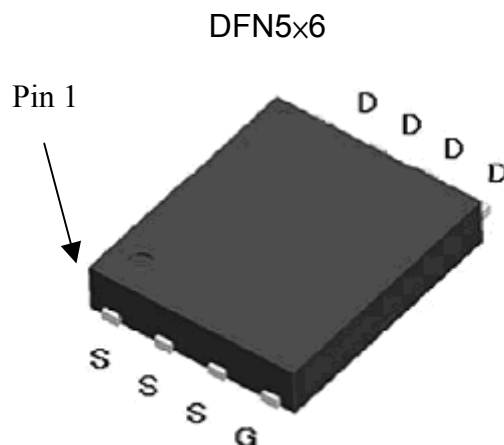


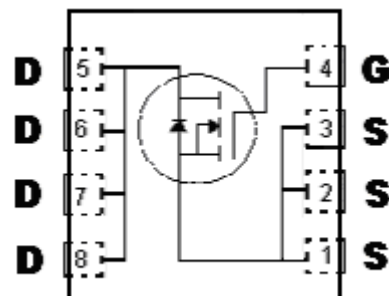
## N-Channel Enhancement Mode Power MOSFET

### Features:

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- Pb-free lead plating and Halogen-free package



|                                                                  |                            |
|------------------------------------------------------------------|----------------------------|
| <b>BV<sub>DSS</sub></b>                                          | <b>40V</b>                 |
| <b>I<sub>D</sub>@V<sub>GS</sub>=10V, T<sub>C</sub>=25°C</b>      | <b>152A(silicon limit)</b> |
| <b>I<sub>D</sub>@V<sub>GS</sub>=10V, T<sub>C</sub>=25°C</b>      | <b>84A(package limit)</b>  |
| <b>I<sub>D</sub>@V<sub>GS</sub>=10V, T<sub>A</sub>=25°C</b>      | <b>23A</b>                 |
| <b>R<sub>DS(ON)</sub>@V<sub>GS</sub>=10V, I<sub>D</sub>=20A</b>  | <b>1.64mΩ (typ)</b>        |
| <b>R<sub>DS(ON)</sub>@V<sub>GS</sub>=4.5V, I<sub>D</sub>=20A</b> | <b>1.89mΩ (typ)</b>        |



G : Gate D : Drain S : Source

### Ordering Information

| Device      | Package                                                     | Shipping               |
|-------------|-------------------------------------------------------------|------------------------|
| KWB2D0N04H8 | DFN 5 x6<br>(Pb-free lead plating and halogen-free package) | 3000 pcs / tape & reel |

## Absolute Maximum Ratings (T<sub>C</sub>=25°C, unless otherwise noted)

| Parameter                                                                                     |                                | Symbol                            | Limits   | Unit |
|-----------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------|----------|------|
| Drain-Source Voltage (Note 1)                                                                 |                                | V <sub>DS</sub>                   | 40       | V    |
| Gate-Source Voltage                                                                           |                                | V <sub>GS</sub>                   | ±20      |      |
| Continuous Drain Current @T <sub>C</sub> =25°C, V <sub>GS</sub> =10V (silicon limit) (Note 5) |                                | I <sub>D</sub>                    | 152      | A    |
| Continuous Drain Current @T <sub>C</sub> =100°C, V <sub>GS</sub> =10V(silicon limit) (Note 5) |                                |                                   | 107      |      |
| Continuous Drain Current @T <sub>C</sub> =25°C, V <sub>GS</sub> =10V (package limit) (Note 1) |                                |                                   | 84       |      |
| Continuous Drain Current @T <sub>A</sub> =25°C, V <sub>GS</sub> =10V (Note 2)                 |                                | I <sub>DSM</sub>                  | 23       |      |
| Continuous Drain Current @T <sub>A</sub> =70°C, V <sub>GS</sub> =10V (Note 2)                 |                                |                                   | 18.4     |      |
| Pulsed Drain Current @ V <sub>GS</sub> =10V (Note 3)                                          |                                | I <sub>DM</sub>                   | 350      |      |
| Avalanche Current (Note 3)                                                                    |                                | I <sub>AS</sub>                   | 50       |      |
| Single Pulse Avalanche Energy @ L=1mH, I <sub>D</sub> =50Amps, V <sub>DD</sub> =30V (Note 4)  |                                | E <sub>AS</sub>                   | 1250     | mJ   |
| Repetitive Avalanche Energy (Note 3)                                                          |                                | E <sub>AR</sub>                   | 12.5     |      |
| Power Dissipation                                                                             | T <sub>C</sub> =25°C (Note 1)  | P <sub>D</sub>                    | 125      | W    |
|                                                                                               | T <sub>C</sub> =100°C (Note 1) |                                   | 62.5     |      |
|                                                                                               | T <sub>A</sub> =25°C (Note 2)  | P <sub>DSM</sub>                  | 2.5      |      |
|                                                                                               | T <sub>A</sub> =70°C (Note 2)  |                                   | 1.6      |      |
| Operating Junction and Storage Temperature                                                    |                                | T <sub>j</sub> , T <sub>stg</sub> | -55~+175 | °C   |

\*Drain current limited by maximum junction temperature

## Thermal Data

| Parameter                                             | Symbol           | Value | Unit |
|-------------------------------------------------------|------------------|-------|------|
| Thermal Resistance, Junction-to-case, max             | R <sub>θJC</sub> | 1.2   | °C/W |
| Thermal Resistance, Junction-to-ambient, max (Note 2) | R <sub>θJA</sub> | 50    |      |

Note : 1.The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=175 °C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

2. The value of R<sub>θJA</sub> is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2 oz. copper, in a still air environment with T<sub>A</sub>=25°C. The value in any given application depends on the user's specific board design. The power dissipation P<sub>DSM</sub> is based on R<sub>θJA</sub> and the maximum allowed junction temperature of 150°C, and the maximum temperature of 175°C may be used if the PCB allows it.

3. Pulse width limited by junction temperature T<sub>J(MAX)</sub>=175°C.

4. Ratings are based on low frequency and low duty cycles to keep initial T<sub>J</sub>=25 °C. 100% tested by conditions of V<sub>DD</sub>=30V, I<sub>D</sub>=20A, L=1mH, V<sub>GS</sub>=10V.

5. Calculated continuous drain current based on maximum allowable junction temperature.

6. The static characteristics are obtained using <300μs pulses, duty cycle 0.5% maximum.

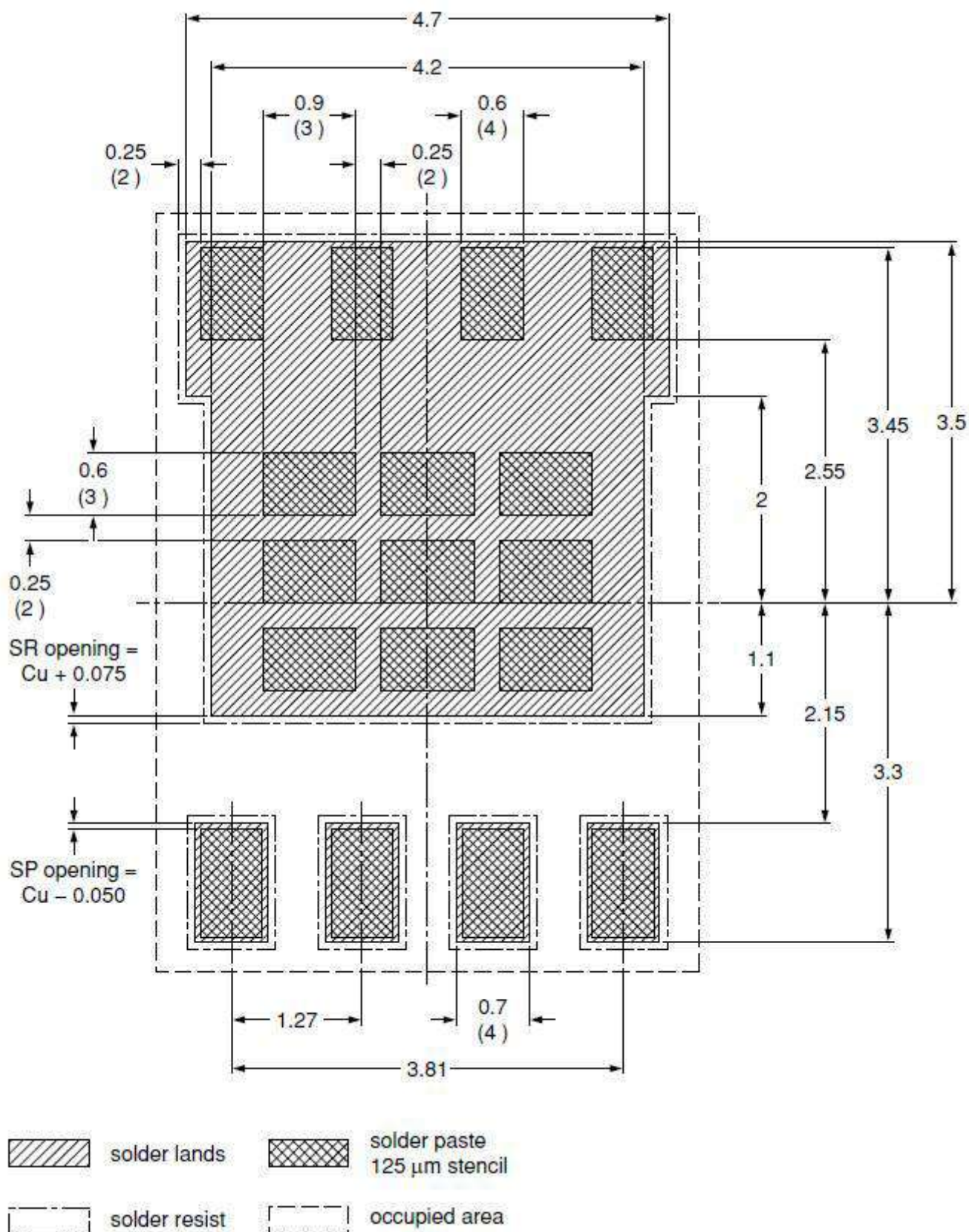
7. The R<sub>θJA</sub> is the sum of thermal resistance from junction to case R<sub>θJC</sub> and case to ambient.

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

| Symbol                                  | Min. | Typ. | Max. | Unit | Test Conditions                                                                       |
|-----------------------------------------|------|------|------|------|---------------------------------------------------------------------------------------|
| Static                                  |      |      |      |      |                                                                                       |
| BV <sub>DSS</sub>                       | 40   | -    | -    | V    | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                            |
| ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>     | -    | 0.03 | -    | V/°C | Reference to 25°C, I <sub>D</sub> =250μA                                              |
| V <sub>GS(th)</sub>                     | 1    | -    | 2.5  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA                             |
| *G <sub>FS</sub>                        | -    | 44.7 | -    | S    | V <sub>DS</sub> =10V, I <sub>D</sub> =20A                                             |
| I <sub>GSS</sub>                        | -    | -    | ±100 | nA   | V <sub>GS</sub> =±20V                                                                 |
| I <sub>DSS</sub>                        | -    | -    | 1    | μA   | V <sub>DS</sub> =40V, V <sub>GS</sub> =0V                                             |
|                                         | -    | -    | 5    |      | V <sub>DS</sub> =32V, V <sub>GS</sub> =0V, T <sub>j</sub> =55°C                       |
| *R <sub>DS(ON)</sub>                    | -    | 1.64 | 2.0  | mΩ   | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                                             |
|                                         | -    | 1.89 | 2.5  |      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A                                            |
| Dynamic                                 |      |      |      |      |                                                                                       |
| *Q <sub>g</sub> (V <sub>GS</sub> =10V)  | -    | 150  | -    | nC   | V <sub>DS</sub> =20V, I <sub>D</sub> =84A, V <sub>GS</sub> =10V                       |
| *Q <sub>g</sub> (V <sub>GS</sub> =4.5V) | -    | 75   | -    |      |                                                                                       |
| *Q <sub>gs</sub>                        | -    | 25   | -    |      |                                                                                       |
| *Q <sub>gd</sub>                        | -    | 35   | -    |      |                                                                                       |
| *t <sub>d(ON)</sub>                     | -    | 31.2 | -    | ns   | V <sub>DS</sub> =20V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V, R <sub>G</sub> =2.7Ω |
| *t <sub>r</sub>                         | -    | 30   | -    |      |                                                                                       |
| *t <sub>d(OFF)</sub>                    | -    | 122  | -    |      |                                                                                       |
| *t <sub>f</sub>                         | -    | 28   | -    |      |                                                                                       |
| C <sub>iss</sub>                        | -    | 6584 | -    | pF   | V <sub>GS</sub> =0V, V <sub>DS</sub> =20V, f=1MHz                                     |
| C <sub>oss</sub>                        | -    | 777  | -    |      |                                                                                       |
| C <sub>rss</sub>                        | -    | 351  | -    |      |                                                                                       |
| R <sub>g</sub>                          | -    | 2.4  | -    | Ω    | f=1MHz                                                                                |
| Source-Drain Diode                      |      |      |      |      |                                                                                       |
| *I <sub>S</sub>                         | -    | -    | 84   | A    |                                                                                       |
| *I <sub>SM</sub>                        | -    | -    | 350  |      |                                                                                       |
| *V <sub>SD</sub>                        | -    | 0.71 | 1.1  | V    | I <sub>S</sub> =5A, V <sub>GS</sub> =0V                                               |
| *t <sub>rr</sub>                        | -    | 26   | -    | ns   | V <sub>GS</sub> =0, I <sub>F</sub> =45A, dI <sub>F</sub> /dt=100A/μs                  |
| *Q <sub>rr</sub>                        | -    | 17   | -    | nC   |                                                                                       |

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

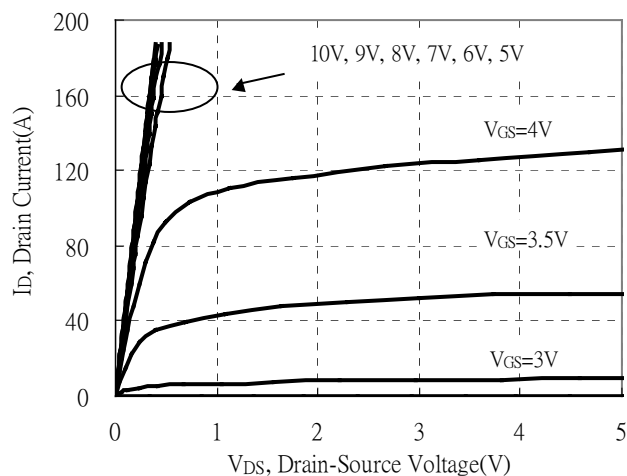
## Recommended Soldering Footprint & Stencil Design



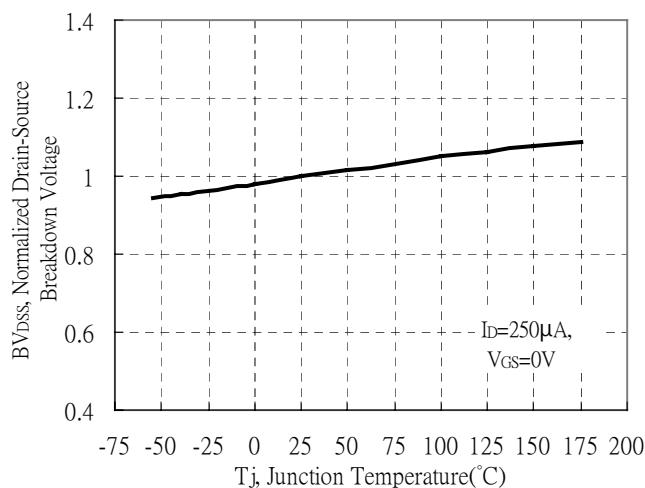
unit : mm

## Typical Characteristics

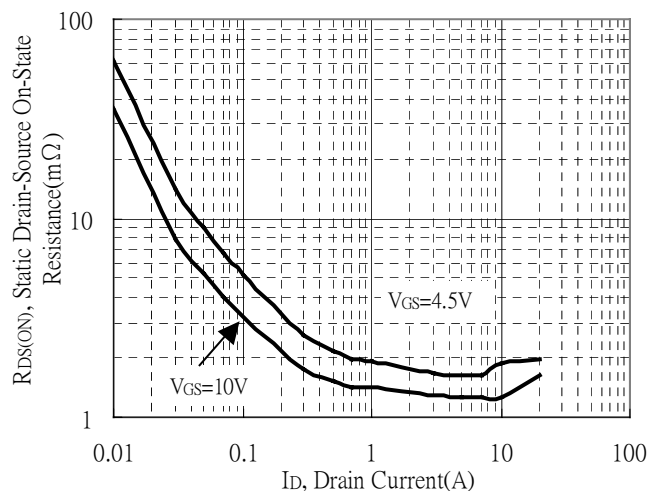
Typical Output Characteristics



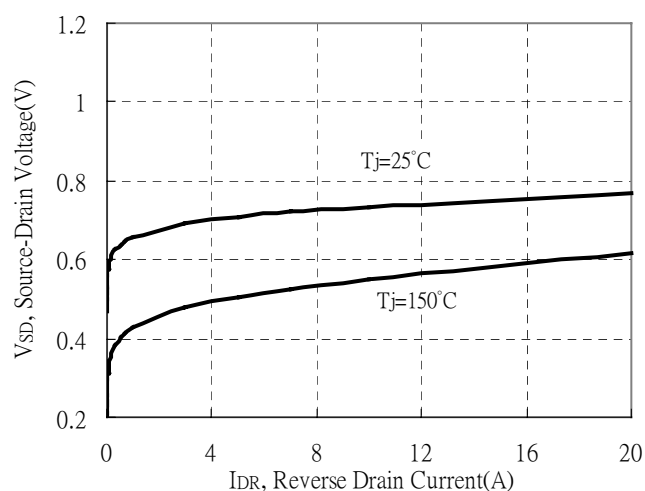
Breakdown Voltage vs Ambient Temperature



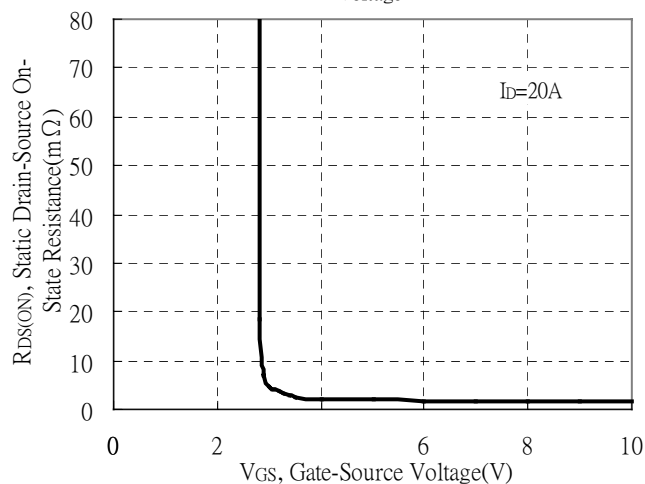
Static Drain-Source On-State resistance vs Drain Current



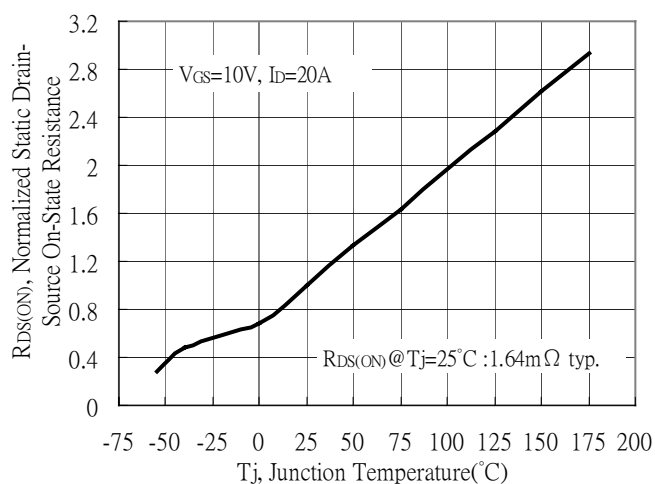
Reverse Drain Current vs Source-Drain Voltage



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

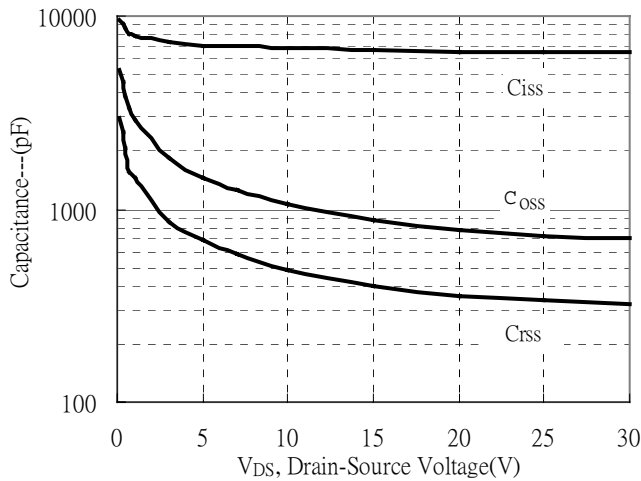


Drain-Source On-State Resistance vs Junction Temperature

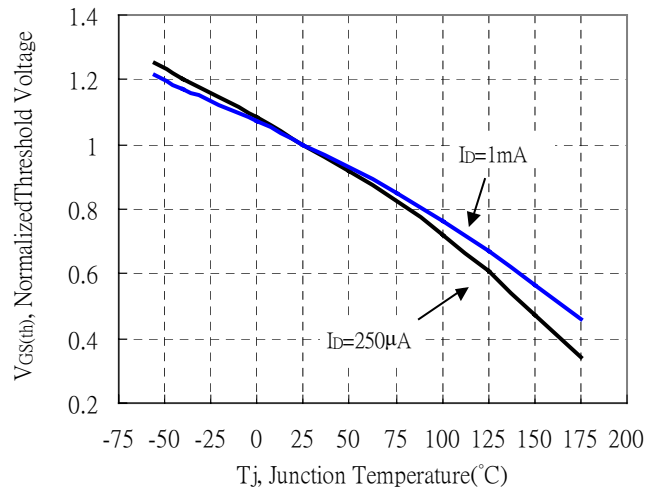


## Typical Characteristics(Cont.)

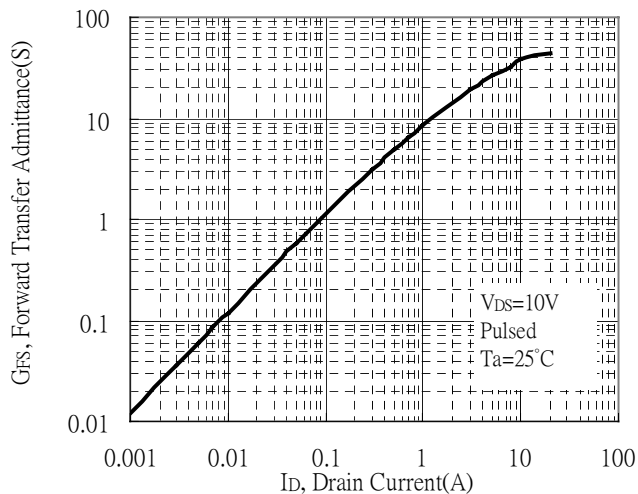
Capacitance vs Drain-to-Source Voltage



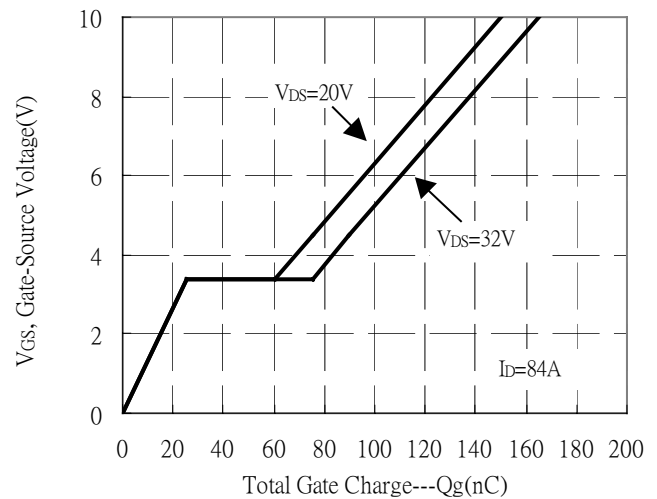
Threshold Voltage vs Junction Temperature



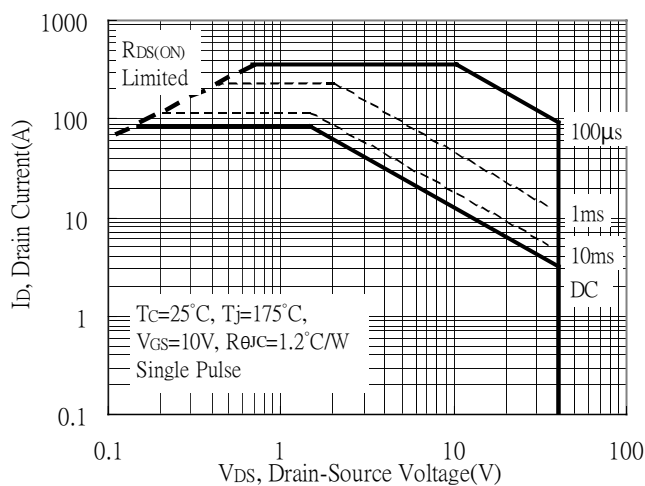
Forward Transfer Admittance vs Drain Current



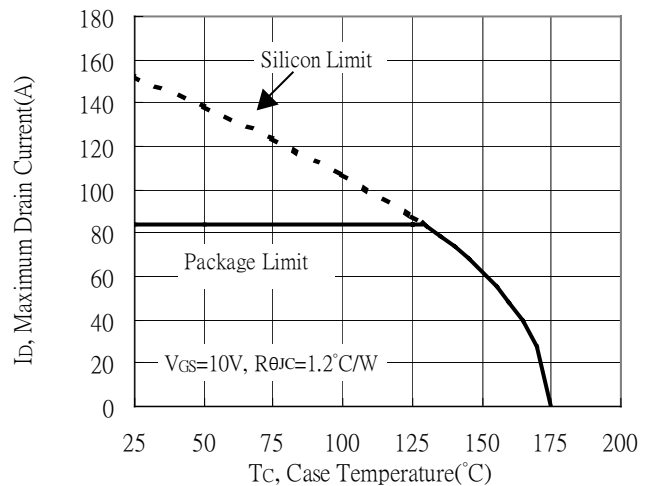
Gate Charge Characteristics



Maximum Safe Operating Area

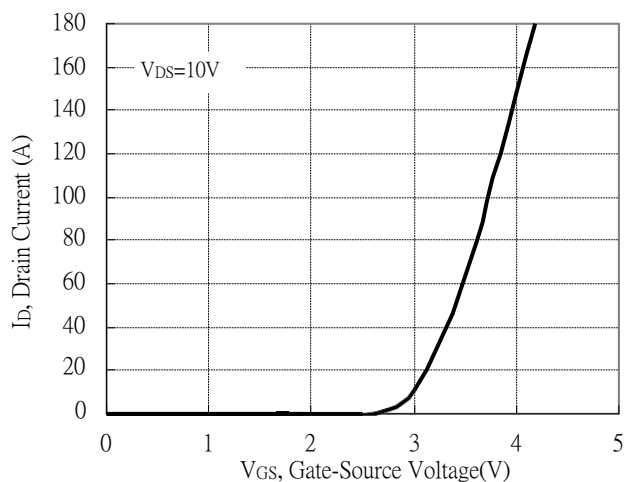


Maximum Drain Current vs Case Temperature

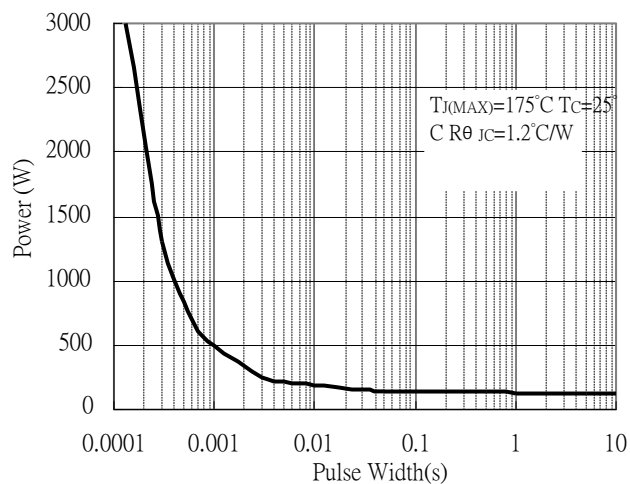


## Typical Characteristics(Cont.)

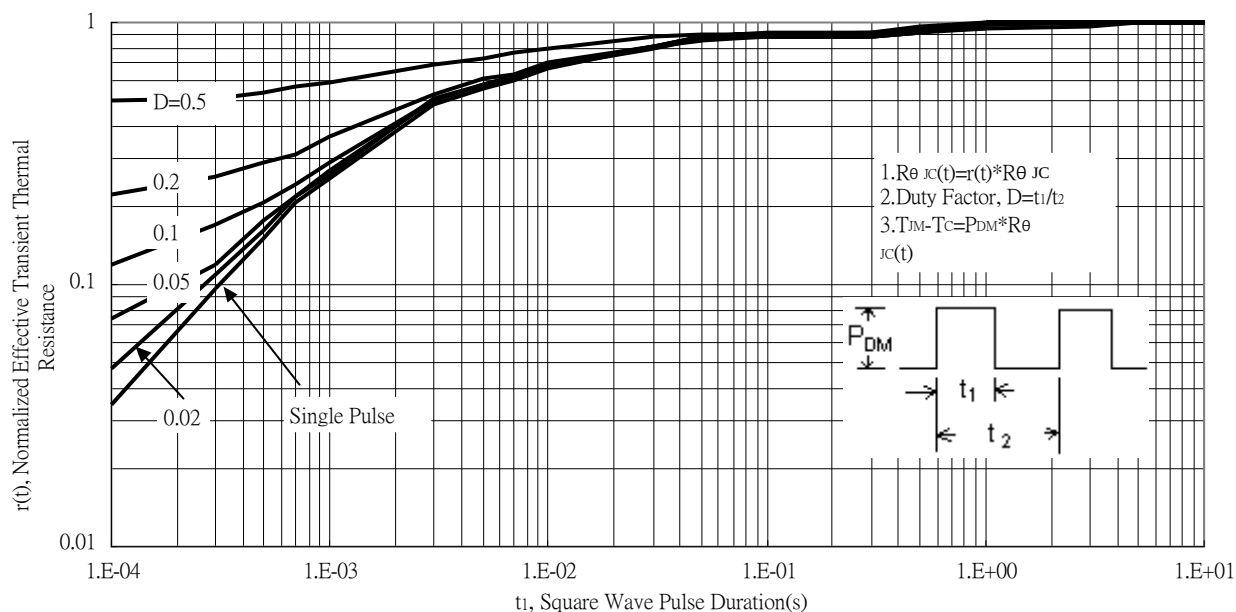
Typical Transfer Characteristics



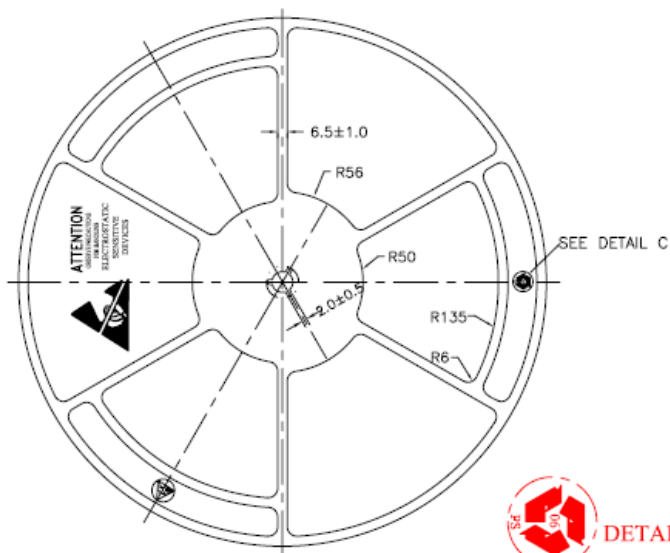
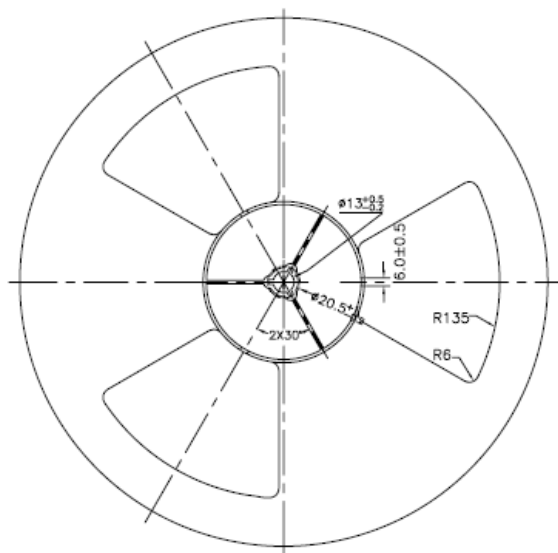
Single Pulse Maximum Power Dissipation



Transient Thermal Response Curves

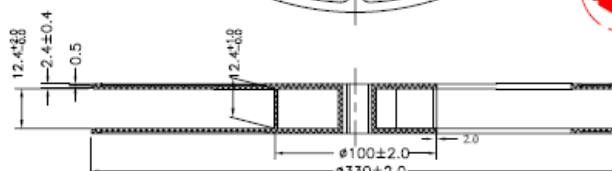


## Reel Dimension

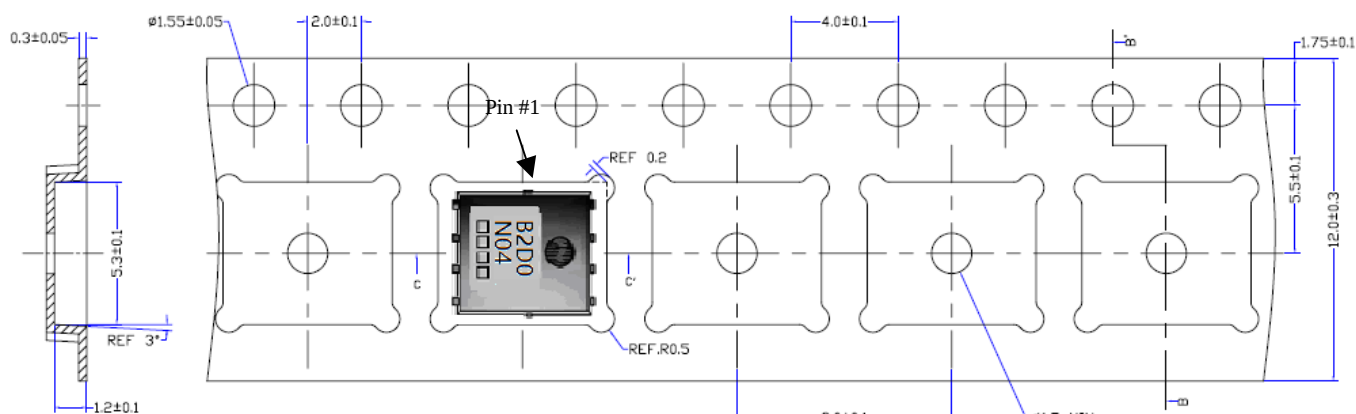


### Notes :

1. All dimensions in mm.
2. Tolerance is +/- 0.25mm, unless otherwise specified.



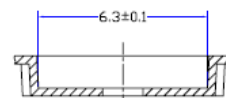
## Carrier Tape Dimension



### Section B-B'

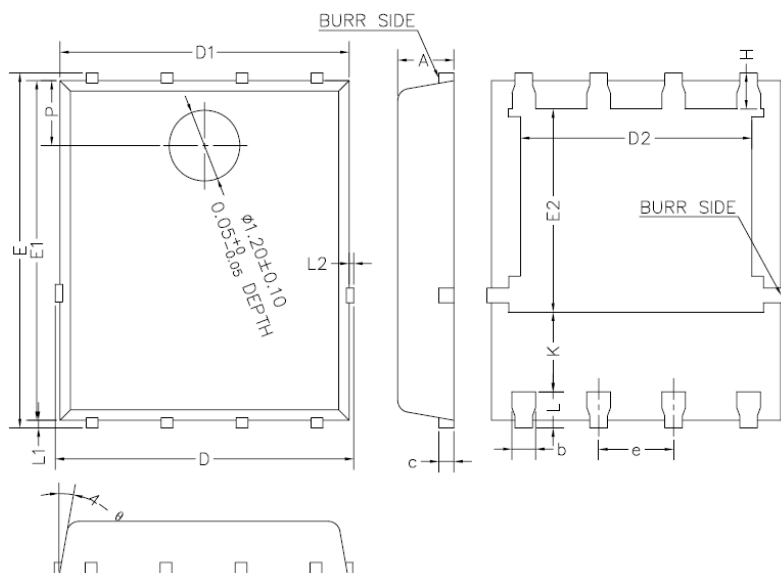
### NOTES:

1. 10 procket hole pitch cumulative tolerance  $\pm 0.2$
2. Carrier camber is within 1mm in 100mm
3. MATERIAL: CONDUCTIVE POYSTYRENE
4. ALL DIMS IN MM
5. Surface resistance  $1 \times 10^{11}(\text{max}) \text{ OHMS/SQ}$

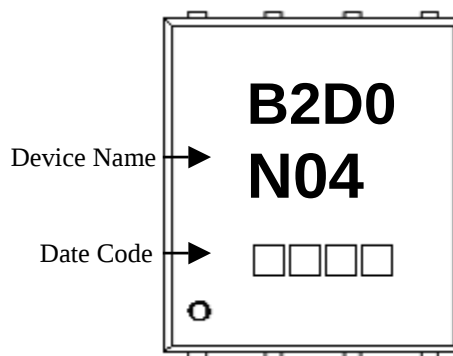


### Section C-C'

## DFN5x6 Dimension



Marking:



8-Lead DFN5x6 Plastic Package  
 Package Code : H8

| DIM | Millimeters |      | Inches |       | DIM      | Millimeters |      | Inches |       |
|-----|-------------|------|--------|-------|----------|-------------|------|--------|-------|
|     | Min.        | Max. | Min.   | Max.  |          | Min.        | Max. | Min.   | Max.  |
| A   | 1.00        | 1.20 | 0.039  | 0.047 | E2       | 3.18        | 3.54 | 0.125  | 0.139 |
| b   | 0.35        | 0.45 | 0.014  | 0.018 | H        | 0.51        | 0.71 | 0.020  | 0.028 |
| c   | 0.21        | 0.34 | 0.008  | 0.013 | K        | 1.10        | -    | 0.043  | -     |
| D   | -           | 5.10 | -      | 0.201 | L        | 0.51        | 0.71 | 0.020  | 0.028 |
| D1  | 4.80        | 5.00 | 0.189  | 0.197 | L1       | 0.06        | 0.20 | 0.002  | 0.008 |
| D2  | 3.82        | 4.11 | 0.150  | 0.162 | L2       | -           | 0.10 | -      | 0.004 |
| e   | 1.17        | 1.37 | 0.046  | 0.054 | p        | 1.00        | 1.20 | 0.039  | 0.047 |
| E   | 5.90        | 6.10 | 0.232  | 0.240 | $\theta$ | 8°          | 12°  | 8°     | 12°   |
| E1  | 5.70        | 5.80 | 0.224  | 0.228 |          |             |      |        |       |