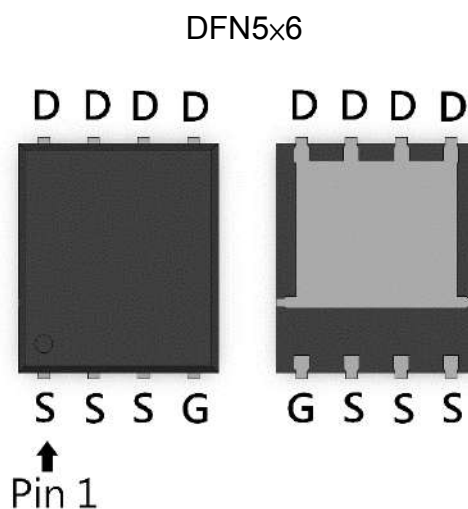


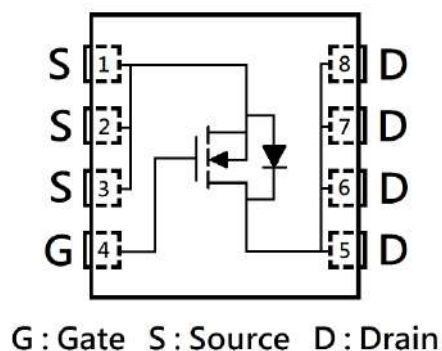
## N-Channel Enhancement Mode Power MOSFET

### Features:

- Low On Resistance
- Low Gate Charge
- Fast Switching Characteristic



KPRB050N15BR



|                                           |              |
|-------------------------------------------|--------------|
| $BV_{DSS}$                                | 150V         |
| $I_D @ V_{GS}=10V, T_C=25^\circ C$        | 18A          |
| $I_D @ V_{GS}=10V, T_A=25^\circ C$        | 4.3A         |
| $R_{DS(ON)}$ typ. @ $V_{GS}=10V, I_D=5A$  | 47m $\Omega$ |
| $R_{DS(ON)}$ typ. @ $V_{GS}=4.5V, I_D=4A$ | 52m $\Omega$ |

### Ordering Information

| Device       | Package                                                   | Shipping               |
|--------------|-----------------------------------------------------------|------------------------|
| KPRB050N15BR | DFN5x6<br>(Pb-free lead plating and halogen-free package) | 3000 pcs / Tape & Reel |

## Absolute Maximum Ratings (T<sub>A</sub>=25°C)

| Parameter                                                              | Symbol                            | Limits   | Unit |
|------------------------------------------------------------------------|-----------------------------------|----------|------|
| Drain-Source Voltage                                                   | V <sub>DS</sub>                   | 150      | V    |
| Gate-Source Voltage                                                    | V <sub>GS</sub>                   | ±20      |      |
| Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>C</sub> =25°C  | I <sub>D</sub>                    | 18       | A    |
| Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>C</sub> =100°C |                                   | 11       |      |
| Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>A</sub> =25°C  |                                   | 4.3      |      |
| Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>A</sub> =70°C  |                                   | 3.4      |      |
| Pulsed Drain Current                                                   | I <sub>DM</sub>                   | 72       |      |
| Continuous Body Diode Forward Current @ T <sub>C</sub> =25°C           | I <sub>S</sub>                    | 18       | mJ   |
| Avalanche Current @ L=0.1mH                                            | I <sub>AS</sub>                   | 18       |      |
| Avalanche Energy @ L=0.5mH                                             | E <sub>AS</sub>                   | 25       |      |
| Total Power Dissipation                                                | T <sub>C</sub> =25°C              | 50       | W    |
|                                                                        | T <sub>C</sub> =100°C             | 20       |      |
|                                                                        | T <sub>A</sub> =25°C              | 2.8      |      |
|                                                                        | T <sub>A</sub> =70°C              | 1.8      |      |
| Operating Junction and Storage Temperature Range                       | T <sub>J</sub> , T <sub>stg</sub> | -55~+150 | °C   |

## Thermal Data

| Parameter                               | Symbol           | Steady State | Unit |
|-----------------------------------------|------------------|--------------|------|
| Thermal Resistance, Junction-to-case    | R <sub>θJC</sub> | 2.5          | °C/W |
| Thermal Resistance, Junction-to-ambient | R <sub>θJA</sub> | 45           |      |

Note:

- \*a. The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
- \*b. 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 power dissipation P<sub>D</sub> is based on R<sub>θJA</sub> and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
- \*c. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C. Ratings are based on low frequency and low duty cycles to keep initial T<sub>J</sub>=25°C.

## Electrical Characteristics (T<sub>A</sub>=25°C, unless otherwise specified)

| Symbol                    | Min. | Typ. | Max. | Unit | Test Conditions                                                                     |
|---------------------------|------|------|------|------|-------------------------------------------------------------------------------------|
| Static                    |      |      |      |      |                                                                                     |
| BV <sub>DSS</sub>         | 150  | -    | -    | V    | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                          |
| V <sub>GS(th)</sub>       | 1    | -    | 2.5  |      | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                            |
| G <sub>FS</sub>           | -    | 11   | -    | S    | V <sub>DS</sub> =10V, I <sub>D</sub> =5A                                            |
| I <sub>GSS</sub>          | -    | -    | ±100 | nA   | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                          |
| I <sub>DSS</sub>          | -    | -    | 1    | μA   | V <sub>DS</sub> =120V, V <sub>GS</sub> =0V                                          |
| R <sub>DS(ON)</sub>       | -    | 47   | 62   | mΩ   | V <sub>GS</sub> =10V, I <sub>D</sub> =5A                                            |
|                           | -    | 52   | 75   |      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A                                           |
| Dynamic                   |      |      |      |      |                                                                                     |
| C <sub>iss</sub>          | -    | 1200 | -    | pF   | V <sub>DS</sub> =75V, V <sub>GS</sub> =0V, f=1MHz                                   |
| C <sub>oss</sub>          | -    | 70   | -    |      |                                                                                     |
| C <sub>rss</sub>          | -    | 9.2  | -    |      |                                                                                     |
| R <sub>g</sub>            | -    | 1    | -    | Ω    | f=1MHz                                                                              |
| Q <sub>g</sub> *1, 2      | -    | 22   | -    | nC   | V <sub>DS</sub> =75V, I <sub>D</sub> =5A, V <sub>GS</sub> =10V                      |
| Q <sub>gs</sub> *1, 2     | -    | 3.8  | -    |      |                                                                                     |
| Q <sub>gd</sub> *1, 2     | -    | 4.4  | -    |      |                                                                                     |
| t <sub>d(ON)</sub> *1, 2  | -    | 11   | -    | ns   | V <sub>DS</sub> =75V, I <sub>D</sub> =5A, V <sub>GS</sub> =10V, R <sub>GS</sub> =6Ω |
| t <sub>r</sub> *1, 2      | -    | 16   | -    |      |                                                                                     |
| t <sub>d(OFF)</sub> *1, 2 | -    | 34   | -    |      |                                                                                     |
| t <sub>f</sub> *1, 2      | -    | 12   | -    |      |                                                                                     |
| Source-Drain Diode        |      |      |      |      |                                                                                     |
| V <sub>SD</sub> *1        | -    | 0.8  | 1.2  | V    | I <sub>S</sub> =5A, V <sub>GS</sub> =0V                                             |
| t <sub>rr</sub>           | -    | 38   | -    | ns   | I <sub>F</sub> =2.3A, dI <sub>F</sub> /dt=100A/μs                                   |
| Q <sub>rr</sub>           | -    | 59   | -    | nC   |                                                                                     |

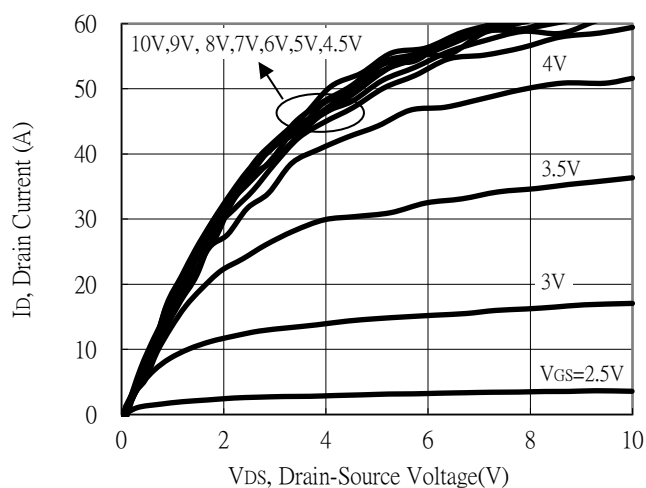
Note:

\*1. Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

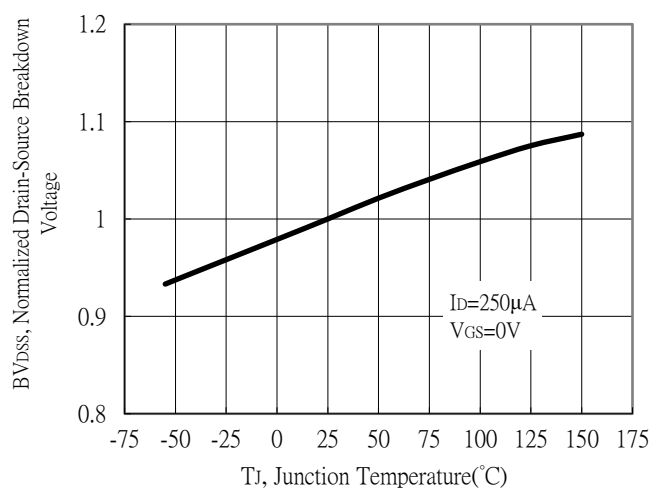
\*2. Independent of operating temperature

## Typical Characteristics

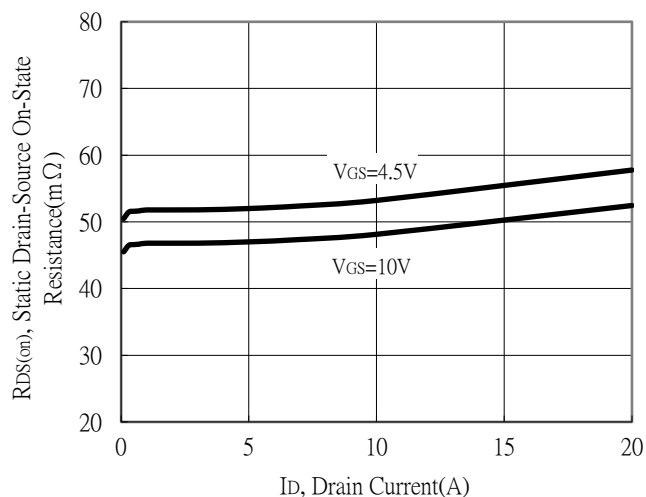
Typical Output Characteristics



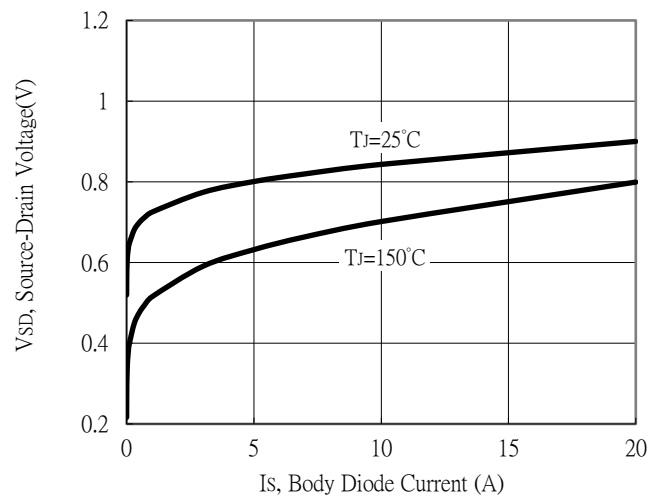
Breakdown Voltage vs Ambient Temperature



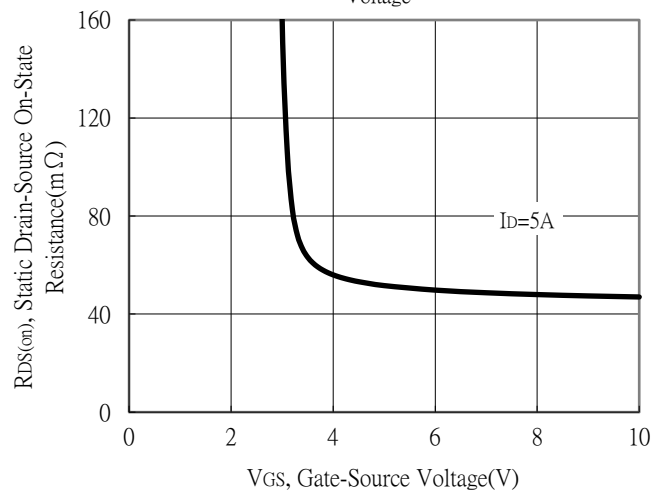
Static Drain-Source On-State resistance vs Drain Current



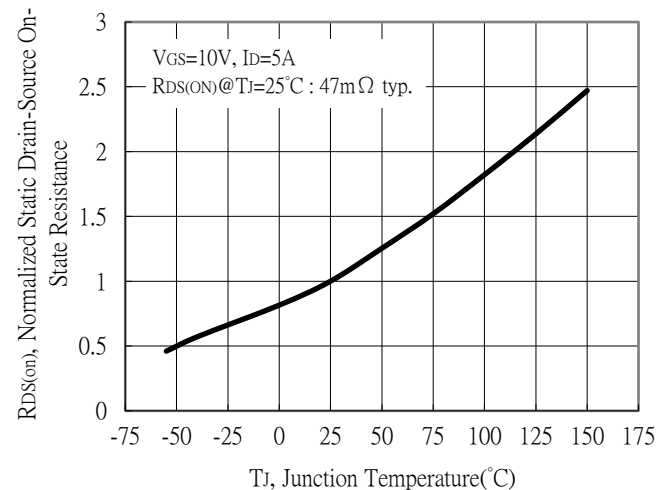
Body Diode Current vs Source-Drain Voltage



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

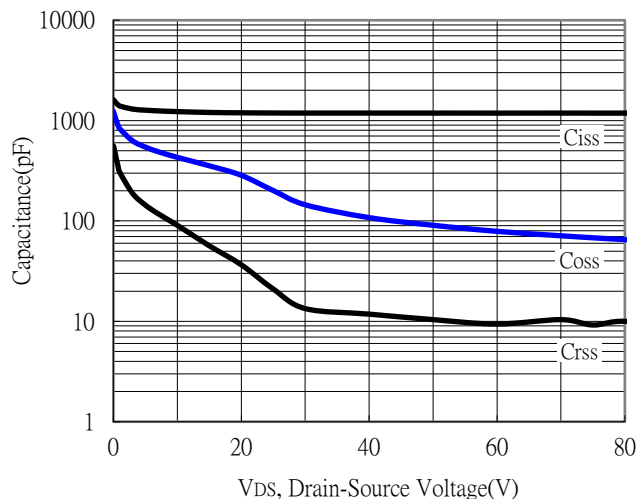


Drain-Source On-State Resistance vs Junction Temperature

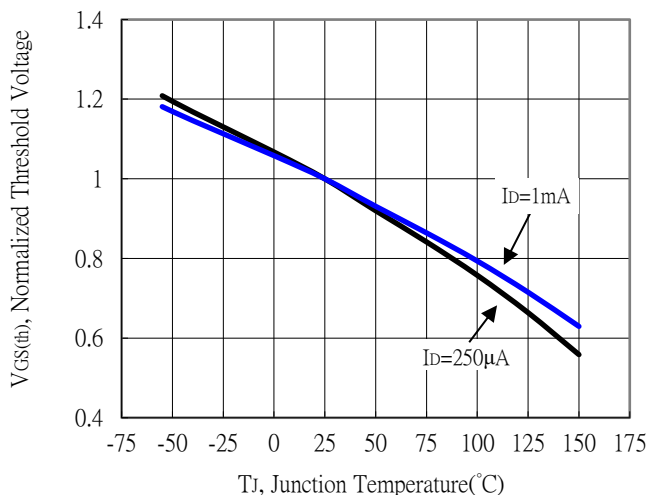


## Typical Characteristics (Cont.)

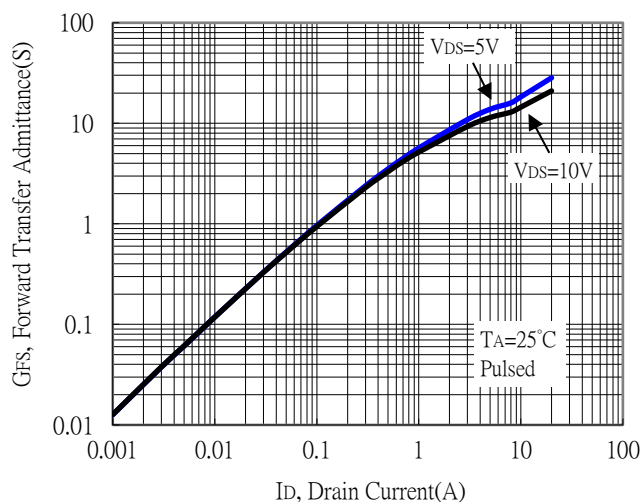
Capacitance vs Drain-to-Source Voltage



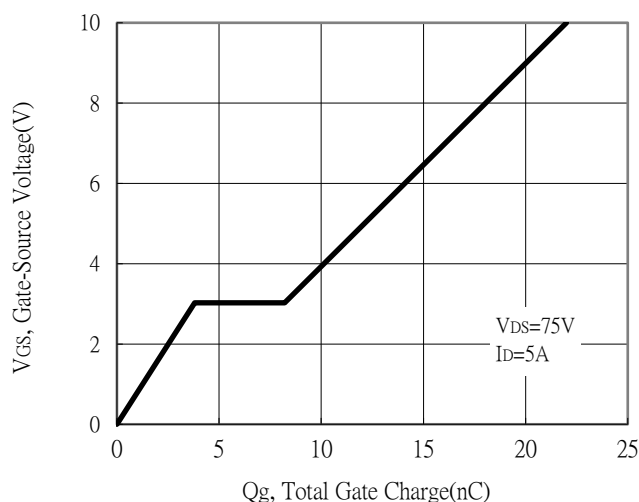
Threshold Voltage vs Junction Temperature



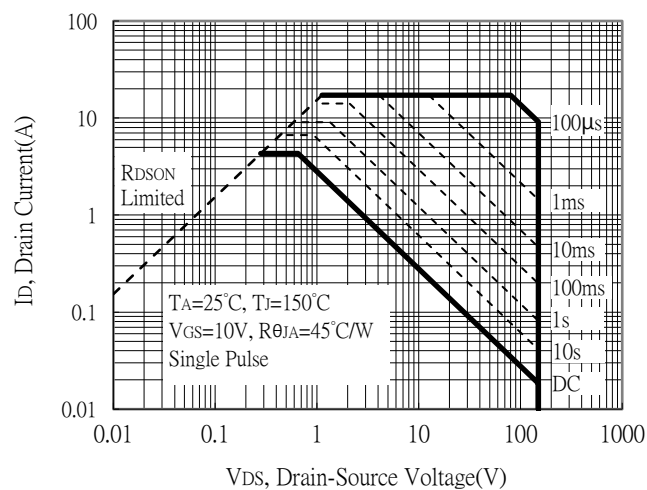
Forward Transfer Admittance vs Drain Current



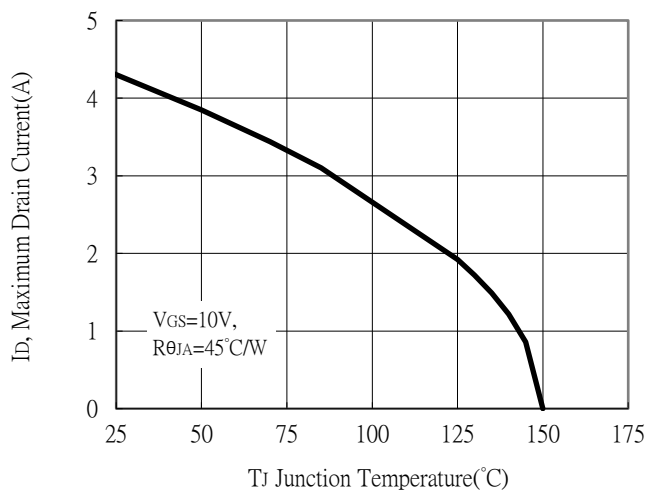
Gate Charge Characteristics



Maximum Safe Operating Area

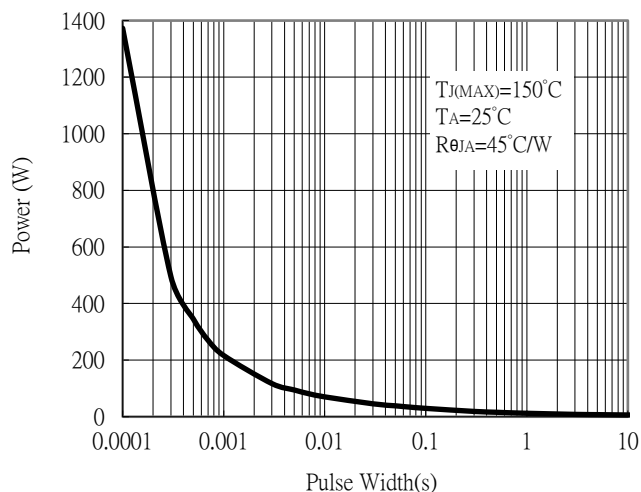


Maximum Drain Current vs Junction Temperature

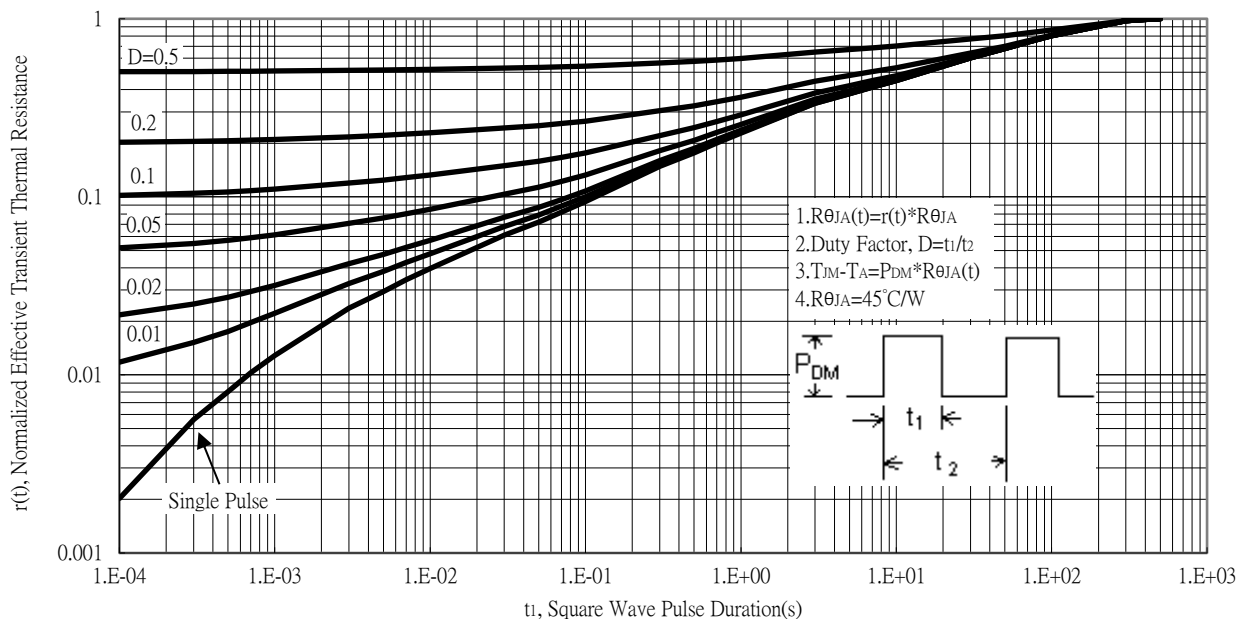


## Typical Characteristics (Cont.)

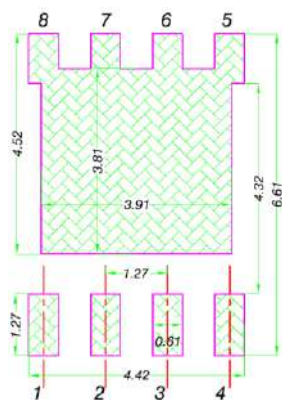
Single Pulse Power Rating, Junction to Ambient



Transient Thermal Response Curves

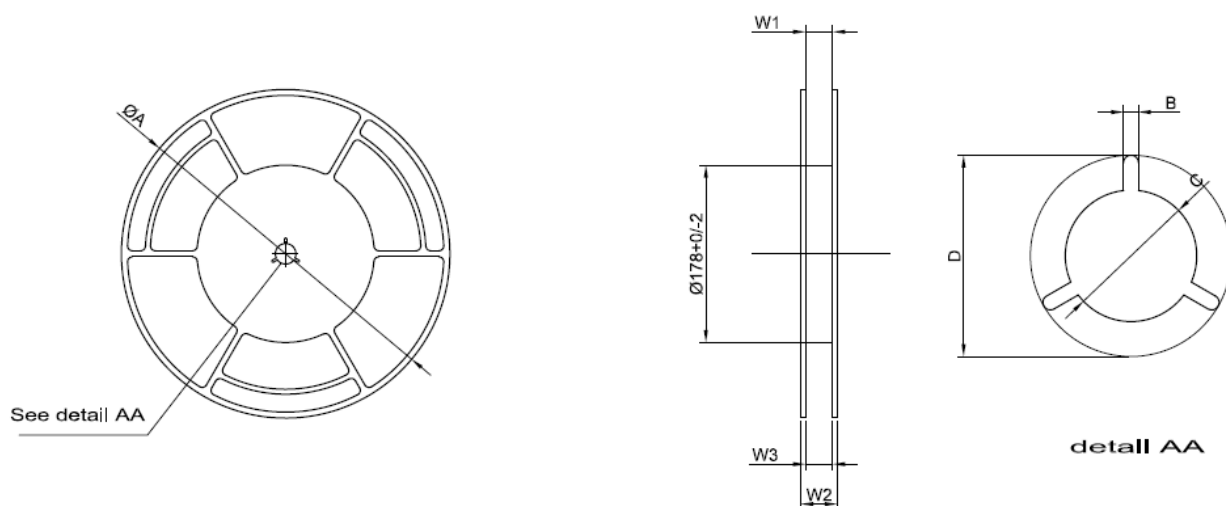


## Recommended Soldering Footprint



Unit : mm

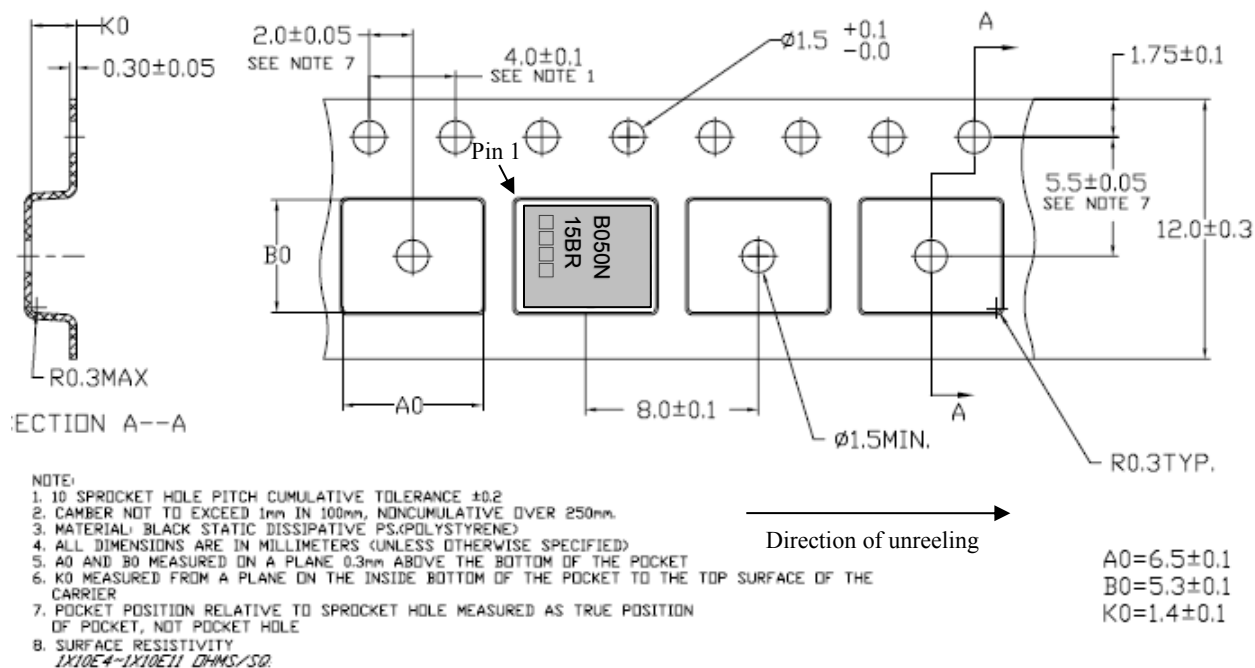
## Reel Dimension



| TAPE SIZE | A             | B             | C                 | D            | W1              | W2             | W3    |
|-----------|---------------|---------------|-------------------|--------------|-----------------|----------------|-------|
| 12mm      | $330 \pm 2.0$ | $2.9 \pm 0.5$ | $13.0 \pm 0.5/-0$ | $23 \pm 1.0$ | $12.4 \pm 2/-0$ | $18.4 \pm 0.5$ | 12~15 |

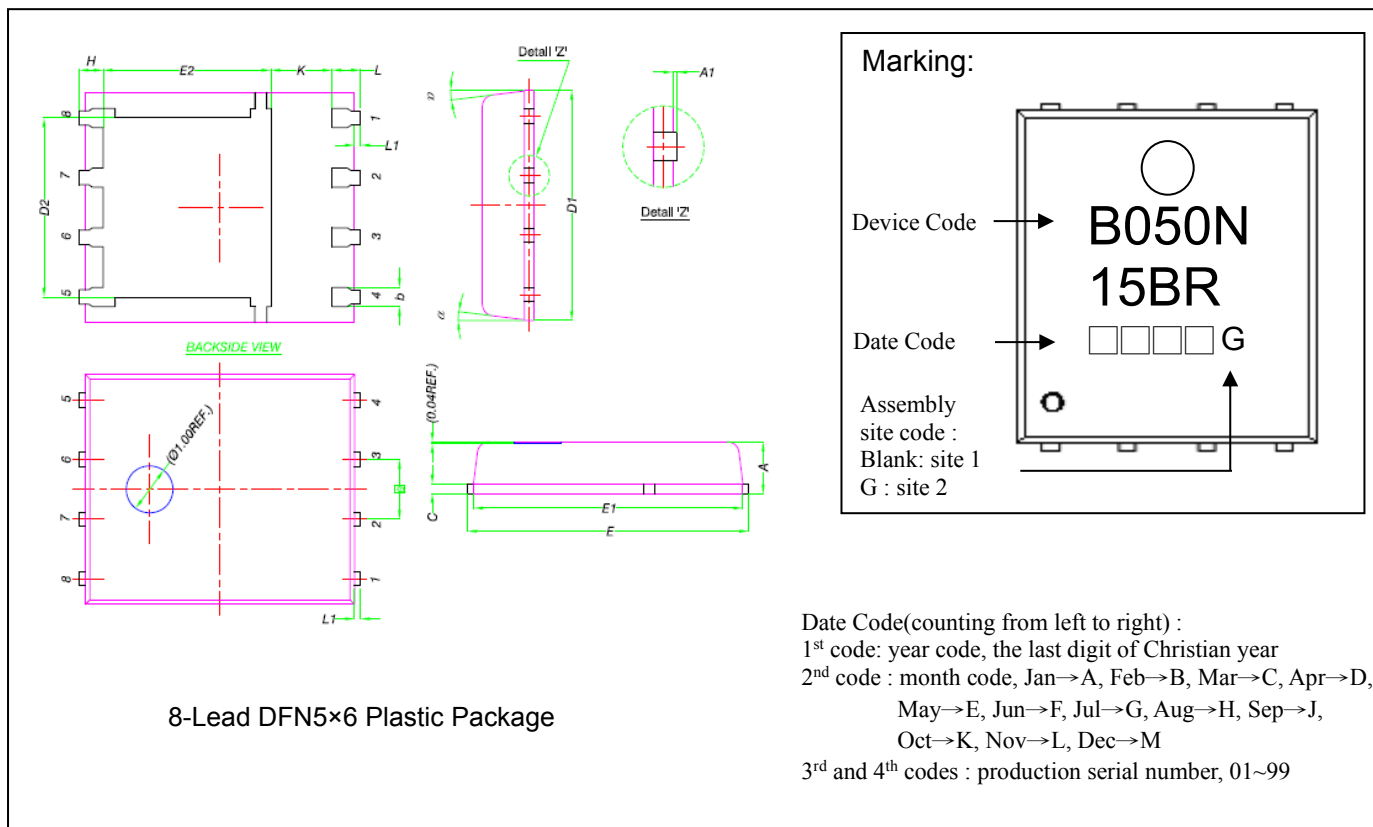
Unit : mm

## Carrier Tape Dimension



Unit : mm

## DFN5x6 Dimension



| DIM | Millimeters |      | Inches |       | DIM | Millimeters |      | Inches |       |
|-----|-------------|------|--------|-------|-----|-------------|------|--------|-------|
|     | Min.        | Max. | Min.   | Max.  |     | Min.        | Max. | Min.   | Max.  |
| A   | 0.90        | 1.10 | 0.035  | 0.043 | E2  | 3.38        | 3.78 | 0.133  | 0.149 |
| A1  | 0.00        | 0.05 | 0.000  | 0.002 | e   | 1.27        | BSC  | 0.050  | BSC   |
| b   | 0.33        | 0.51 | 0.013  | 0.020 | H   | 0.41        | 0.61 | 0.016  | 0.024 |
| C   | 0.20        | 0.30 | 0.008  | 0.012 | K   | 1.10        | -    | 0.043  | -     |
| D1  | 4.80        | 5.00 | 0.189  | 0.197 | L   | 0.51        | 0.71 | 0.020  | 0.028 |
| D2  | 3.61        | 3.96 | 0.142  | 0.156 | L1  | 0.06        | 0.20 | 0.002  | 0.008 |
| E   | 5.90        | 6.10 | 0.232  | 0.240 | α   | 0°          | 12°  | 0°     | 12°   |
| E1  | 5.70        | 5.80 | 0.224  | 0.228 |     |             |      |        |       |