

**/ Descriptions**

TO-251          N          MOS          N-CHANNEL MOSFET in a TO-251 Plastic Package.

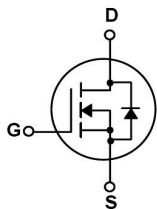
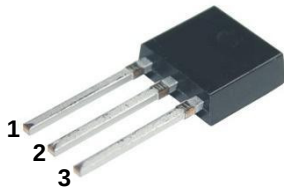
**/ Features**

Low gate charge, low crss, fast switching.

**/ Applications**

DC/DC

These devices are well suited for high efficiency switching DC/DC converters and switch mode power supplies.

**/ Equivalent Circuit****/ Pinning**

PIN1   G          PIN 2   D          PIN 3   S

**/ h<sub>FE</sub> Classifications & Marking**

See Marking Instructions.

## / Absolute Maximum Ratings(Ta=25 )

| Parameter                               | Symbol                       | Rating     | Unit |
|-----------------------------------------|------------------------------|------------|------|
| Drain-Source Voltage                    | $V_{DSS}$                    | 650        | V    |
| Drain Current                           | $I_D(T_C=25^\circ\text{C})$  | 2.0        | A    |
| Drain Current                           | $I_D(T_C=100^\circ\text{C})$ | 1.3        | A    |
| Drain Current - Pulsed                  | $I_{DM}$                     | 6.0        | A    |
| Gate-Source Voltage                     | $V_{GSS}$                    | $\pm 30$   | V    |
| Single Pulsed Avalanche Energy          | $E_{AS}$                     | 120        | mJ   |
| Repetitive Avalanche Energy             | $E_{AR}$                     | 5.4        | mJ   |
| Avalanche Current                       | $I_{AR}$                     | 2.0        | A    |
| Power Dissipation                       | $P_D(T_C=25^\circ\text{C})$  | 37         | W    |
| Operating and Storage Temperature Range | $T_J, T_{STG}$               | -55 to 150 |      |

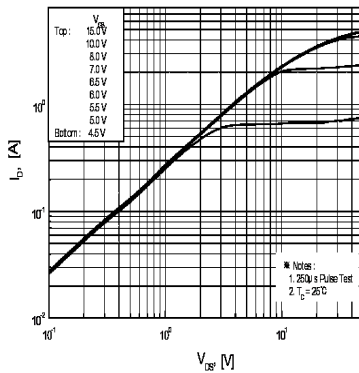
## / Electrical Characteristics(Ta=25 )

| Parameter                          | Symbol       | Test Conditions                            | Min | Typ  | Max       | Unit     |
|------------------------------------|--------------|--------------------------------------------|-----|------|-----------|----------|
| Drain-Source Breakdown Voltage     | $BV_{DSS}$   | $V_{GS}=0V$ $I_D=250\mu A$                 | 650 |      |           | V        |
| Zero Gate Voltage Drain Current    | $I_{DSS}$    | $V_{DS}=650V$ $V_{GS}=0V$                  |     |      | 1.0       | $\mu A$  |
|                                    |              | $V_{DS}=480V$ $T_C=125^\circ\text{C}$      |     |      | 100       | $\mu A$  |
| Gate-Body Leakage Current Forward  | $I_{GSS}$    | $V_{GS}=\pm 30V$ $V_{DS}=0V$               |     |      | $\pm 0.1$ | $\mu A$  |
| Gate Threshold Voltage             | $V_{GS(th)}$ | $V_{DS}=V_{GS}$ $I_D=250\mu A$             | 2.0 |      | 4.0       | V        |
| Static Drain-Source On-Resistance  | $R_{DS(on)}$ | $V_{GS}=10V$ $I_D=1.0A$                    |     | 4.0  | 5.0       | $\Omega$ |
| Forward Transconductance           | $g_{FS}$     | $V_{DS}=40V$ $I_D=1.0A$                    |     | 2.05 |           | S        |
| Drain-Source Diode Forward Voltage | $V_{SD}$     | $V_{GS}=0V$ $I_S=2.0A$                     |     |      | 1.4       | V        |
| Input Capacitance                  | $C_{iss}$    | $V_{DS}=25V$ $V_{GS}=0V$<br>$f=1.0MHz$     |     | 320  | 420       | pF       |
| Output Capacitance                 | $C_{oss}$    |                                            |     | 35   | 46        | pF       |
| Reverse Transfer Capacitance       | $C_{rss}$    |                                            |     | 4.5  | 6.0       | pF       |
| Turn-On Delay Time                 | $t_{d(on)}$  | $V_{DD}=300V$ $I_D=2.0A$<br>$R_G=25\Omega$ |     | 8.0  | 30        | ns       |
| Turn-On Rise Time                  | $t_r$        |                                            |     | 23   | 60        | ns       |
| Turn-Off Delay Time                | $t_{d(off)}$ |                                            |     | 25   | 60        | ns       |
| Turn-Off Fall Time                 | $t_f$        |                                            |     | 28   | 70        | ns       |

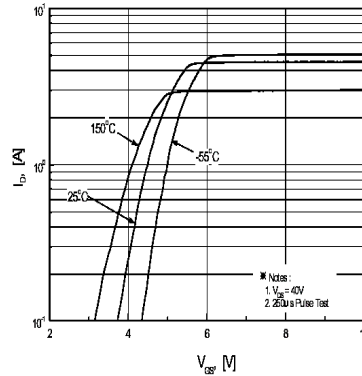


# Electrical Characteristic Curve

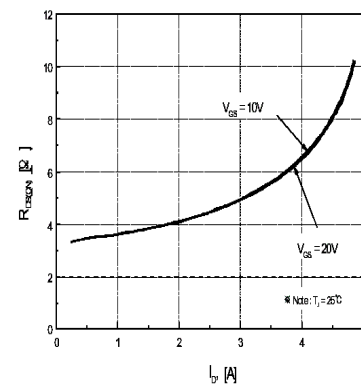
ID - VDS



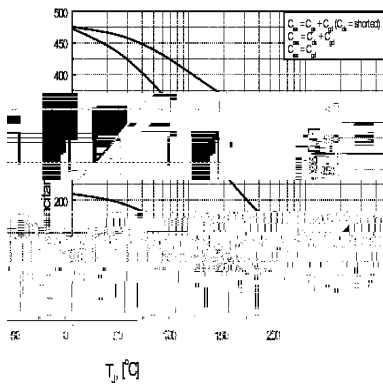
ID - VGS



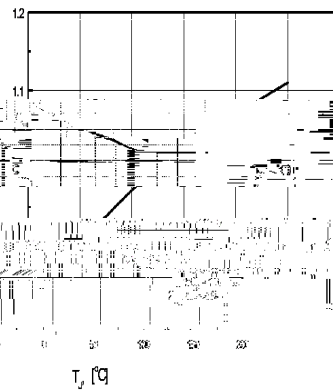
RDS(ON) - ID



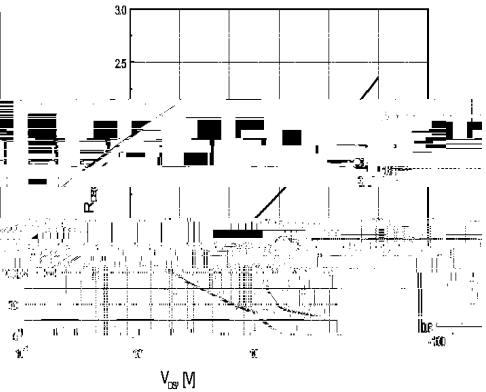
Ciss, Coss, Crss - VDS



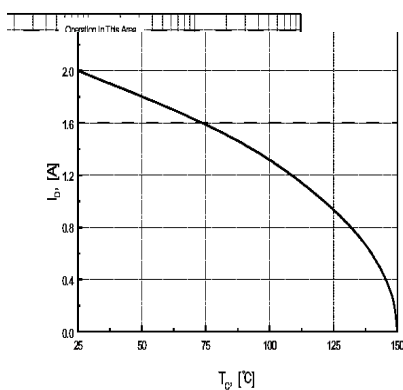
BVDS - TJ



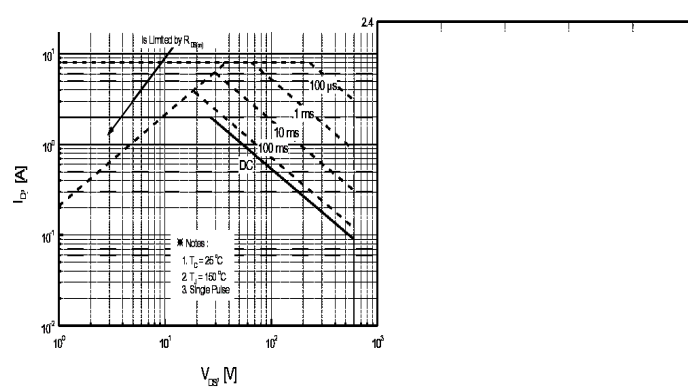
RDS(ON) - TJ



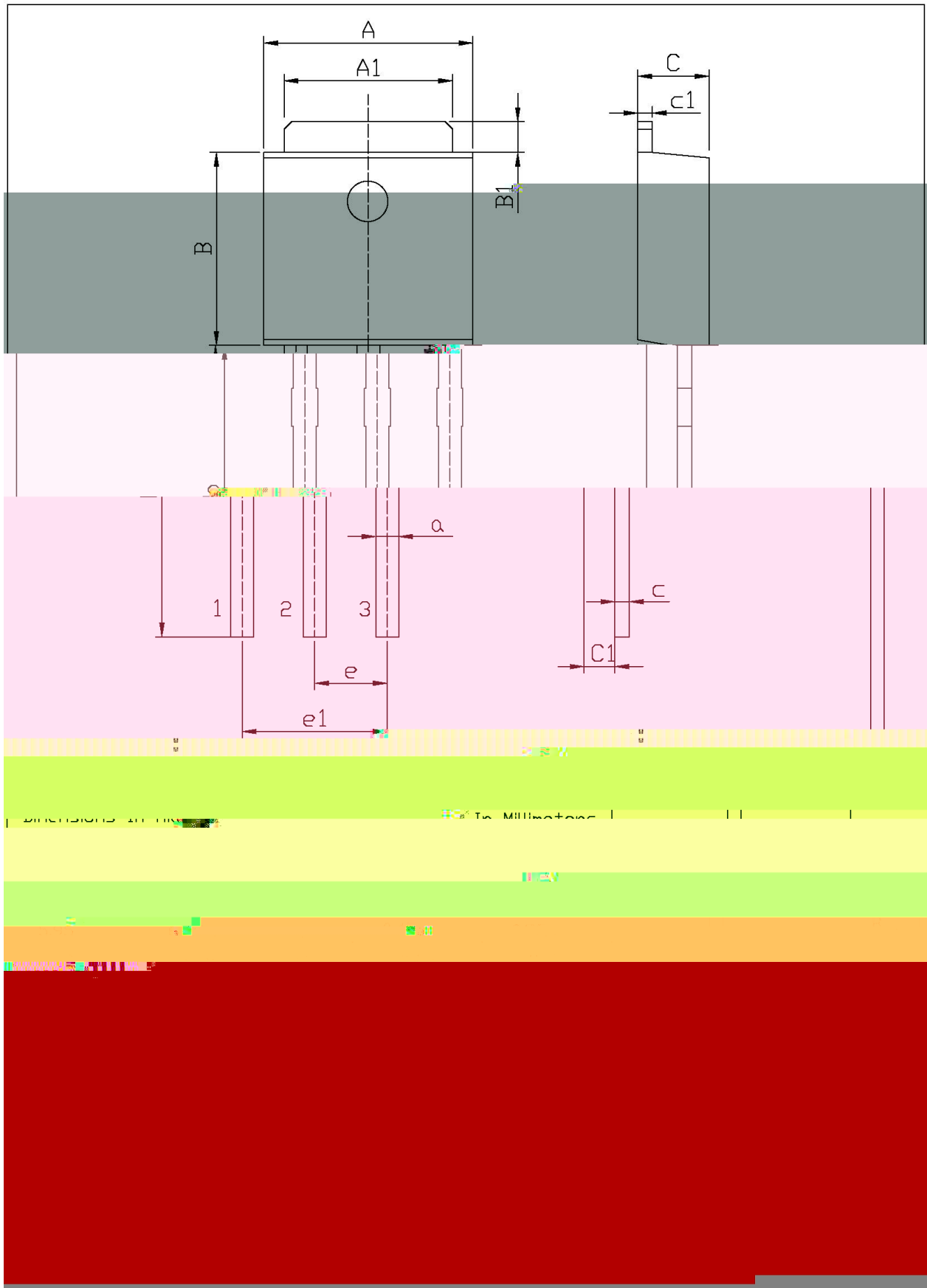
ID - VDS



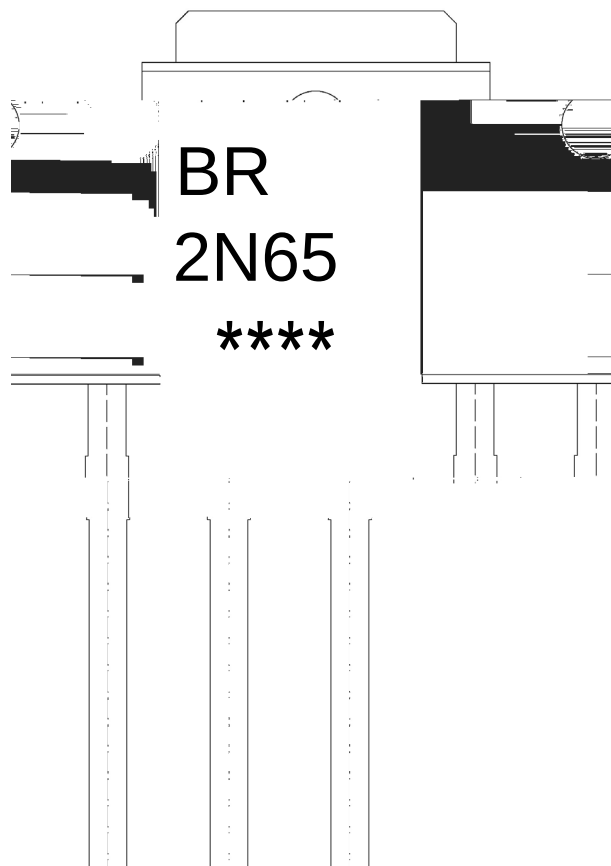
ID - Tc



/ Package Dimensions



/ Marking Instructions



BR

2N65

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Note:

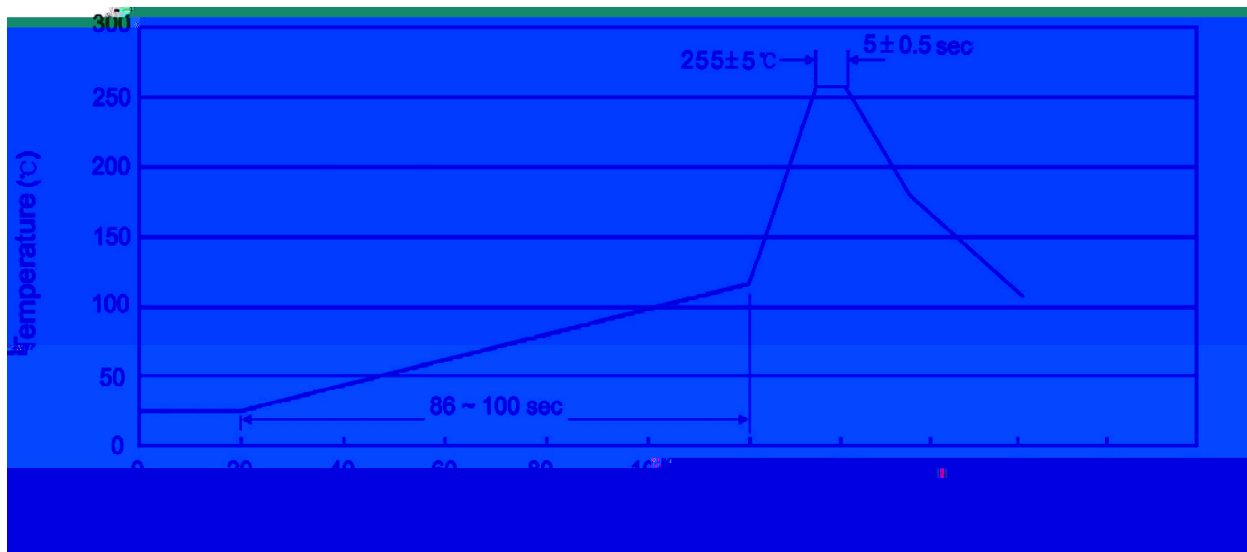
BR: Company Code

2N65: Product Type.

\*\*\*\*: Lot No. Code, code change with Lot No.



## ( ) / Temperature Profile for Dip Soldering(Pb-Free)



Note:

- |   |       |     |           |                                         |                                      |
|---|-------|-----|-----------|-----------------------------------------|--------------------------------------|
| 1 | 25    | 150 | 60        | 90sec;                                  | 1.Preheating:25~150 , Time:60~90sec. |
| 2 | 255±5 |     | 5±0.5sec; | 2.Peak Temp.:255±5 , Duration:5±0.5sec. |                                      |
| 3 |       | 2   | 10        | /sec.                                   | 3. Cooling Speed: 2~10 /sec.         |

## / Resistance to Soldering Heat Test Conditions

|       |           |             |               |
|-------|-----------|-------------|---------------|
| 270±5 | 10±1 sec. | Temp.:270±5 | Time:10±1 sec |
|-------|-----------|-------------|---------------|

## / Packaging SPEC.

## / REEL

| Package Type<br>封装形式 | Units 包装数量         |                         |                        |                              |                        | Dimension 包装尺寸 (unit: mm <sup>3</sup> ) |             |             |
|----------------------|--------------------|-------------------------|------------------------|------------------------------|------------------------|-----------------------------------------|-------------|-------------|
|                      | Units/Reel<br>只/卷盘 | Reels/Inner Box<br>卷盘/盒 | Units/Inner Box<br>只/盒 | Inner Boxes/Outer Box<br>盒/箱 | Units/Outer Box<br>只/箱 | Reel                                    | Inner Box 盒 | Outer Box 箱 |
| TO-251               | 1,000              | 10                      | 10,000                 | 5                            | 50,000                 | 135×190                                 | 237×172×102 | 560×245×195 |

## / TUBE

| Package Type<br>封装形式 | Units 包装数量         |                         |                        |                              |                        | Dimension 包装尺寸 (unit: mm <sup>3</sup> ) |             |             |
|----------------------|--------------------|-------------------------|------------------------|------------------------------|------------------------|-----------------------------------------|-------------|-------------|
|                      | Units/Tube<br>只/套管 | Tubes/Inner Box<br>套管/盒 | Units/Inner Box<br>只/盒 | Inner Boxes/Outer Box<br>盒/箱 | Units/Outer Box<br>只/箱 | Tube 套管                                 | Inner Box 盒 | Outer Box 箱 |
| TO-251/252           | 75                 | 48                      | 3,600                  | 5                            | 18,000                 | 526×20.5×5.25                           | 555×164×50  | 575×290×180 |

## / Notices