## N -Channel Enhancement Mode Power MOSFET

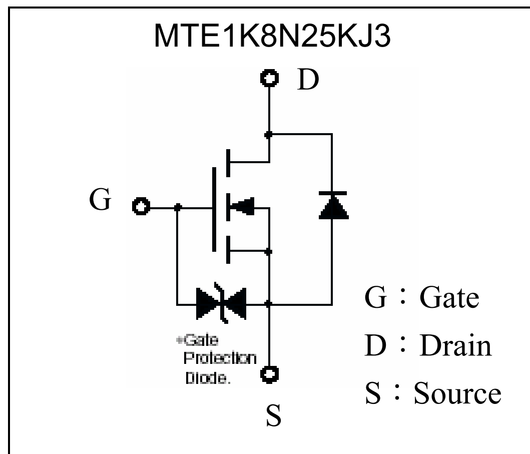
# MTE1K8N25KJ3

| | |
|---|---|
| $BV_{DSS}$ | 250V |
| $I_D$ | 2.5A |
| $R_{DS(ON)}$@$V_{GS}$=10V, $I_D$=2A | 1.63Ω(typ) |
| $R_{DS(ON)}$@$V_{GS}$=6V, $I_D$=1A | 1.41Ω(typ) |

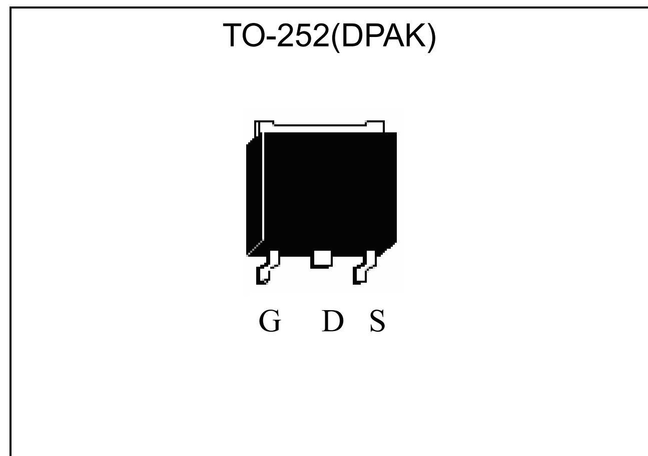
## Features

- Low gate charge
- Simple drive requirement
- Pb-free lead plating and halogen-free package
- ESD protected gate

## Equivalent Circuit

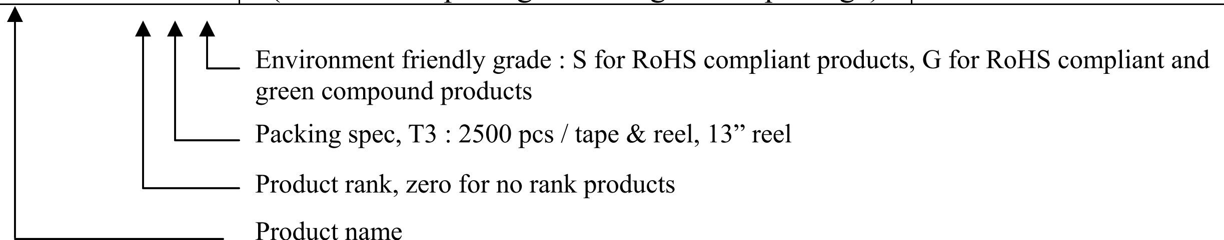



## Outline




## Ordering Information

| Device | Package | Shipping |
|---|---|---|
| MTE1K8N25KJ3-0-T3-G | TO-252 (Pb-free lead plating and halogen-free package) | 2500 pcs / Tape & Reel |



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

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 250 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | |
| Continuous Drain Current @ Tc=25°C, $V_{GS}$=10V | $I_D$ | 2.5 | A |
| Continuous Drain Current @ Tc=100°C, $V_{GS}$=10V | $I_D$ | 1.6 | |
| Pulsed Drain Current *1 | $I_{DM}$ | 10 | |
| ESD susceptibility *2 | | 2000 | V |
| Total Power Dissipation @Tc=25℃ | Pd | 25 | W |
| Total Power Dissipation @Tc=100℃ | | 10 | |
| Operating Junction and Storage Temperature Range | Tj, Tstg | -55~+150 | °C |

Note : *1. Pulse width limited by maximum junction temperature
*2. Human body model, 1.5kΩ in series with 100pF

## Thermal Data

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance, Junction-to-case, max | $R_{th,j-c}$ | 5 | °C/W |
| Thermal Resistance, Junction-to-ambient, max | $R_{th,j-a}$ | 50 (Note 1) | |
| Thermal Resistance, Junction-to-ambient, max | $R_{th,j-a}$ | 110 (Note 2) | |

Note : 1.When mounted on PCB of 1 in² pad area, t≤10s.
2. When mounted on the minimum pad size recommended (PCB mount), t≤10s.

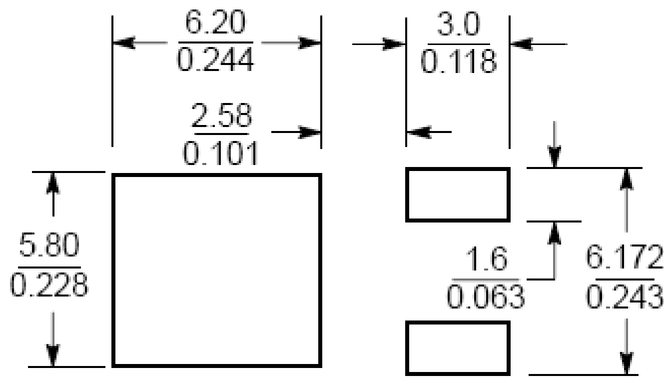
## Characteristics (Tc=25°C, unless otherwise specified)

| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|
| **Static** | | | | | |
| $BV_{DSS}$ | 250 | - | - | V | $V_{GS}$=0V, $I_D$=250μA |
| $\Delta BV_{DSS}/\Delta Tj$ | - | 0.3 | - | V/°C | Reference to 25°C, $I_D$=250μA |
| $V_{GS(th)}$ | 1.5 | 2.3 | 3.5 | V | $V_{DS}$ =$V_{GS}$, $I_D$=250μA |
| $G_{FS}$ *1 | - | 2.4 | - | S | $V_{DS}$ =15V, $I_D$=2A |
| $I_{GSS}$ | - | - | ±10 | μA | $V_{GS}$=±20V, $V_{DS}$=0V |
| $I_{DSS}$ | - | - | 1 | | $V_{DS}$ =200V, $V_{GS}$ =0V |
| | - | - | 25 | | $V_{DS}$ =200V, $V_{GS}$ =0V, Tj=125°C |
| $R_{DS(ON)}$ *1 | - | 1.63 | 2.2 | Ω | $V_{GS}$ =10V, $I_D$=2A |
| | - | 1.41 | 2 | | $V_{GS}$ =6V, $I_D$=1A |
| **Dynamic** | | | | | |
| Qg *1, 2 | - | 4.5 | - | nC | $I_D$=2.5A, $V_{DS}$=200V, $V_{GS}$=10V |
| Qgs *1, 2 | - | 1 | - | | |
| Qgd *1, 2 | - | 1.5 | - | | |
| $t_{d(ON)}$ *1, 2 | - | 12 | - | ns | $V_{DS}$=125V, $I_D$=1A, $V_{GS}$=10V, $R_G$=6Ω |
| tr *1, 2 | - | 11 | - | | |
| $t_{d(OFF)}$ *1, 2 | - | 13 | - | | |
| $t_f$ *1, 2 | - | 8 | - | | |
| Ciss | - | 215 | - | pF | $V_{GS}$=0V, $V_{DS}$=25V, f=1MHz |
| Coss | - | 16 | - | | |
| Crss | - | 7.7 | - | | |

| Source-Drain Diode | | | | | |
|---|---|---|---|---|---|
| $I_S$ *1 | - | - | 2.5 | A | |
| $I_{SM}$ *3 | - | - | 10 | | |
| $V_{SD}$ *1 | - | 0.79 | 1.2 | V | $I_S$=1A, $V_{GS}$=0V |
| trr | - | 80 | - | ns | $I_F$=1A, $dI_F/dt$=100A/μs |
| Qrr | - | 330 | - | nC | |

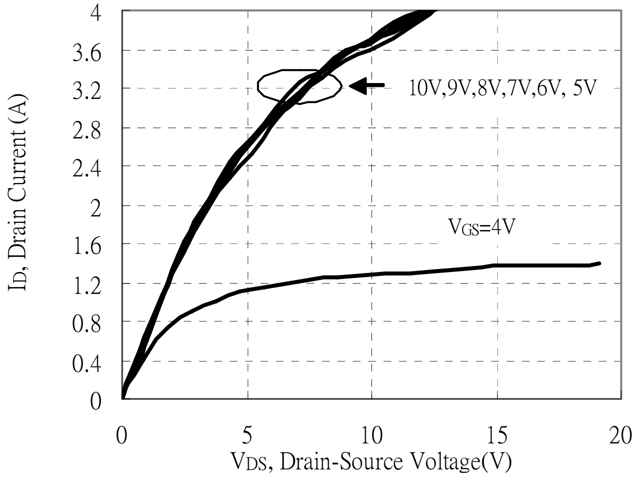
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

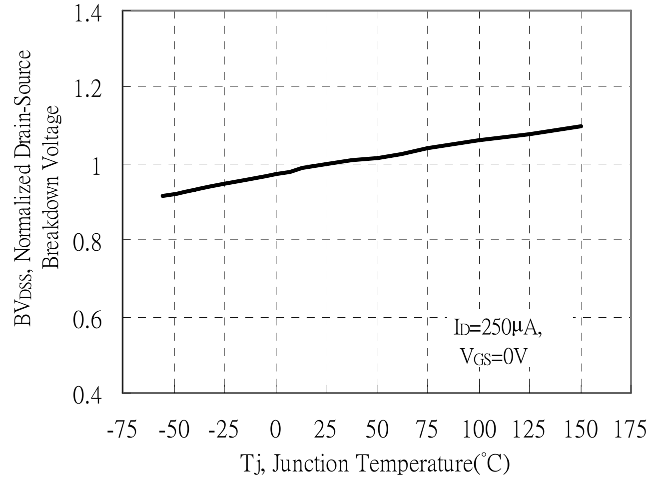
## Recommended soldering footprint

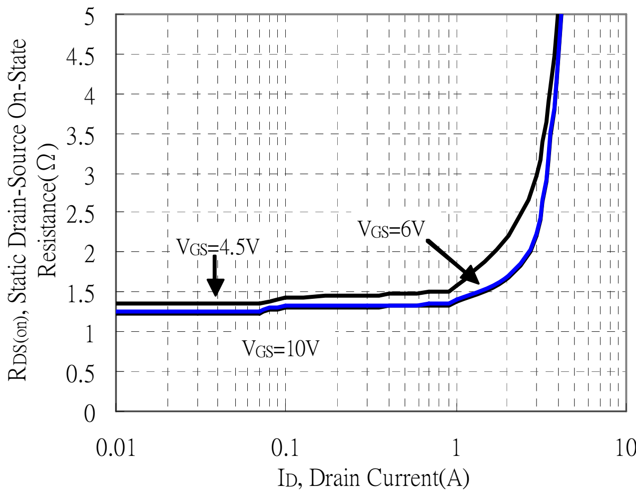


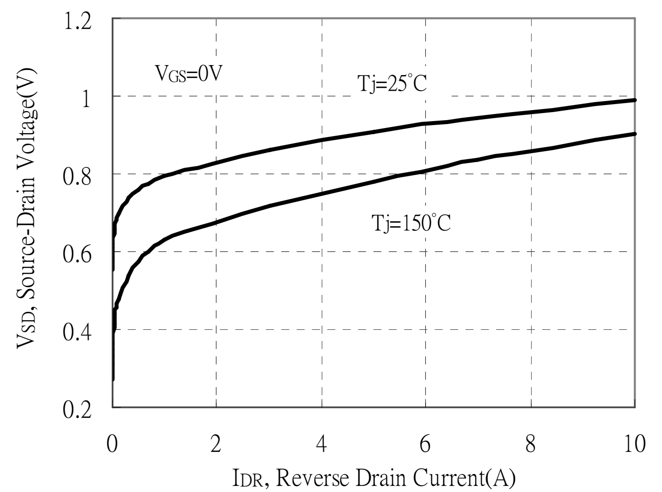

Unit ( mm / inch )

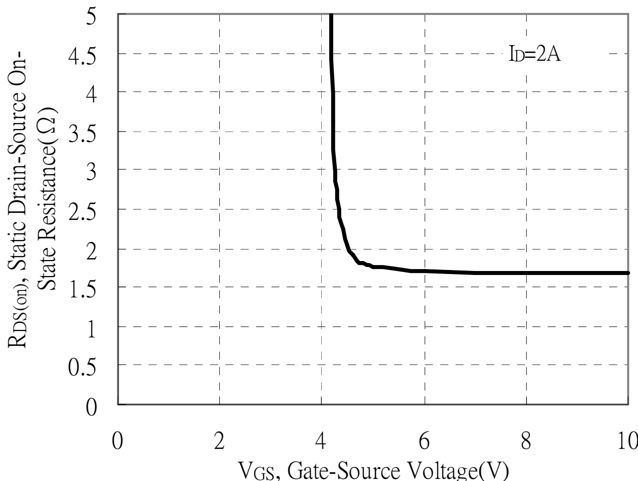
## Typical Characteristics

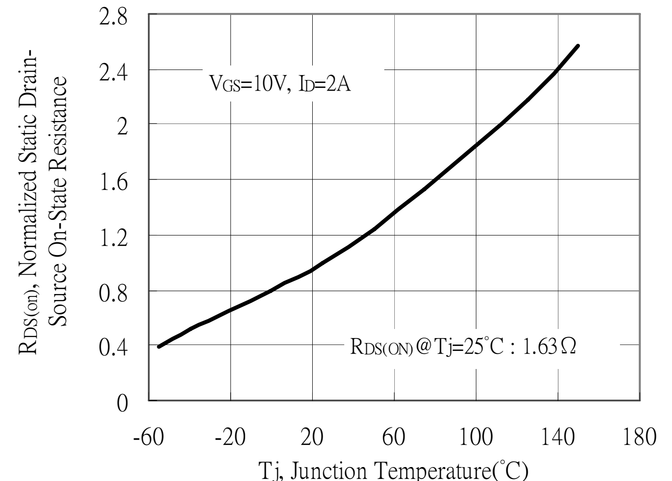


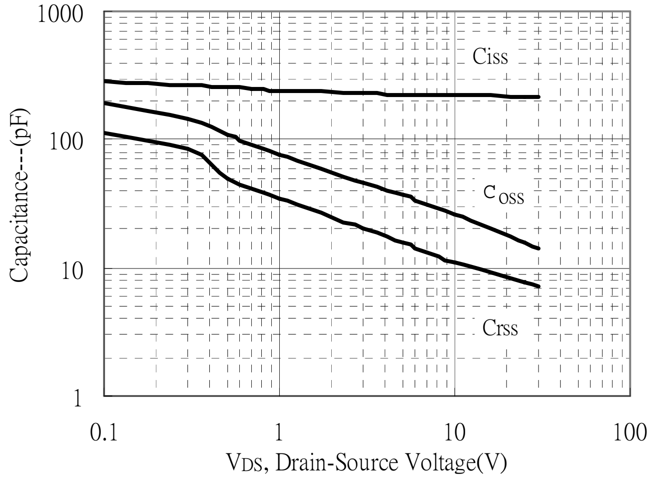



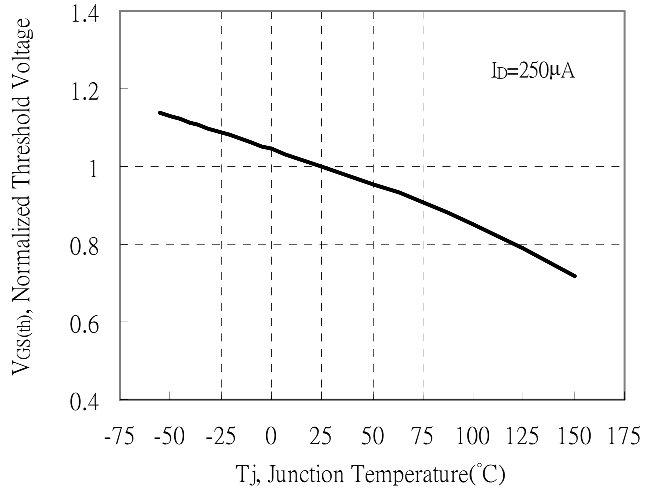



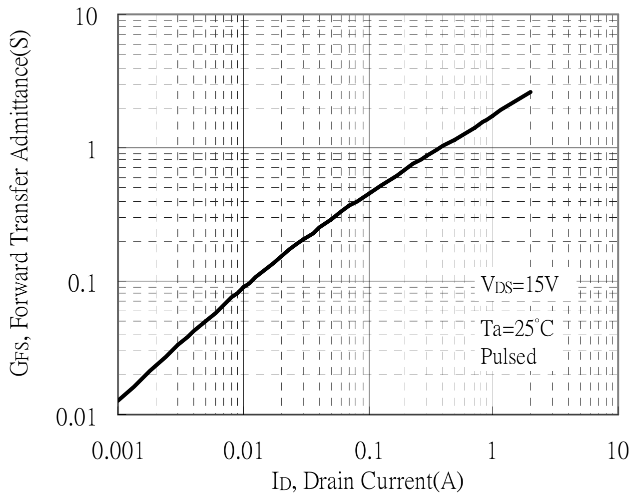



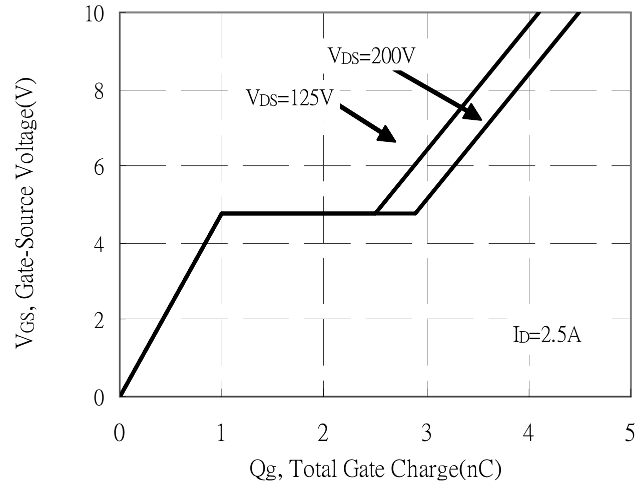



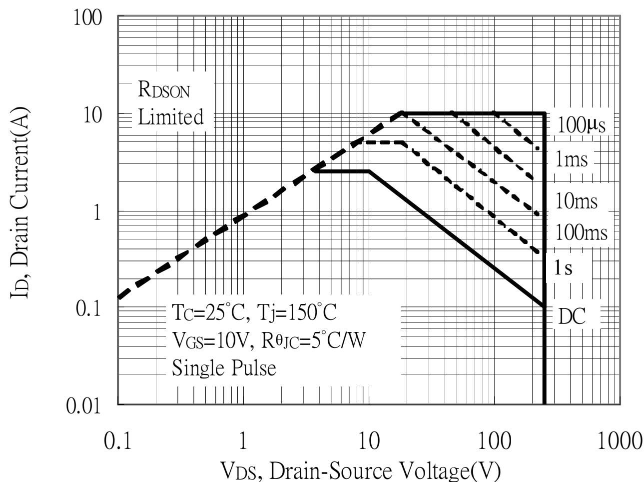
## Typical Characteristics(Cont.)

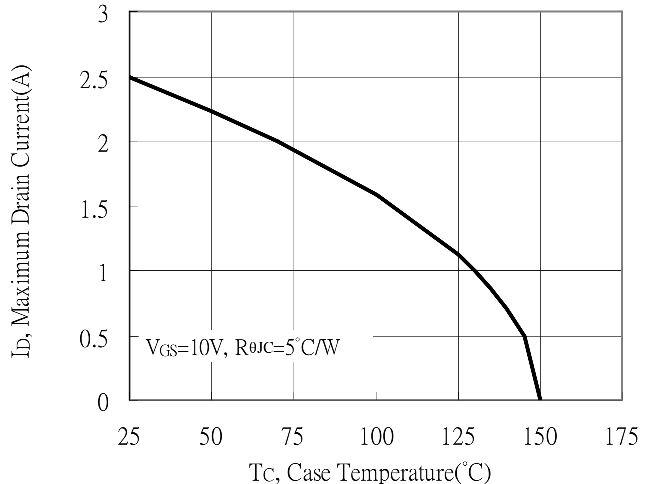


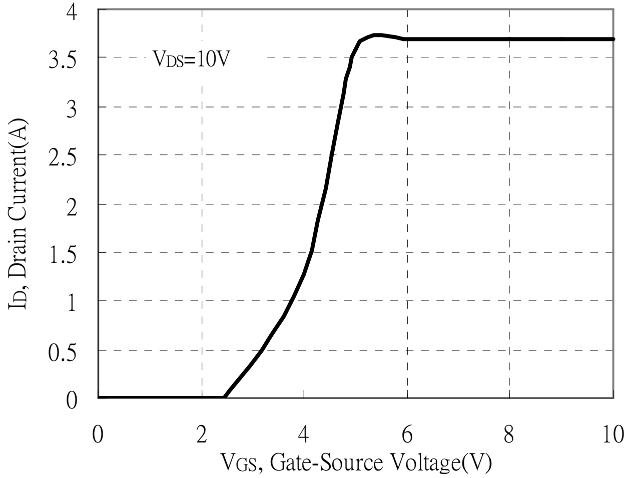



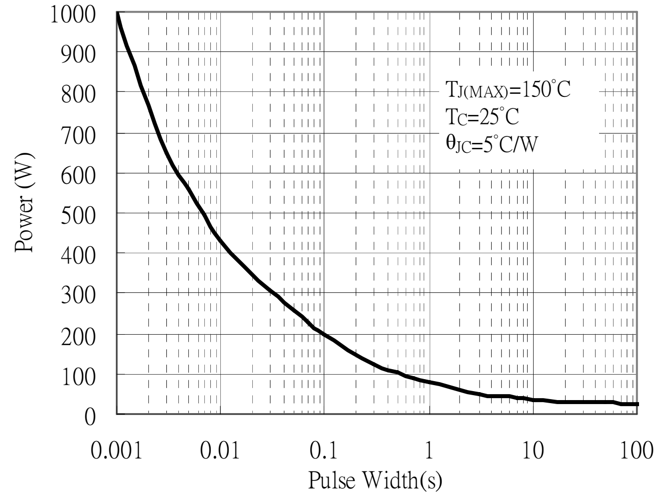



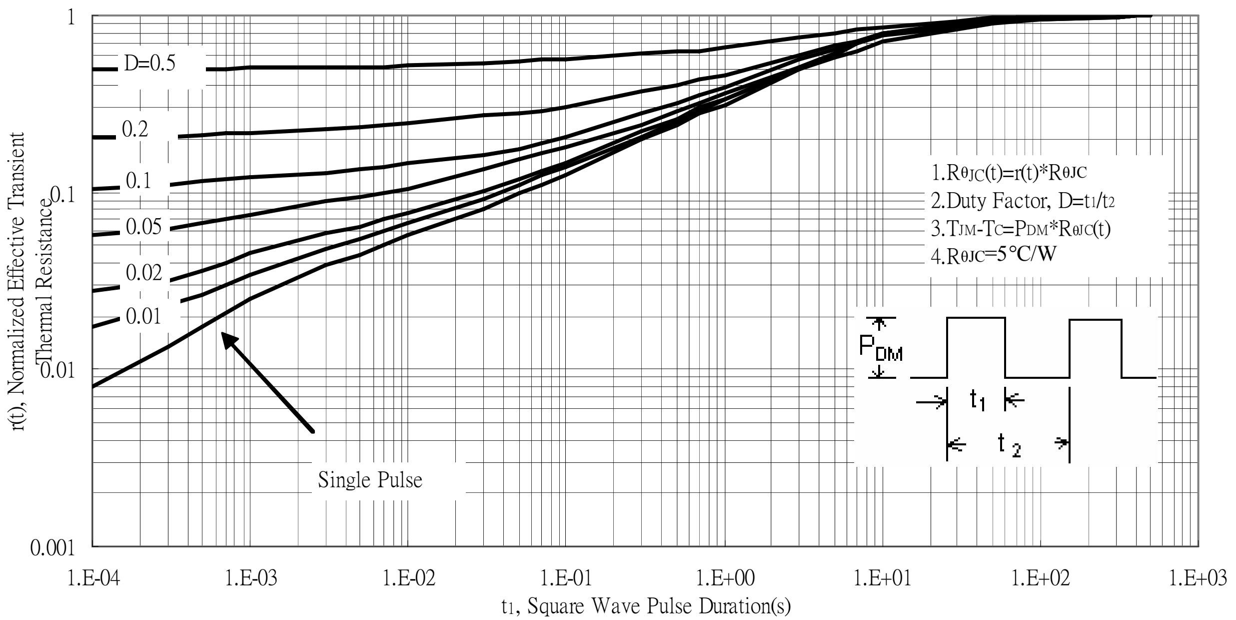



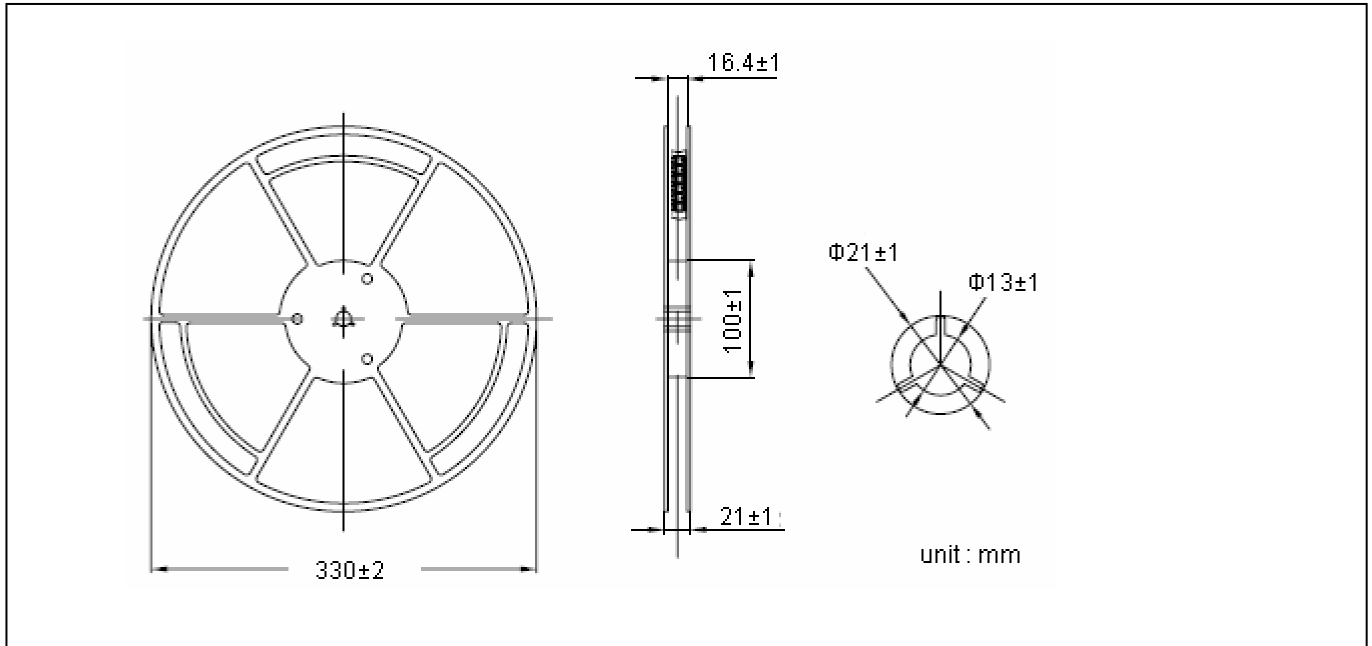
## Typical Characteristics(Cont.)



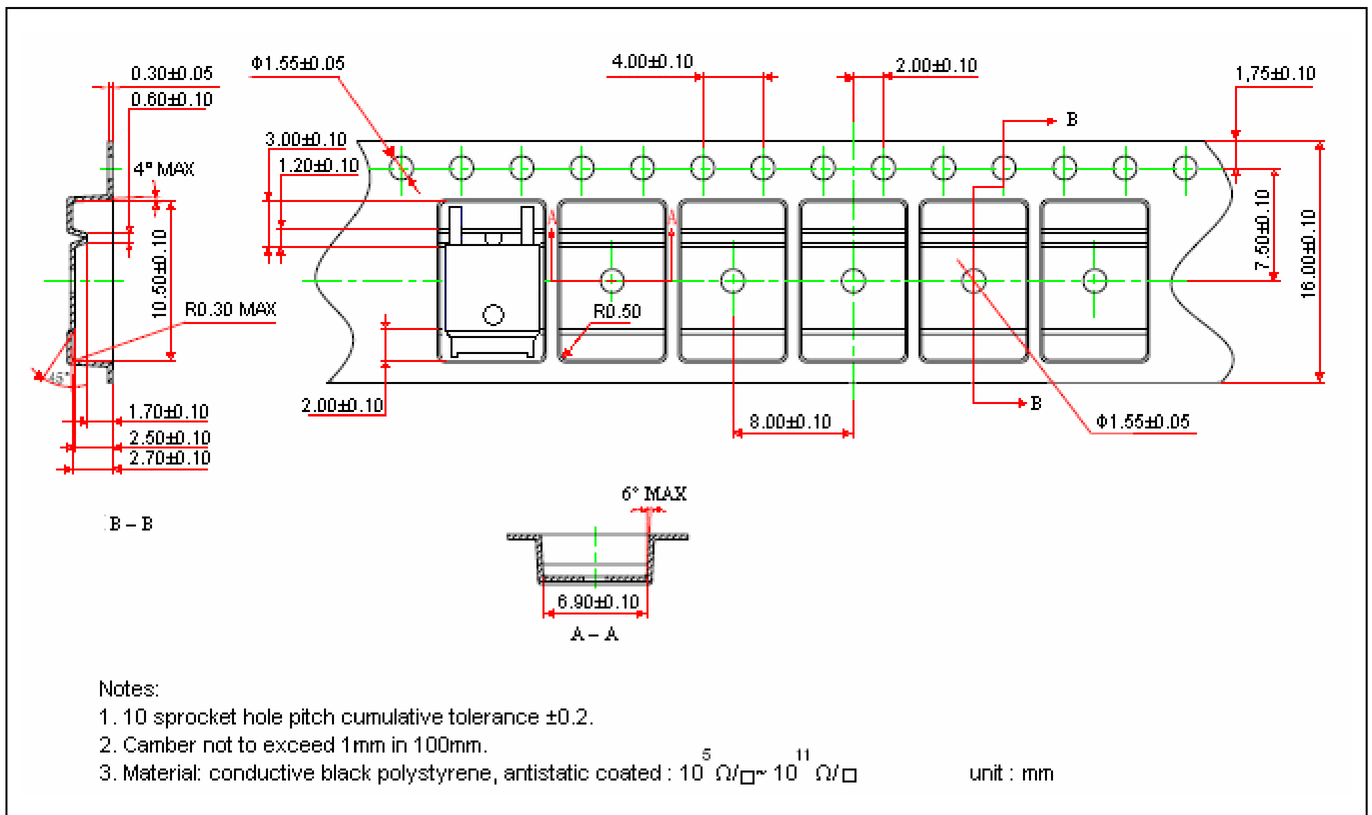



## Reel Dimension



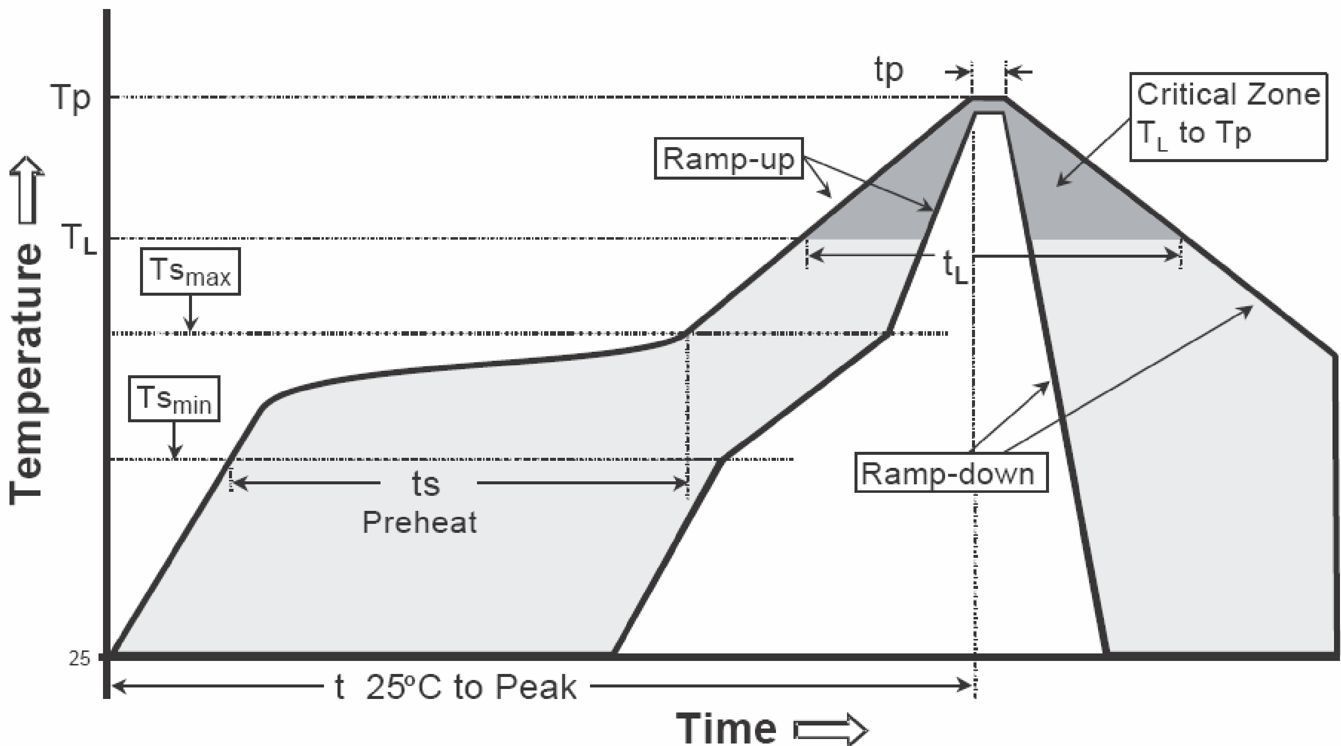

## Carrier Tape Dimension



## Recommended wave soldering condition

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

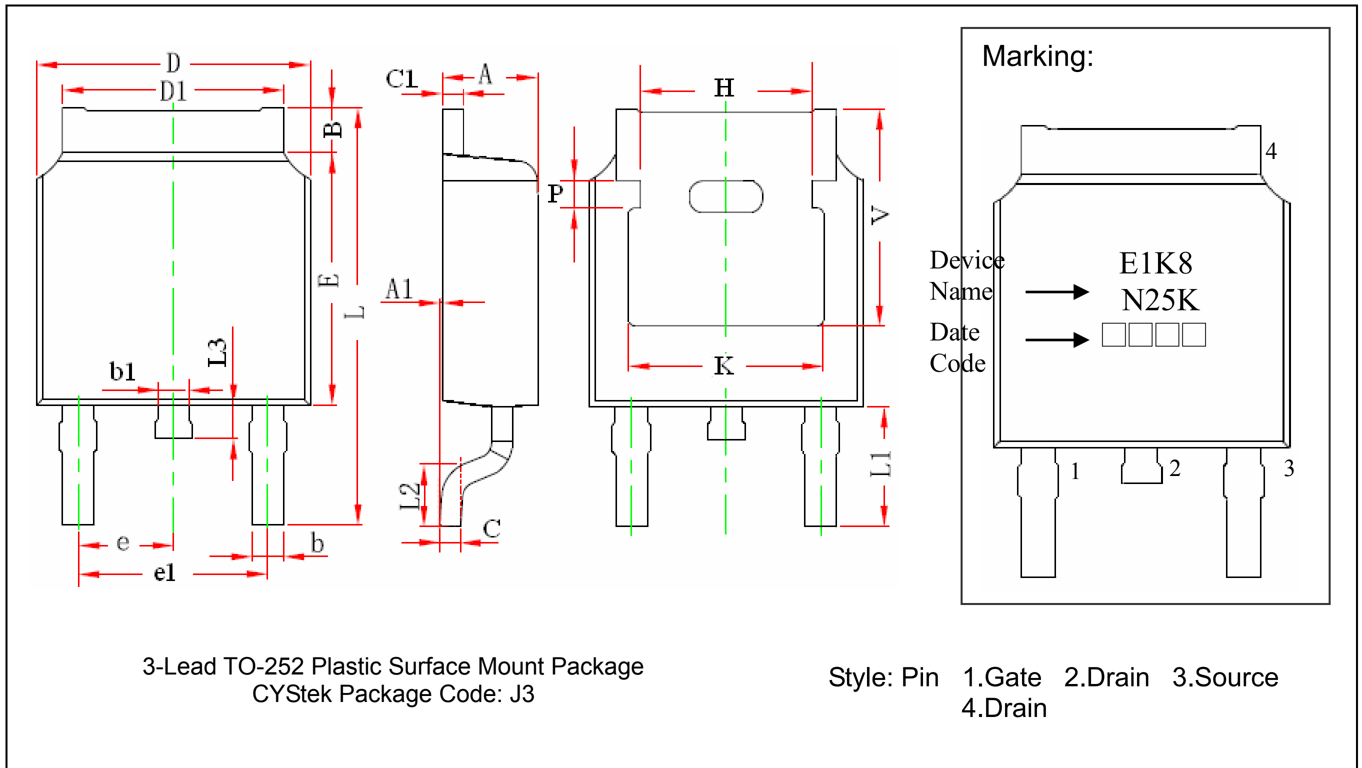
## Recommended temperature profile for IR reflow




| 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<br>−Temperature Min(Ts min)<br>−Temperature Max(Ts max)<br>−Time(ts min to ts max) | <br>100°C<br>150°C<br>60-120 seconds | <br>150°C<br>200°C<br>60-180 seconds |
| Time maintained above:<br>−Temperature (TL)<br>− Time (tL) | <br>183°C<br>60-150 seconds | <br>217°C<br>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.

## TO-252 Dimension




3-Lead TO-252 Plastic Surface Mount Package
CYStek Package Code: J3

Style: Pin 1.Gate 2.Drain 3.Source 4.Drain

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|---|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.087 | 0.094 | 2.200 | 2.400 | e | 0.086 | 0.094 | 2.186 | 2.386 |
| A1 | 0.000 | 0.005 | 0.000 | 0.127 | e1 | 0.172 | 0.188 | 4.372 | 4.772 |
| B | 0.039 | 0.048 | 0.990 | 1.210 | H | 0.163 | REF | 4.140 | REF |
| b | 0.026 | 0.034 | 0.660 | 0.860 | K | 0.190 | REF | 4.830 | REF |
| b1 | 0.026 | 0.034 | 0.660 | 0.860 | L | 0.386 | 0.409 | 9.800 | 10.400 |
| C | 0.018 | 0.023 | 0.460 | 0.580 | L1 | 0.114 | REF | 2.900 | REF |
| C1 | 0.018 | 0.023 | 0.460 | 0.580 | L2 | 0.055 | 0.067 | 1.400 | 1.700 |
| D | 0.256 | 0.264 | 6.500 | 6.700 | L3 | 0.024 | 0.039 | 0.600 | 1.000 |
| D1 | 0.201 | 0.215 | 5.100 | 5.460 | P | 0.026 | REF | 0.650 | REF |
| E | 0.236 | 0.244 | 6.000 | 6.200 | V | 0.211 | REF | 5.350 | REF |

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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