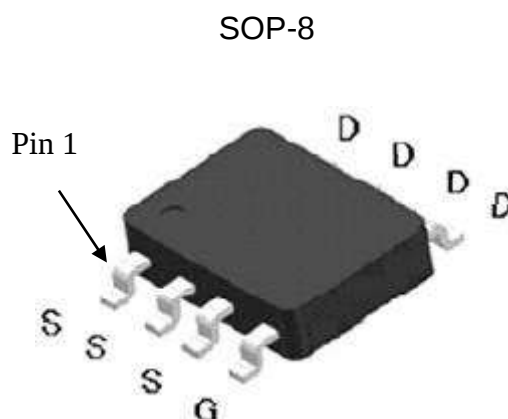


## N-Channel LOGIC Level Enhancement Mode Power MOSFET

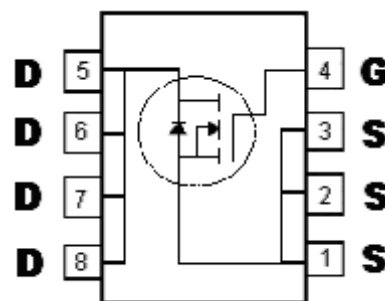
### Description:

The KSCB20N03 is a N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The SOP-8 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.



### Features:

- Single Drive Requirement
- Low On-resistance
- Fast Switching Characteristic
- Dynamic dv/dt rating
- Repetitive Avalanche Rated
- Pb-free & Halogen-free package



G : Gate  
D : Drain  
S : Source

|                                                                 |                     |
|-----------------------------------------------------------------|---------------------|
| <b>BV<sub>DSS</sub></b>                                         | <b>30V</b>          |
| <b>I<sub>D</sub>@ T<sub>A</sub>=25°C, V<sub>GS</sub>=10V</b>    | <b>10.2A</b>        |
| <b>R<sub>DS(ON)</sub>@V<sub>GS</sub>=10V, I<sub>D</sub>=9A</b>  | <b>13.6 mΩ(typ)</b> |
| <b>R<sub>DS(ON)</sub>@V<sub>GS</sub>=4.5V, I<sub>D</sub>=7A</b> | <b>22.3 mΩ(typ)</b> |

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

| Parameter                                                              | Symbol                            | Limits                        | Unit |
|------------------------------------------------------------------------|-----------------------------------|-------------------------------|------|
| Drain-Source Voltage                                                   | V <sub>DS</sub>                   | 30                            | V    |
| Gate-Source Voltage                                                    | V <sub>GS</sub>                   | ±20                           |      |
| Continuous Drain Current @ T <sub>A</sub> =25°C, V <sub>GS</sub> =10V  | I <sub>D</sub>                    | 10.2                          | A    |
| Continuous Drain Current @ T <sub>A</sub> =100°C, V <sub>GS</sub> =10V | I <sub>D</sub>                    | 6.5                           |      |
| Pulsed Drain Current                                                   | I <sub>DM</sub>                   | 40 *1                         |      |
| Avalanche Current                                                      | I <sub>AS</sub>                   | 10                            |      |
| Avalanche Energy @ L=0.1mH, I <sub>D</sub> =10A, R <sub>G</sub> =25Ω   | E <sub>AS</sub>                   | 5                             | mJ   |
| Repetitive Avalanche Energy @ L=0.05mH                                 | E <sub>AR</sub>                   | 1.6 *2                        |      |
| Total Power Dissipation                                                | P <sub>D</sub>                    | T <sub>A</sub> =25 °C<br>3.1  | W    |
|                                                                        |                                   | T <sub>A</sub> =100 °C<br>1.2 |      |
| Operating Junction and Storage Temperature                             | T <sub>j</sub> , T <sub>stg</sub> | -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 <sub>th,j-c</sub> | 25    | °C/W |
| Thermal Resistance, Junction-to-ambient (Note) | R <sub>th,j-a</sub> | 40    |      |

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

## Characteristics (T<sub>c</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>                         | 1.0  | 1.7  | 3.0  |      | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA        |
| G <sub>FS</sub>                             | -    | 9    | -    | S    | V <sub>DS</sub> =5V, I <sub>D</sub> =8A                          |
| 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                        |
|                                             | -    | -    | 25   |      | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, T <sub>j</sub> =125°C |
| *R <sub>DS(ON)</sub>                        | -    | 13.6 | 18   | mΩ   | V <sub>GS</sub> =10V, I <sub>D</sub> =9A                         |
|                                             | -    | 22.3 | 29   |      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =7A                        |
| Dynamic                                     |      |      |      |      |                                                                  |
| Q <sub>g</sub> (V <sub>GS</sub> =10V) *1, 2 | -    | 11   | -    | nC   | I <sub>D</sub> =9A, V <sub>DS</sub> =15V, V <sub>GS</sub> =10V   |
| Q <sub>g</sub> (V <sub>GS</sub> =5V) *1, 2  | -    | 6.4  | -    |      |                                                                  |
| Q <sub>gs</sub> *1, 2                       | -    | 1.9  | -    |      |                                                                  |
| Q <sub>gd</sub> *1, 2                       | -    | 3    | -    |      |                                                                  |
| C <sub>iss</sub>                            | -    | 715  | -    | pF   | V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1MHz                |
| C <sub>oss</sub>                            | -    | 76   | -    |      |                                                                  |
| C <sub>rss</sub>                            | -    | 66   | -    |      |                                                                  |
| R <sub>g</sub>                              | -    | 2.2  | -    | Ω    | V <sub>GS</sub> =15mV, V <sub>DS</sub> =0V, f=1MHz               |

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

| Symbol                                         | Min. | Typ. | Max. | Unit | Test Conditions                                                                       |
|------------------------------------------------|------|------|------|------|---------------------------------------------------------------------------------------|
| Dynamic                                        |      |      |      |      |                                                                                       |
| t <sub>d(ON)</sub> *1, 2                       | -    | 7.5  | -    | ns   | V <sub>DS</sub> =15V, I <sub>D</sub> =1A, V <sub>GS</sub> =10V,<br>R <sub>G</sub> =6Ω |
| t <sub>r</sub> *1, 2                           | -    | 12   | -    |      |                                                                                       |
| t <sub>d(OFF)</sub> *1, 2                      | -    | 21   | -    |      |                                                                                       |
| t <sub>f</sub> *1, 2                           | -    | 7    | -    |      |                                                                                       |
| Source-Drain Diode Ratings and Characteristics |      |      |      |      |                                                                                       |
| I <sub>S</sub> *1                              | -    | -    | 2.3  | A    |                                                                                       |
| I <sub>SM</sub> *3                             | -    | -    | 9.2  |      |                                                                                       |
| V <sub>SD</sub> *1                             | -    | 0.78 | 1.2  | V    | I <sub>F</sub> =2.3A, V <sub>GS</sub> =0V                                             |
| t <sub>rr</sub>                                | -    | 50   | -    | ns   | I <sub>F</sub> =2.3A, dI <sub>F</sub> /dt=100A/μs                                     |
| Q <sub>rr</sub>                                | -    | 2    | -    | nC   |                                                                                       |

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

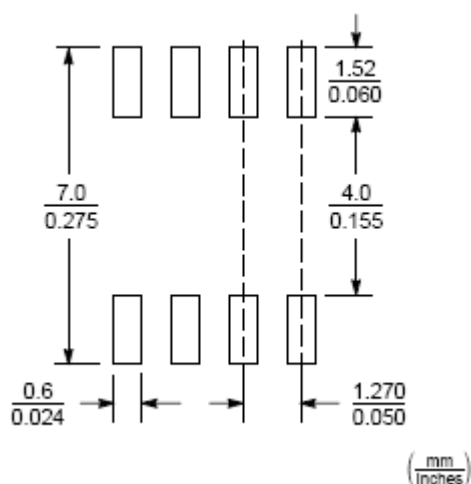
\*2.Independent of operating temperature

\*3.Pulse width limited by maximum junction temperature.

## Ordering Information

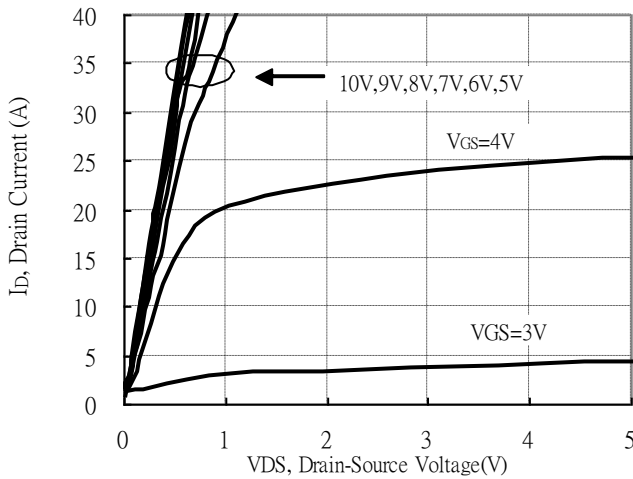
| Device    | Package                                          | Shipping               |
|-----------|--------------------------------------------------|------------------------|
| KSCB20N03 | SOP-8<br>(RoHS compliant & Halogen-free package) | 2500 pcs / Tape & Reel |

## Recommended Soldering Footprint

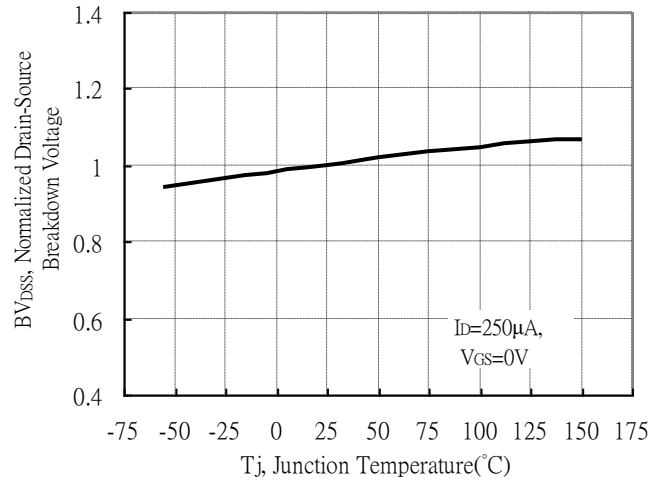


## Typical Characteristics

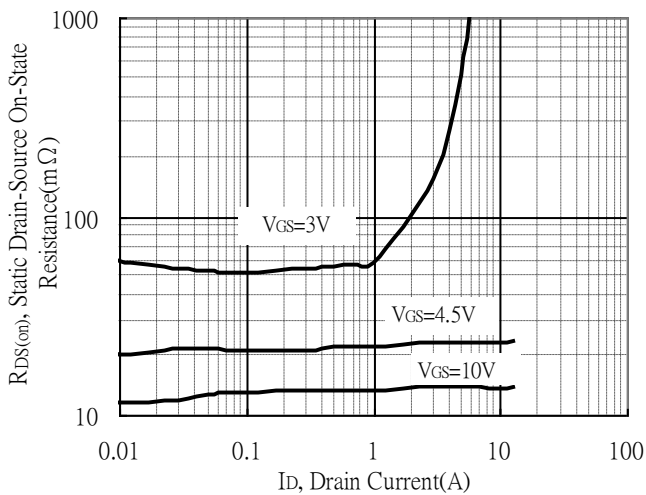
Typical Output Characteristics



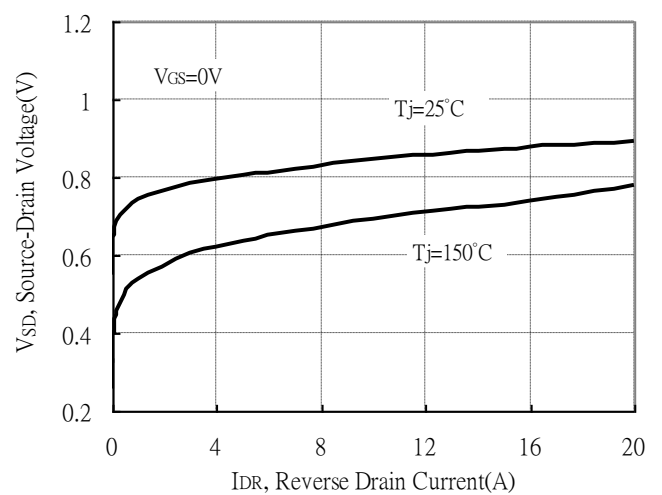
Breakdown Voltage vs Junction Temperature



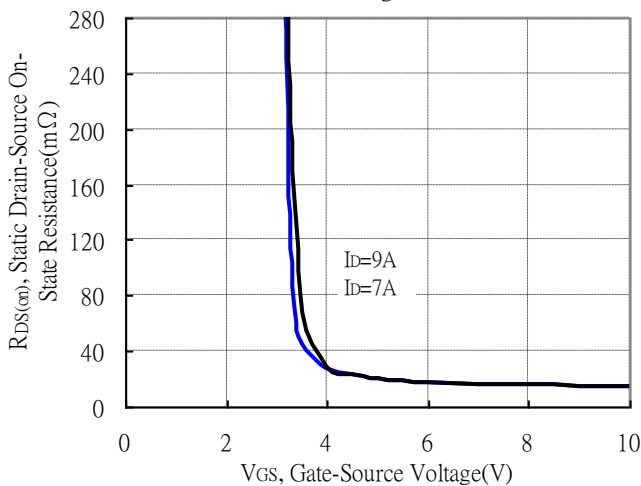
Static Drain-Source On-State resistance vs Drain Current



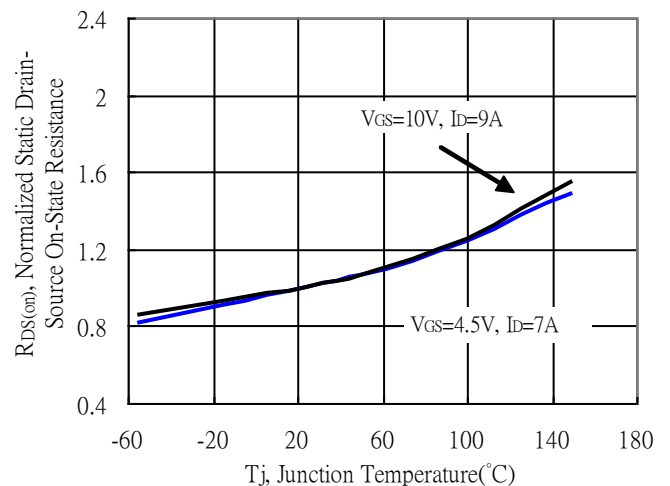
Reverse Drain Current vs Source-Drain Voltage



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

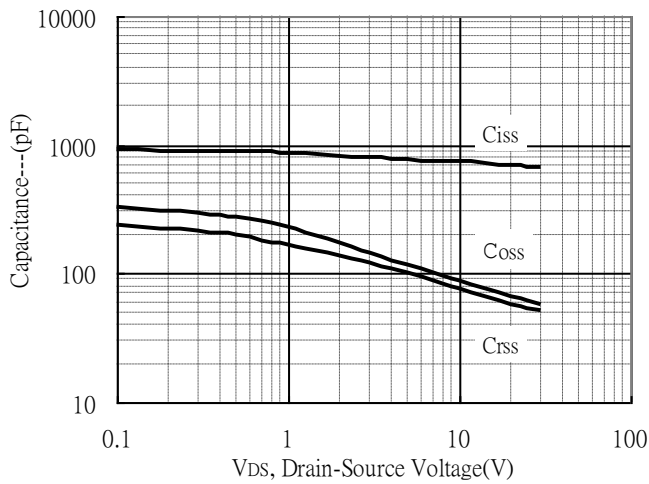


Drain-Source On-State Resistance vs Junction Temperature

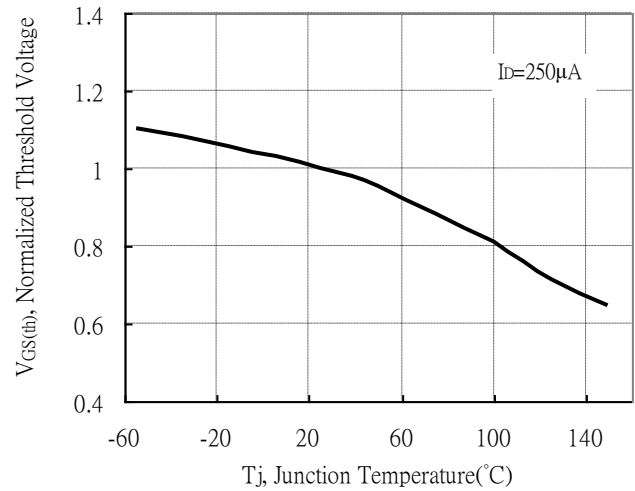


## Typical Characteristics(Cont.)

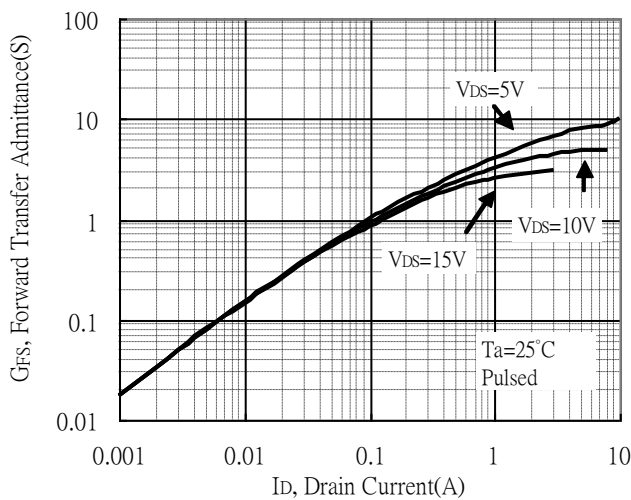
Capacitance vs Drain-to-Source Voltage



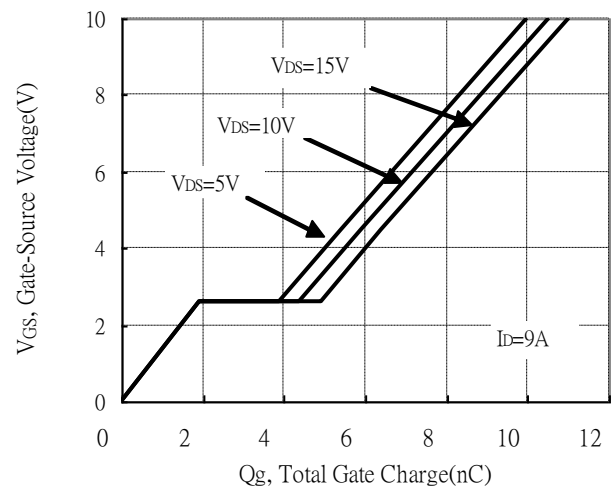
Threshold Voltage vs Junction Temperature



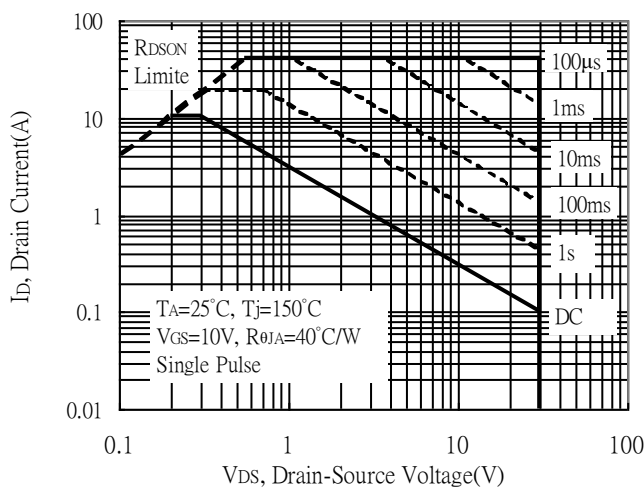
Forward Transfer Admittance vs Drain Current



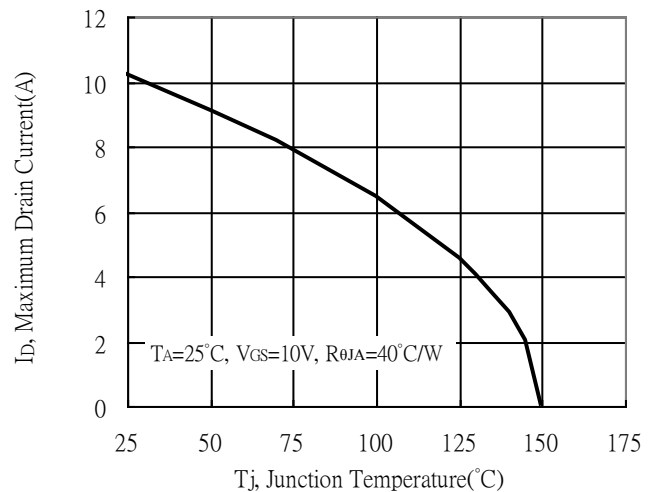
Gate Charge Characteristics



Maximum Safe Operating Area

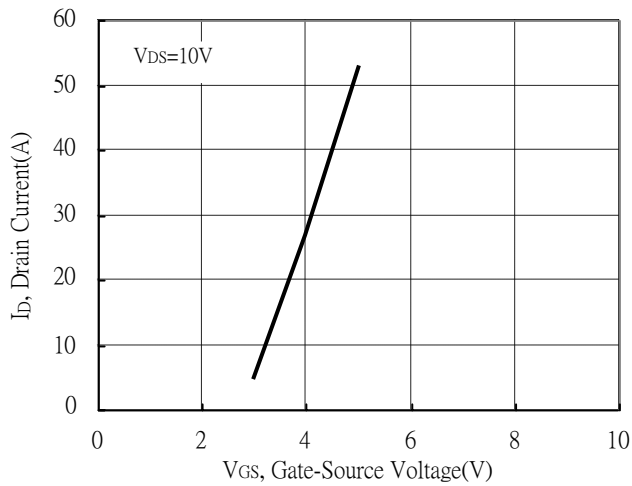


Maximum Drain Current vs Junction Temperature

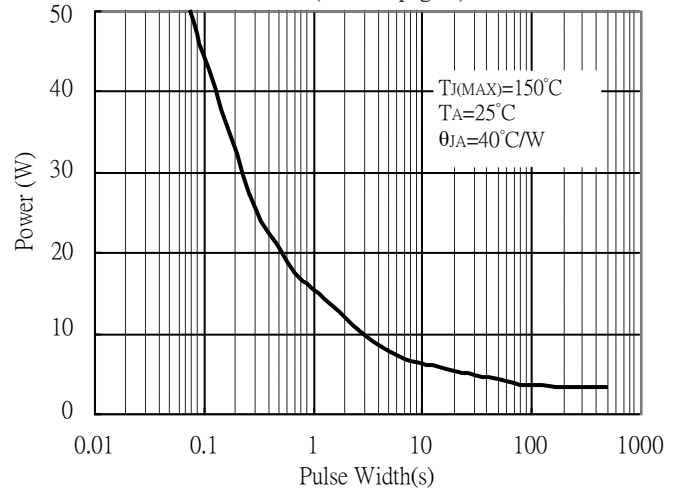


## Typical Characteristics(Cont.)

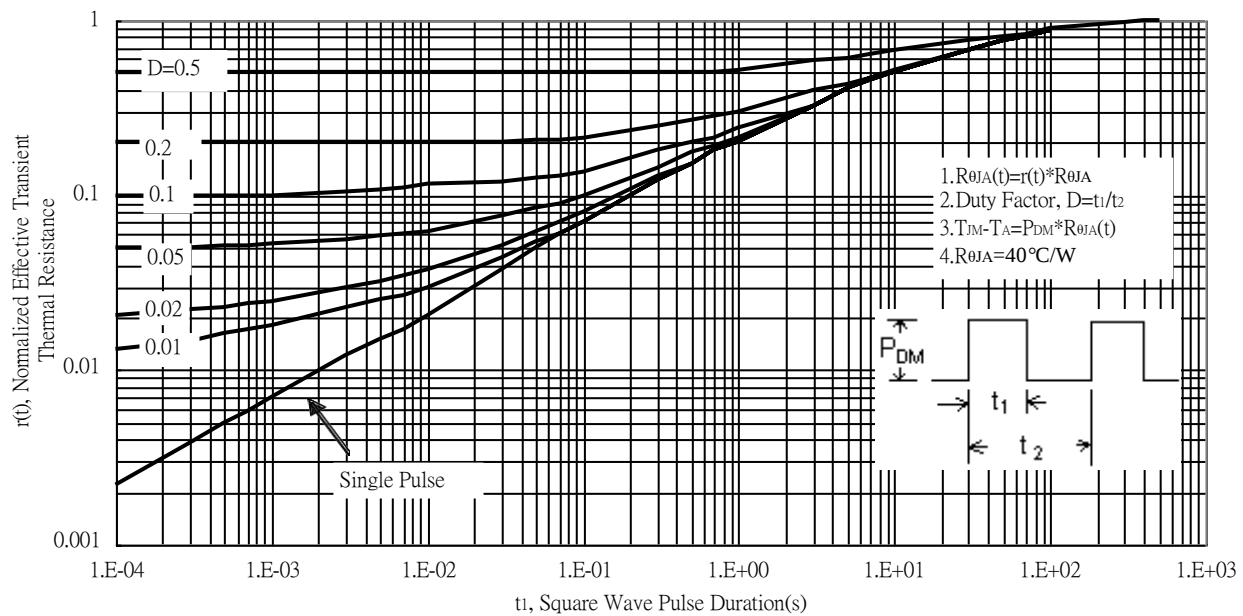
Typical Transfer Characteristics



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

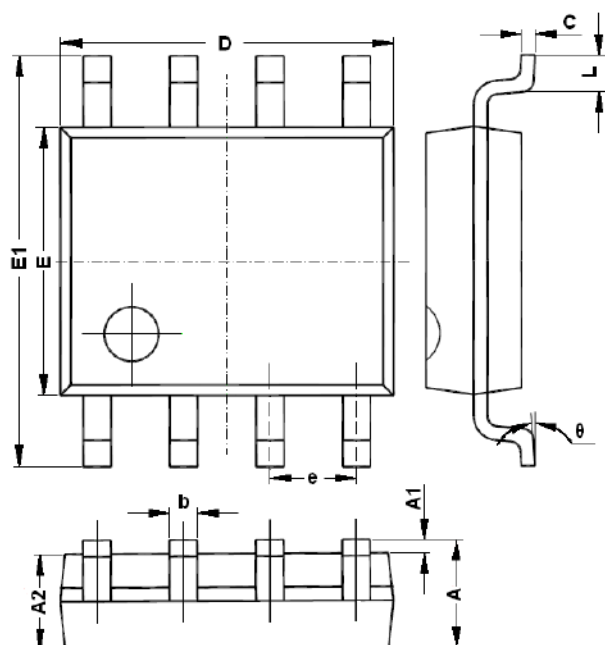


Transient Thermal Response Curves

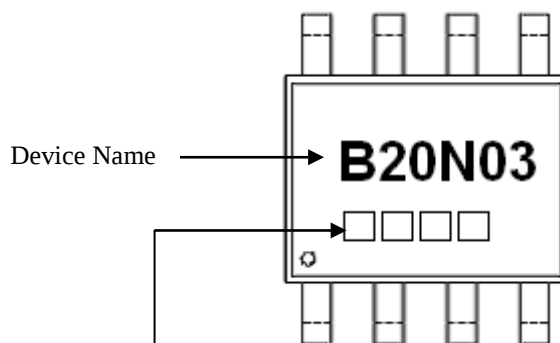




## SOP-8 Dimension



Marking:



Data Code :

First Code : Last digit of Christian Year

Second 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

Last Two Codes : Production Serial Code, 01~99

8-Lead SOP-8 Plastic Package

| 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       | (BSC) | 0.050  | (BSC) |
| 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 |     |             |       |        |       |