

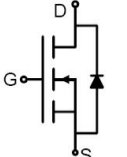


# 30N03A

## 30V N-Channel Power

|   |   |
|---|---|
| <p><b>Mosfet</b></p> <p><b>General Description</b></p> <p>These N-channel enhancement mode power mosfets used advanced trench technology design, provided excellent R<sub>ds(on)</sub> and low gate charge. Which accords with the RoHS standard.</p> <p><b>Features</b></p> <ul style="list-style-type: none"> <li>● V<sub>DS</sub> = 30V, I<sub>D</sub> = 90A</li> <li>● R<sub>ds(on)</sub>, 3.9 mΩ (Typ) @ V<sub>GS</sub> = 10V</li> <li>● R<sub>ds(on)</sub>, 6.5mΩ (Typ) @ V<sub>GS</sub> = 4.5V</li> <li>● Low on resistance</li> <li>● Low gate charge</li> <li>● Fast switching</li> <li>● Low reverse transfer capacitances</li> </ul> <p><b>Application</b></p> <ul style="list-style-type: none"> <li>● DC-DC converters</li> <li>● Synchronous Rectifier</li> </ul> | <div style="text-align: center;">  <p>TO-252(DPAK) top view</p>  <p>Marking and pin Assignment</p>  <p>Schematic Diagram</p> </div> |
|---|---|

### Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|--------|----------------|-----------|------------|----------|
| 30N03A         | 30N03A | TO-252         | 330mm     | 12mm       | 2500     |

### Absolute Maximum Ratings(TA=25°C unless otherwise noted)

| Parameter                                 |          | Symbol           | Value       | Unit |
|---|----------|------------------|-------------|------|
| Drain-Source Voltage                      |          | V <sub>DS</sub>  | 30          | V    |
| Gate-Source Voltage                       |          | V <sub>GS</sub>  | ±20         | V    |
| Drain Current-Continuous <sup>Note3</sup> | TC=25°C  | I <sub>D</sub>   | 90          | A    |
|   | TC=100°C |                  | 63          | A    |
| Drain Current-Pulsed <sup>Note1</sup>     |          | I <sub>DM</sub>  | 200         | A    |
| Avalanche Energy <sup>Note4</sup>         |          | E <sub>AS</sub>  | 280         | mJ   |
| Avalanche Current                         |          | I <sub>AS</sub>  | 33          | A    |
| Maximum Power Dissipation                 |          | P <sub>D</sub>   | 105         | W    |
|   |          |                  |             |      |
| Storage Temperature Range                 |          | T <sub>STG</sub> | -55 to +150 | °C   |
| Operating Junction Temperature Range      |          | T <sub>J</sub>   | -55 to +150 | °C   |

### Thermal Resistance

| Parameter                            | Symbol           | Min. | Typ. | Max | Unit |
|--------------------------------------|------------------|------|------|-----|------|
| Thermal Resistance, Junction-to-Case | R <sub>θJC</sub> | -    | 3.3  | -   | °C/W |

**Electrical Characteristics(T<sub>J</sub>=25°C unless otherwise noted)**

| OFF CHARACTERISTICS             |                   |   |      |      |      |      |
|---------------------------------|-------------------|---|------|------|------|------|
| Parameter                       | Symbol            | Conditions                                  | Min. | Typ. | Max. | Unit |
| Drain-Source Breakdown Voltage  | BV <sub>DSS</sub> | V <sub>GS</sub> =0V, I <sub>DS</sub> =250uA | 30   | -    | -    | V    |
| Zero Gate Voltage Drain Current | I <sub>DSS</sub>  | V <sub>DS</sub> =30V, V <sub>GS</sub> =0V   | -    | -    | 1    | uA   |
| Gate-Body Leakage               | I <sub>GSS</sub>  | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V  | -    | -    | ±100 | nA   |

| ON CHARACTERISTICS               |                     |   |      |      |      |      |
|----------------------------------|---------------------|---|------|------|------|------|
| Parameter                        | Symbol              | Conditions  | Min. | Typ. | Max. | Unit |
| Gate Threshold Voltage           | V <sub>GS(TH)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250uA | 1.0  | 1.7  | 2.5  | V    |
| Drain-Source On-State Resistance | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>DS</sub> =30A                | -    | 3.9  | 5.0  | mΩ   |
|                                  |                     | V <sub>GS</sub> =4.5V, I <sub>DS</sub> =20A               | -    | 6.5  | 8.0  |      |

| DYNAMIC CHARACTERISTICS      |                  |  |      |      |      |      |
|------------------------------|------------------|--|------|------|------|------|
| Parameter                    | Symbol           | Conditions   | Min. | Typ. | Max. | Unit |
| Input Capacitance            | C <sub>ISS</sub> | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V,<br>f=1MHz | -    | 1963 | -    | pF   |
| Output Capacitance           | C <sub>OSS</sub> |  | -    | 248  | -    |      |
| Reverse Transfer Capacitance | C <sub>rss</sub> |  | -    | 221  | -    |      |
| Gate Resisitance             | R <sub>g</sub>   | V <sub>DD</sub> =0V, V <sub>GS</sub> =1V,<br>F=1MHz    | -    | 1.43 | -    | Ω    |

| SWITCHING CHARACTERISTICS     |                     |  |      |      |      |      |
|-------------------------------|---------------------|--|------|------|------|------|
| Parameter                     | Symbol              | Conditions   | Min. | Typ. | Max. | Unit |
| Turn-On Delay Time            | T <sub>d(on)</sub>  | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V,<br>R <sub>GEN</sub> =3Ω<br>I <sub>D</sub> =20A | -    | 55   | -    | ns   |
| Rise Time                     | t <sub>r</sub>      |  | -    | 36.4 | -    |      |
| Turn-Off Delay Time           | T <sub>d(off)</sub> |  | -    | 37.5 | -    |      |
| Fall Time                     | t <sub>f</sub>      |  | -    | 14   | -    |      |
| Total Gate Charge at 10V      | Q <sub>g</sub>      | V <sub>DS</sub> =15V, I <sub>DS</sub> =45A,<br>V <sub>GS</sub> =10V                        | -    | 41   | -    | nC   |
| Gate to Source Gate Charge    | Q <sub>gs</sub>     |  | -    | 6.4  | -    |      |
| Gate to Drain "Miller" Charge | Q <sub>gd</sub>     |  | -    | 11   | -    |      |

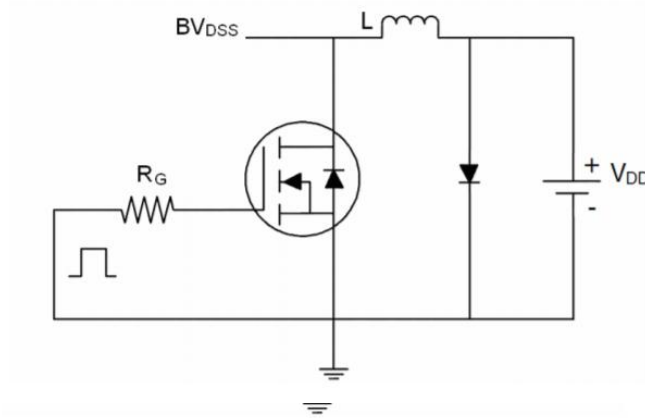
| DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS |                 |   |      |      |      |      |
|--|-----------------|---|------|------|------|------|
| Parameter  | Symbol          | Conditions                                | Min. | Typ. | Max. | Unit |
| Drain-Source Diode Forward Voltage                     | V <sub>SD</sub> | V <sub>GS</sub> =0V, I <sub>DS</sub> =20A | -    | -    | 1.2  | V    |
| Reverse Recovery Time                                  | t <sub>rr</sub> | T <sub>J</sub> =25°C, I <sub>F</sub> =20A | -    | 21.7 | -    | nS   |
| Reverse Recovery Charge                                | Q <sub>rr</sub> | di/dt=100A/us                             | -    | 7.2  | -    | nC   |

**Notes:**

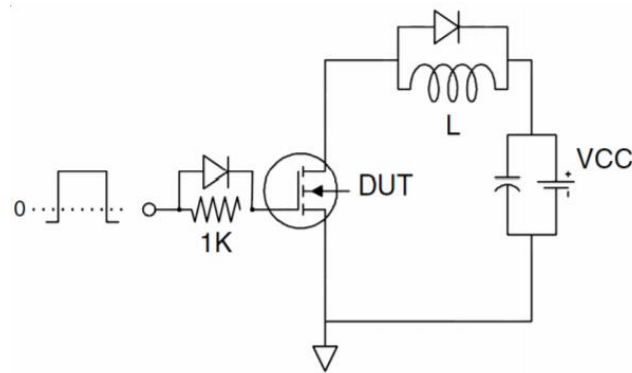
- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, t<sub>s</sub>≤10sec.
- 3: Pulse width ≤ 300μs, duty cycle ≤ 2%.
- 4: EAS condition: L=0.5mH, V<sub>DD</sub>=15V, V<sub>G</sub>=10V, V<sub>GATE</sub>=30V, Start T<sub>J</sub>=25°C.

**Test Circuit**

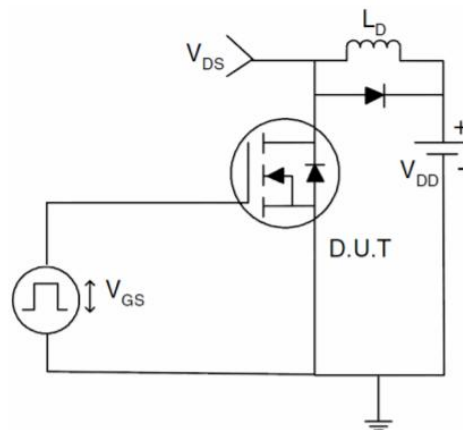
**1) E<sub>AS</sub> Test Circuit**



**2) Gate Charge Test Circuit**



**3) Switch Time Test Circuit**



Typical Electrical and Thermal Characteristics (Curves)

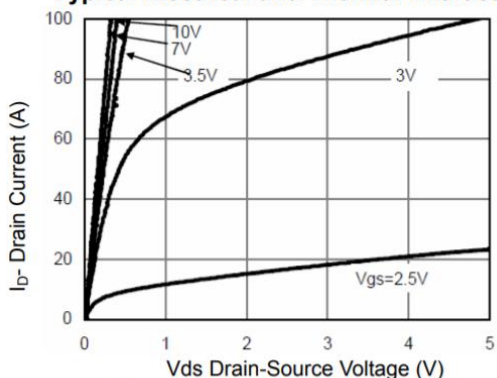


Figure 1 Output Characteristics

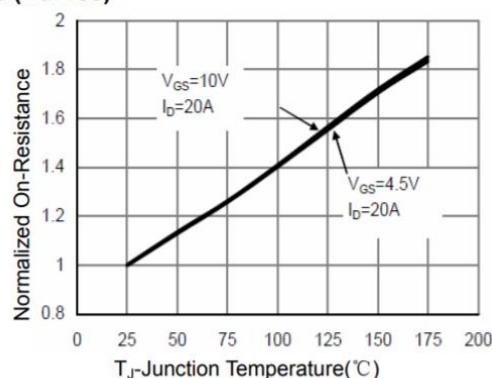


Figure 4 Rds(on)-Junction Temperature

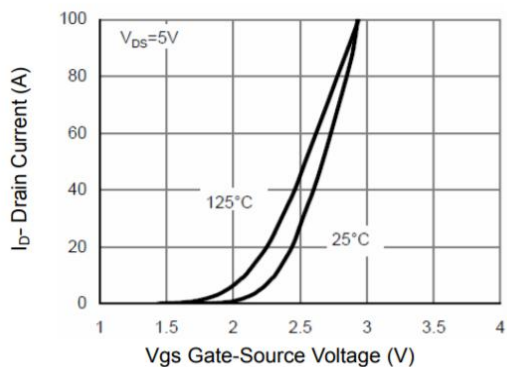


Figure 2 Transfer Characteristics

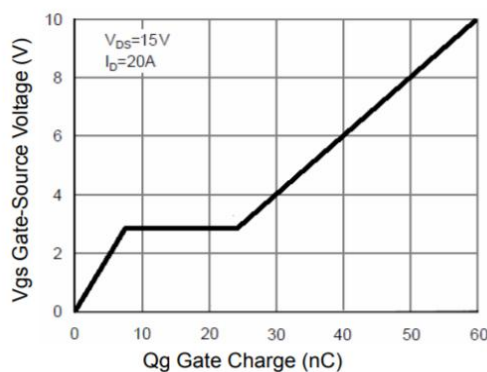


Figure 5 Gate Charge

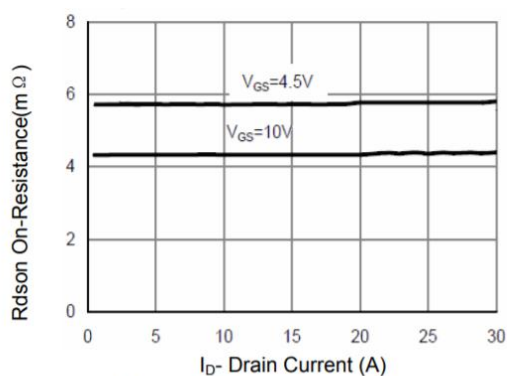


Figure 3 Rds(on)-Drain Current

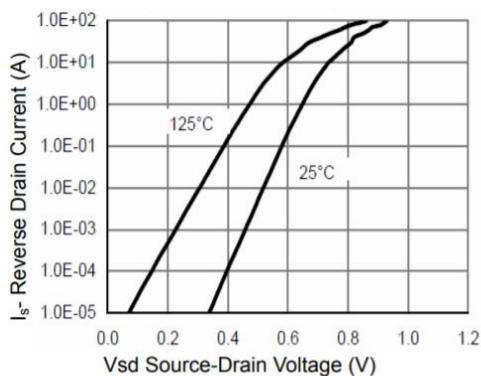
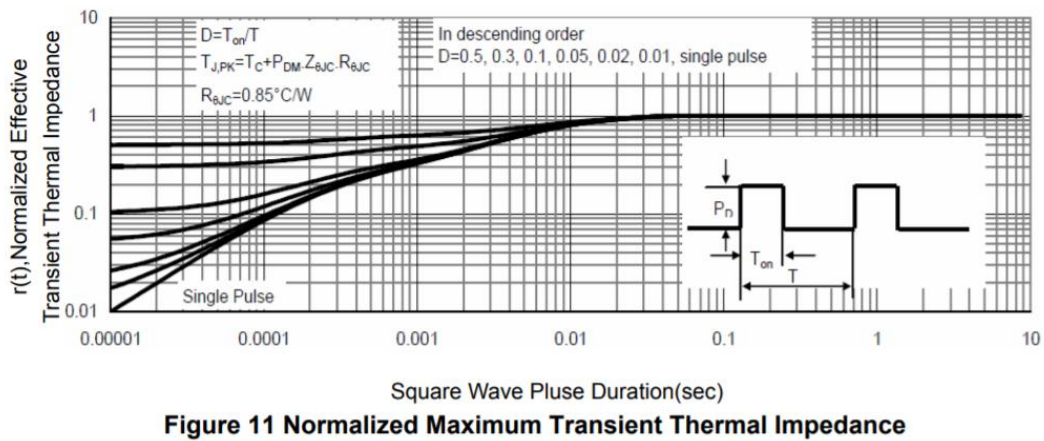
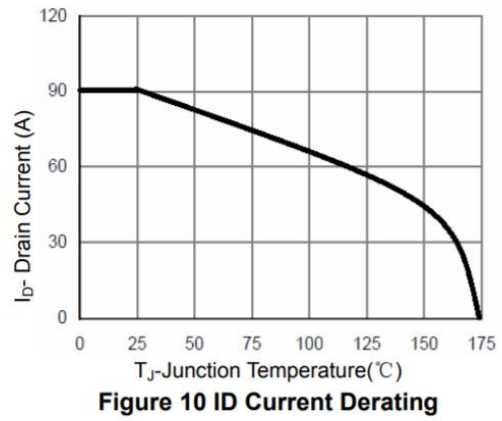
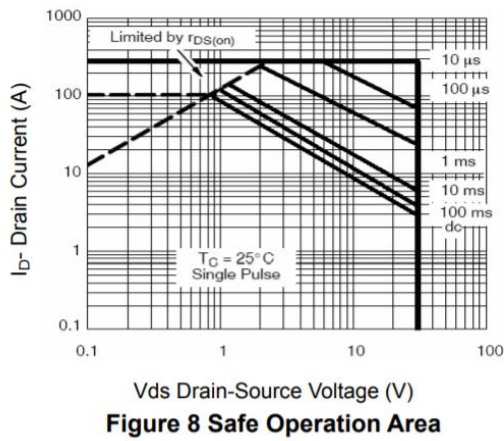
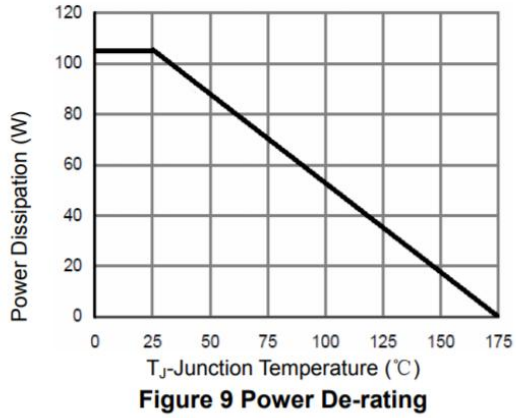
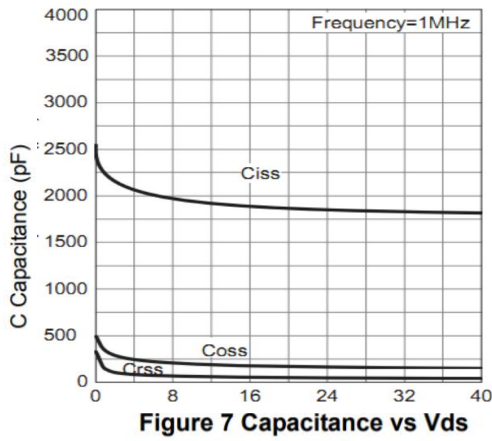
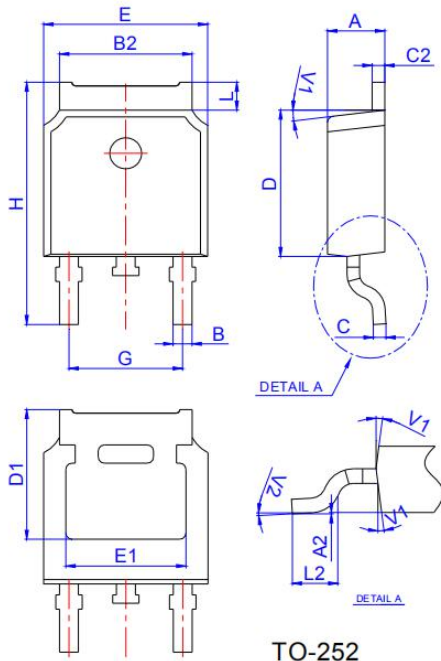


Figure 6 Source-Drain Diode Forward

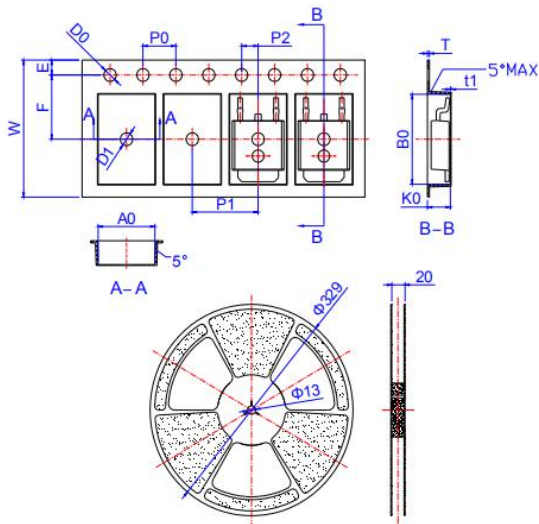


Package Mechanical Data



| Ref. | Dimensions  |      |       |          |      |       |
|------|-------------|------|-------|----------|------|-------|
|      | Millimeters |      |       | Inches   |      |       |
|      | Min.        | Typ. | Max.  | Min.     | Typ. | Max.  |
| A    | 2.10        |      | 2.50  | 0.083    |      | 0.098 |
| A2   | 0           |      | 0.10  | 0        |      | 0.004 |
| B    | 0.66        |      | 0.86  | 0.026    |      | 0.034 |
| B2   | 5.18        |      | 5.48  | 0.202    |      | 0.216 |
| C    | 0.40        |      | 0.60  | 0.016    |      | 0.024 |
| C2   | 0.44        |      | 0.58  | 0.017    |      | 0.023 |
| D    | 5.90        |      | 6.30  | 0.232    |      | 0.248 |
| D1   | 5.30REF     |      |       | 0.209REF |      |       |
| E    | 6.40        |      | 6.80  | 0.252    |      | 0.268 |
| E1   | 4.63        |      |       | 0.182    |      |       |
| G    | 4.47        |      | 4.67  | 0.176    |      | 0.184 |
| H    | 9.50        |      | 10.70 | 0.374    |      | 0.421 |
| L    | 1.09        |      | 1.21  | 0.043    |      | 0.048 |
| L2   | 1.35        |      | 1.65  | 0.053    |      | 0.065 |
| V1   |             | 7°   |       |          | 7°   |       |
| V2   | 0°          |      | 6°    | 0°       |      | 6°    |

Reel Specification-TO-252



| Ref. | Dimensions  |       |       |        |       |       |
|------|-------------|-------|-------|--------|-------|-------|
|      | Millimeters |       |       | Inches |       |       |
|      | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| W    | 15.90       | 16.00 | 16.10 | 0.626  | 0.630 | 0.634 |
| E    | 1.65        | 1.75  | 1.85  | 0.065  | 0.069 | 0.073 |
| F    | 7.40        | 7.50  | 7.60  | 0.291  | 0.295 | 0.299 |
| D0   | 1.40        | 1.50  | 1.60  | 0.055  | 0.059 | 0.063 |
| D1   | 1.40        | 1.50  | 1.60  | 0.055  | 0.059 | 0.063 |
| P0   | 3.90        | 4.00  | 4.10  | 0.154  | 0.157 | 0.161 |
| P1   | 7.90        | 8.00  | 8.10  | 0.311  | 0.315 | 0.319 |
| P2   | 1.90        | 2.00  | 2.10  | 0.075  | 0.079 | 0.083 |
| A0   | 6.85        | 6.90  | 7.00  | 0.270  | 0.271 | 0.276 |
| B0   | 10.45       | 10.50 | 10.60 | 0.411  | 0.413 | 0.417 |
| K0   | 2.68        | 2.78  | 2.88  | 0.105  | 0.109 | 0.113 |
| T    | 0.24        |       | 0.27  | 0.009  |       | 0.011 |
| t1   | 0.10        |       |       | 0.004  |       |       |
| 10P0 | 39.80       | 40.00 | 40.20 | 1.567  | 1.575 | 1.583 |

|                      |                 |       |  |
|----------------------|-----------------|-------|--|
| DWG NO: TO-252-01-A1 | TITLE<br>TO-252 | SCALE |  |
|                      |                 | 4:1   |  |
| SHEET                | 1 OF 1          |       |  |