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

**July 2008**

## *SE10N60*
## 10A,600V N-Channel MOSFET

**Revision:A**

## General Description

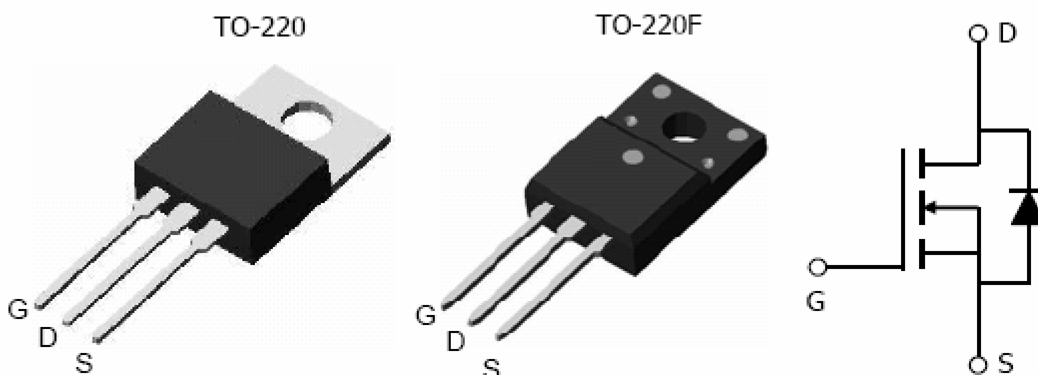
The MOSFETs from SINO-IC provide the best combination of fast switching, low on-resistance and cost-effectiveness.

## Features

- $V_{DS}$ (V) = 700V @150℃
- $I_D$ = 10A
- $R_{DS(ON)}$ <0.75Ω  ($V_{GS}$ = 10V)

## Pin configurations

See Diagram below




## Absolute Maximum Ratings

| Parameter | | Symbol | Rating | Units |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 600 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±30 | V |
| Drain Current (Note 1) | Continuous | $I_D$ | 10 | A |
| | Pulsed | | 36 | |
| Total Power Dissipation | | $P_D$ | 208 | W |
| Operating Junction Temperature Range | | $T_J$ | -50 to 150 | °C |

## Thermal Characteristics

| Parameter | | Symbol | Typ | Max | Units |
|---|---|---|---|---|---|
| Maximum Junction-to-Ambient A | t ≤ 10s | $R_{\theta JA}$ | - | 65 | °C/W |
| Maximum Case-to-Sink | Steady-State | $R_{\theta CS}$ | - | 0.5 | °C/W |
| Maximum Junction-to-- Case | Steady-State | $R_{\theta JC}$ | - | 0.6 | °C/W |

| Electrical Characteristics (TJ=25°C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **Symbol** | **Parameter** | **Test Conditions** | **Min** | **Typ** | **Max** | **Units** |
| **OFF/ON CHARACTERISTICS (Note 2)** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $I_D$=250 μ A, $V_{GS}$=0 V | 600 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=600 V, $V_{GS}$=0 V | | | 1 | μ A |
| $I_{GSS}$ | Gate-Body leakage current | $V_{DS}$=0 V, $V_{GS}$=±30 V | | | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$ $I_D$=250 μ A | 3 | 4 | 5 | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V, $I_D$=5 A | - | 0.6 | 0.75 | Ω |
| $g_{FS}$ | Forward Transconductance | $V_{Ds}$=40V, $I_D$=5A | - | 15 | - | S |
| **DYNAMIC PARAMETERS** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=25V, f=1MHz | 1100 | 1320 | 1600 | pF |
| $C_{oss}$ | Output Capacitance | | 105 | 130 | 160 | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | 7.5 | 9.3 | 11 | pF |
| TON | Turn-On Time | VDS =300V, $I_D$= 10A,VGS = 10 V,RGEN =25 Ω | - | 28 | 35 | ns |
| TOFF | Turn-Off Time | | - | 76 | 95 | ns |
| Tr | Turn-on Rise Time | | - | 66 | 80 | ns |
| Tf | Turn-on Fall Time | | - | 64 | 80 | ns |
| $Q_g(10)$ | Total Gate Charge | $V_{DS}$=480V,$I_D$=10A,$V_{GS}$=10V | - | 31.1 | 40 | nC |
| $Q_{gs}$ | Gate-Source Charge | | - | 6.4 | 10 | nC |
| $Q_{gd}$ | Gate-Drain Charge | | - | 14.4 | 20 | nC |
| $t_{rr}$ | Body Diode Reverse Recovery Time | $I_F$=10A, dI/dt=100A/ μ s | - | 290 | 350 | ns |
| $Q_{rr}$ | Body Diode Reverse Recovery Charge | $I_F$=10A, dI/dt=100A/ μ s | - | 3.9 | 4.7 | uC |

## Typical Characteristics

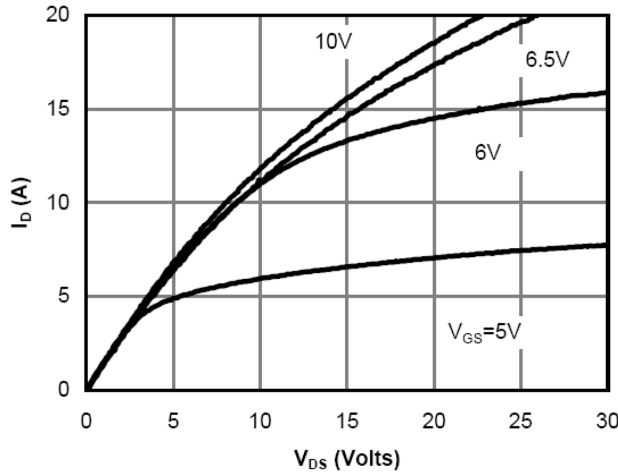



**Fig 1: On-Region Characteristics**

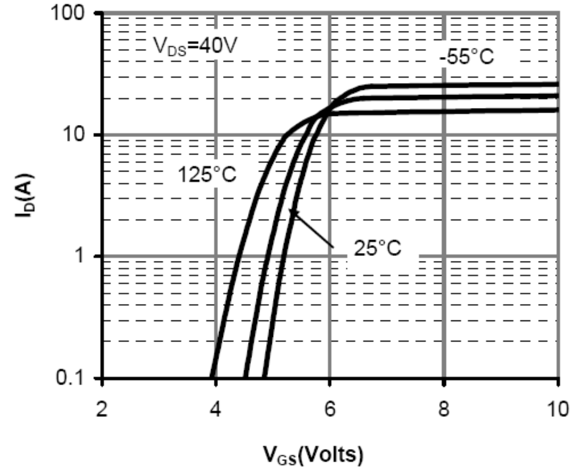



**Figure 2: Transfer Characteristics**

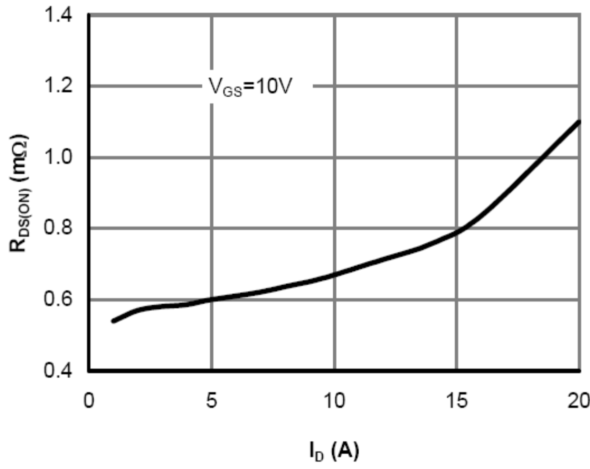



**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**

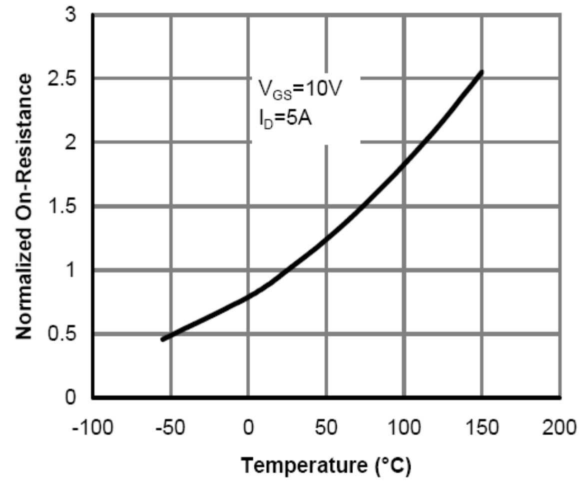



**Figure 4: On-Resistance vs. Junction Temperature**

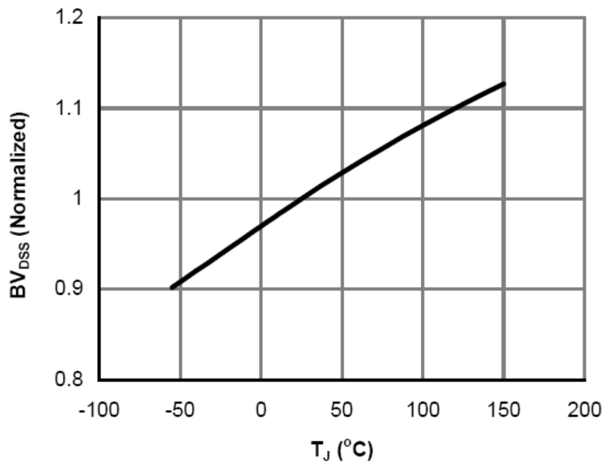



**Figure 5: Break Down vs. Junction Temperature**

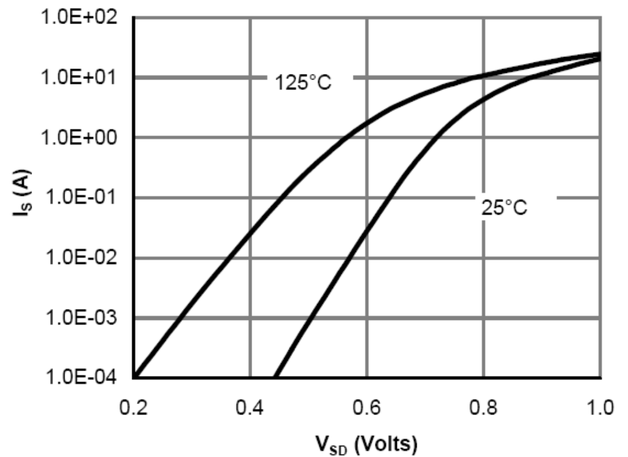



**Figure 6: Body-Diode Characteristics**

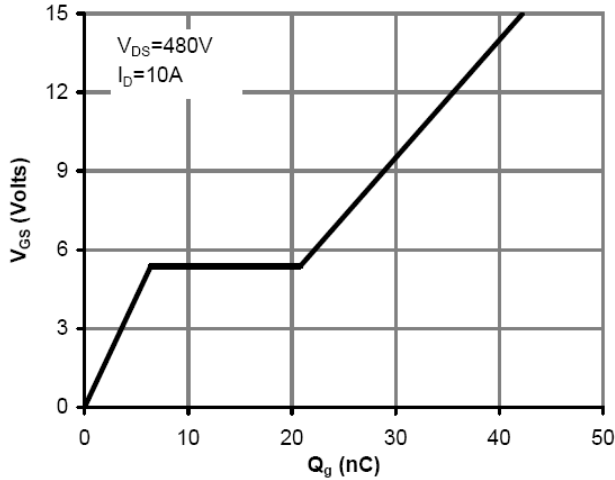



Figure 7: Gate-Charge Characteristics

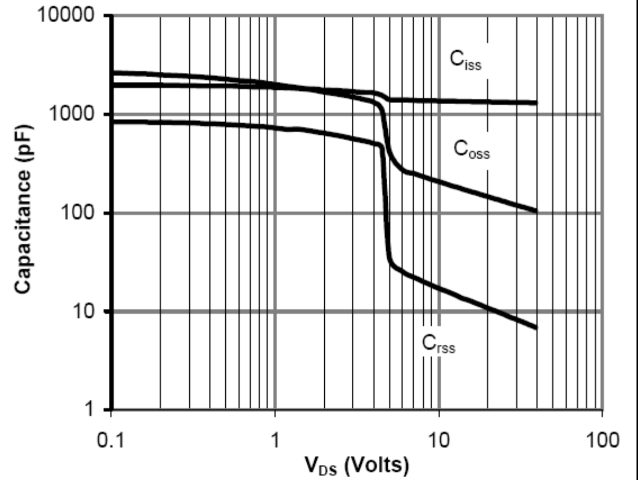



Figure 8: Capacitance Characteristics

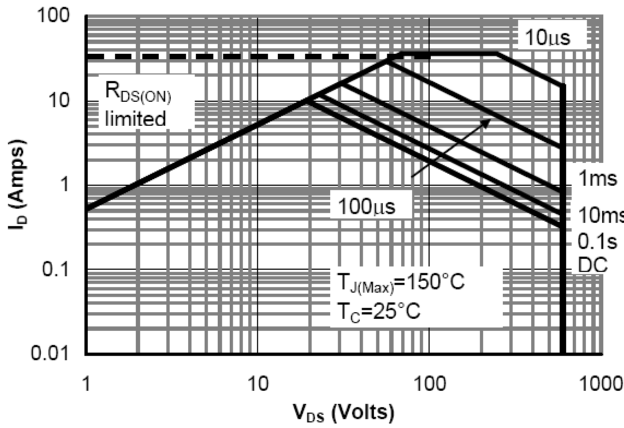



Figure 9: Maximum Forward Biased Safe Operating

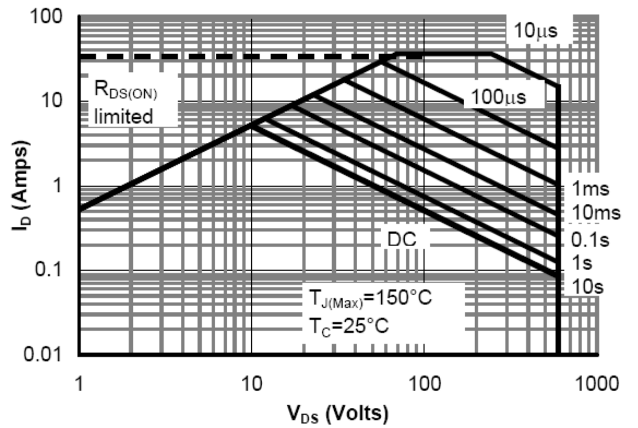



Figure 10: Maximum Forward Biased Safe

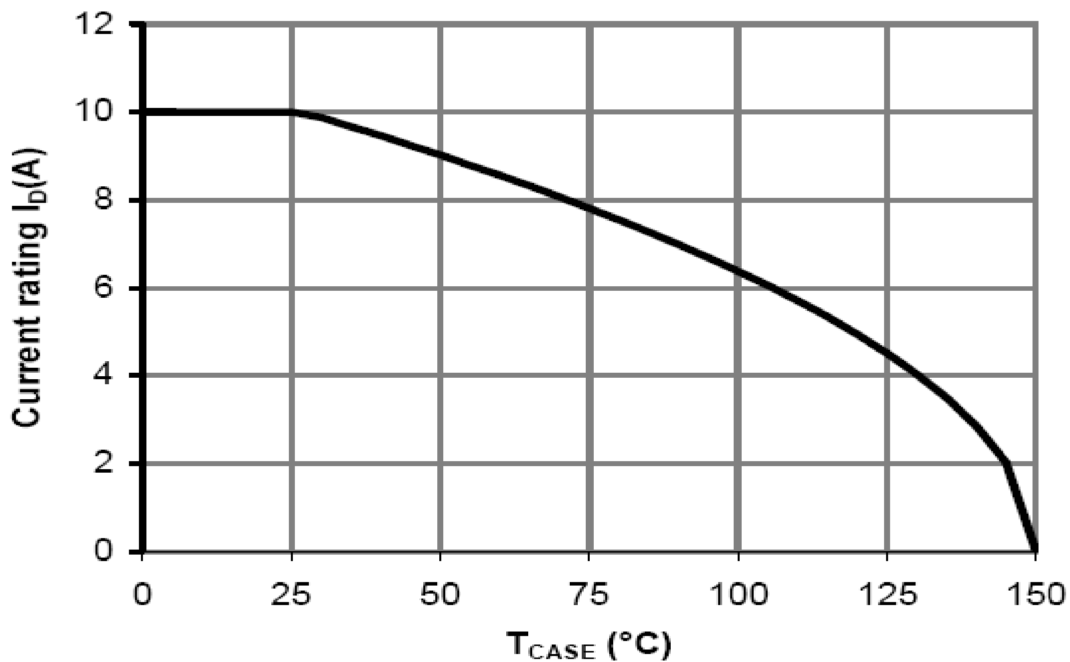



Figure 11: Current De-rating (Note B)

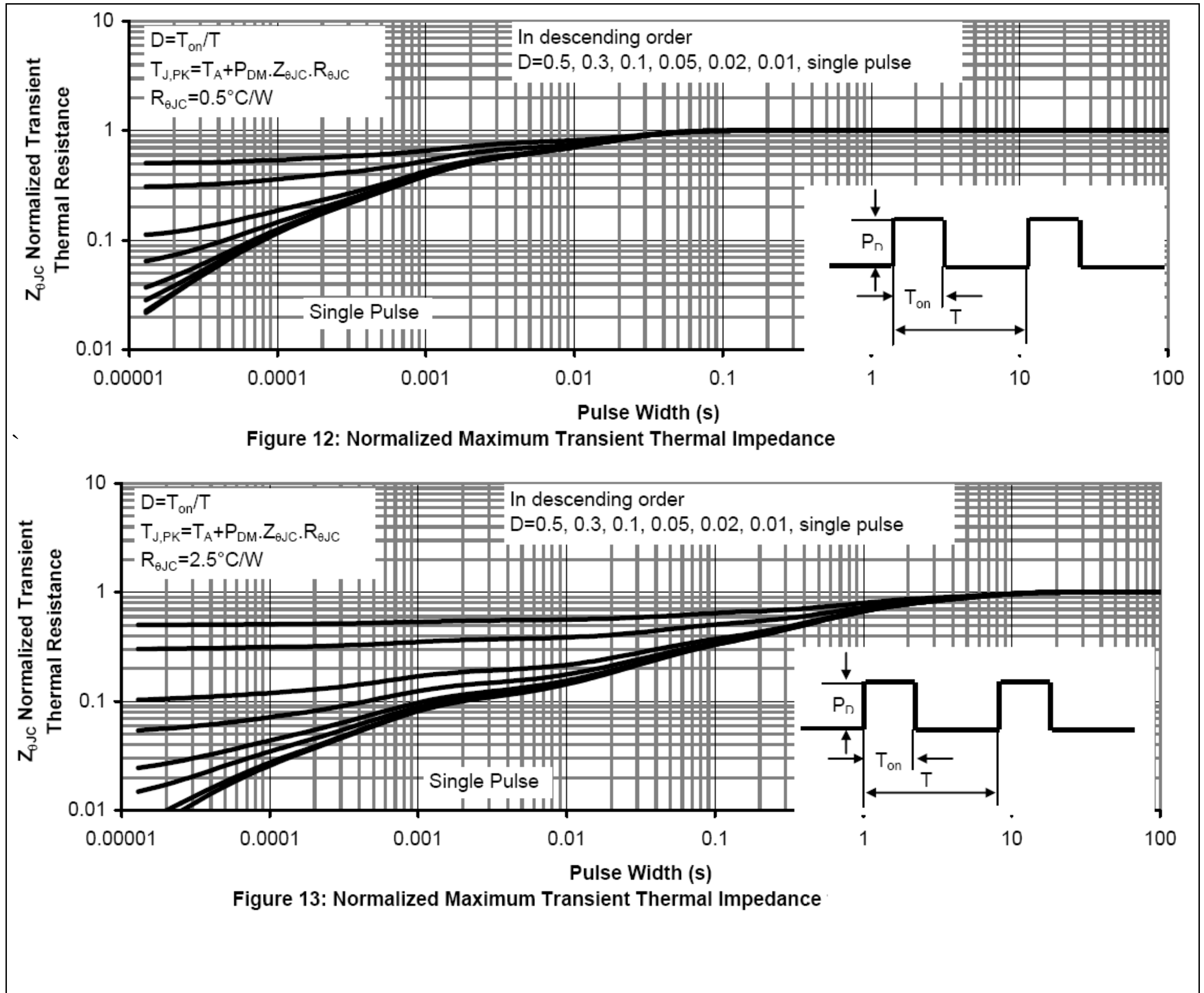



**Figure 12: Normalized Maximum Transient Thermal Impedance**

**Figure 13: Normalized Maximum Transient Thermal Impedance**

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