

### Features

- Enhancement mode
- Very low on-resistance
- Fast Switching
- 100% Avalanche test
- Pb-free lead plating; RoHS compliant

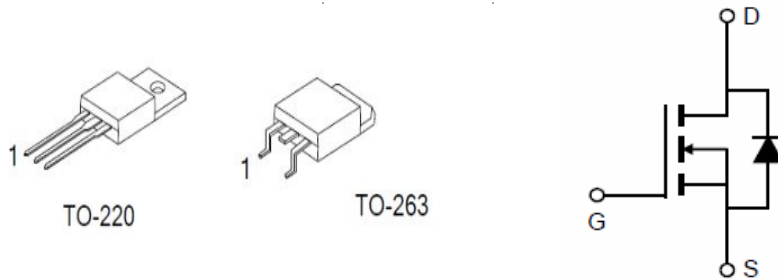
### Product Summary

|                                           |       |
|-------------------------------------------|-------|
| V <sub>DS</sub>                           | 150V  |
| R <sub>DS(on)</sub> @V <sub>GS</sub> =12V | 11 mΩ |
| I <sub>D</sub>                            | 100A  |

### Application

- Automotive applications and a wide variety of other applications
- High Efficiency Synchronous in SMPS
- High Speed Power Switching

| Part ID    | Package Type | Marking |
|------------|--------------|---------|
| SFP100N150 | TO-220       | 100N150 |
| SFB100N150 | TO-263       | 100N150 |



Maximum ratings, at  $T_J=25^\circ\text{C}$ , unless otherwise specified

| Symbol                                          | Parameter                           |                       | Rating     | Unit |
|-------------------------------------------------|-------------------------------------|-----------------------|------------|------|
| Common Ratings (Tc=25°C Unless Otherwise Noted) |                                     |                       |            |      |
| V <sub>GS</sub>                                 | Gate-Source Voltage                 |                       | ±25        | V    |
| V <sub>(BR)DSS</sub>                            | Drain-Source Breakdown Voltage      |                       | 150        | V    |
| T <sub>J</sub>                                  | Maximum Junction Temperature        |                       | 175        | °C   |
| T <sub>STG</sub>                                | Storage Temperature Range           |                       | -55 to 150 | °C   |
| I <sub>S</sub>                                  | Diode Continuous Forward Current    | T <sub>C</sub> =25°C  | 100        | A    |
| Mounted on Large Heat Sink                      |                                     |                       |            |      |
| I <sub>D</sub>                                  | Continuous Drain current@VGS=10V    | T <sub>C</sub> =25°C  | 100        | A    |
|                                                 |                                     | T <sub>C</sub> =100°C | 65         | A    |
| I <sub>DM</sub>                                 | Pulse Drain Current Tested ①        | T <sub>C</sub> =25°C  | 300        | A    |
| P <sub>D</sub>                                  | Maximum Power Dissipation           | T <sub>C</sub> =25°C  | 230        | W    |
| R <sub>θJC</sub>                                | Thermal Resistance-Junction to Case |                       | 0.65       | °C/W |
| R <sub>θJA</sub>                                | Thermal Resistance Junction-Ambient |                       | 52.5       | °C/W |
| Drain-Source Avalanche Ratings                  |                                     |                       |            |      |
| EAS                                             | Avalanche Energy, Single Pulsed ②   |                       | 225        | mJ   |

# SFP(B)100N150

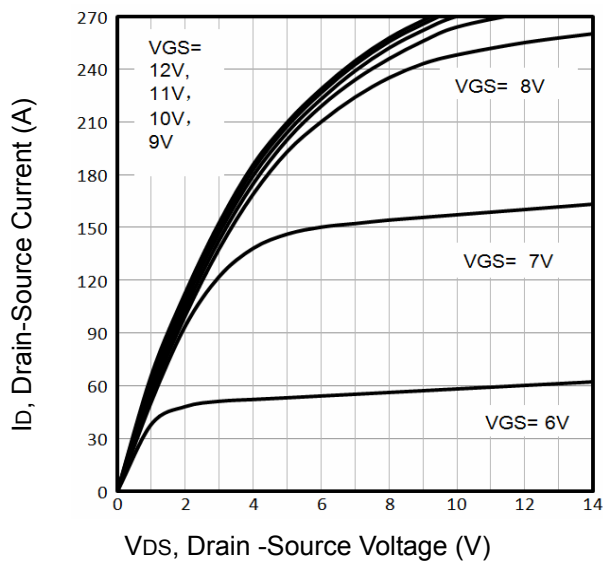
| Symbol                                                                               | Parameter                                              | Condition                                                                                      | Min. | Typ. | Max. | Unit |
|--------------------------------------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------|------|------|------|------|
| Static Electrical Characteristics @ T <sub>c</sub> = 25°C (unless otherwise stated)  |                                                        |                                                                                                |      |      |      |      |
| V <sub>(BR)DSS</sub>                                                                 | Drain-Source Breakdown Voltage                         | V <sub>GS</sub> =0V I <sub>D</sub> =250μA                                                      | 150  | --   | --   | V    |
| I <sub>DSS</sub>                                                                     | Zero Gate Voltage Drain Current(T <sub>c</sub> =25°C)  | V <sub>DS</sub> =150V,V <sub>GS</sub> =0V                                                      | --   | --   | 1    | μA   |
|                                                                                      | Zero Gate Voltage Drain Current(T <sub>c</sub> =125°C) | V <sub>DS</sub> =150V,V <sub>GS</sub> =0V                                                      | --   | --   | 100  | μA   |
| I <sub>GSS</sub>                                                                     | Gate-Body Leakage Current                              | V <sub>GS</sub> =±25V,V <sub>DS</sub> =0V                                                      | --   | --   | ±100 | nA   |
| V <sub>GS(TH)</sub>                                                                  | Gate Threshold Voltage                                 | V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =250μA                                        | 3.0  | 4.0  | 5.0  | V    |
| R <sub>DS(ON)</sub>                                                                  | Drain-Source On-State Resistance③                      | V <sub>GS</sub> =12V, I <sub>D</sub> =30A                                                      | --   | 11.0 | 12.5 | mΩ   |
| R <sub>DS(ON)</sub>                                                                  | Drain-Source On-State Resistance③                      | V <sub>GS</sub> =10V, I <sub>D</sub> =30A                                                      | --   | 11.2 | 13.0 | mΩ   |
| Dynamic Electrical Characteristics @ T <sub>c</sub> = 25°C (unless otherwise stated) |                                                        |                                                                                                |      |      |      |      |
| C <sub>iss</sub>                                                                     | Input Capacitance                                      | V <sub>DS</sub> =20V,V <sub>GS</sub> =0V,<br>f=1MHz                                            | --   | 5960 | --   | pF   |
| C <sub>oss</sub>                                                                     | Output Capacitance                                     |                                                                                                | --   | 485  | --   | pF   |
| C <sub>rss</sub>                                                                     | Reverse Transfer Capacitance                           |                                                                                                | --   | 125  | --   | pF   |
| Q <sub>g</sub>                                                                       | Total Gate Charge                                      | V <sub>DS</sub> =75V,I <sub>D</sub> =20A,<br>V <sub>GS</sub> =10V                              | --   | 75   | --   | nC   |
| Q <sub>gs</sub>                                                                      | Gate-Source Charge                                     |                                                                                                | --   | 26   | --   | nC   |
| Q <sub>gd</sub>                                                                      | Gate-Drain Charge                                      |                                                                                                | --   | 20   | --   | nC   |
| Switching Characteristics                                                            |                                                        |                                                                                                |      |      |      |      |
| t <sub>d(on)</sub>                                                                   | Turn-on Delay Time                                     | V <sub>DD</sub> =75V,<br>I <sub>D</sub> =10A,<br>R <sub>G</sub> =6.8Ω,<br>V <sub>GS</sub> =10V | --   | 22   | --   | nS   |
| t <sub>r</sub>                                                                       | Turn-on Rise Time                                      |                                                                                                | --   | 28   | --   | nS   |
| t <sub>d(off)</sub>                                                                  | Turn-Off Delay Time                                    |                                                                                                | --   | 35   | --   | nS   |
| t <sub>f</sub>                                                                       | Turn-Off Fall Time                                     |                                                                                                | --   | 12   | --   | nS   |
| Source- Drain Diode Characteristics@ T <sub>c</sub> = 25°C (unless otherwise stated) |                                                        |                                                                                                |      |      |      |      |
| V <sub>SD</sub>                                                                      | Forward on voltage                                     | I <sub>SD</sub> =30A,V <sub>GS</sub> =0V                                                       | --   | 0.80 | 1.2  | V    |
| t <sub>rr</sub>                                                                      | Reverse Recovery Time                                  | T <sub>J</sub> =25°C ,I <sub>sd</sub> =20A,<br>V <sub>GS</sub> =0V                             | --   | 50   | --   | nS   |
| Q <sub>rr</sub>                                                                      | Reverse Recovery Charge                                | di/dt=300A/μs                                                                                  |      | 105  |      | nC   |

NOTE:

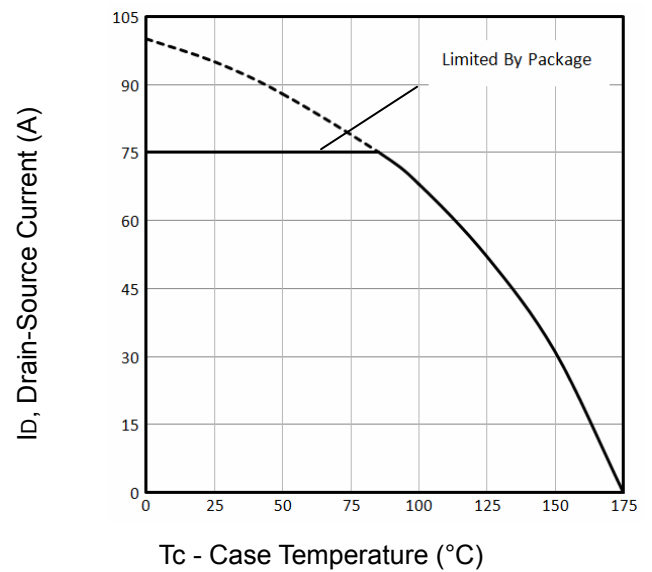
- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Limited by T<sub>Jmax</sub>, starting T<sub>J</sub> = 25°C, L = 0.5mH, R<sub>G</sub> = 25Ω, I<sub>AS</sub> = 30A, V<sub>GS</sub> = 10V. Part not recommended for use above this value
- ③ Pulse width ≤ 300μs; duty cycle ≤ 2%.

# SFP(B)100N150

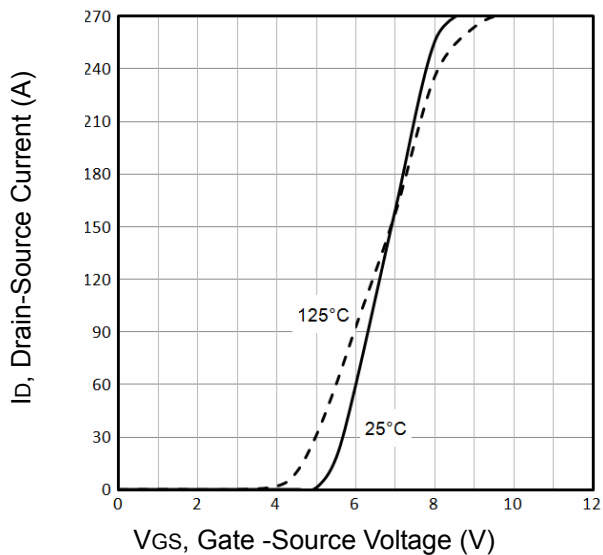
## Typical Characteristics



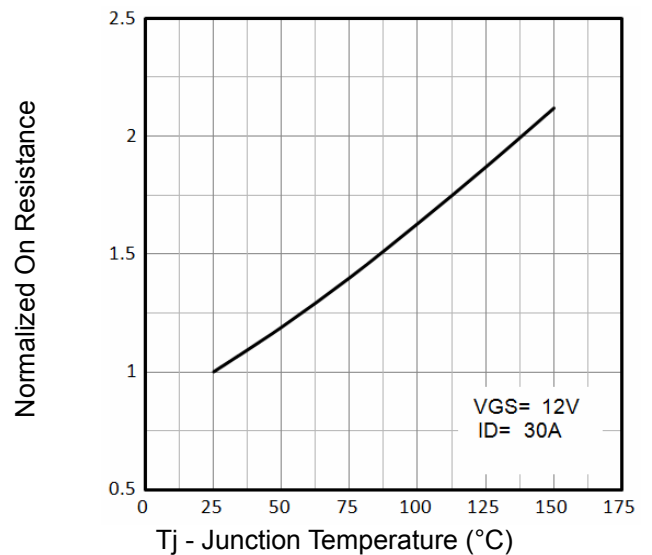
**Fig1.** Typical Output Characteristics



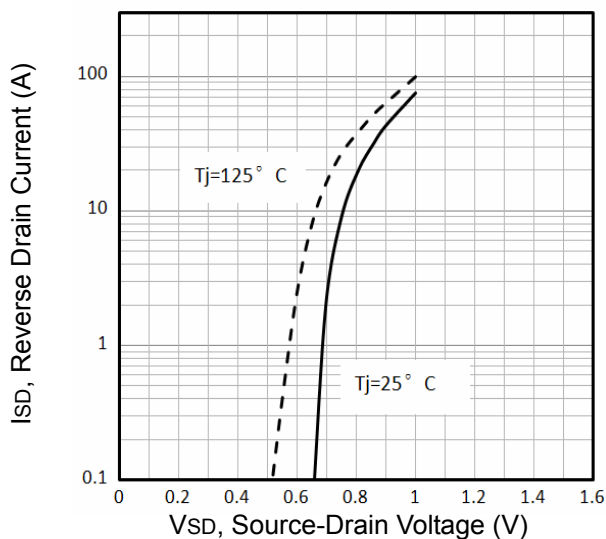
**Fig2.** Maximum Drain Current Vs Case Temperature



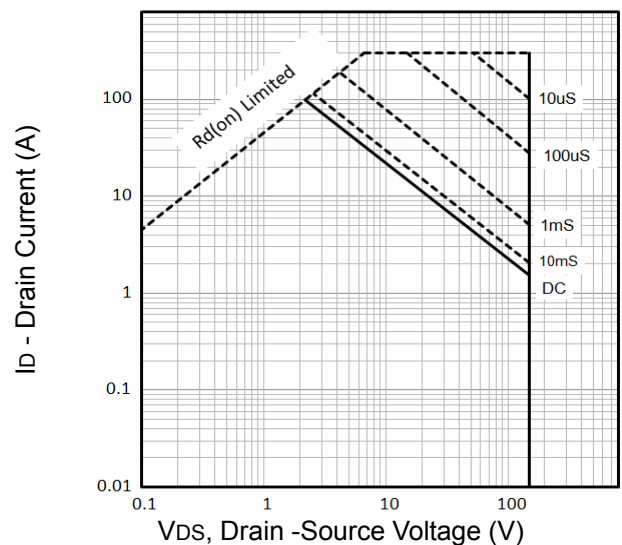
**Fig3.** Typical Transfer Characteristics



**Fig4.** Normalized On-Resistance Vs. Temperature



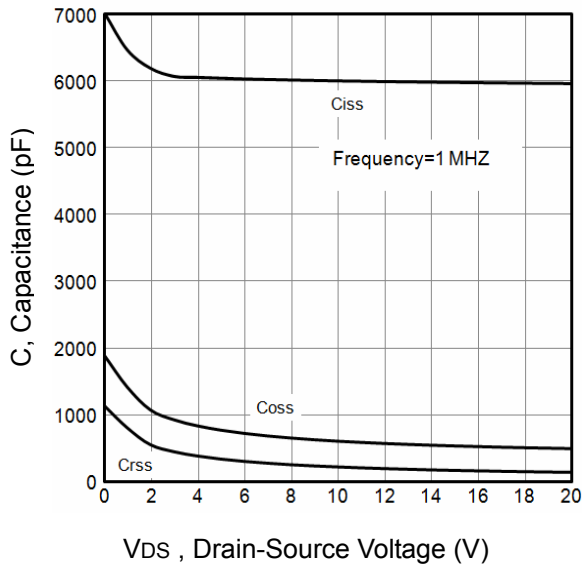
**Fig5.** Typical Source-Drain Diode Forward Voltage



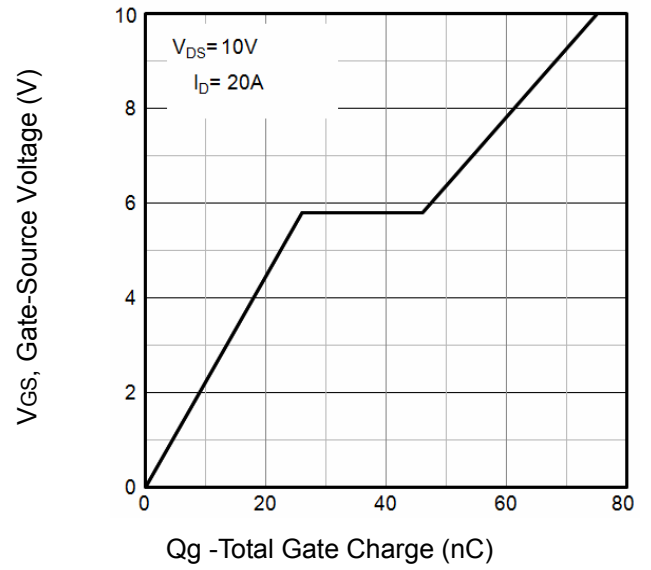
**Fig6.** Maximum Safe Operating Area

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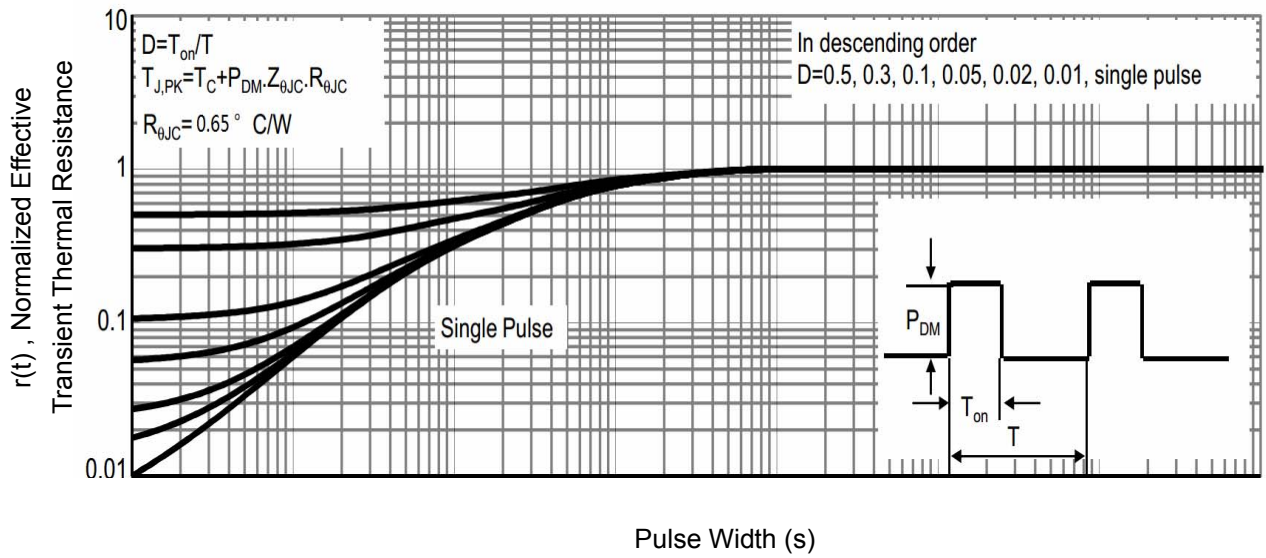
## Typical Characteristics



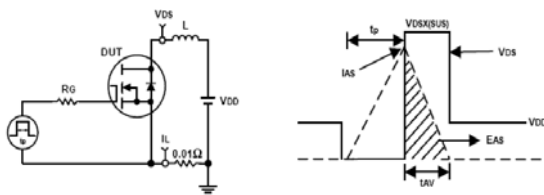
**Fig7.** Typical Capacitance Vs. Drain-Source Voltage



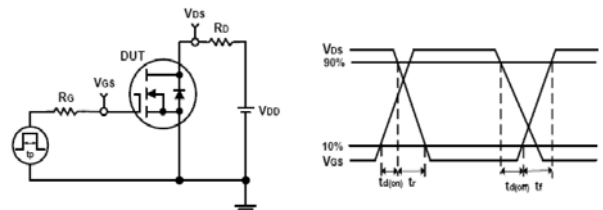
**Fig8.** Typical Gate Charge Vs. Gate-Source Voltage



**Fig9.** Normalized Maximum Transient Thermal Impedance



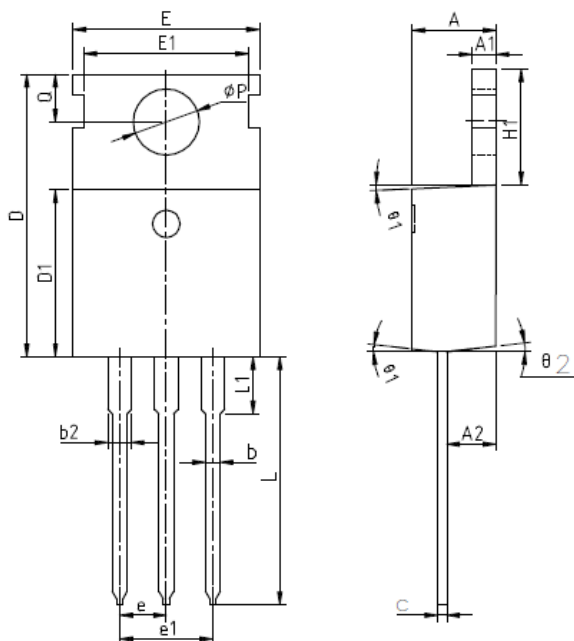
**Fig10.** Unclamped Inductive Test Circuit and waveforms



**Fig11.** Switching Time Test Circuit and waveforms

## PACKAGE DIMENSION

### TO-220



| SYMBOL     | MIN      | NOM   | MAX   |
|------------|----------|-------|-------|
| A          | 4.27     | 4.57  | 4.87  |
| A1         | 1.15     | 1.30  | 1.45  |
| A2         | 2.10     | 2.40  | 2.70  |
| b          | 0.70     | 0.80  | 1.00  |
| b2         | 1.17     | 1.27  | 1.50  |
| c          | 0.40     | 0.50  | 0.65  |
| D          | 15.10    | 15.60 | 16.10 |
| D1         | 8.80     | 9.10  | 9.40  |
| D2         | 5.70     | 6.70  | 7.00  |
| E          | 9.70     | 10.00 | 10.30 |
| E1         | -        | 8.70  | -     |
| E2         | 9.65     | 10.00 | 10.35 |
| E3         | 7.00     | 8.00  | 8.40  |
| e          | 2.54 BSC |       |       |
| e1         | 5.08 BSC |       |       |
| H1         | 6.00     | 6.50  | 6.85  |
| L          | 12.75    | 13.50 | 13.90 |
| L1         | -        | 3.10  | 3.40  |
| $\phi P$   | 3.45     | 3.60  | 3.75  |
| Q          | 2.60     | 2.80  | 3.00  |
| $\theta 1$ | 4°       | 7°    | 10°   |
| $\theta 2$ | 0°       | 3°    | 6°    |

### TO-263

