

SE8N65A

**N-Channel Enhancement-Mode MOSFET**

Revision: A

**General Description**

This type used advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of application

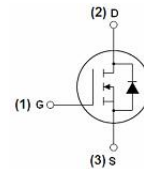
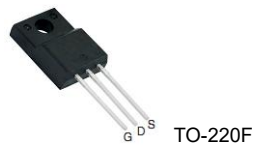
**Features**

For a single MOSFET

- $V_{DS} = 650V$
- $R_{DS(ON)} = 1.085\Omega @ V_{GS}=10V$

**Pin configurations**

See Diagram below



**Absolute Maximum Ratings**

| Parameter                                   |            | Symbol   | Rating     | Units       |
|---------------------------------------------|------------|----------|------------|-------------|
| Drain-Source Voltage                        |            | $V_{DS}$ | 650        | V           |
| Gate-Source Voltage                         |            | $V_{GS}$ | $\pm 30$   | V           |
| Avalanche Current <sup>2</sup>              |            | $I_{AR}$ | 7.5        | A           |
| Drain Current                               | Continuous | $I_D$    | 8.0        | A           |
|                                             | Pulsed     |          | 28         |             |
| Avalanche Energy Single Pulsed <sup>3</sup> |            | $E_{AS}$ | 420        | mJ          |
| Power Dissipation                           |            | $P_D$    | 48         | W           |
| Operating Junction Temperature Range        |            | $T_J$    | -55 to 150 | $^{\circ}C$ |

**Thermal Resistance**

| Symbol          | Parameter           | Typ. | Max. | Units         |
|-----------------|---------------------|------|------|---------------|
| $R_{\theta JA}$ | Junction to Ambient |      | 62.5 | $^{\circ}C/W$ |

## SE8N65A

| Electrical Characteristics (T <sub>J</sub> =25°C unless otherwise noted) |                                    |                                                                    |     |       |      |       |
|--------------------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------|-----|-------|------|-------|
| Symbol                                                                   | Parameter                          | Test Conditions                                                    | Min | Typ   | Max  | Units |
| <b>OFF CHARACTERISTICS (Note 2)</b>                                      |                                    |                                                                    |     |       |      |       |
| B <sub>V</sub> DSS                                                       | Drain-Source Breakdown Voltage     | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA,                        | 650 |       |      | V     |
| I <sub>DSS</sub>                                                         | Drain to Source Leakage Current    | V <sub>DS</sub> =650V, V <sub>GS</sub> =0V                         |     |       | 10   | μA    |
| I <sub>GSS</sub>                                                         | Gate-Body Leakage Current          | V <sub>GS</sub> =30V                                               |     |       | 100  | nA    |
| V <sub>GS(th)</sub>                                                      | Gate Threshold Voltage             | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA          | 2   |       | 4    | V     |
| R <sub>DS(ON)</sub>                                                      | Static Drain-Source On-Resistance  | V <sub>GS</sub> =10V, I <sub>D</sub> =2.1A                         |     | 1.085 | 1.30 | Ω     |
| <b>DYNAMIC PARAMETERS</b>                                                |                                    |                                                                    |     |       |      |       |
| C <sub>iss</sub>                                                         | Input Capacitance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =25V,<br>f=1MHz               |     | 1100  | 1430 | pF    |
| C <sub>oss</sub>                                                         | Output Capacitance                 |                                                                    |     | 135   | 175  | pF    |
| C <sub>rss</sub>                                                         | Reverse Transfer Capacitance       |                                                                    |     | 16    | 21   | pF    |
| <b>SWITCHING PARAMETERS</b>                                              |                                    |                                                                    |     |       |      |       |
| Q <sub>g</sub>                                                           | Total Gate Charge <sup>2</sup>     | V <sub>GS</sub> =10V, V <sub>DS</sub> =480V,<br>I <sub>D</sub> =7A |     | 29    | 38   | nC    |
| Q <sub>gs</sub>                                                          | Gate Source Charge                 |                                                                    |     | 7     |      | nC    |
| Q <sub>gd</sub>                                                          | Gate Drain Charge                  |                                                                    |     | 14.5  |      | nC    |
| t <sub>d(on)</sub>                                                       | Turn-On Delay Time                 | V <sub>DS</sub> =325V, R <sub>GEN</sub> =25Ω<br>I <sub>D</sub> =7A |     | 30    | 70   | ns    |
| t <sub>d(off)</sub>                                                      | Turn-Off Delay Time                |                                                                    |     | 80    | 170  | ns    |
| t <sub>d(r)</sub>                                                        | Turn-On Rise Time                  |                                                                    |     | 65    | 140  | ns    |
| t <sub>d(f)</sub>                                                        | Turn-Off Fall Time                 |                                                                    |     | 60    | 130  | ns    |
| <b>Source-Drain Diode Characteristics</b>                                |                                    |                                                                    |     |       |      |       |
| V <sub>SD</sub>                                                          | Drain-Source Diode Forward Voltage | V <sub>GS</sub> =0V, I <sub>S</sub> =7A                            |     |       | 1.5  | V     |
| I <sub>S</sub>                                                           | Max Drain-Source Diode Current     |                                                                    |     |       | 7.5  | A     |
| I <sub>SM</sub>                                                          | Max Pulse Drain-Source Current     |                                                                    |     |       | 28   | A     |
| t <sub>rr</sub>                                                          | Reverse Recovery Time              | V <sub>GS</sub> =0V, I <sub>S</sub> =7A                            |     | 320   |      | ns    |
| Q <sub>RR</sub>                                                          | Reverse Recovery Charge            | di <sub>F</sub> /dt=100A/μs <sup>1</sup>                           |     | 2.4   |      | μC    |

Typical Characteristics

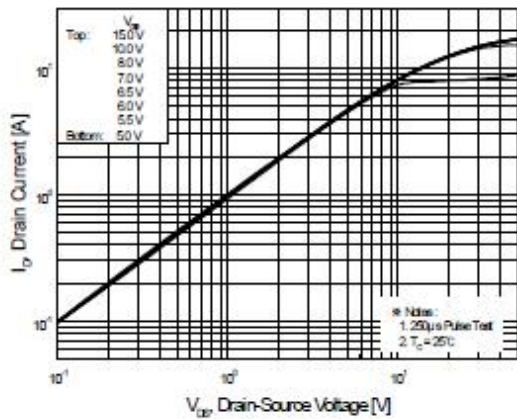


Figure 1. On-Region Characteristics

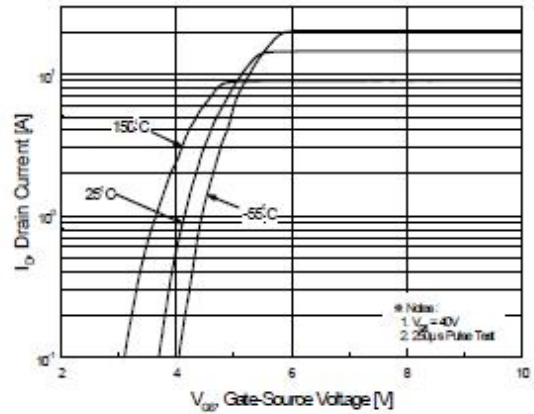


Figure 2. Transfer Characteristics

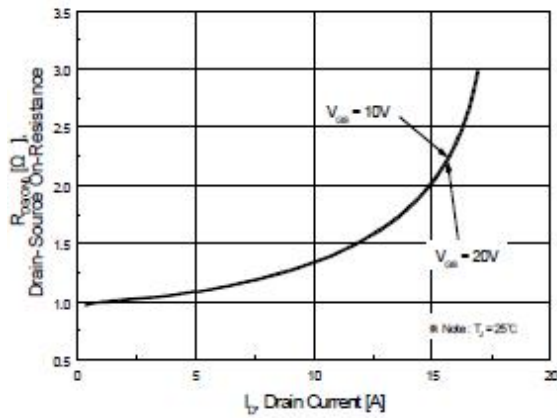


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

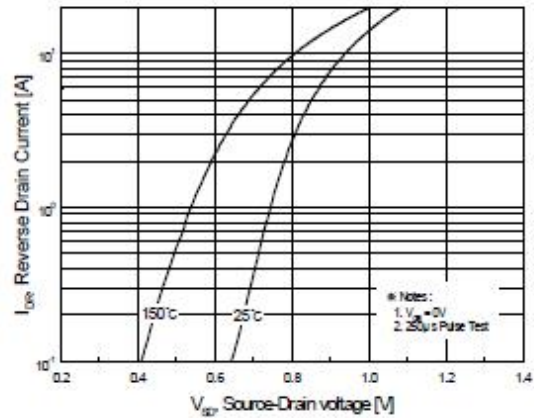


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

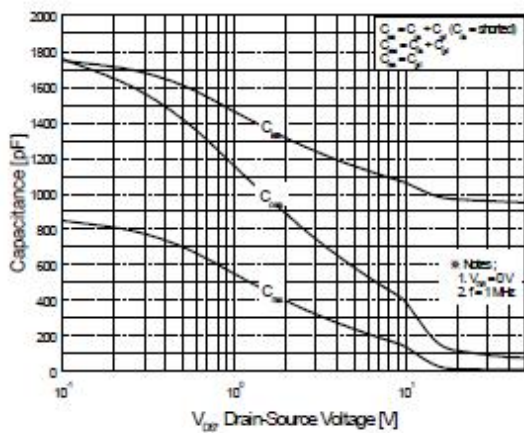


Figure 5. Capacitance Characteristics

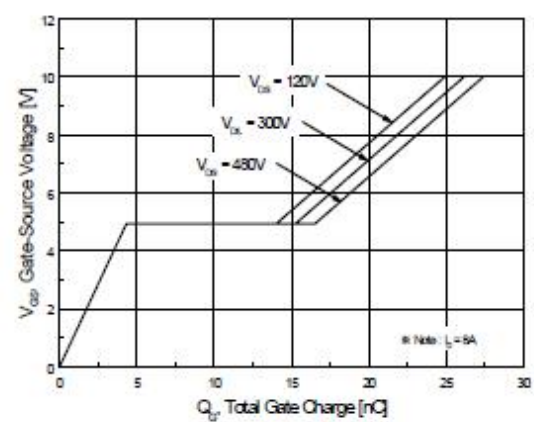


Figure 6. Gate Charge Characteristics

Typical Characteristics

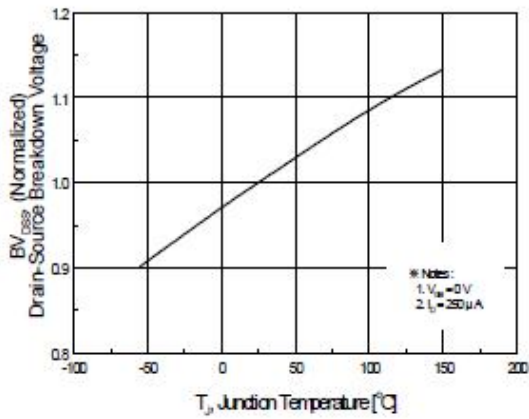


Figure 7. Breakdown Voltage Variation vs Temperature

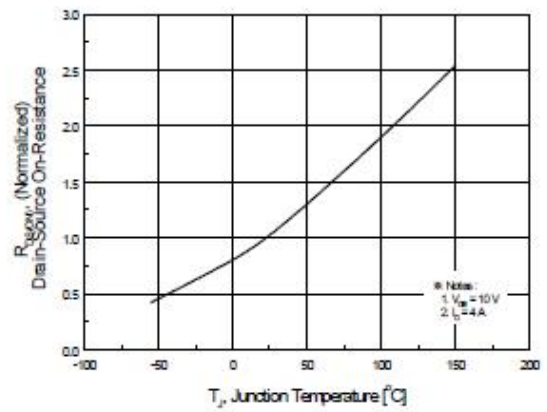


Figure 8. On-Resistance Variation vs Temperature

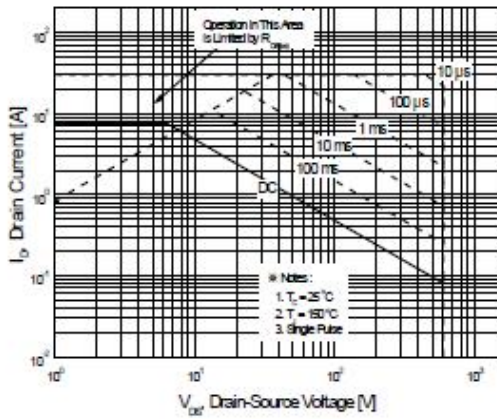


Figure 9-2. Maximum Safe Operating Area

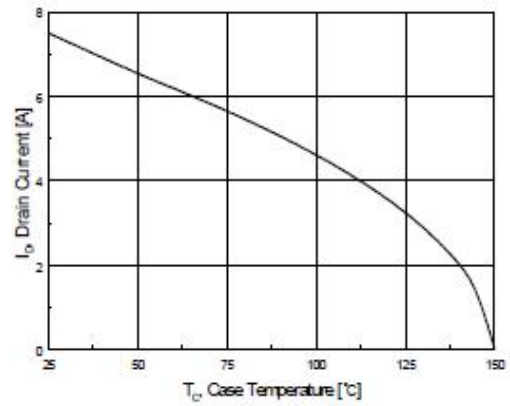


Figure 10. Maximum Drain Current vs Case Temperature

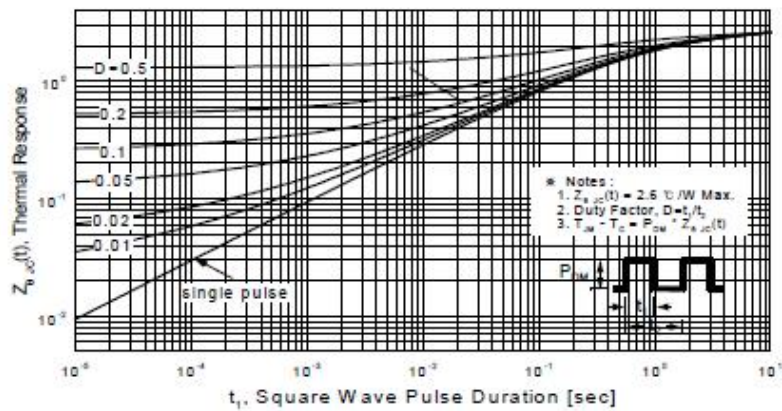
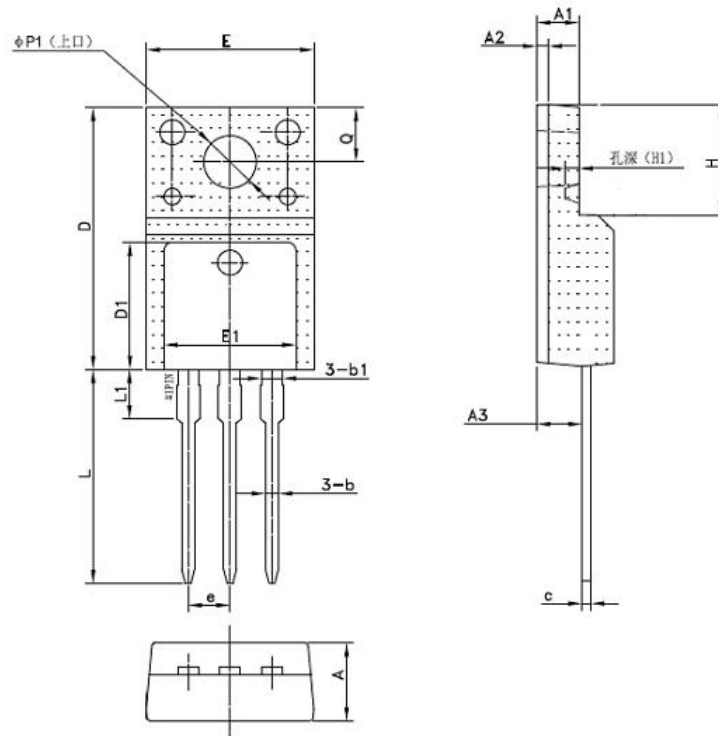


Figure 11-2. Transient Thermal Response Curve

# SE8N65A

## Package Outline Dimension

### TO-220F



| Symbol    | Dimensions(mm) |        |       |
|-----------|----------------|--------|-------|
|           | Min.           | Typ.   | Max.  |
| A         | 4.50           | 4.70   | 4.90  |
| A1        | 2.44           | 2.54   | 2.64  |
| A2        | 0.60           | 0.70   | 0.80  |
| A3        | 2.56           | 2.76   | 2.96  |
| b         | 0.70           | 0.80   | 0.95  |
| b1        | -              | 1.28   | -     |
| c         | 0.45           | 0.50   | 0.65  |
| D         | 15.67          | 15.87  | 16.07 |
| D1        | -              | 7.70   | -     |
| E         | 9.96           | 10.16  | 10.36 |
| E1        | -              | 8.00   | -     |
| e         | 2.54(BSC)      |        |       |
| H         | 6.50           | 6.70   | 6.90  |
| (H1)      | -              | (0.81) | -     |
| L         | 12.48          | 12.98  | 13.20 |
| L1        | -              | 2.93   | -     |
| $\phi P1$ | 2.98           | 3.18   | 3.38  |
| Q         | 3.10           | 3.30   | 3.50  |

**The SINO-IC logo is a registered trademark of ShangHai Sino-IC Microelectronics Co., Ltd.**

**© 2005 SINO-IC – Printed in China – All rights reserved.**

**SHANGHAI SINO-IC MICROELECTRONICS CO., LTD**

**Add:** Building 3, Room 3401-03, No.200 Zhangheng Road, ZhangJiang Hi-Tech Park, Pudong,  
Shanghai 201203, China

**Phone:** +86-21-33932402 33932403 33932405 33933508 33933608

**Fax:** +86-21-33932401

**Email:** webmaster@sino-ic.net

**Website:** <http://www.sino-ic.net>