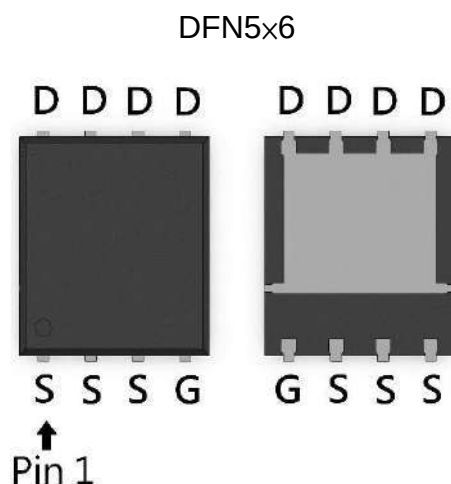


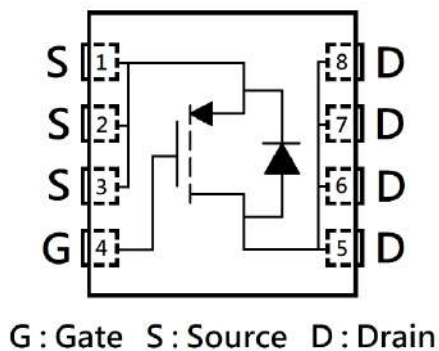
## P-Channel Enhancement Mode Power MOSFET

### Features:

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



|                                         |               |
|-----------------------------------------|---------------|
| $BV_{DSS}$                              | -30V          |
| $I_D@V_{GS}=-10V, T_C=25^{\circ}C$      | -84A          |
| $I_D@V_{GS}=-10V, T_A=25^{\circ}C$      | -20A          |
| $R_{DS(ON) typ.}@V_{GS}=-10V, I_D=-20A$ | 2.6m $\Omega$ |
| $R_{DS(ON) typ.}@V_{GS}=-10V, I_D=-15A$ | 4.8m $\Omega$ |



### Ordering Information

| Device     | Package                                                   | Shipping               |
|------------|-----------------------------------------------------------|------------------------|
| KPRB3D0P03 | 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>          | -30                               | V           |
| Gate-Source Voltage                                                                       | V <sub>GS</sub>          | ± 20                              |             |
| Continuous Drain Current @ V <sub>GS</sub> =-10V, T <sub>C</sub> =25°C (silicon limit) *a | I <sub>D</sub>           | -117                              | A           |
| Continuous Drain Current @ V <sub>GS</sub> =-10V, T <sub>C</sub> =25°C (package limit) *a |                          | -84                               |             |
| Continuous Drain Current @ V <sub>GS</sub> =-10V, T <sub>C</sub> =100°C *a                |                          | -74                               |             |
| Continuous Drain Current @ V <sub>GS</sub> =-10V, T <sub>A</sub> =25°C *b                 |                          | -20                               |             |
| Continuous Drain Current @ V <sub>GS</sub> =-10V, T <sub>A</sub> =70°C *b                 |                          | -16                               |             |
| Pulsed Drain Current *c                                                                   | I <sub>DM</sub>          | -336                              |             |
| Continuous Body Diode Forward Current @ T <sub>C</sub> =25°C *a                           | I <sub>S</sub>           | -80                               |             |
| Pulsed Body Diode Forward Current @ T <sub>C</sub> =25°C *a                               | I <sub>SM</sub>          | -320                              |             |
| Avalanche Current @ L=0.1mH                                                               | I <sub>AS</sub>          | -60                               |             |
| Avalanche Energy @ L=0.5mH                                                                | E <sub>AS</sub>          | 225                               | mJ          |
| Total Power Dissipation                                                                   | T <sub>C</sub> =25°C *a  | 96                                | W           |
|                                                                                           | T <sub>C</sub> =100°C *a | 38                                |             |
|                                                                                           | T <sub>A</sub> =25°C *b  | 2.8                               |             |
|                                                                                           | T <sub>A</sub> =70°C *b  | 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> | 1.3          | °C/W |
| Thermal Resistance, Junction-to-ambient *b | 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)

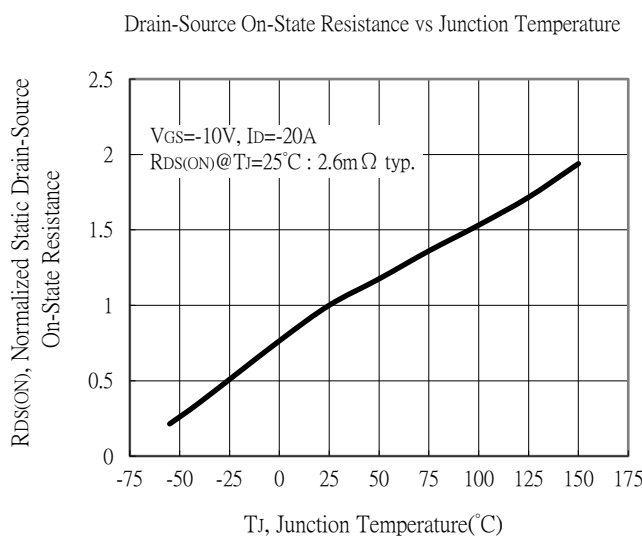
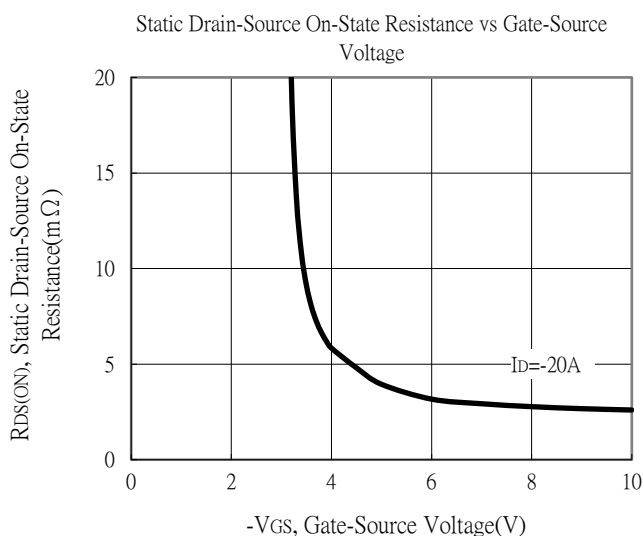
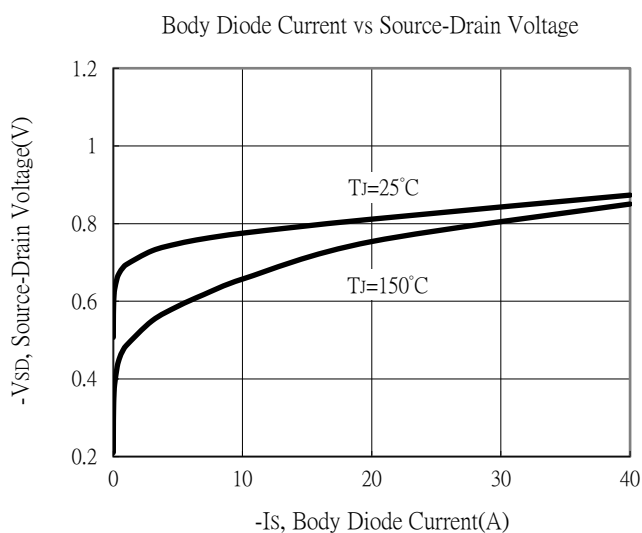
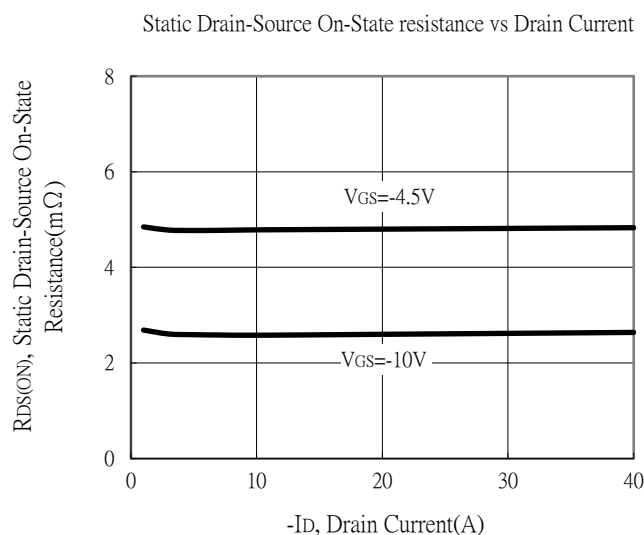
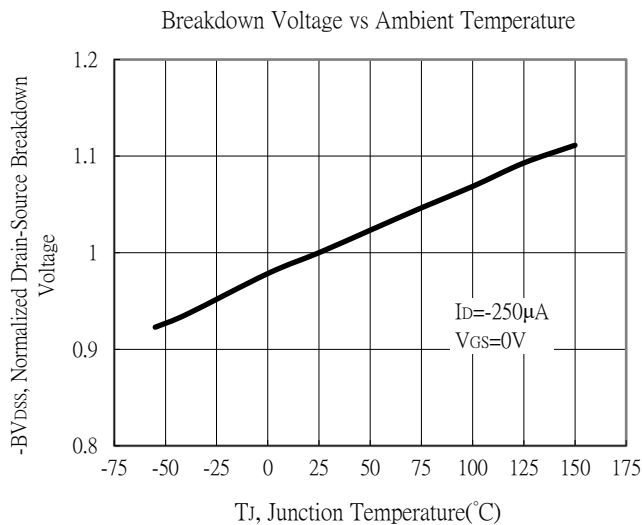
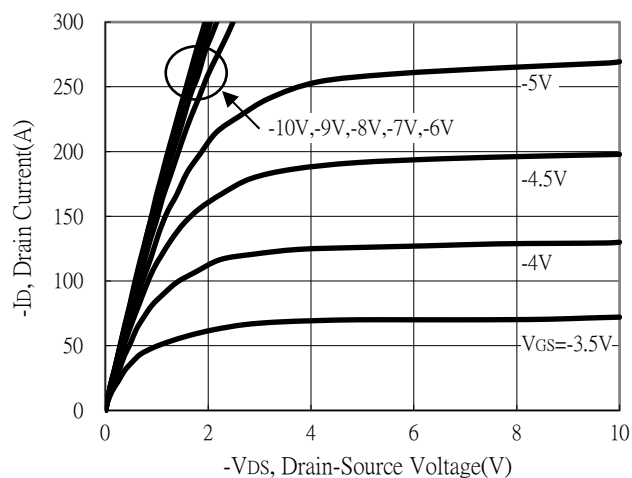
| Symbol                    | Min. | Typ.  | Max. | Unit | Test Conditions                                                                          |
|---------------------------|------|-------|------|------|------------------------------------------------------------------------------------------|
| Static                    |      |       |      |      |                                                                                          |
| BV <sub>DSS</sub>         | -30  | -     | -    | 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>           | -    | 52    | -    | S    | V <sub>DS</sub> =-10V, I <sub>D</sub> =-20A                                              |
| 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> =-24V, V <sub>GS</sub> =0V                                               |
| R <sub>DS(ON)</sub>       | -    | 2.6   | 3.6  | m Ω  | V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A                                              |
|                           | -    | 4.8   | 6.5  |      | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-15A                                             |
| Dynamic                   |      |       |      |      |                                                                                          |
| C <sub>iss</sub>          | -    | 10500 | -    | pF   | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz                                       |
| C <sub>oss</sub>          | -    | 1150  | -    |      |                                                                                          |
| C <sub>rss</sub>          | -    | 500   | -    |      |                                                                                          |
| R <sub>g</sub>            | -    | 2.2   | -    | Ω    | f=1MHz                                                                                   |
| Q <sub>g</sub> *1, 2      | -    | 114   | -    | nC   | V <sub>DS</sub> =-15V, I <sub>D</sub> =-20A, V <sub>GS</sub> =-4.5V                      |
| Q <sub>g</sub> *1, 2      | -    | 225   | -    |      | V <sub>DS</sub> =-15V, I <sub>D</sub> =-20A, V <sub>GS</sub> =-10V                       |
| Q <sub>gs</sub> *1, 2     | -    | 30    | -    |      |                                                                                          |
| Q <sub>gd</sub> *1, 2     | -    | 52    | -    |      |                                                                                          |
| t <sub>d(ON)</sub> *1, 2  | -    | 37    | -    | ns   | V <sub>DS</sub> =-15V, I <sub>D</sub> =-20A, V <sub>GS</sub> =-10V, R <sub>GS</sub> =1 Ω |
| t <sub>r</sub> *1, 2      | -    | 32    | -    |      |                                                                                          |
| t <sub>d(OFF)</sub> *1, 2 | -    | 175   | -    |      |                                                                                          |
| t <sub>f</sub> *1, 2      | -    | 40    | -    |      |                                                                                          |
| Source-Drain Diode        |      |       |      |      |                                                                                          |
| V <sub>SD</sub> *1        | -    | -0.81 | -1.2 | V    | I <sub>S</sub> =-20A, V <sub>GS</sub> =0V                                                |
| t <sub>rr</sub>           | -    | 34    | -    | ns   | I <sub>F</sub> =-20A, dI <sub>F</sub> /dt=100A/μs                                        |
| Q <sub>rr</sub>           | -    | 34    | -    | nC   |                                                                                          |

Note:

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

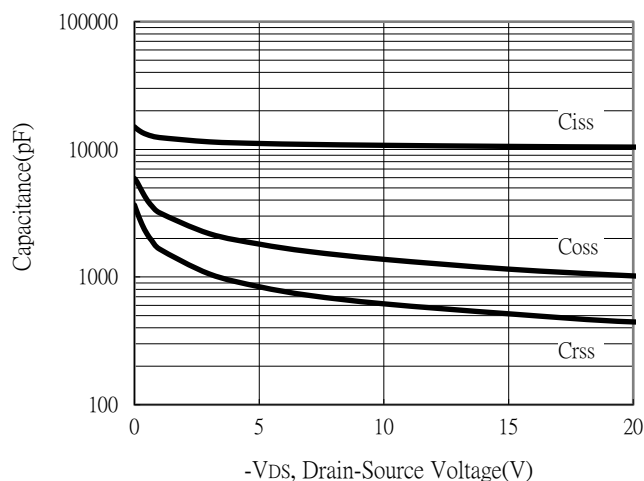
\*2. Independent of operating temperature

## Typical Characteristics

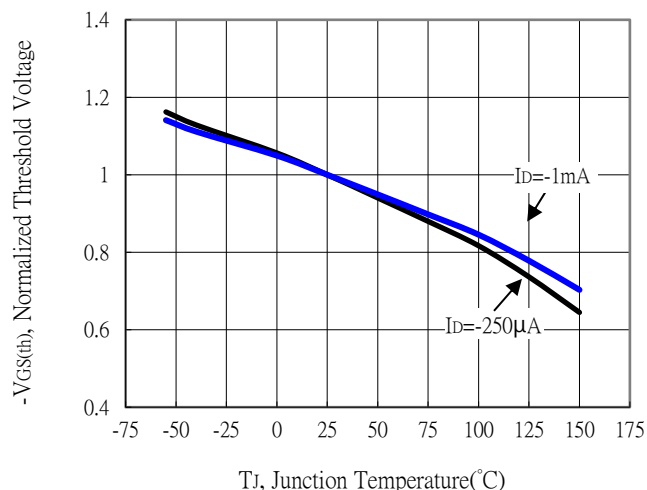


## Typical Characteristics (Cont.)

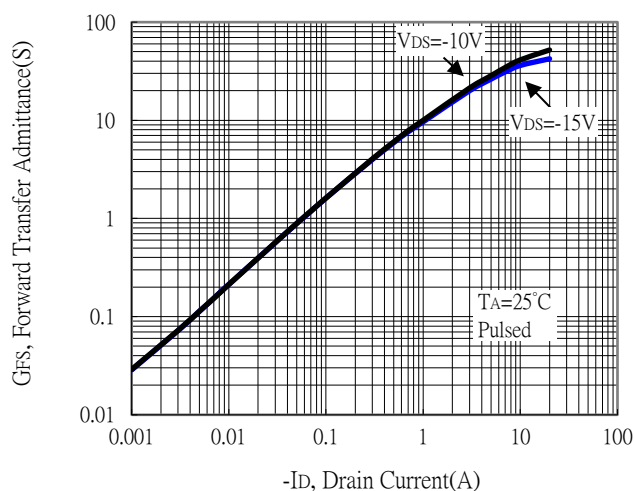
Capacitance vs Drain-to-Source Voltage



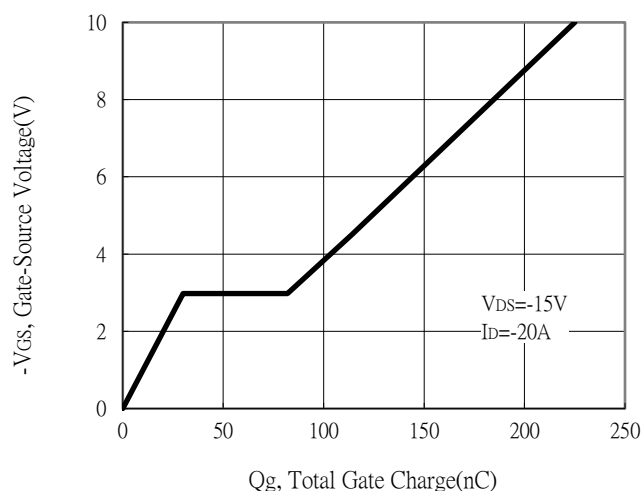
Threshold Voltage vs Junction Temperature



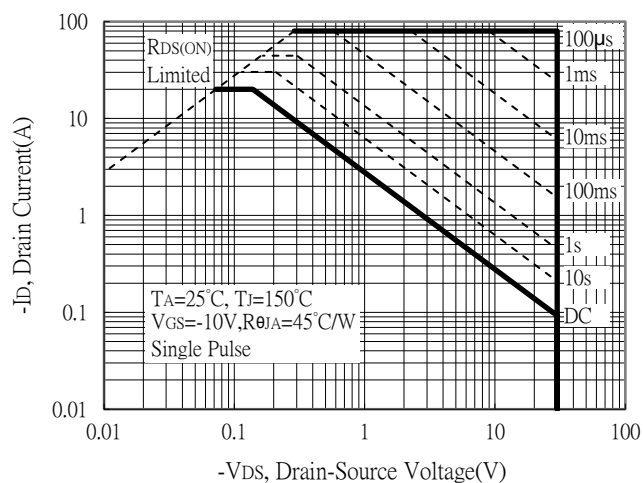
Forward Transfer Admittance vs Drain Current



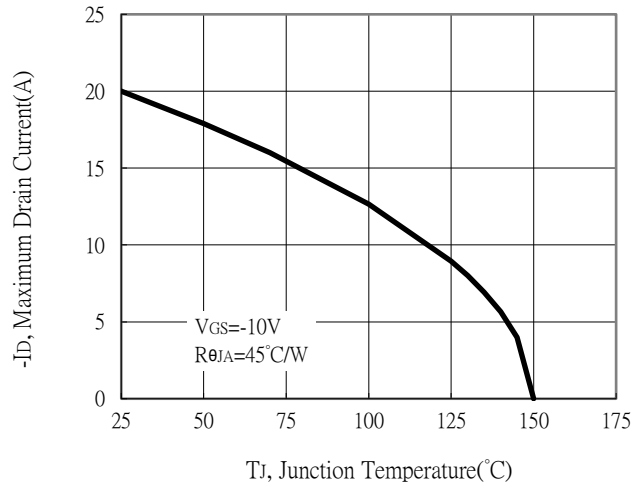
Gate Charge Characteristics



Maximum Safe Operating Area

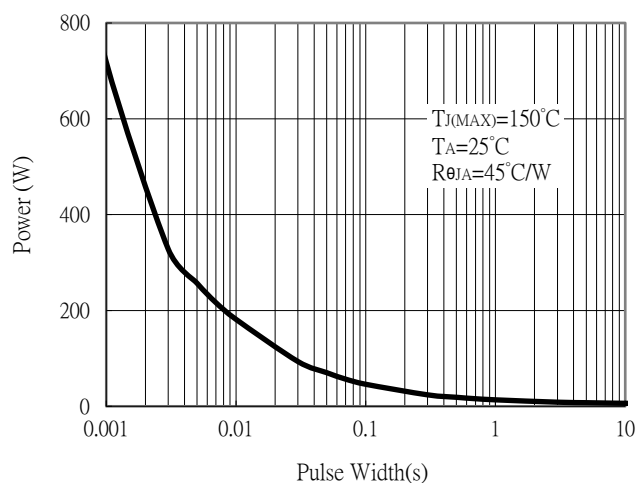


Maximum Drain Current vs Junction Temperature

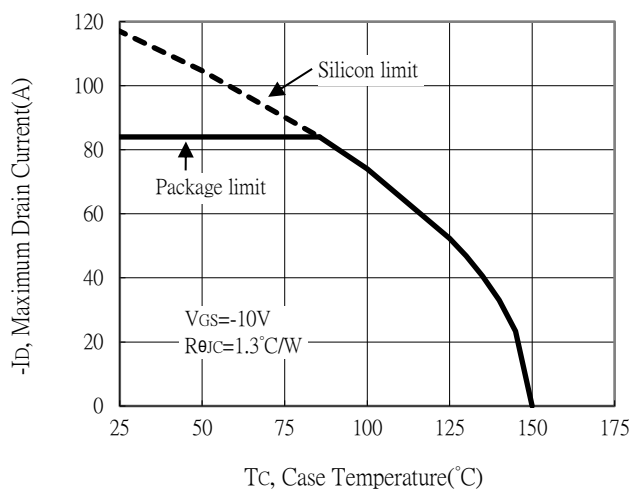


## Typical Characteristics (Cont.)

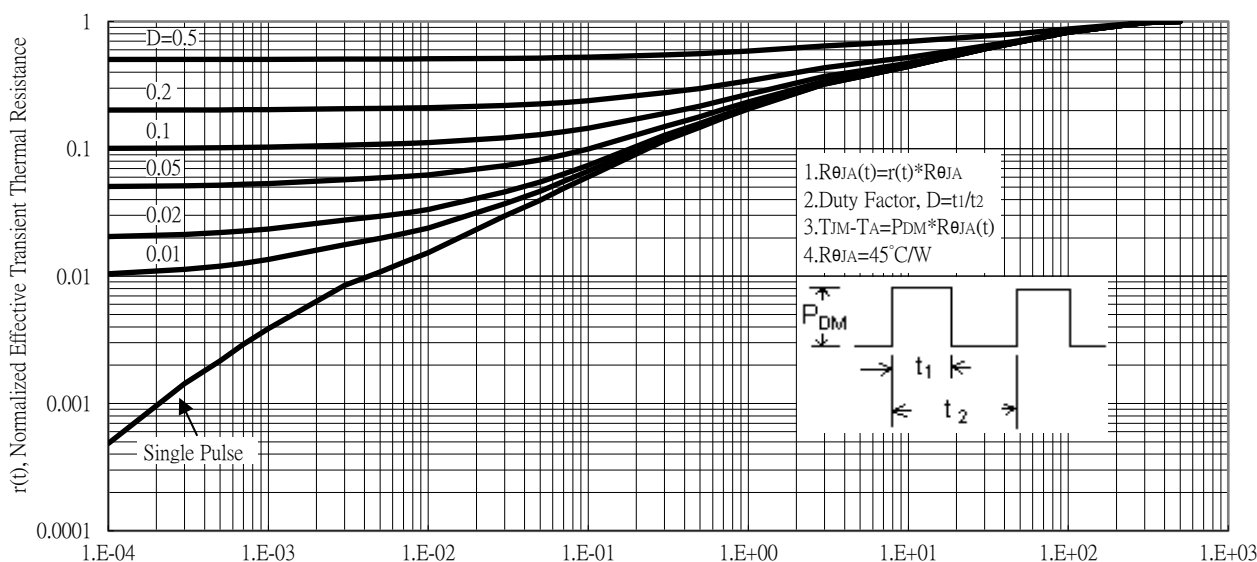
Single Pulse Power Rating, Junction to Ambient



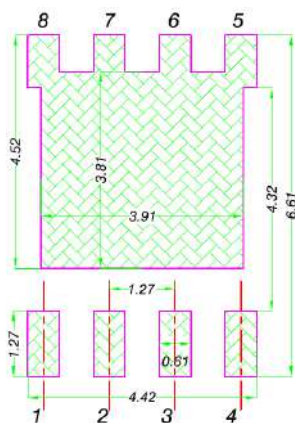
Maximum Drain Current vs Case Temperature



Transient Thermal Response Curves

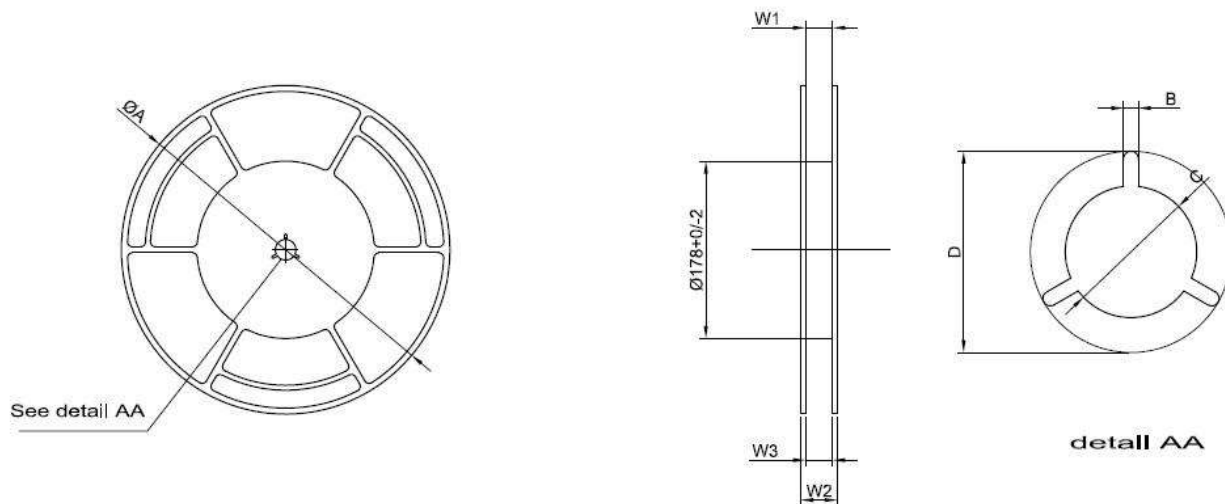


## Recommended Soldering Footprint



Unit : mm

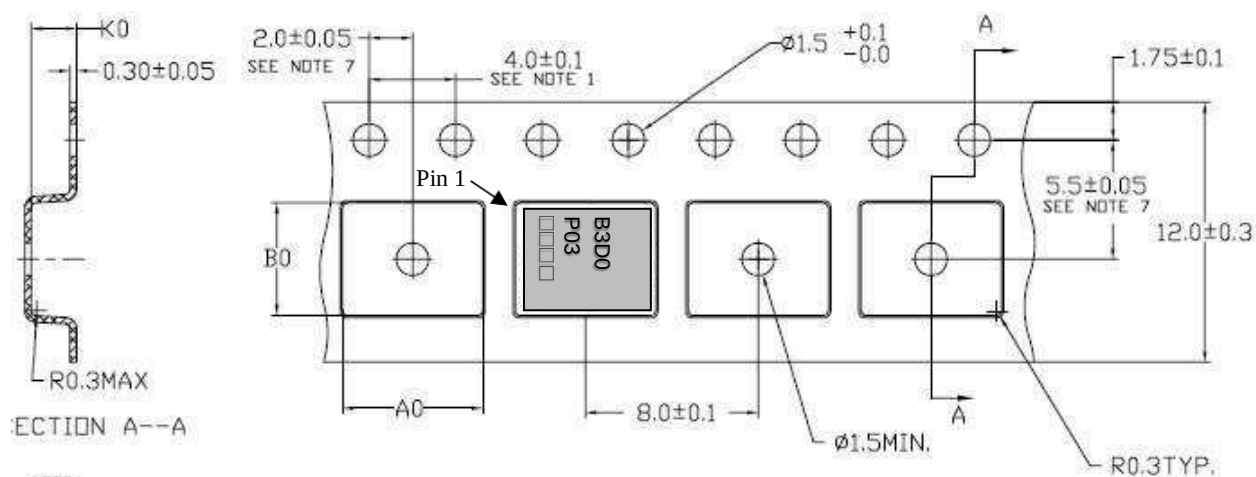
## Reel Dimension



| 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



NOTE:

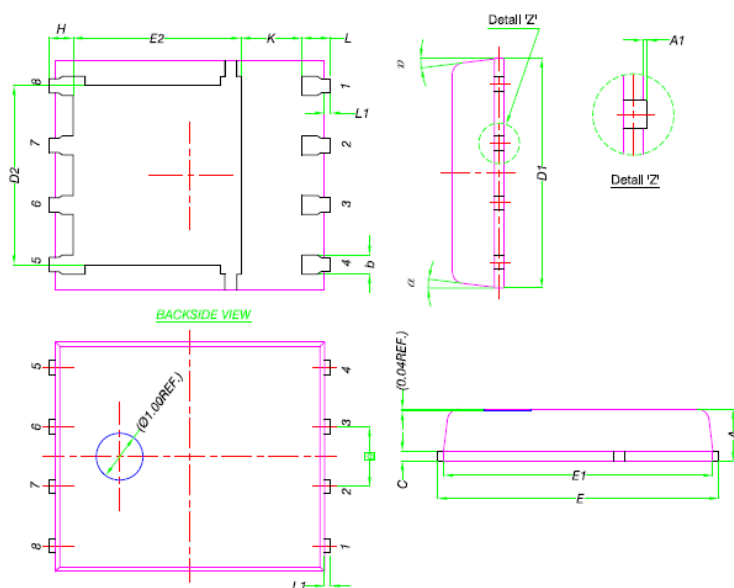
1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE  $\pm 0.2$
2. CAMBER NOT TO EXCEED 1mm IN 100mm, NONCUMULATIVE OVER 250mm.
3. MATERIAL: BLACK STATIC DISSIPATIVE PS(POLYSTYRENE)
4. ALL DIMENSIONS ARE IN MILLIMETERS (UNLESS OTHERWISE SPECIFIED)
5.  $A0$  AND  $B0$  MEASURED ON A PLANE 0.3mm ABOVE THE BOTTOM OF THE POCKET
6.  $K0$  MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE OF THE CARRIER
7. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED AS TRUE POSITION OF POCKET, NOT POCKET HOLE
8. SURFACE RESISTIVITY  
 $1 \times 10^4 \sim 1 \times 10^{11} \text{ OHMS/SQ.}$

Direction of unreeling

$A0 = 6.5 \pm 0.1$   
 $B0 = 5.3 \pm 0.1$   
 $K0 = 1.4 \pm 0.1$

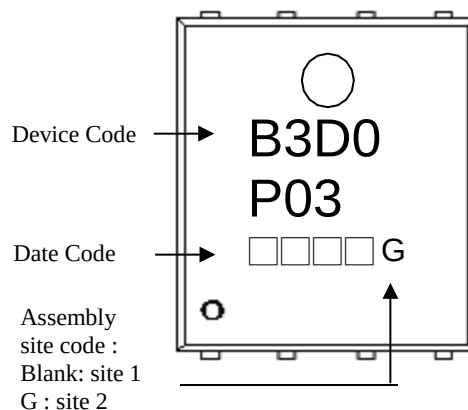
Unit : mm

## DFN5x6 Dimension



8-Lead DFN5x6 Plastic Package

### Marking:



Date Code(counting from left to right) :  
 1<sup>st</sup> code: year code, the last digit of Christian year  
 2<sup>nd</sup> 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  
 3<sup>rd</sup> and 4<sup>th</sup> codes : production serial number, 01~99

| 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 |     |             |      |        |       |