Ordering number : ENA1820

# BMS4007

## N-Channel Power MOSFET
## 75V, 60A, 7.8mΩ, TO-220ML(LS)

ON Semiconductor®
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### Features

- ON-resistance $R_{DS}(on)$=6mΩ (typ.)
- Input capacitance Ciss=9700pF (typ.)
- 10V drive

### Specifications

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

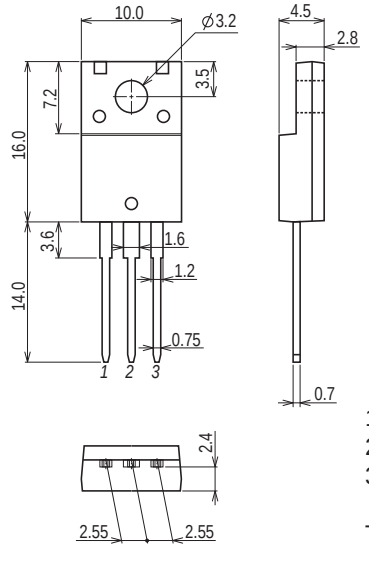
| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Drain-to-Source Voltage | $V_{DSS}$ | | 75 | V |
| Gate-to-Source Voltage | $V_{GSS}$ | | ±20 | V |
| Drain Current (DC) | $I_D$ | | 60 | A |
| Drain Current (Pulse) | $I_{DP}$ | PW≤10μs, duty cycle≤1% | 240 | A |
| Allowable Power Dissipation | $P_D$ | | 2.0 | W |
| | | Tc=25°C | 30 | W |
| Channel Temperature | Tch | | 150 | °C |
| Storage Temperature | Tstg | | −55 to +150 | °C |
| Avalanche Energy (Single Pulse) *1 | $E_{AS}$ | | 299 | mJ |
| Avalanche Current *2 | $I_{AV}$ | | 48 | A |

Note :*1 $V_{DD}$=48V, L=100μH, $I_{AV}$=48A (Fig.1)
*2 L≤100μH, Single pulse

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### Package Dimensions

unit : mm (typ)
7525-002



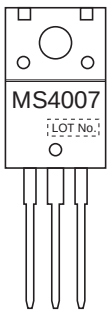

1 : Gate
2 : Drain
3 : Source

TO-220ML(LS)

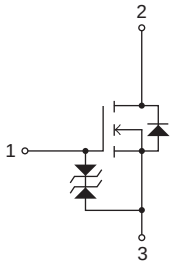
### Product & Package Information

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

### Marking



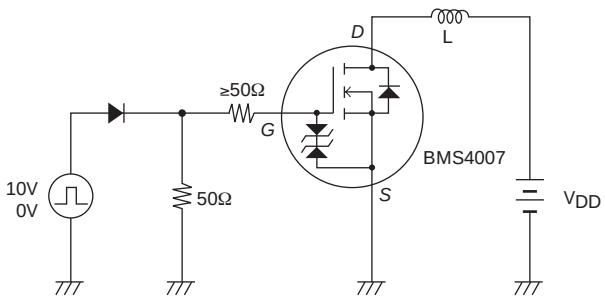

### Electrical Connection



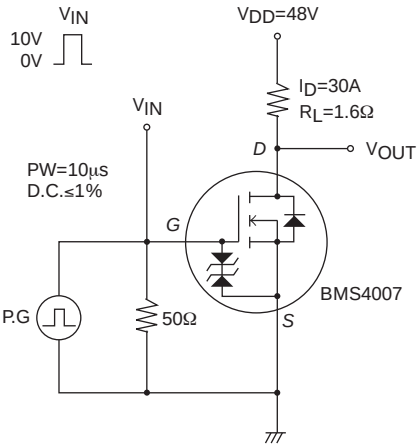
## Electrical Characteristics at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$=1mA, $V_{GS}$=0V | 75 | | | V |
| Zero-Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=75V, $V_{GS}$=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 | 2 | | 4 | V |
| Forward Transfer Admittance | \| yfs \| | $V_{DS}$=10V, $I_D$=30A | | 110 | | S |
| Static Drain-to-Source On-State Resistance | $R_{DS}$(on) | $I_D$=30A, $V_{GS}$=10V | | 6 | 7.8 | mΩ |
| Input Capacitance | Ciss | $V_{DS}$=20V, f=1MHz | | 9700 | | pF |
| Output Capacitance | Coss | | | 540 | | pF |
| Reverse Transfer Capacitance | Crss | | | 360 | | pF |
| Turn-ON Delay Time | $t_d$(on) | See Fig.2 | | 100 | | ns |
| Rise Time | $t_r$ | | | 180 | | ns |
| Turn-OFF Delay Time | $t_d$(off) | | | 460 | | ns |
| Fall Time | $t_f$ | | | 160 | | ns |
| Total Gate Charge | Qg | $V_{DS}$=48V, $V_{GS}$=10V, $I_D$=60A | | 160 | | nC |
| Gate-to-Source Charge | Qgs | | | 40 | | nC |
| Gate-to-Drain “Miller” Charge | Qgd | | | 40 | | nC |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=60A, $V_{GS}$=0V | | 0.9 | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | See Fig.3 | | 70 | | ns |
| Reverse Recovery Charge | $Q_{rr}$ | $I_S$=60A, $V_{GS}$=0V, di/dt=100A/μs | | 183 | | nC |

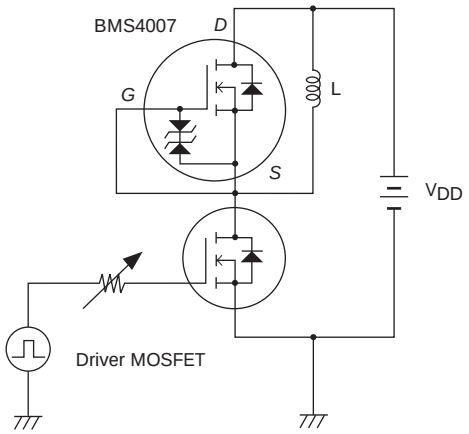
### Fig.1 Avalanche Resistance Test Circuit

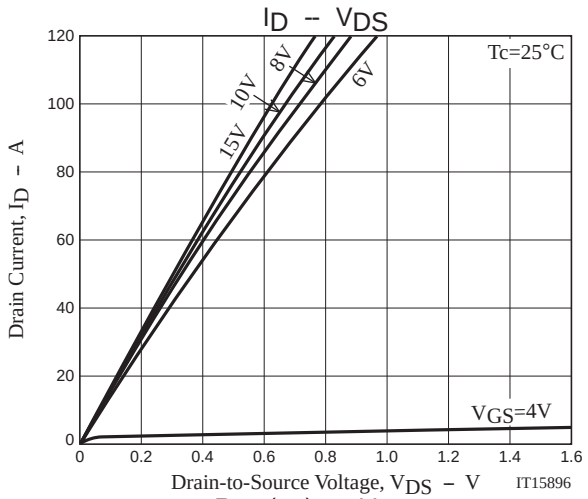


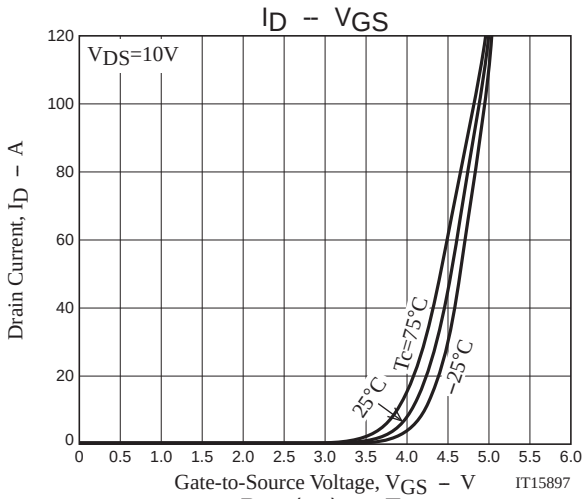

### Fig.2 Switching Time Test Circuit

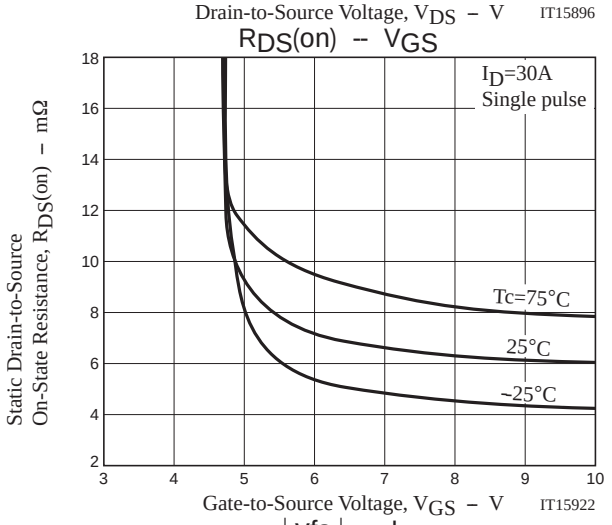


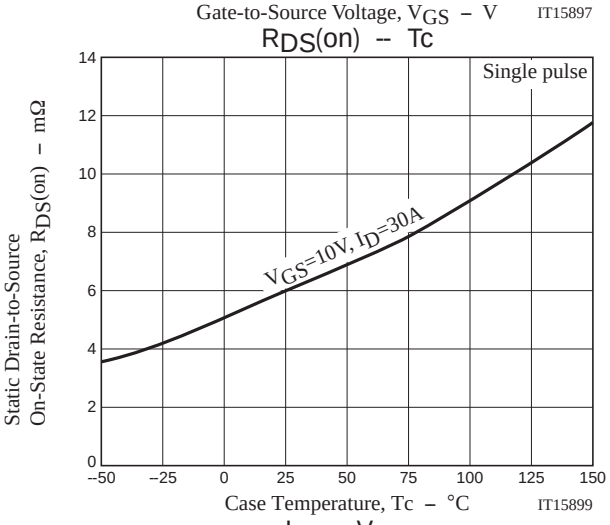

### Fig.3 Reverse Recovery Time Test Circuit

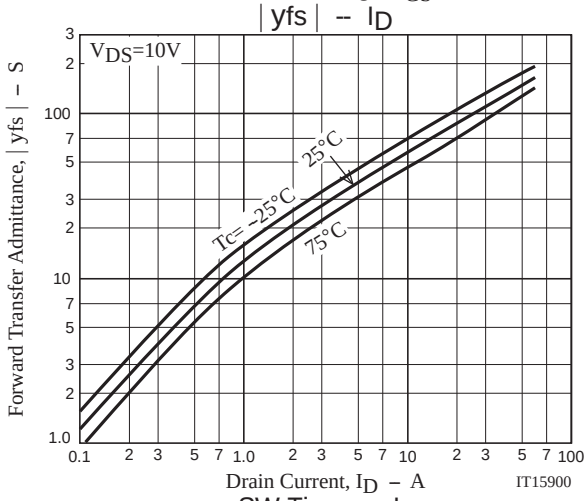


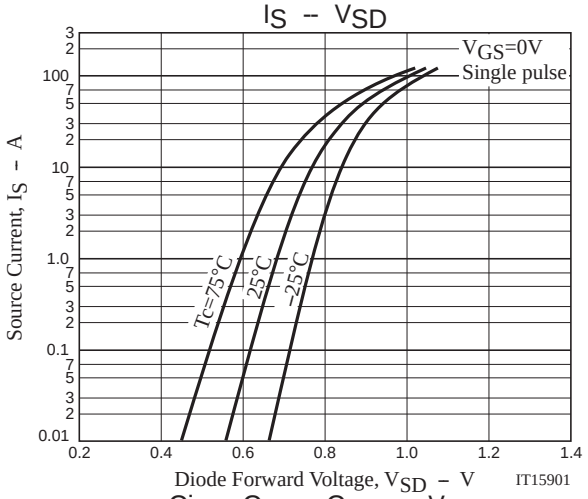

ID -- VDS
Tc=25°C
10V
8V
6V
15V
VGS=4V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT15896

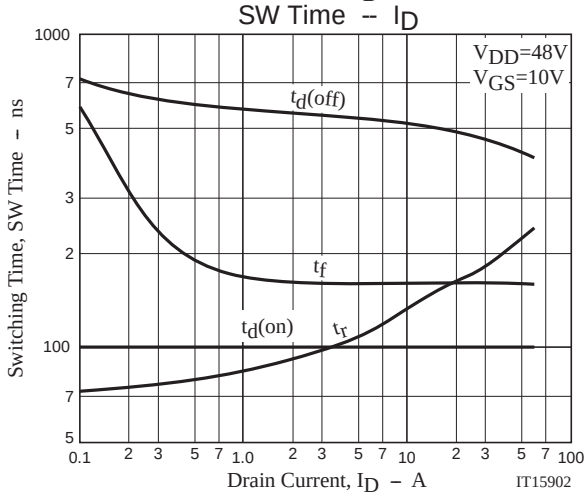

ID -- VGS
VDS=10V
Tc=75°C
25°C
–25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT15897

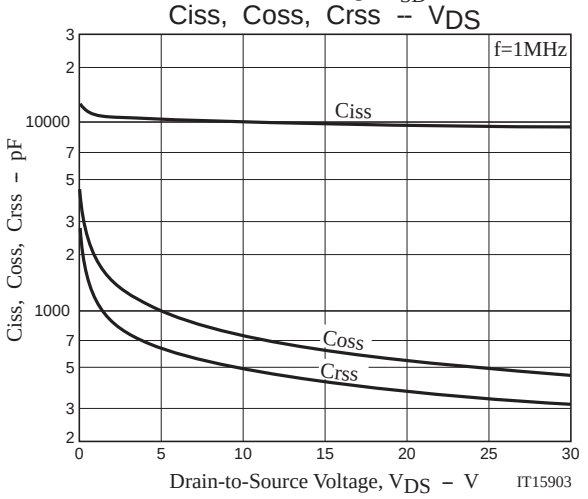

RDS(on) -- VGS
ID=30A
Single pulse
Tc=75°C
25°C
–25°C
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT15922

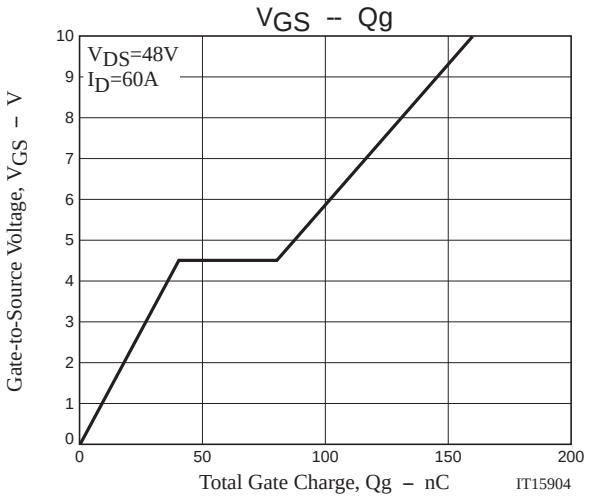

RDS(on) -- Tc
Single pulse
VGS=10V, ID=30A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT15899

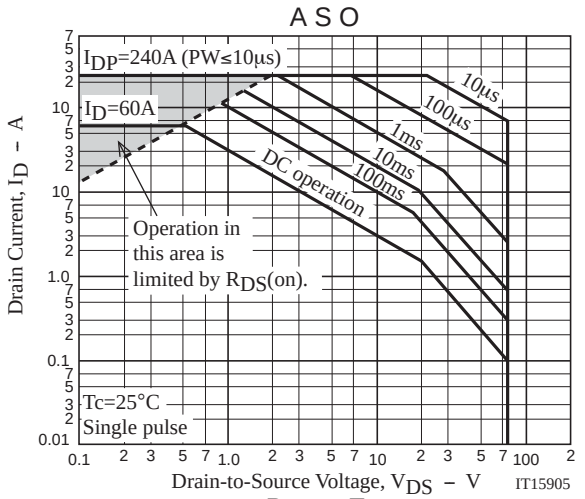

| yfs | -- ID
VDS=10V
25°C
Tc= –25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT15900

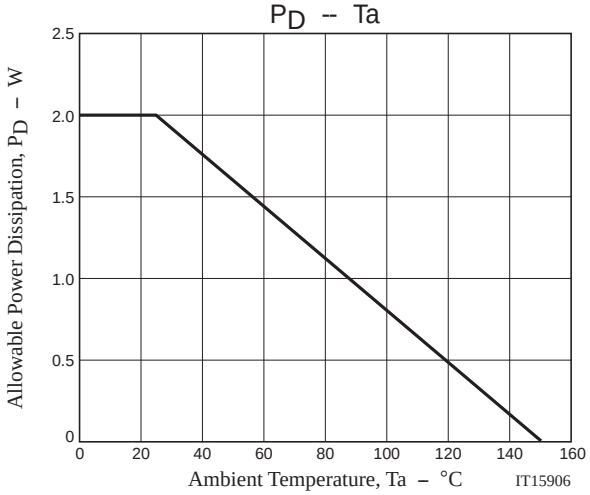

IS -- VSD
VGS=0V
Single pulse
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT15901

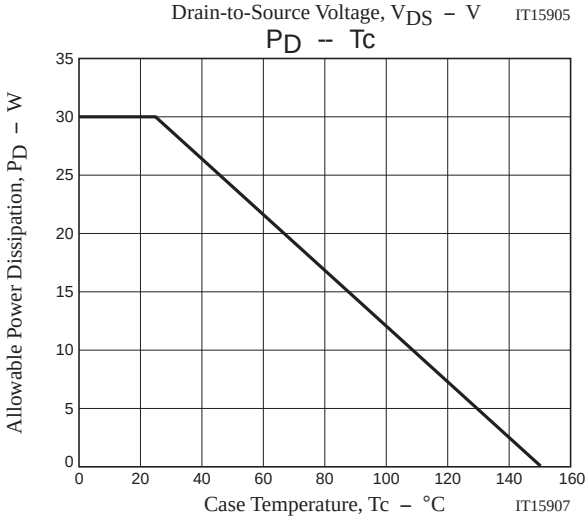

SW Time -- ID
VDD=48V
VGS=10V
td(off)
tf
td(on)
tr
Switching Time, SW Time – ns
Drain Current, ID – A
IT15902

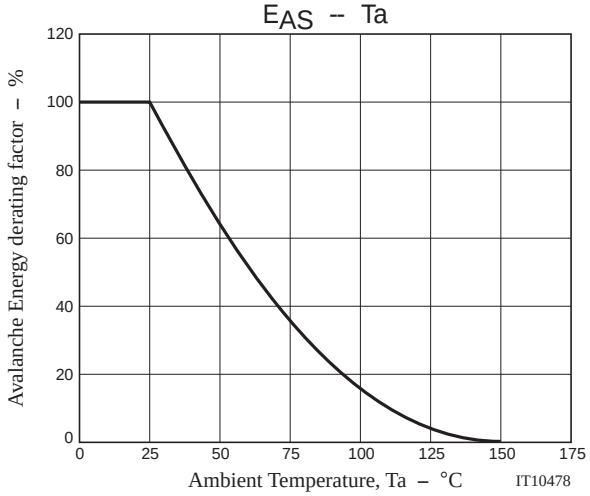

Ciss, Coss, Crss -- VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT15903


VGS – Qg
VDS=48V
ID=60A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT15904


A S O
IDP=240A (PW≤10μs)
ID=60A
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
IT15905


PD – Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT15906


PD – Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT15907


EAS – Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT10478

Note on usage : Since the BMS4007 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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