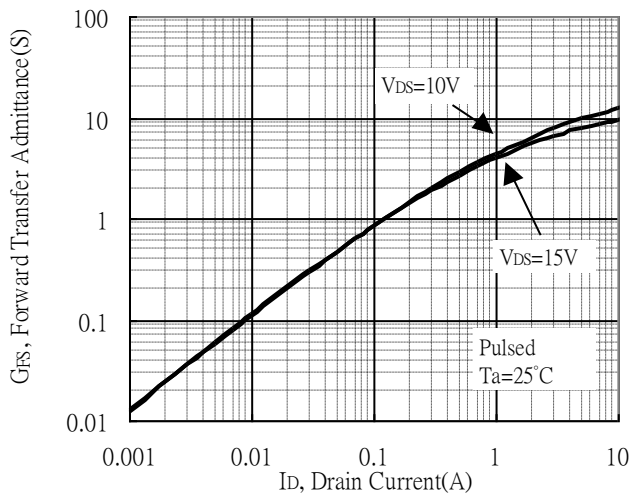
Capacitance vs Drain-to-Source Voltage



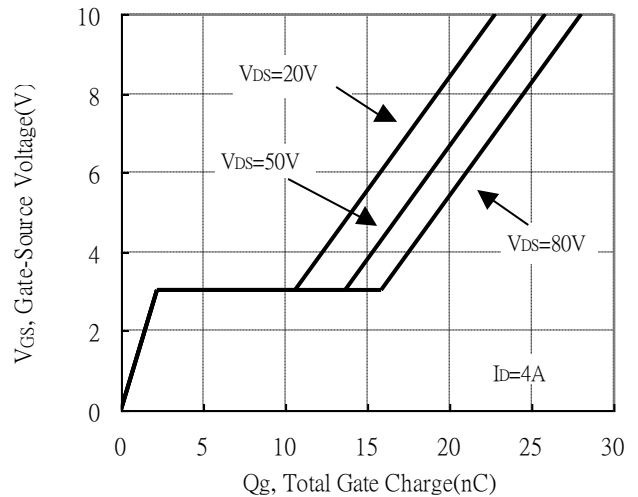
Threshold Voltage vs Junction Temperature



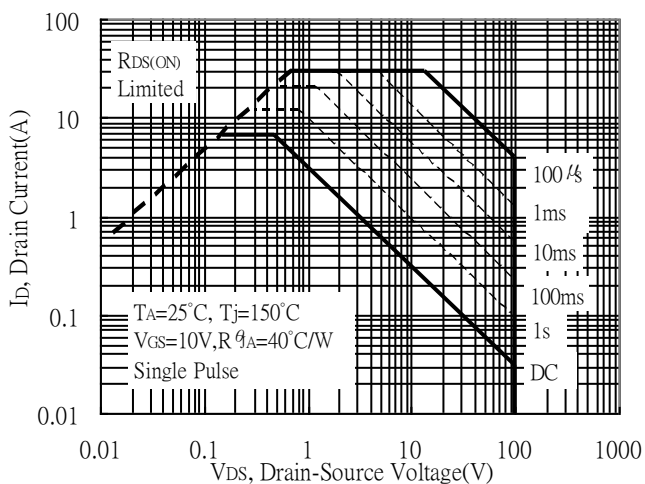
Forward Transfer Admittance vs Drain Current



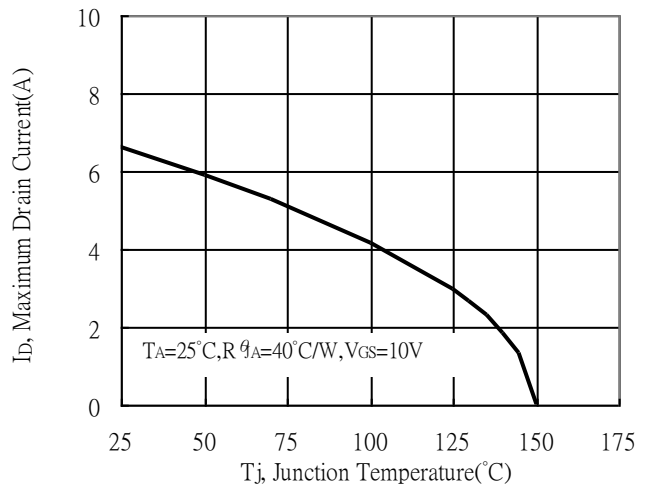
Gate Charge Characteristics



Maximum Safe Operating Area

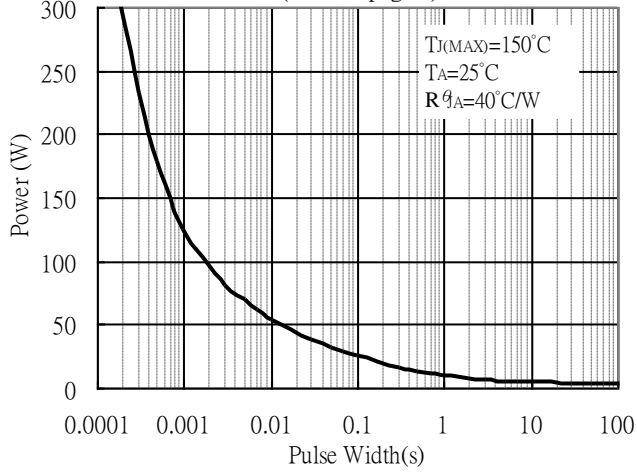


Maximum Drain Current vs Junction Temperature

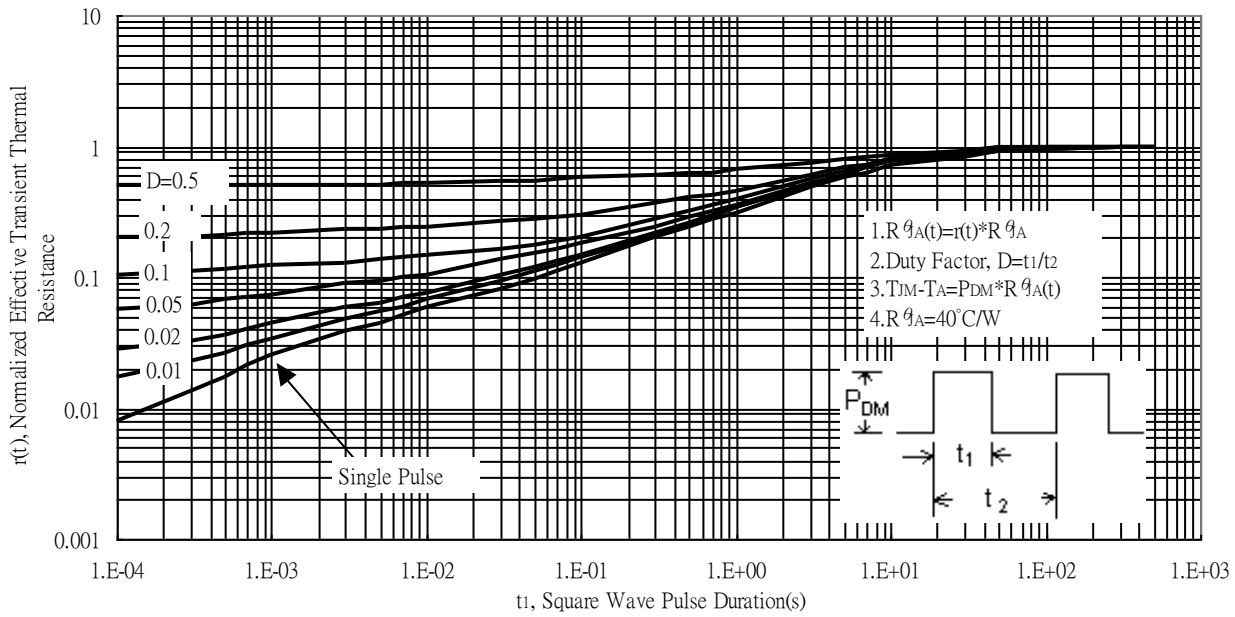


Typical Characteristics(Cont.)

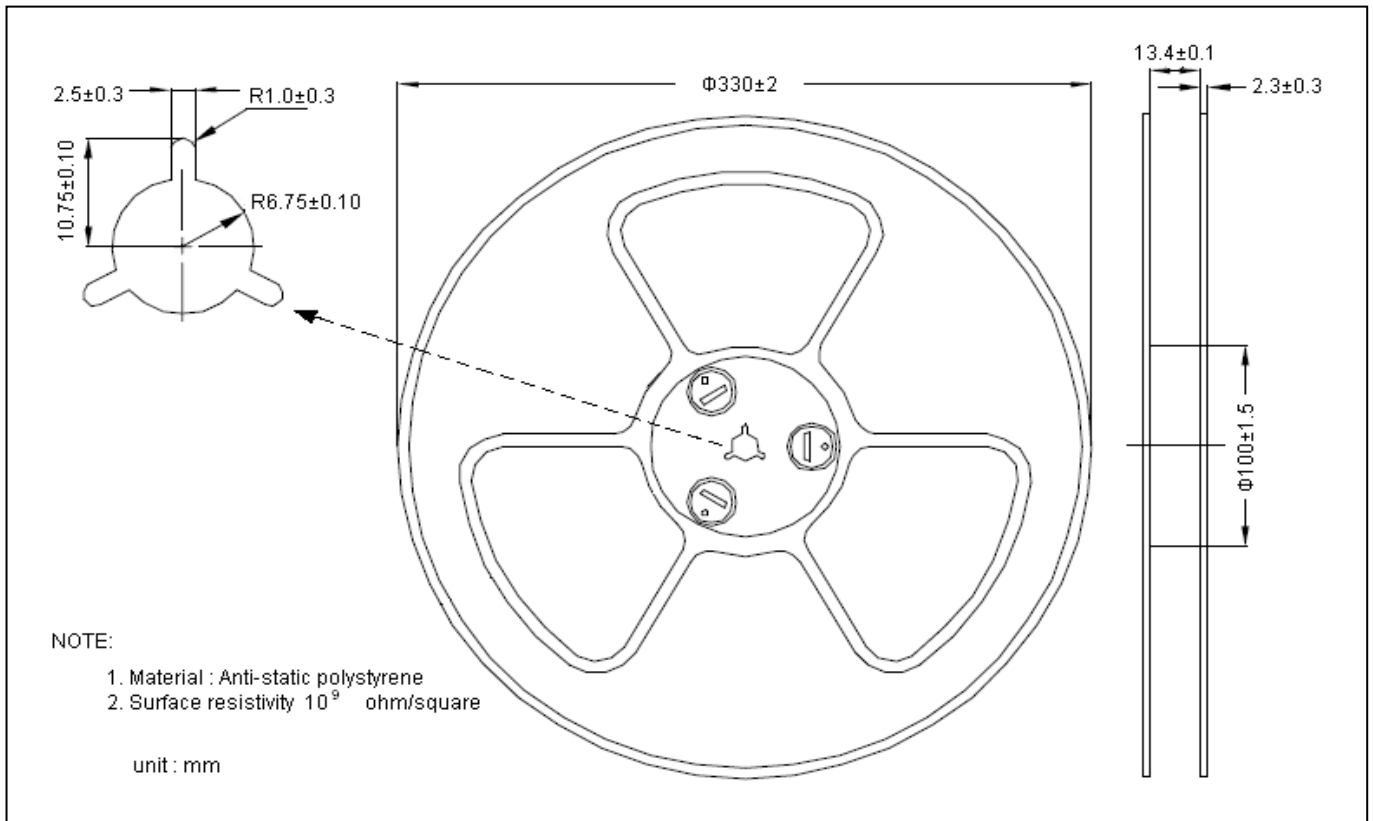
Single Pulse Power Rating, Junction to Ambient
 (Note on page 2)



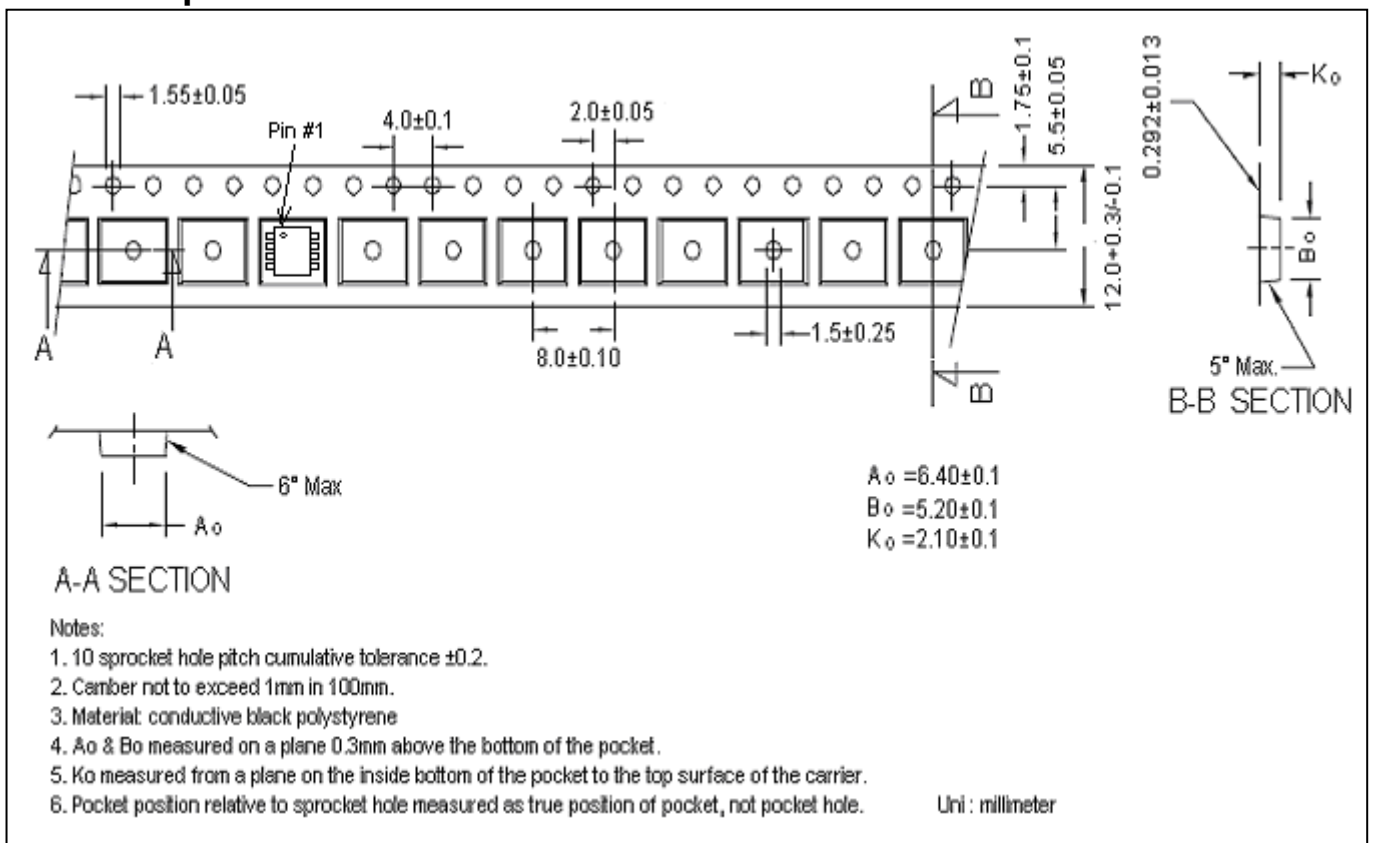
Transient Thermal Response Curves



Reel Dimension



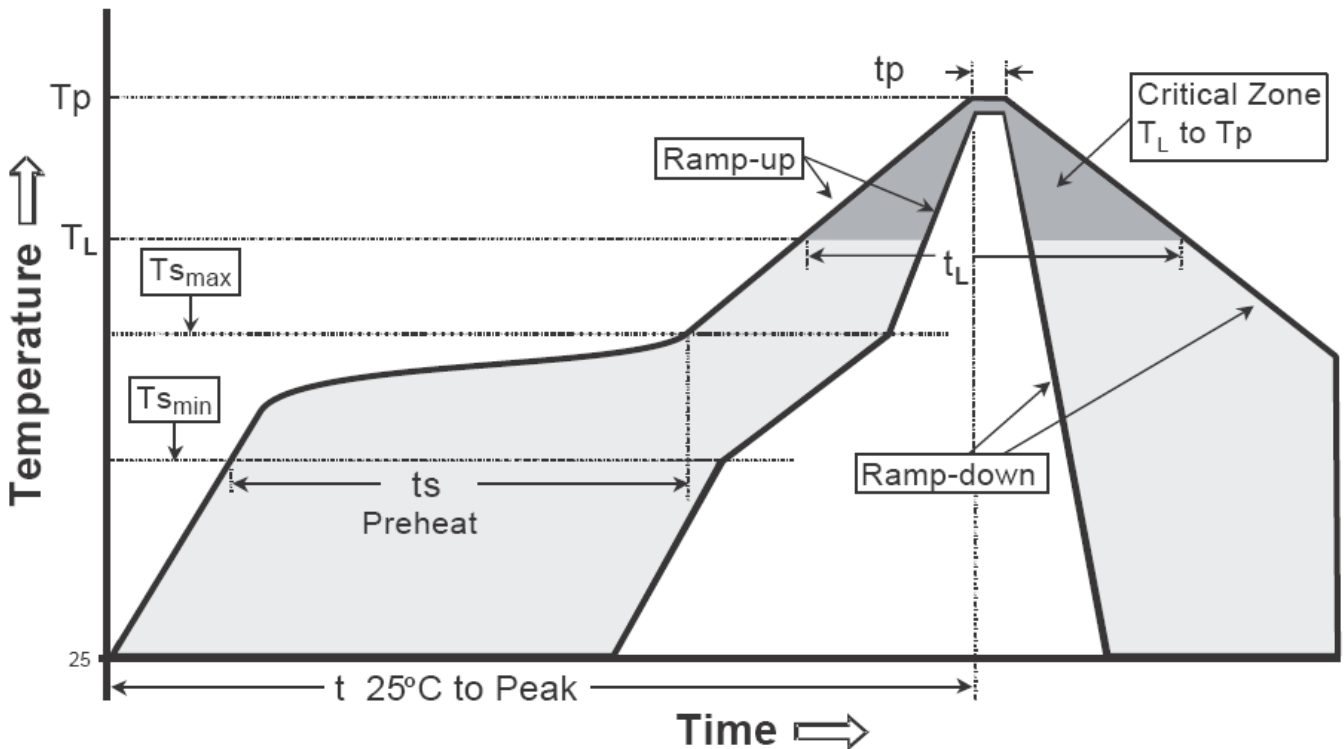
Carrier Tape Dimension



Recommended wave soldering condition

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

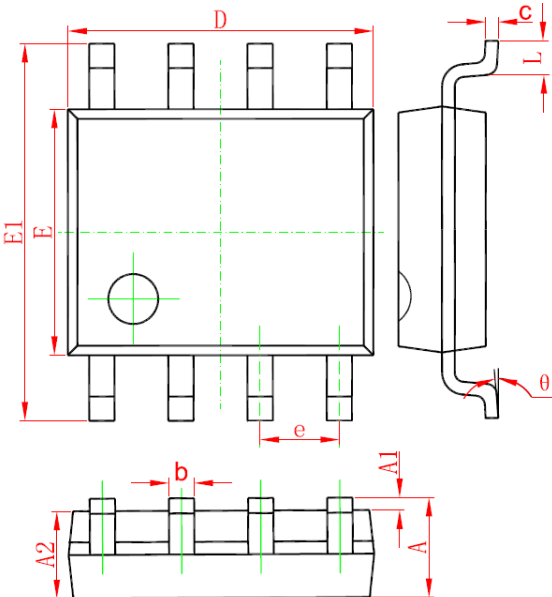
Recommended temperature profile for IR reflow



| Profile feature | Sn-Pb eutectic Assembly | Pb-free Assembly |
|---|-------------------------|------------------|
| Average ramp-up rate (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. |

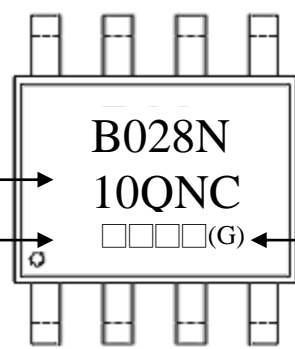
Note : All temperatures refer to topside of the package, measured on the package body surface.

SOP-8 Dimension



The diagram shows three views of an 8-lead SOP-8 package: a top view with dimensions D, E, E1, and e; a side view with dimensions c, L, and θ ; and a bottom view with dimensions A1, A2, and b.

Marking:



The marking diagram shows a top view of the package with the following markings: "B028N" and "10QNC" in the center, a date code "□□□□(G)" to the right, and a production site code "□" to the left of the date code.

Device Code → B028N
 10QNC
 Date Code → □□□□(G) ← Production site code

Date Code(counting from left to right) :
 1st code: year code, the last digit of Christian year
 2nd code : month code, Jan→A, Feb→B, Mar→C, Apr→D
 May→E, Jun→F, Jul→G, Aug→H, Sep→J,
 Oct→K, Nov→L, Dec→M
 3rd and 4th codes : production serial number, 01~99

Production site code : blank→ JCET, G →GEM

**8-Lead SOP-8 Plastic Package
 CYStek Package Code: Q8**

*: Typical

| DIM | Millimeters | | Inches | | DIM | Millimeters | | Inches | |
|-----|-------------|-------|--------|-------|----------|-------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 1.350 | 1.750 | 0.053 | 0.069 | E | 3.800 | 4.000 | 0.150 | 0.157 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 | E1 | 5.800 | 6.200 | 0.228 | 0.244 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 | e | *1.270 | | *0.050 | |
| b | 0.330 | 0.510 | 0.013 | 0.020 | L | 0.400 | 1.270 | 0.016 | 0.050 |
| c | 0.170 | 0.250 | 0.006 | 0.010 | θ | 0° | 8° | 0° | 8° |
| D | 4.700 | 5.100 | 0.185 | 0.200 | | | | | |

- 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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