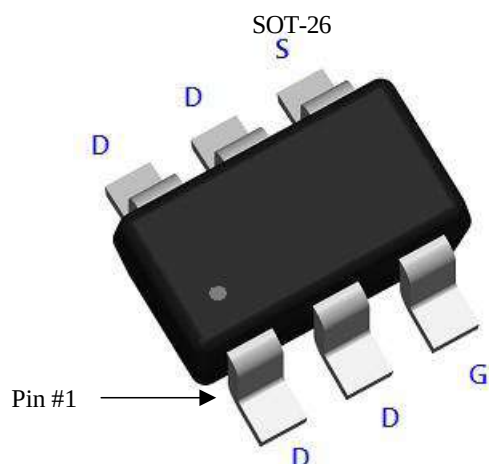


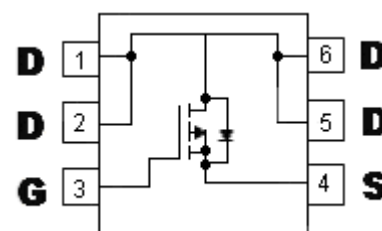
## P-Channel Enhancement Mode MOSFET

### Features:

- Simple drive requirement
- Low on-resistance
- Small package outline
- Pb-free lead plating and halogen-free package



|                           |             |
|---------------------------|-------------|
| BVDSS                     | -30V        |
| ID@VGS=-10V, TA=25 °C     | -5.2A       |
| RDSON@VGS=-10V, ID=-5A    | 39mΩ (typ.) |
| RDSON@VGS=-4.5V, ID=-3.7A | 54mΩ (typ.) |
| RDSON@VGS=-4V, ID=-3A     | 60mΩ (typ.) |



G : Gate S : Source D : Drain

### Ordering Information

| Device   | Package                                                   | Shipping               |
|----------|-----------------------------------------------------------|------------------------|
| KWP658N6 | SOT-26<br>(Pb-free lead plating and halogen-free package) | 3000 pcs / Tape & Reel |

## Absolute Maximum Ratings (Ta=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>A</sub> =25 °C (Note 1) | I <sub>D</sub>                    | -5.2     | A      |
| Continuous Drain Current @ V <sub>GS</sub> =-10V, T <sub>A</sub> =70 °C (Note 1) |                                   | -4.2     |        |
| Pulsed Drain Current (Note 2, 3)                                                 | I <sub>DM</sub>                   | -30      |        |
| Total Power Dissipation @ T <sub>A</sub> =25 °C                                  | P <sub>D</sub>                    | 1.6      | W      |
| Linear Derating Factor                                                           |                                   | 0.013    | W / °C |
| Operating Junction and Storage Temperature Range                                 | T <sub>j</sub> ; T <sub>stg</sub> | -55~+150 | °C     |
| Thermal Resistance, Junction-to-Ambient (Note 1)                                 | R <sub>θJA</sub>                  | 78       | °C/W   |
| Thermal Resistance, Junction-to-Case                                             | R <sub>θJC</sub>                  | 25       |        |

Note : 1.Surface mounted on 1 in<sup>2</sup> copper pad of FR-4 board. 156°C/W when mounted on minimum copper pad.

2.Pulse width limited by maximum junction temperature.

3.Pulse Width ≤300μs, Duty Cycle≤2%

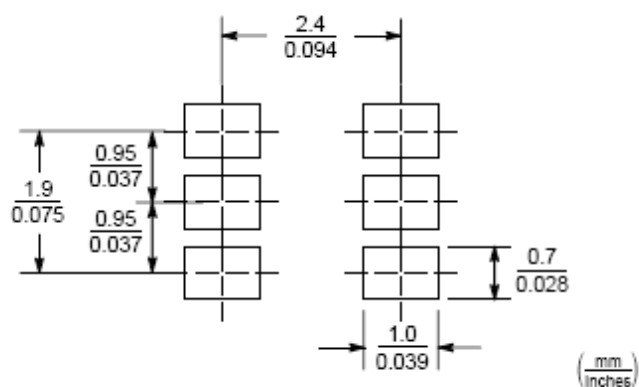
## Electrical Characteristics (Ta=25°C, unless otherwise noted)

| Symbol                              | Min. | Typ.  | Max. | Unit | Test Conditions                                                                       |
|-------------------------------------|------|-------|------|------|---------------------------------------------------------------------------------------|
| <b>Static</b>                       |      |       |      |      |                                                                                       |
| BV <sub>DSS</sub>                   | -30  | -     | -    | V    | V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA                                           |
| ΔBV <sub>DSS</sub> /ΔT <sub>j</sub> | -    | -0.02 | -    | 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                             |
| 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                                            |
|                                     | -    | -     | -10  |      | V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>j</sub> =55°C                      |
| *R <sub>DS(ON)</sub>                | -    | 39    | 50   | mΩ   | I <sub>D</sub> =-5A, V <sub>GS</sub> =-10V                                            |
|                                     | -    | 54    | 75   |      | I <sub>D</sub> =-3.7A, V <sub>GS</sub> =-4.5V                                         |
|                                     | -    | 60    | 85   |      | I <sub>D</sub> =-3A, V <sub>GS</sub> =-4V                                             |
| *G <sub>FS</sub>                    | -    | 4.8   | -    | S    | V <sub>DS</sub> =-10V, I <sub>D</sub> =-3A                                            |
| <b>Dynamic</b>                      |      |       |      |      |                                                                                       |
| C <sub>iss</sub>                    | -    | 648   | -    | pF   | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz                                    |
| C <sub>oss</sub>                    | -    | 76    | -    |      |                                                                                       |
| C <sub>rss</sub>                    | -    | 66    | -    |      |                                                                                       |
| t <sub>d(ON)</sub>                  | -    | 6     | -    | ns   | V <sub>DS</sub> =-15V, I <sub>D</sub> =-5A, V <sub>GS</sub> =-10V, R <sub>G</sub> =1Ω |
| t <sub>r</sub>                      | -    | 18    | -    |      |                                                                                       |
| t <sub>d(OFF)</sub>                 | -    | 49.6  | -    |      |                                                                                       |
| t <sub>f</sub>                      | -    | 16.2  | -    |      |                                                                                       |
| Q <sub>g</sub>                      | -    | 8     | -    | nC   | V <sub>DS</sub> =-24V, I <sub>D</sub> =-5A, V <sub>GS</sub> =-5V                      |
| Q <sub>gs</sub>                     | -    | 2     | -    |      |                                                                                       |
| Q <sub>gd</sub>                     | -    | 3.3   | -    |      |                                                                                       |

| Source Drain Diode |   |       |      |    |                                                                         |
|--------------------|---|-------|------|----|-------------------------------------------------------------------------|
| *I <sub>S</sub>    | - | -     | -2   | A  |                                                                         |
| *I <sub>SM</sub>   | - | -     | -8   |    |                                                                         |
| *V <sub>SD</sub>   | - | -0.81 | -1.2 | V  | I <sub>S</sub> =-1.7A, V <sub>GS</sub> =0V                              |
| *T <sub>rr</sub>   | - | 7.7   | -    | ns | I <sub>F</sub> =-1.7A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/μs |
| Q <sub>rr</sub>    | - | 2.9   | -    | nC |                                                                         |

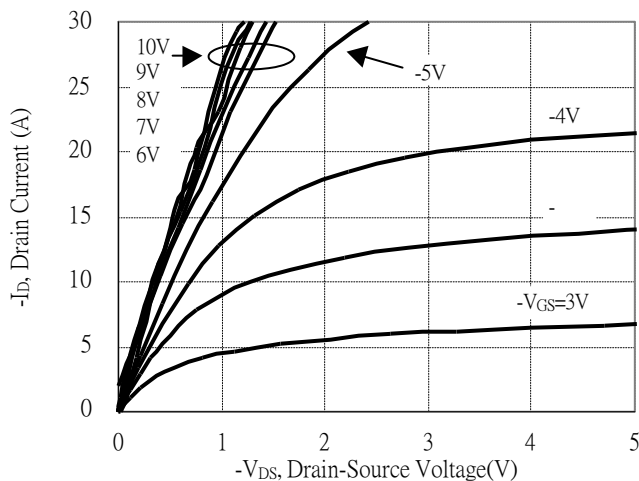
\*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

## Recommended Soldering Footprint

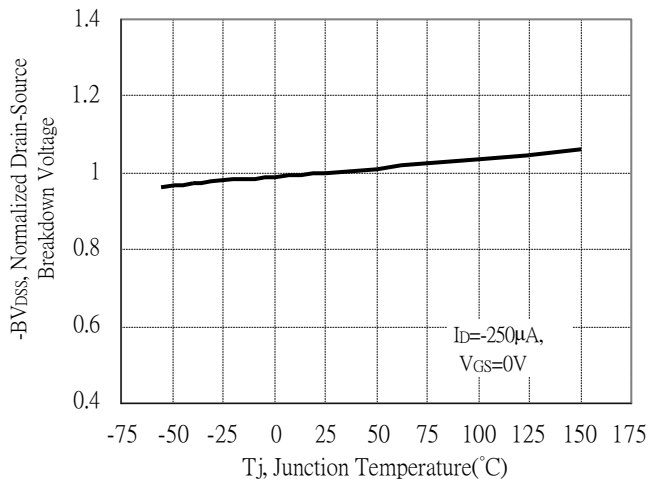


## Typical Characteristics

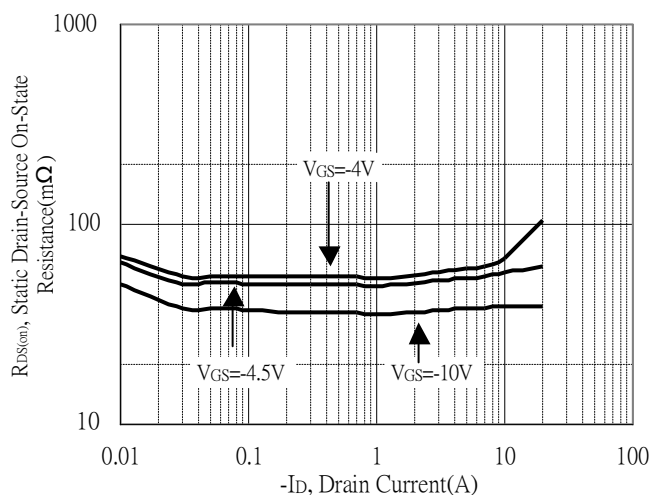
Typical Output Characteristics



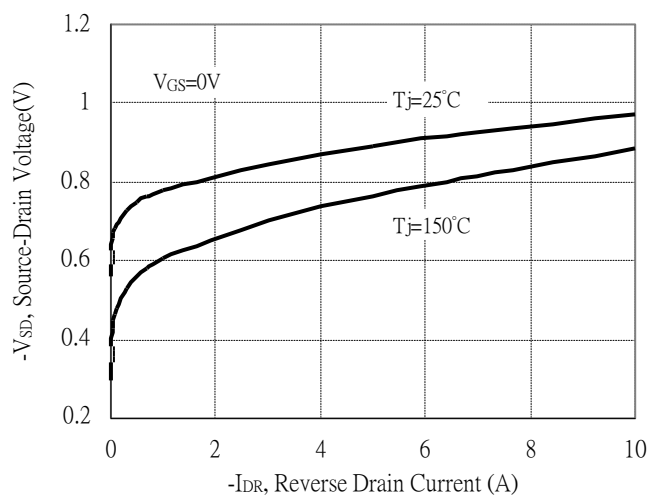
Breakdown Voltage vs Ambient Temperature



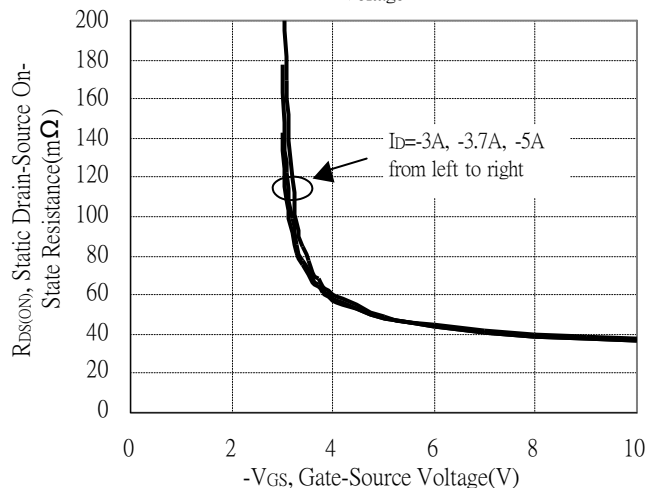
Static Drain-Source On-State resistance vs Drain Current



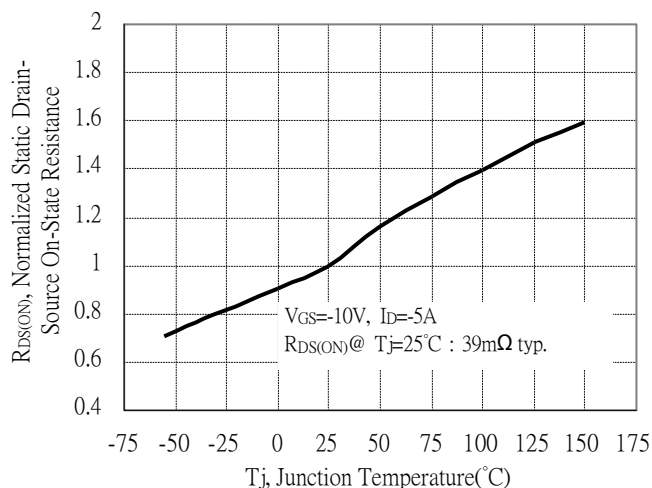
Reverse Drain Current vs Source-Drain Voltage



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

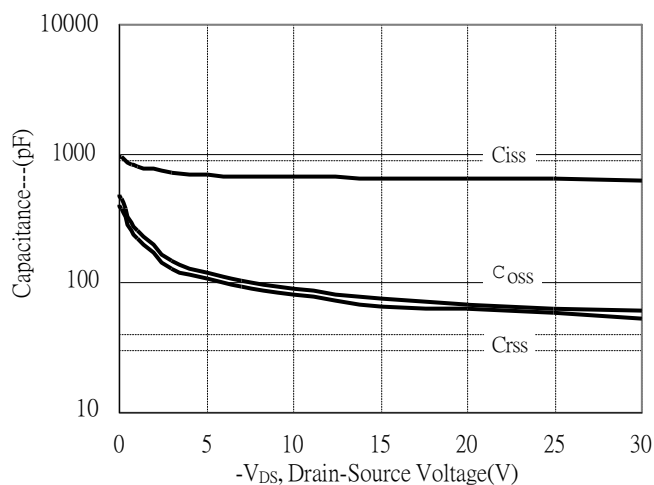


Drain-Source On-State Resistance vs Junction Temperature

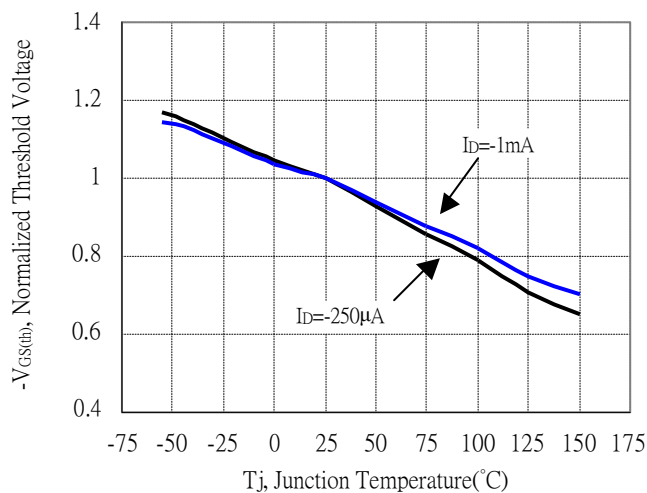


## Typical Characteristics(Cont.)

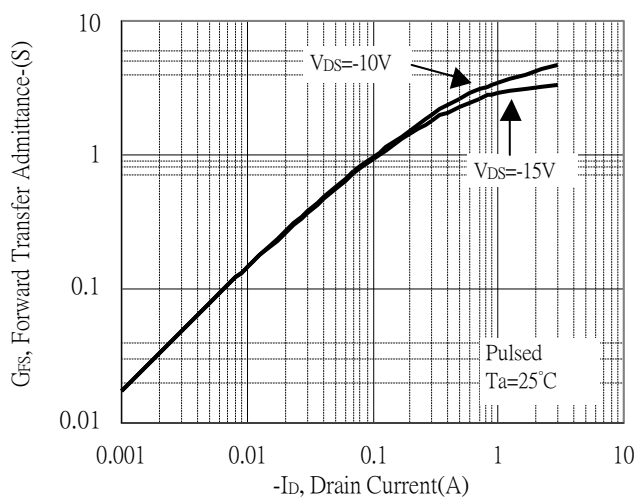
Capacitance vs Drain-to-Source Voltage



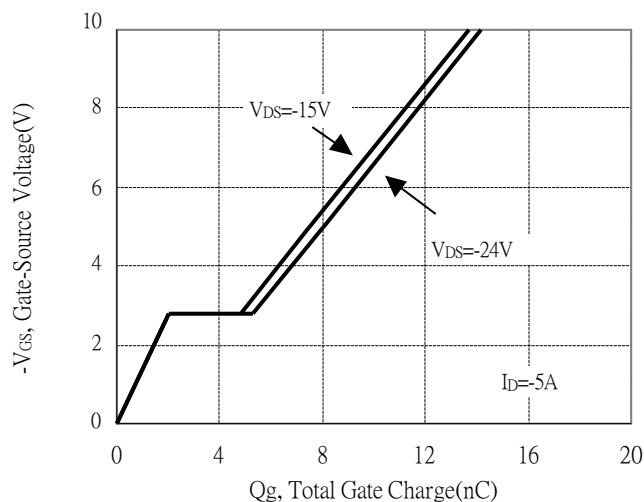
Threshold Voltage vs Junction Temperature



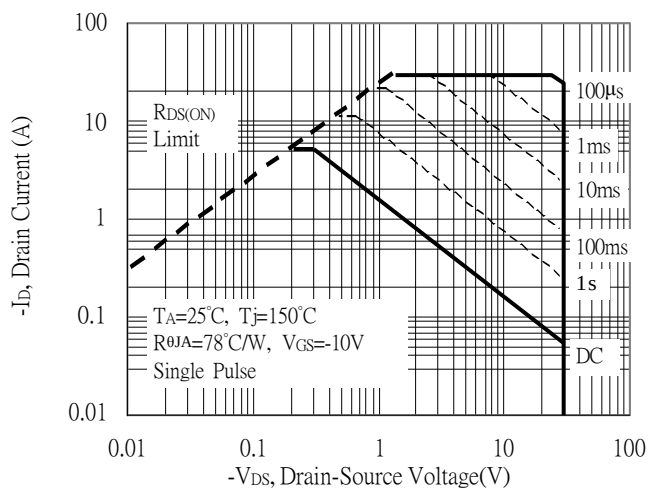
Forward Transfer Admittance vs Drain Current



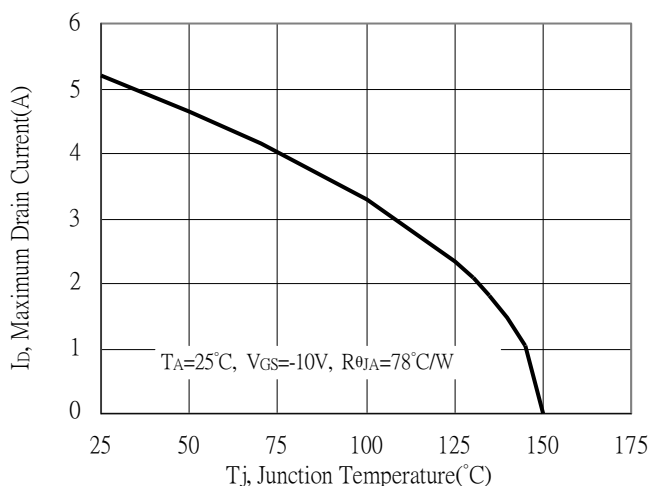
Gate Charge Characteristics



Maximum Safe Operating Area

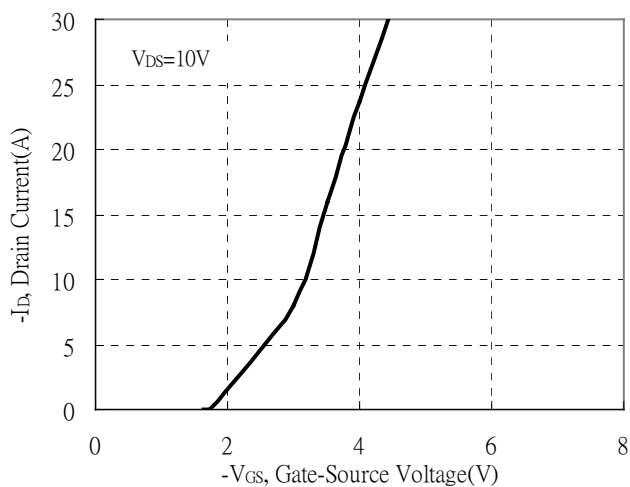


Maximum Drain Current vs Junction Temperature

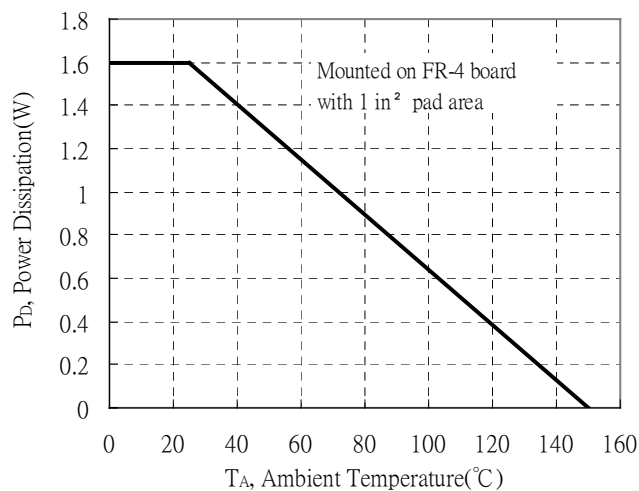


## Typical Characteristics(Cont.)

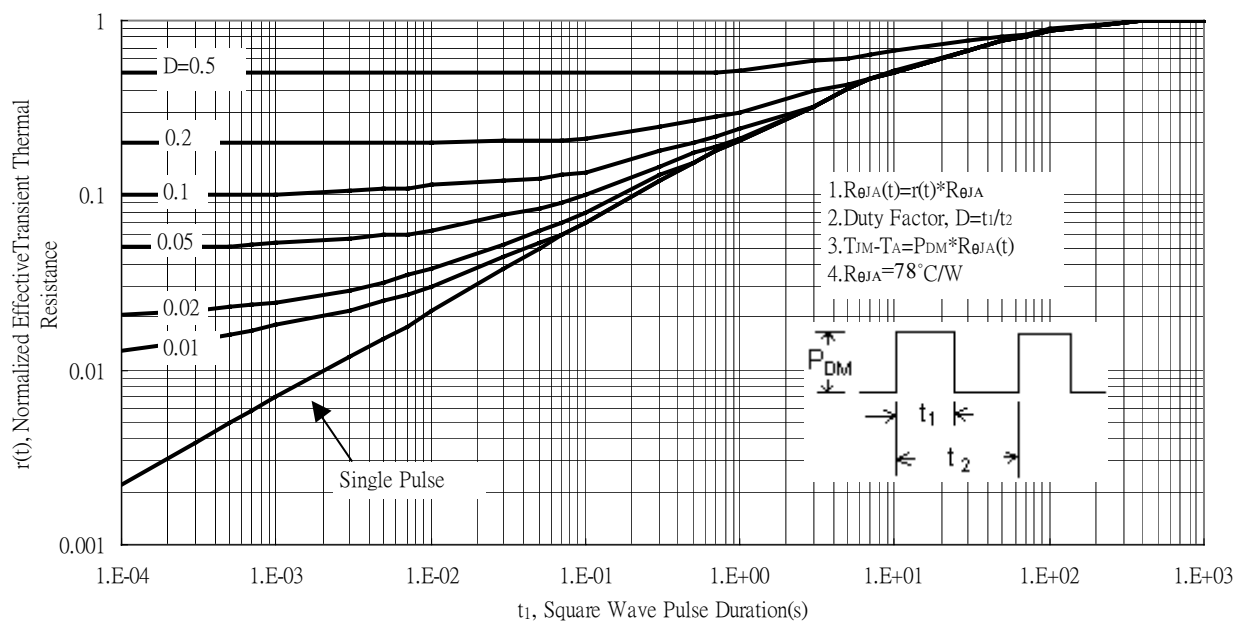
Typical Transfer Characteristics



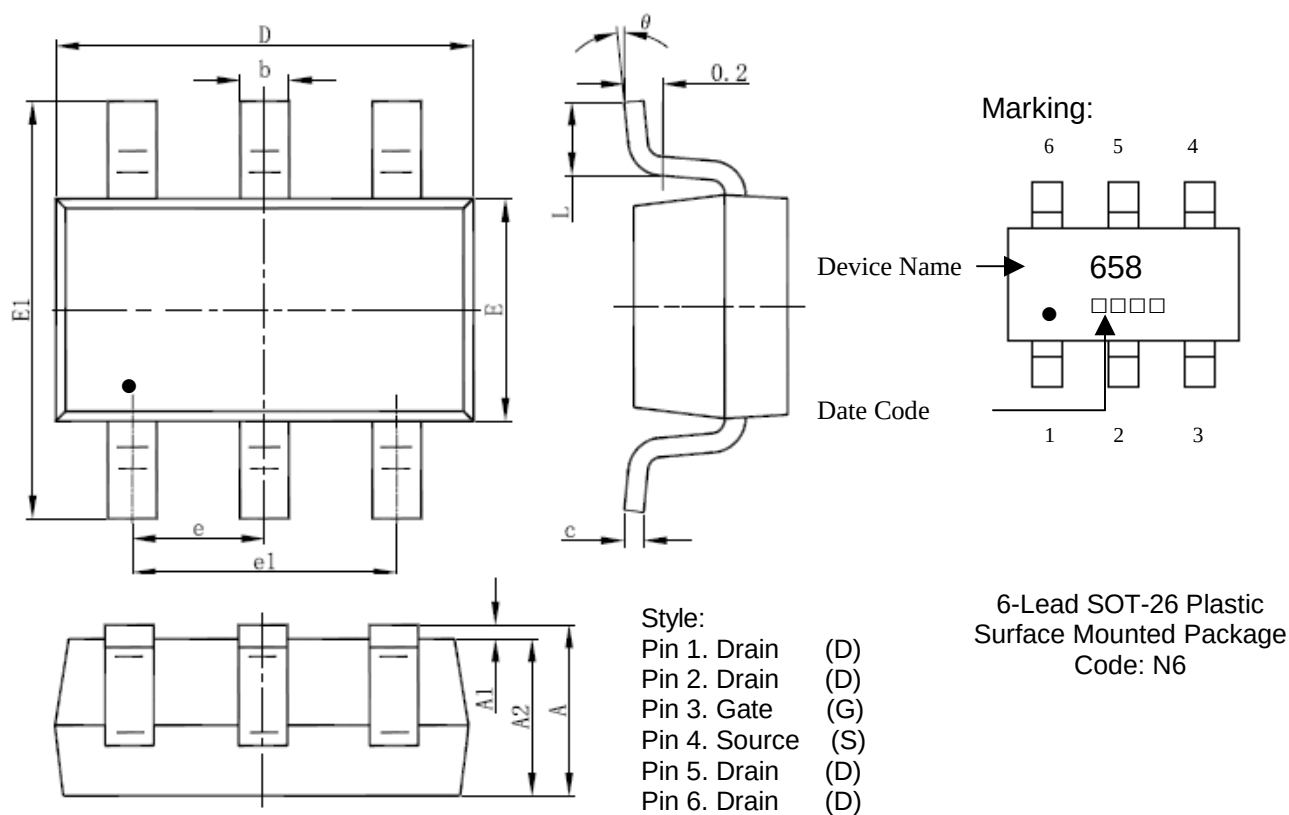
Power Derating Curve



Transient Thermal Response Curves



## SOT-26 Dimension



| DIM | Millimeters |       | Inches |       | DIM | Millimeters |       | Inches      |       |
|-----|-------------|-------|--------|-------|-----|-------------|-------|-------------|-------|
|     | Min.        | Max.  | Min.   | Max.  |     | Min.        | Max.  | Min.        | Max.  |
| A   | 1.050       | 1.250 | 0.041  | 0.049 | E   | 1.500       | 1.700 | 0.059       | 0.067 |
| A1  | 0.000       | 0.100 | 0.000  | 0.004 | E1  | 2.650       | 2.950 | 0.104       | 0.116 |
| A2  | 1.050       | 1.150 | 0.041  | 0.045 | e   | 0.950 (BSC) |       | 0.037 (BSC) |       |
| b   | 0.300       | 0.500 | 0.012  | 0.020 | e1  | 1.800       | 2.000 | 0.071       | 0.079 |
| c   | 0.100       | 0.200 | 0.004  | 0.008 | L   | 0.300       | 0.600 | 0.012       | 0.024 |
| D   | 2.820       | 3.020 | 0.111  | 0.119 | θ   | 0°          | 8°    | 0°          | 8°    |