

## Descriptions

These N-channel MOSFET are produced using advanced plane MOSFET Technology, which provides Low on-state resistance, high switching performance and excellent quality. These devices are suitable device for SMPS, high Speed switching and general purpose applications.

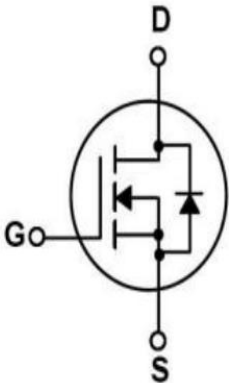
## Features

- $V_{DS} = 650V$
- $I_D = 2A @ V_{GS} = 10V$
- $R_{DS(ON)} (Typ) = 4.3 \Omega @ V_{GS} = 10V$

## Applications

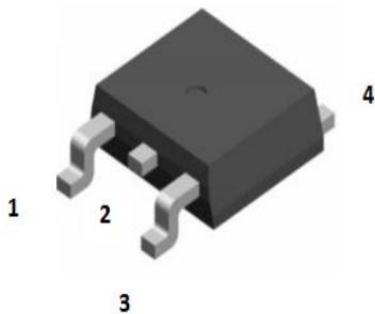
- Power Supply
- PFC
- High Current, High Speed Switching

## Equivalent Circuit



## Pinning

TO-252



PIN1:Gate PIN 2:Drain PIN 3:Source PIN 4:Drain

## Absolute Maximum Ratings(Ta=25°C)

| Parameter                               | Symbol                         | Rating     | Unit                 |
|-----------------------------------------|--------------------------------|------------|----------------------|
| Drain-Source Voltage                    | $V_{DS}$                       | 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                  | $I_{DM}$                       | 8          | A                    |
| Gate-Source Voltage                     | $V_{GS}$                       | $\pm 30$   | 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                       | $P_D(T_C=25^{\circ}\text{C})$  | 28         | W                    |
| Operating and Storage Temperature Range | $T_J, T_{STG}$                 | -55 to 150 | $^{\circ}\text{C}$   |
| Junction to Ambient                     | $R_{\theta JA}$                | 110        | $^{\circ}\text{C/W}$ |
| Junction to Case                        | $R_{\theta JC}$                | 4.46       | $^{\circ}\text{C/W}$ |

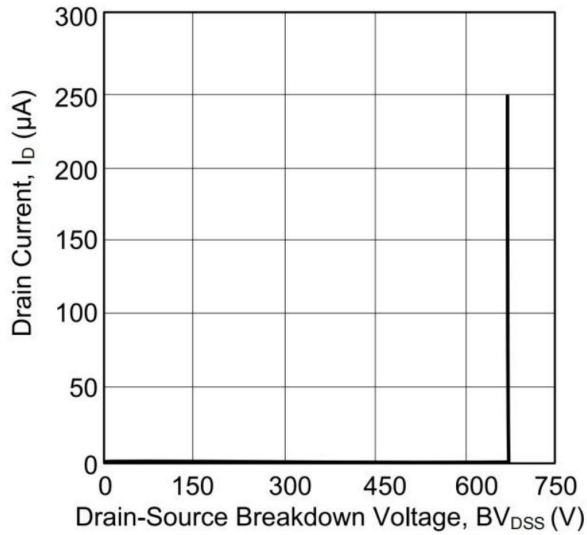
## Electrical Characteristics(Ta=25°C)

| 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 | $R_{DS(on)}$ | $V_{GS}=10V$ $I_D=1.0A$                       |     | 4.3 | 6.5       | $\Omega$ |
| Input Capacitance                 | $C_{iss}$    | $V_{DS}=25V$ $V_{GS}=0V$<br>$f=1.0\text{MHz}$ |     | 325 |           | pF       |
| Output Capacitance                | $C_{oss}$    |                                               |     | 30  |           | pF       |
| Reverse Transfer Capacitance      | $C_{rss}$    |                                               |     | 5   |           | pF       |
| Total Gate Charge                 | $Q_G$        | $V_{DS}=520V$ , $I_D=2.0A$ ,<br>$V_{GS}=10V$  |     | 46  |           | nC       |
| Gate-Source Charge                | $Q_{GS}$     |                                               |     | 4.2 |           |          |
| Gate-Drain Charge                 | $Q_{GD}$     |                                               |     | 8.5 |           |          |

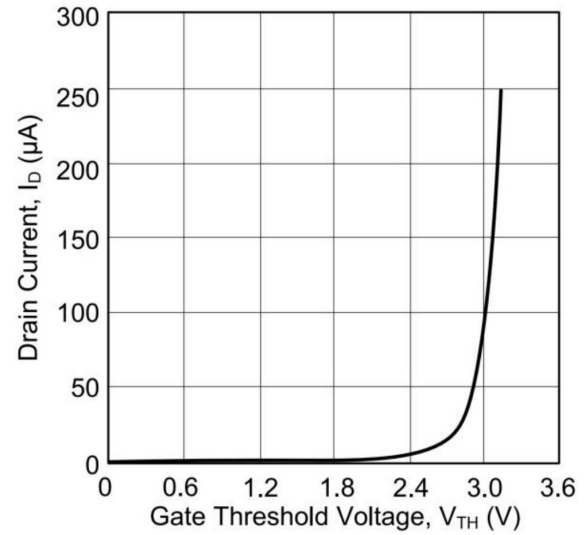
## Electrical Characteristics(Ta=25°C)

| Parameter                                             | Symbol       | Test Conditions                                             | Min | Typ | Max | Unit |
|-------------------------------------------------------|--------------|-------------------------------------------------------------|-----|-----|-----|------|
| Turn-On Delay Time                                    | $t_{d(on)}$  | $V_{DD}=325V \quad I_D=2.0A$<br>$R_G=25\Omega$              |     | 36  |     | ns   |
| Turn-On Rise Time                                     | $t_r$        |                                                             |     | 42  |     |      |
| Turn-Off Delay Time                                   | $t_{d(off)}$ |                                                             |     | 132 |     |      |
| Turn-Off Fall Time                                    | $t_f$        |                                                             |     | 41  |     |      |
| Maximum Continuous Drain-Source Diode Forward Current | $I_S$        |                                                             |     |     | 2.0 | A    |
| Maximum Pulsed Drain-Source Diode Forward Current     | $I_{SM}$     |                                                             |     |     | 8   | A    |
| Drain-Source Diode Forward Voltage                    | $V_{SD}$     | $V_{GS} = 0V, \quad I_S = 2.0A$                             |     |     | 1.4 | V    |
| Reverse Recovery Time                                 | $t_{rr}$     | $V_{GS} = 0V, \quad I_S = 2.0A,$<br>$dI_F/dt = 100 A/\mu s$ |     | 182 |     | nS   |
| Reverse Recovery Charge                               | $Q_{rr}$     |                                                             |     | 0.8 |     | nC   |

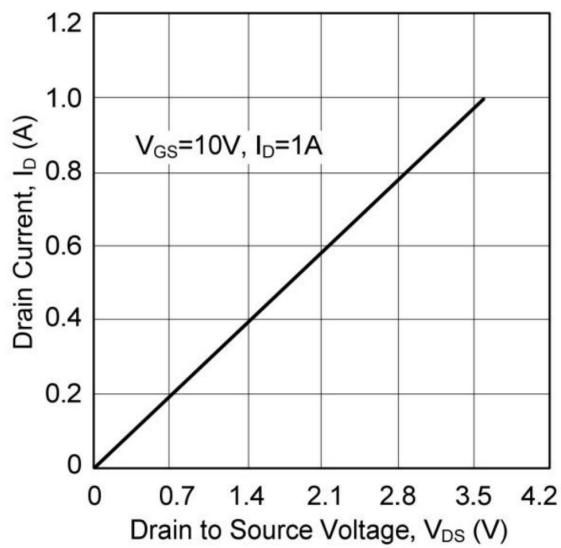
## Electrical Characteristic Curve



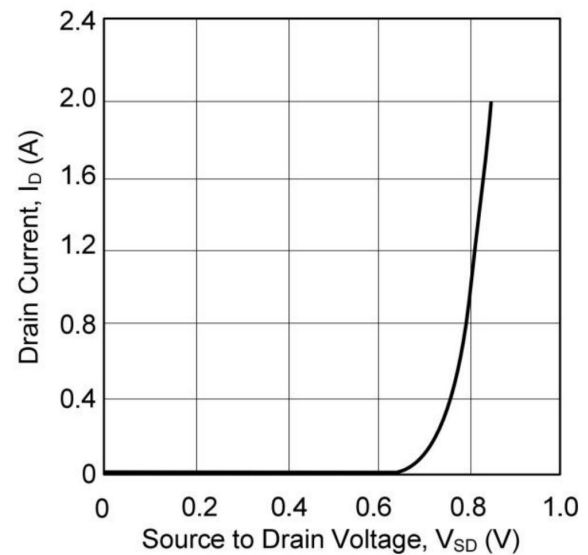
1. Drain Current vs. Drain-Source Breakdown Voltage



2. Drain Current vs. Gate Threshold Voltage

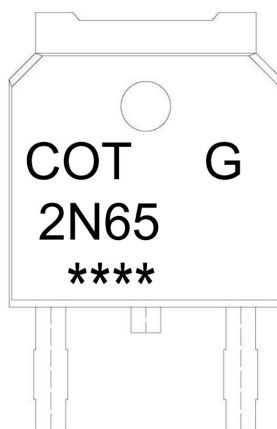


3. Drain-Source On-State Resistance Characteristics



4. Drain Current vs. Source to Drain Voltage

## Marking Instructions



Note:

COT: Company Logo

G: Halogen Free

2N65: Product Type.

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

## Packaging SPEC

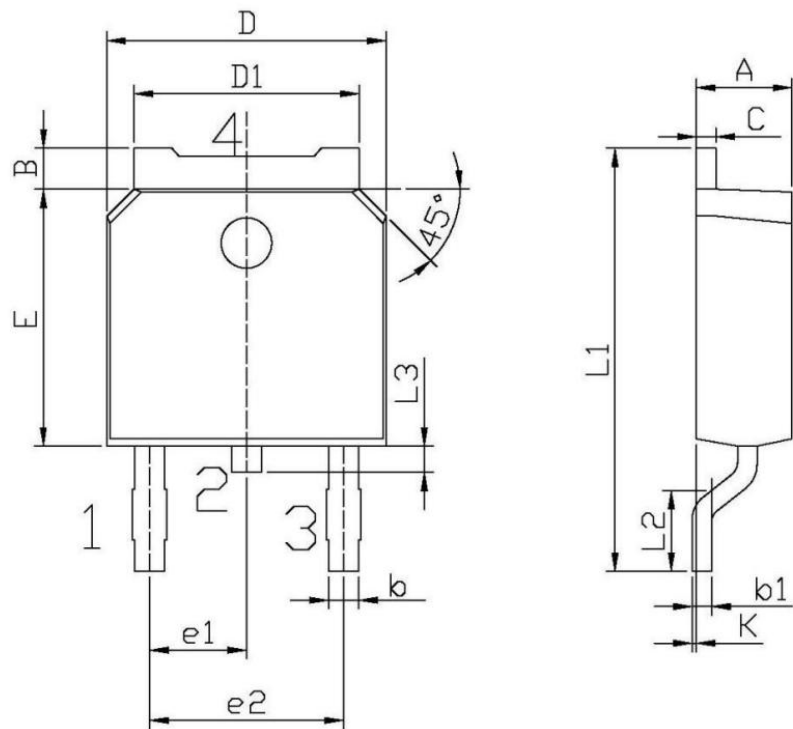
## REEL INFORMATION

| Package Type | Units      |                 |                 |                       |                 | Dimension     |                                 |                                 |
|--------------|------------|-----------------|-----------------|-----------------------|-----------------|---------------|---------------------------------|---------------------------------|
|              | Units/Reel | Reels/Inner Box | Units/Inner Box | Inner Boxes/Outer Box | Units/Outer Box | Reel unit: mm | Inner Box unit: mm <sup>3</sup> | Outer Box unit: mm <sup>3</sup> |
| TO-252       | 2,500      | 2               | 5,000           | 5                     | 25,000          | 13" ×16       | 360×360×50                      | 385×257×392                     |

## TUBE INFORMATION

| Package Type | Units      |                 |                 |                       |                 | Dimension                  |                                 |                                 |
|--------------|------------|-----------------|-----------------|-----------------------|-----------------|----------------------------|---------------------------------|---------------------------------|
|              | Units/Tube | Tubes/Inner Box | Units/Inner Box | Inner Boxes/Outer Box | Units/Outer Box | Tube unit: mm <sup>3</sup> | Inner Box unit: mm <sup>3</sup> | Outer Box unit: mm <sup>3</sup> |
| TO-252       | 75         | 48              | 3,600           | 5                     | 18,000          | 526×20.5×5.25              | 555×164×50                      | 575×290×180                     |

Package Outline Dimensions



单位: mm

| Symbol | Dimensions In Millimeters |      | Symbol | Dimensions In Millimeters |       |
|--------|---------------------------|------|--------|---------------------------|-------|
|        | Min                       | Max  |        | Min                       | Max   |
| A      | 2.20                      | 2.40 | E      | 5.95                      | 6.25  |
| B      | 0.95                      | 1.25 | e1     | 2.24                      | 2.34  |
| b      | 0.70                      | 0.90 | e2     | 4.43                      | 4.73  |
| b1     | 0.45                      | 0.55 | L1     | 9.85                      | 10.35 |
| C      | 0.45                      | 0.55 | L2     | 1.70                      | 2.00  |
| D      | 6.45                      | 6.75 | L3     | 0.60                      | 0.90  |
| D1     | 5.10                      | 5.50 | K      | 0.00                      | 0.10  |

T0-252