SHANGHAI SINO-IC MICROELECTRONICS CO., LTD.

**Dec 2014**

SE3205A

# N-Channel Enhancement-Mode MOSFET

Revision: A

## General Description

This type used advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge.

- High density cell design for ultra low $R_{DS(ON)}$
- Excellent package for good heat dissipation

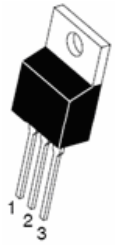
## Features

For a single MOSFET

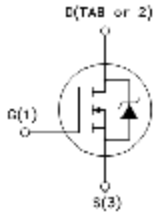
- $V_{DS}$ = 55V
- $R_{DS(ON)}$ = 6.5mΩ @ $V_{GS}$=10V
-

## Pin configurations

See Diagram below




TO-220




## Absolute Maximum Ratings

| Parameter | | Symbol | Rating | Units |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 55 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Drain Current | Continuous | $I_D$ | 110 | A |
| | Pulsed | | 390 | |
| Total Power Dissipation | @TA=25℃ | $P_D$ | 200 | W |
| Operating Junction Temperature Range | | $T_J$ | -55 to 175 | ℃ |

| Electrical Characteristics (TJ=25℃ unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **Symbol** | **Parameter** | **Test Conditions** | **Min** | **Typ** | **Max** | **Units** |
| **OFF CHARACTERISTICS (Note 2)** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $I_D$=250μA, $V_{GS}$=0V | 55 | | | V |
| $I_{DSS}$ | Drain to Source Leakage Current | $V_{DS}$=55V, $V_{GS}$=0V | | | 100 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{GS}$=20V | | | 100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$= $V_{GS}$, $I_D$=250μA | 2.1 | | 3.9 | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=10V, $I_D$=60A | | 6.5 | 7.9 | mΩ |
| **DYNAMIC PARAMETERS** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=25V, f=1MHz | | 3247 | | pF |
| $C_{oss}$ | Output Capacitance | | | 781 | | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 211 | | pF |
| **SWITCHING PARAMETERS** | | | | | | |
| $Q_g$ | Total Gate Charge [2] | $V_{GS}$=10V, $V_{DS}$=45V, $I_D$=62A | | | 146 | nC |
| $Q_{gs}$ | Gate Source Charge | | | | 35 | nC |
| $Q_{gd}$ | Gate Drain Charge | | | | 54 | nC |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{GS}$=10V, $V_{DS}$=28V, $R_{GEN}$=4.5Ω | | 14 | | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | | 50 | | ns |
| $t_{d(r)}$ | Turn-On Rise Time | | | 101 | | ns |
| $t_{d(f)}$ | Turn-Off Fall Time | | | 65 | | ns |

## Typical Characteristics

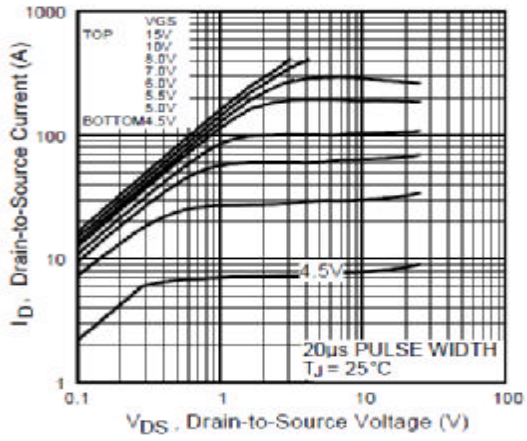



**Fig 1.** Typical Output Characteristics

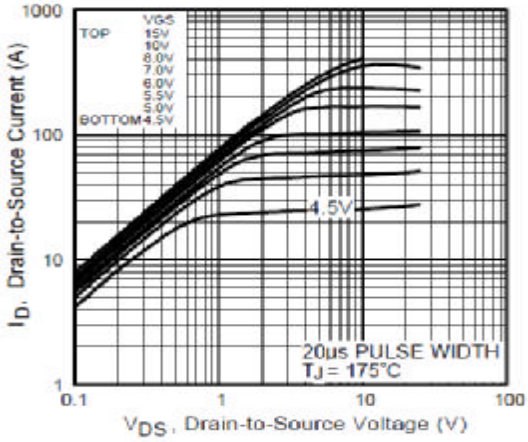



**Fig 2.** Typical Output Characteristics

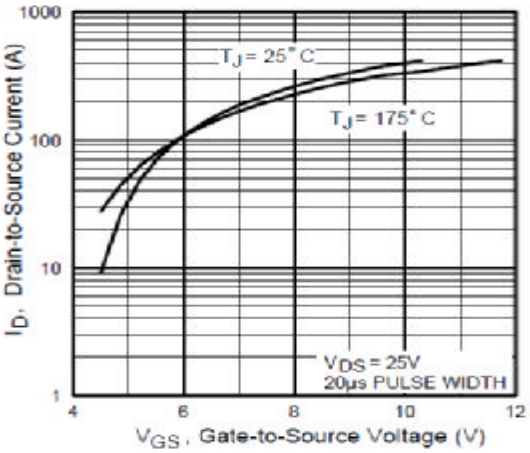



**Fig 3.** Typical Transfer Characteristics

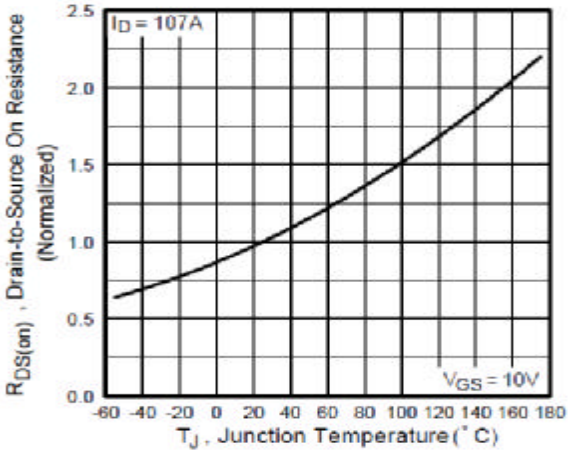



**Fig 4.** Normalized On-Resistance Vs. Temperature

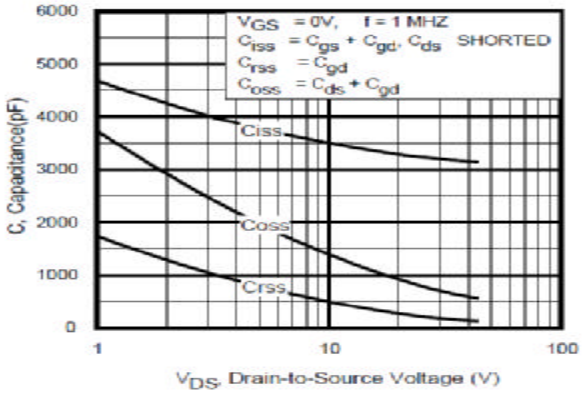



**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage

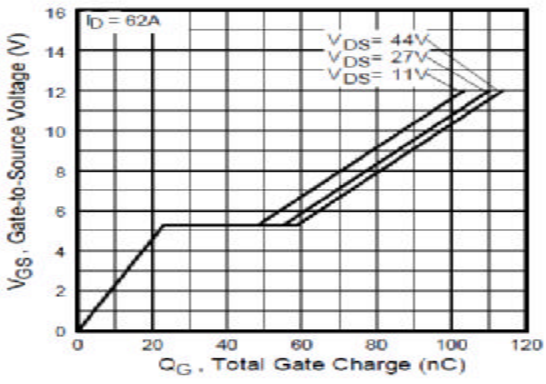



**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage

## Typical Characteristics

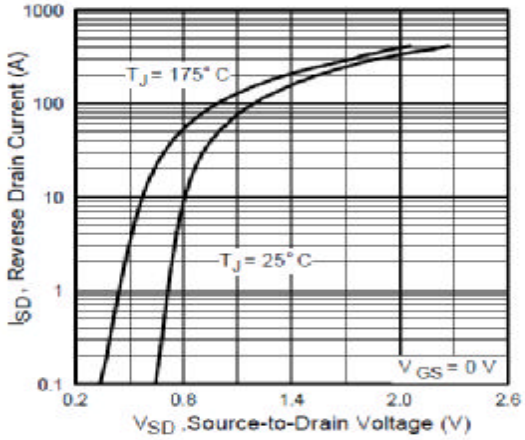



**Fig 7.** Typical Source-Drain Diode Forward Voltage

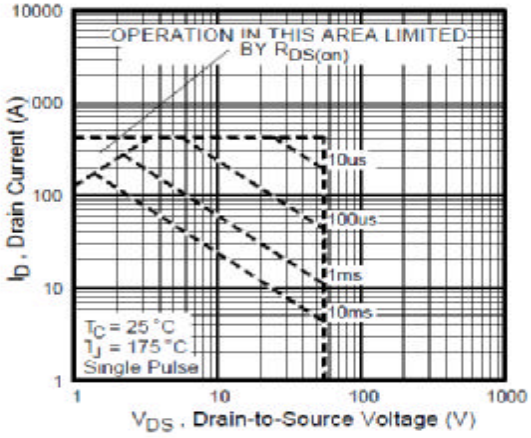



**Fig 8.** Maximum Safe Operating Area

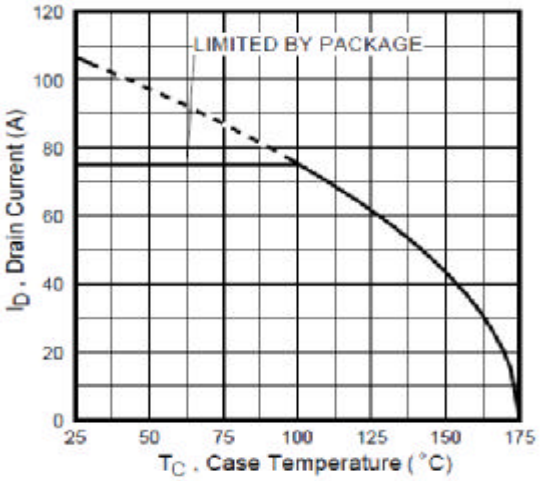



**Fig 9.** Maximum Drain Current Vs. Case Temperature

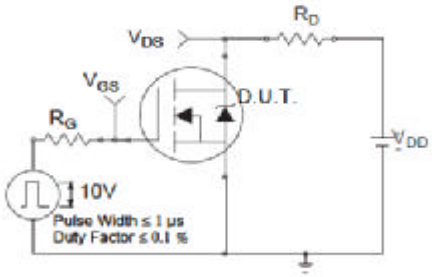



**Fig 10a.** Switching Time Test Circuit

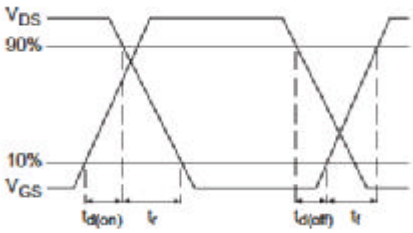
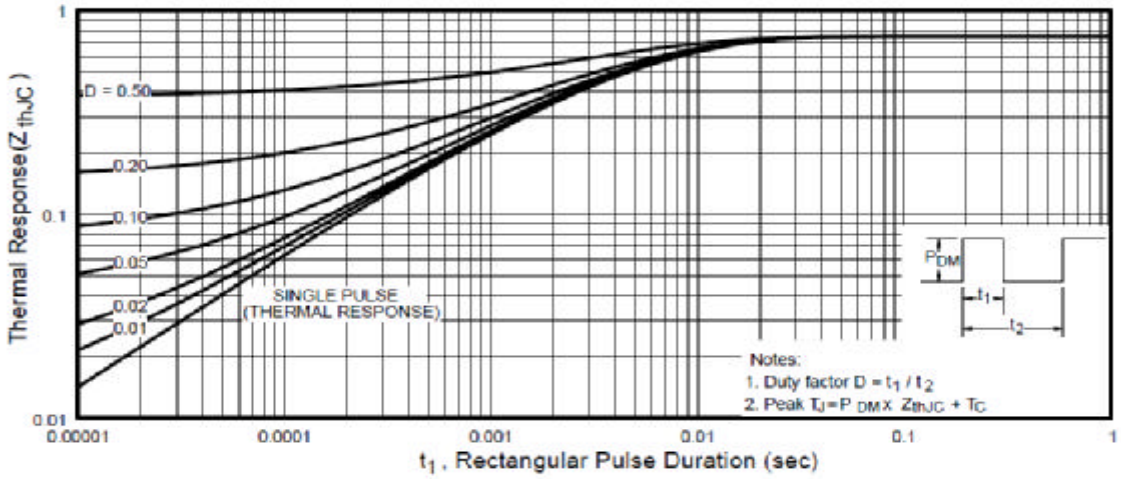
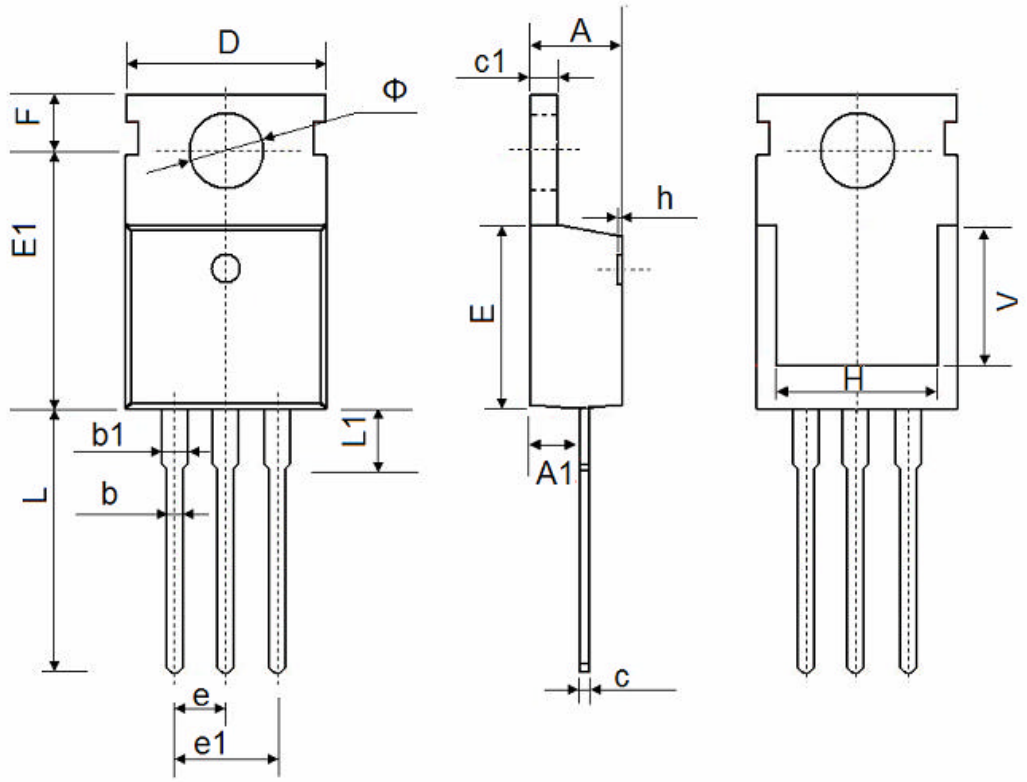



**Fig 10b.** Switching Time Waveforms



## Package Outline Dimension

**TO-220**




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 4.400 | 4.600 | 0.173 | 0.181 |
| A1 | 2.250 | 2.550 | 0.089 | 0.100 |
| b | 0.710 | 0.910 | 0.028 | 0.036 |
| b1 | 1.170 | 1.370 | 0.046 | 0.054 |
| c | 0.330 | 0.650 | 0.013 | 0.026 |
| c1 | 1.200 | 1.400 | 0.047 | 0.055 |
| D | 9.910 | 10.250 | 0.390 | 0.404 |
| E | 8.9500 | 9.750 | 0.352 | 0.384 |
| E1 | 12.650 | 12.950 | 0.498 | 0.510 |
| e | 2.540 TYP. | | 0.100 TYP. | |
| e1 | 4.980 | 5.180 | 0.196 | 0.204 |
| F | 2.650 | 2.950 | 0.104 | 0.116 |
| H | 7.900 | 8.100 | 0.311 | 0.319 |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| L | 12.900 | 13.400 | 0.508 | 0.528 |
| L1 | 2.850 | 3.250 | 0.112 | 0.128 |
| V | 7.500 REF. | | 0.295 REF. | |
| Φ | 3.400 | 3.800 | 0.134 | 0.150 |

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