Ordering number : ENA1907

SANYO Semiconductors

DATA SHEET

P-Channel Silicon MOSFET

# BMS3003 — General-Purpose Switching Device Applications

## Features

- ON-resistance $R_{DS}(on)1$=5.0mΩ (typ.)
- Input capacitance Ciss=13200pF (typ.)
- 4V drive

## Specifications

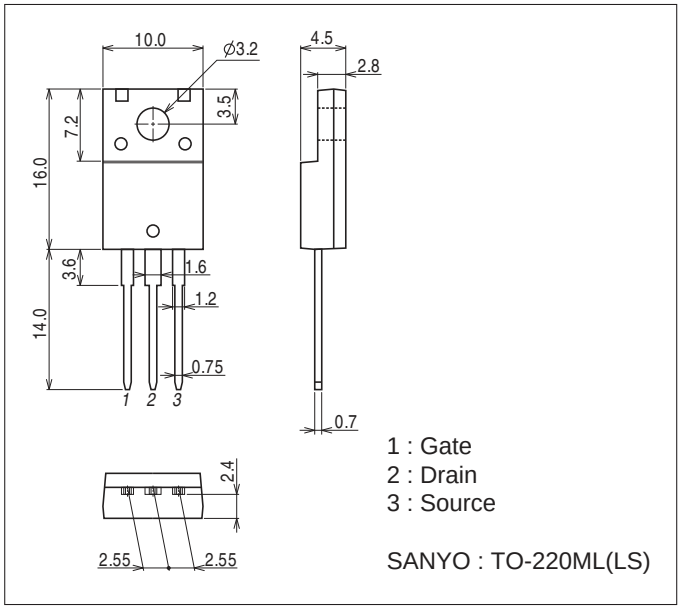
### Absolute Maximum Ratings at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Drain-to-Source Voltage | $V_{DSS}$ | | −60 | V |
| Gate-to-Source Voltage | $V_{GSS}$ | | ±20 | V |
| Drain Current (DC) | $I_D$ | | −78 | A |
| Drain Current (Pulse) | $I_{DP}$ | PW≤10μs, duty cycle≤1% | −312 | A |
| Allowable Power Dissipation | $P_D$ | | 2.0 | W |
| | | Tc=25°C | 40 | W |
| Channel Temperature | Tch | | 150 | °C |
| Storage Temperature | Tstg | | −55 to +150 | °C |
| Avalanche Energy (Single Pulse) *1 | $E_{AS}$ | | 420 | mJ |
| Avalanche Current *2 | $I_{AV}$ | | −60 | A |

Note :*1 $V_{DD}$=−36V, L=100μH, $I_{AV}$=−60A (Fig.1)
*2 L≤100μH, Single pulse

### Package Dimensions

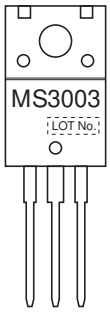
unit : mm (typ)
7525-002



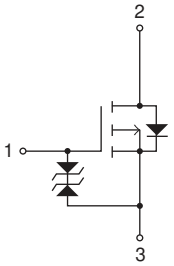

### Product & Package Information

- Package : TO-220ML(LS)
- JEITA, JEDEC : SC-67, SOT-186A
- Minimum Packing Quantity : 100 pcs./bag or 50pcs./magazine

### Marking



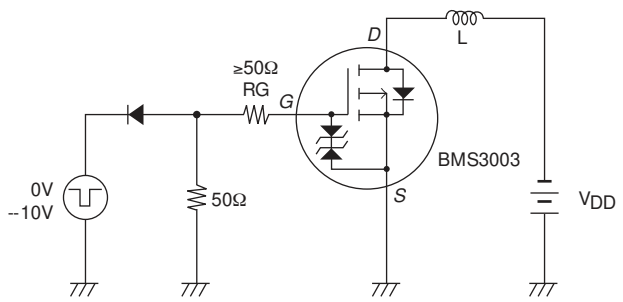

### Electrical Connection



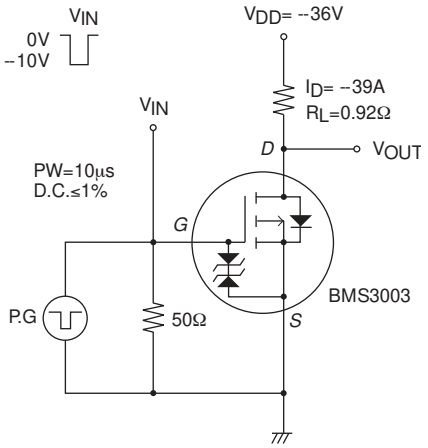
## Electrical Characteristics at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$=−1mA, $V_{GS}$=0V | −60 | | | V |
| Zero-Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=−60V, $V_{GS}$=0V | | | −10 | μA |
| Gate-to-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±16V, $V_{DS}$=0V | | | ±10 | μA |
| Cutoff Voltage | $V_{GS}$(off) | $V_{DS}$=−10V, $I_D$=−1mA | −1.2 | | −2.6 | V |
| Forward Transfer Admittance | \| yfs \| | $V_{DS}$=−10V, $I_D$=−39A | | 130 | | S |
| Static Drain-to-Source On-State Resistance | $R_{DS}$(on)1 | $I_D$=−39A, $V_{GS}$=−10V | | 5.0 | 6.5 | mΩ |
| | $R_{DS}$(on)2 | $I_D$=−39A, $V_{GS}$=−4V | | 6.5 | 9.0 | mΩ |
| Input Capacitance | Ciss | $V_{DS}$=−20V, f=1MHz | | 13200 | | pF |
| Output Capacitance | Coss | | | 1300 | | pF |
| Reverse Transfer Capacitance | Crss | | | 950 | | pF |
| Turn-ON Delay Time | $t_d$(on) | See Fig.2 | | 90 | | ns |
| Rise Time | $t_r$ | | | 360 | | ns |
| Turn-OFF Delay Time | $t_d$(off) | | | 1200 | | ns |
| Fall Time | $t_f$ | | | 680 | | ns |
| Total Gate Charge | Qg | $V_{DS}$=−36V, $V_{GS}$=−10V, $I_D$=−78A | | 285 | | nC |
| Gate-to-Source Charge | Qgs | | | 35 | | nC |
| Gate-to-Drain “Miller” Charge | Qgd | | | 70 | | nC |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=−78A, $V_{GS}$=0V | | −0.95 | −1.5 | V |
| Reverse Recovery Time | $t_{rr}$ | See Fig.3 | | 150 | | ns |
| Reverse Recovery Charge | $Q_{rr}$ | $I_S$=−78A, $V_{GS}$=0V, di/dt=−100A/μs | | 470 | | nC |

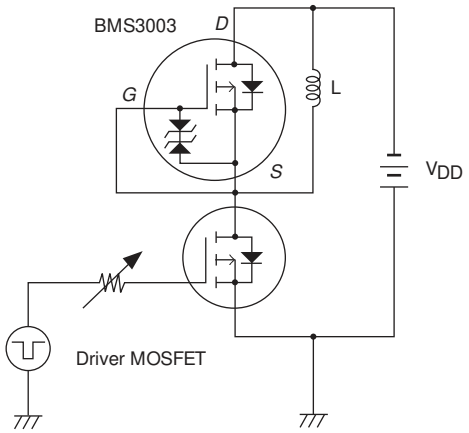
### Fig.1 Avalanche Resistance Test Circuit

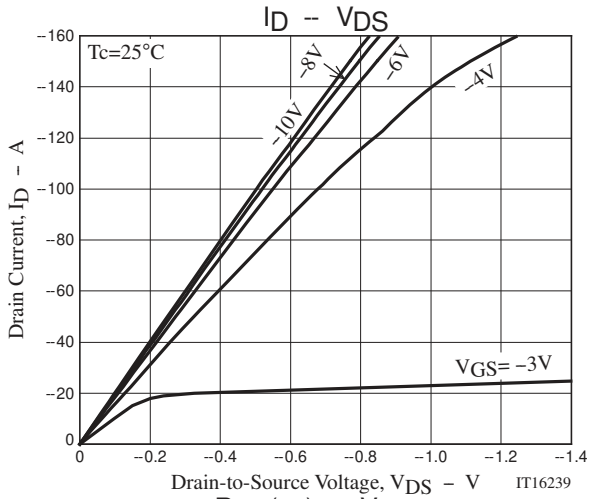


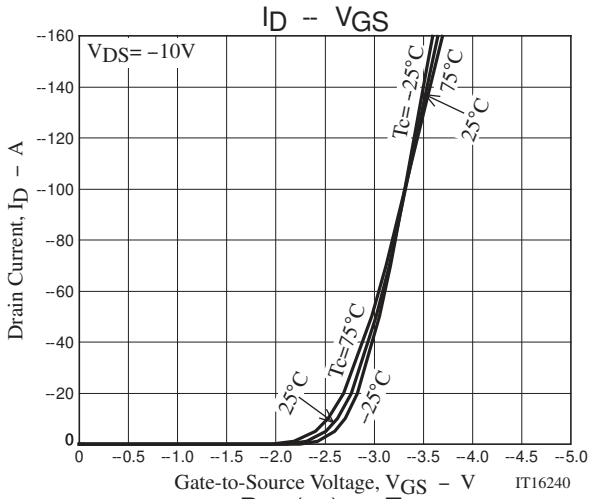

### Fig.2 Switching Time Test Circuit

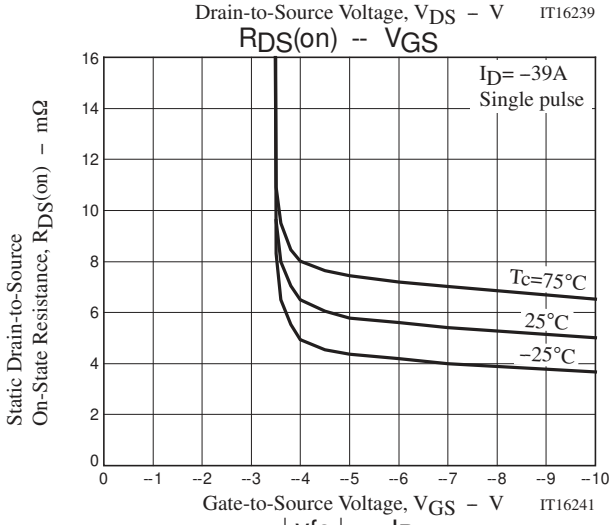


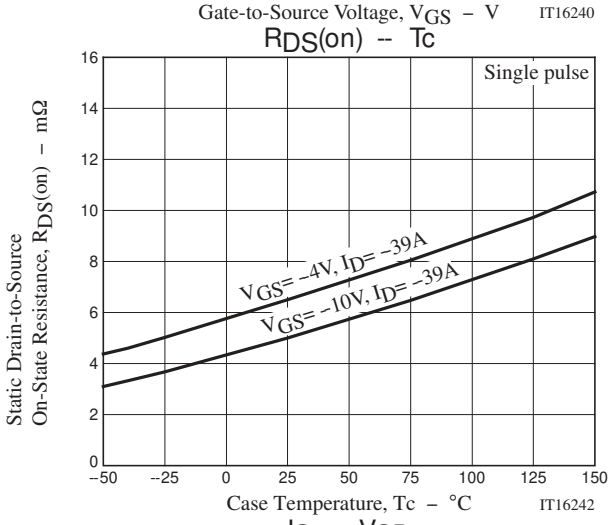

### Fig.3 Reverse Recovery Time Test Circuit

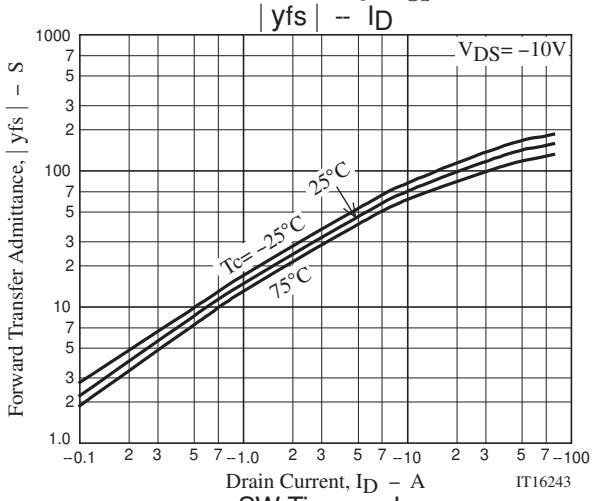


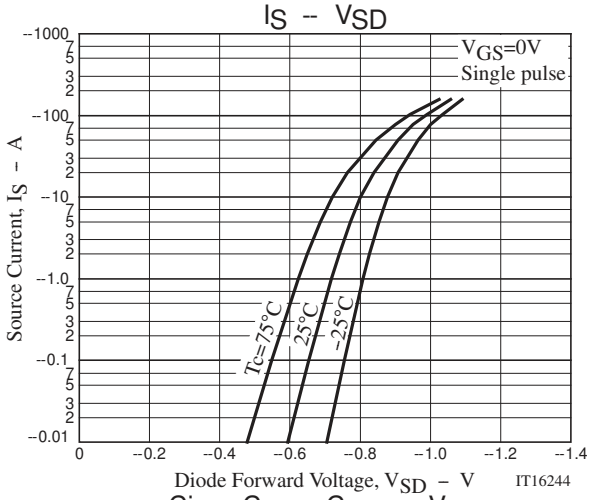

ID -- VDS
Tc=25°C
–8V
–6V
–4V
–10V
VGS= –3V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT16239

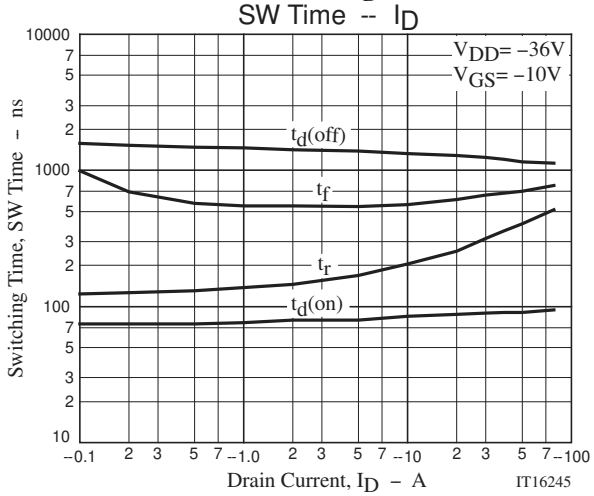

ID -- VGS
VDS= –10V
Tc= –25°C
75°C
25°C
Tc=75°C
25°C
–25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT16240

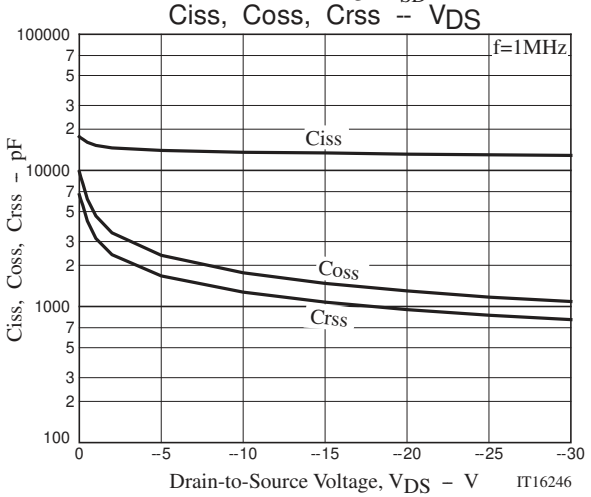

RDS(on) -- VGS
ID= –39A
Single pulse
Tc=75°C
25°C
–25°C
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT16241

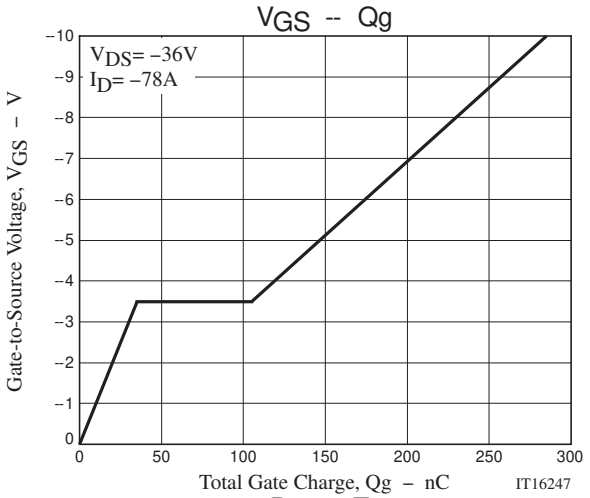

RDS(on) -- Tc
Single pulse
VGS= –4V, ID= –39A
VGS= –10V, ID= –39A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT16242

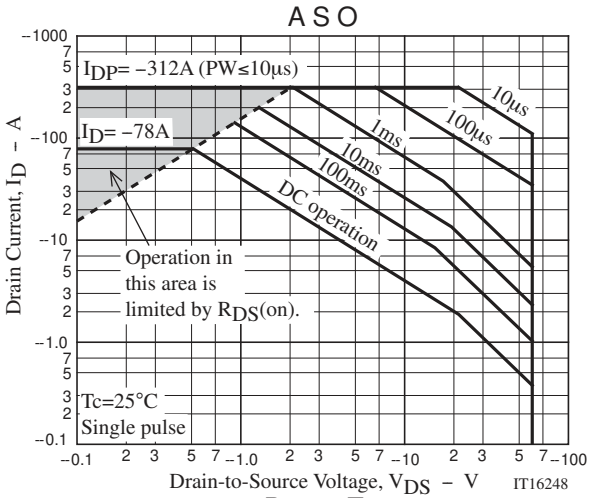

| yfs | -- ID
VDS= –10V
25°C
Tc= –25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT16243

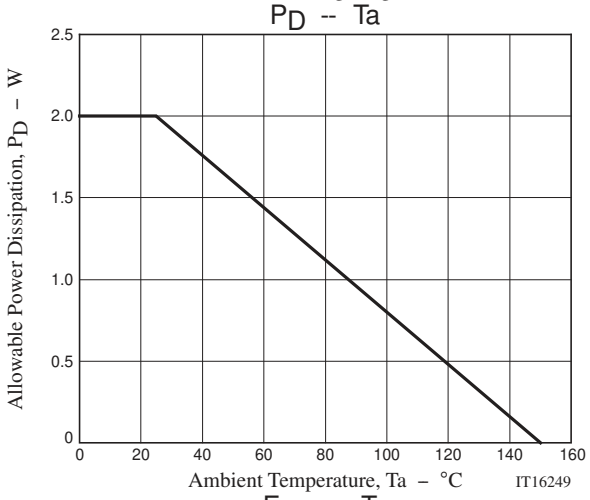

IS -- VSD
VGS=0V
Single pulse
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT16244

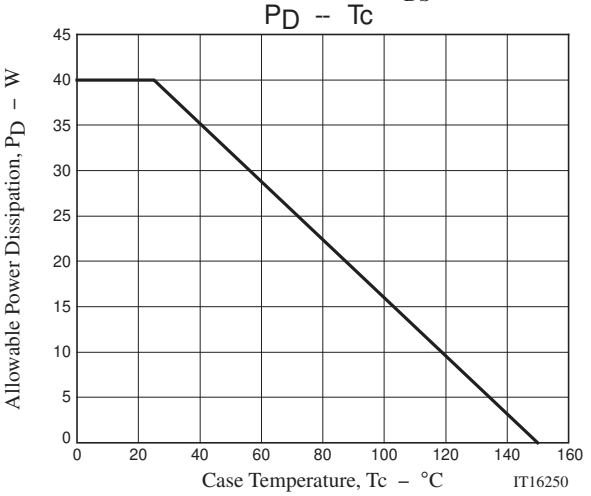

SW Time -- ID
VDD= –36V
VGS= –10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT16245

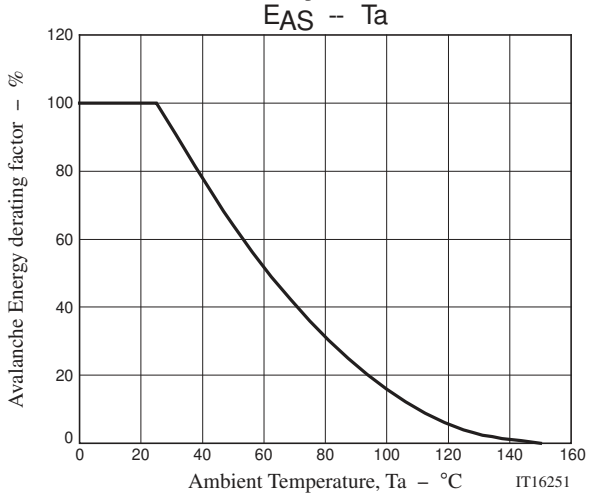

Ciss, Coss, Crss -- VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT16246


VGS -- Qg
VDS= −36V
ID= −78A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT16247


A S O
IDP= −312A (PW≤10μs)
ID= −78A
10μs
100μs
1ms
10ms
100ms
DC operation
Operation in
this area is
limited by RDS(on).
Tc=25°C
Single pulse
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT16248


PD -- Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT16249


PD -- Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT16250


EAS -- Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT16251

Note on usage : Since the BMS3003 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.



This catalog provides information as of December, 2010. Specifications and information herein are subject to change without notice.