Ordering number : ENA1369

SANYO Semiconductors

DATA SHEET

N-Channel Silicon MOSFET

# 2SK4198FG — General-Purpose Switching Device Applications

## Features

- Low ON-resistance, low input capacitance, ultrahigh-speed switching.
- Adoption of high reliability HVP process.
- Attachment workability is good by Mica-less package.
- Avalanche resistance guarantee.

## Specifications

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

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Drain-to-Source Voltage | $V_{DSS}$ | | 600 | V |
| Gate-to-Source Voltage | $V_{GSS}$ | | ±30 | V |
| Drain Current (DC) | $I_{Dc}$ *1 | Limited only by maximum temperature Tch=150°C | 5 | A |
| | $I_{Dpack}$ *2 | Tc=25°C (SANYO's ideal heat dissipation condition)*3 | 4 | A |
| Drain Current (Pulse) | $I_{DP}$ | PW≤10μs, duty cycle≤1% | 18 | A |
| Allowable Power Dissipation | $P_D$ | | 2.0 | W |
| | | Tc=25°C (SANYO's ideal heat dissipation condition)*3 | 30 | W |
| Channel Temperature | Tch | | 150 | °C |
| Storage Temperature | Tstg | | −55 to +150 | °C |
| Avalanche Energy (Single Pulse) *4 | $E_{AS}$ | | 55 | mJ |
| Avalanche Current *5 | $I_{AV}$ | | 4.5 | A |

Note :*1 Shows chip capability.

*2 Package limited.

*3 SANYO's condition is radiation from backside.

The method is applying silicone grease to the backside of the device and attaching the device to water-cooled radiator made of aluminium.

*4 $V_{DD}$=50V, L=5mH, $I_{AV}$=4.5A

*5 L≤5mH, Single pulse

Marking : K4198

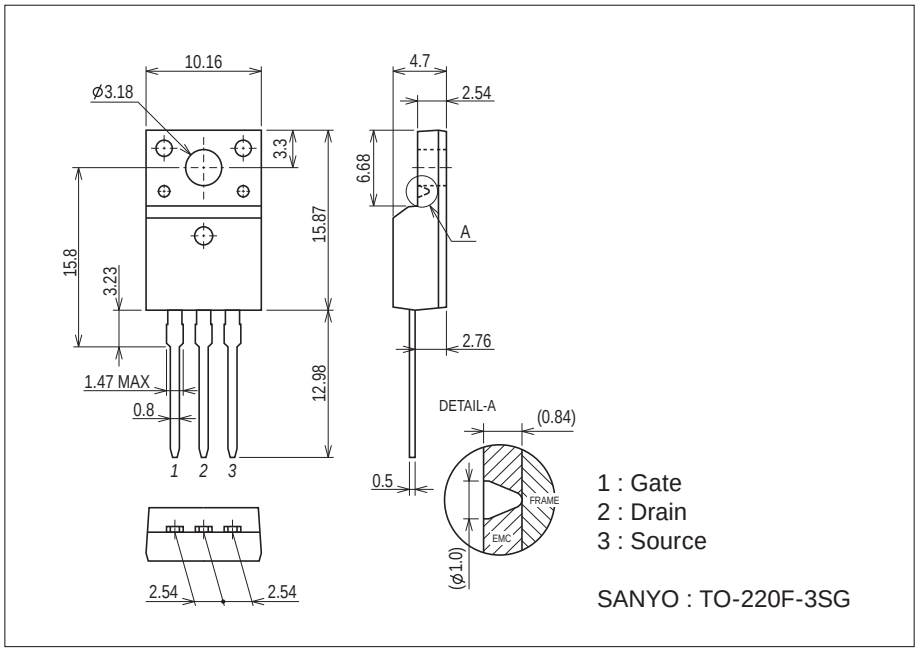
## Electrical Characteristics at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$=10mA, $V_{GS}$=0V | 600 | | | V |
| Zero-Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=480V, $V_{GS}$=0V | | | 100 | μA |
| Gate-to-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±30V, $V_{DS}$=0V | | | ±100 | nA |
| Cutoff Voltage | $V_{GS}$(off) | $V_{DS}$=10V, $I_D$=1mA | 3 | | 5 | V |
| Forward Transfer Admittance | \| yfs \| | $V_{DS}$=10V, $I_D$=2.5A | 1.2 | 2.4 | | S |
| Static Drain-to-Source On-State Resistance | $R_{DS}$(on) | $I_D$=2.5A, $V_{GS}$=10V | | 1.8 | 2.34 | Ω |
| Input Capacitance | Ciss | $V_{DS}$=30V, f=1MHz | | 360 | | pF |
| Output Capacitance | Coss | $V_{DS}$=30V, f=1MHz | | 69 | | pF |
| Reverse Transfer Capacitance | Crss | $V_{DS}$=30V, f=1MHz | | 15 | | pF |
| Turn-ON Delay Time | $t_d$(on) | See specified Test Circuit. | | 13 | | ns |
| Rise Time | $t_r$ | See specified Test Circuit. | | 28 | | ns |
| Turn-OFF Delay Time | $t_d$(off) | See specified Test Circuit. | | 39 | | ns |
| Fall Time | $t_f$ | See specified Test Circuit. | | 15 | | ns |
| Total Gate Charge | Qg | $V_{DS}$=200V, $V_{GS}$=10V, $I_D$=5A | | 14.3 | | nC |
| Gate-to-Source Charge | Qgs | $V_{DS}$=200V, $V_{GS}$=10V, $I_D$=5A | | 3.0 | | nC |
| Gate-to-Drain “Miller” Charge | Qgd | $V_{DS}$=200V, $V_{GS}$=10V, $I_D$=5A | | 8.2 | | nC |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=5A, $V_{GS}$=0V | | 0.9 | 1.2 | V |

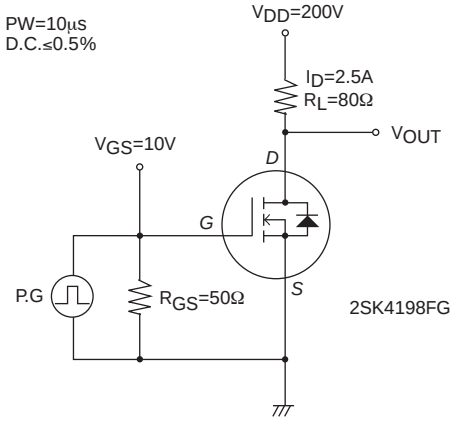
## Package Dimensions

unit : mm (typ)

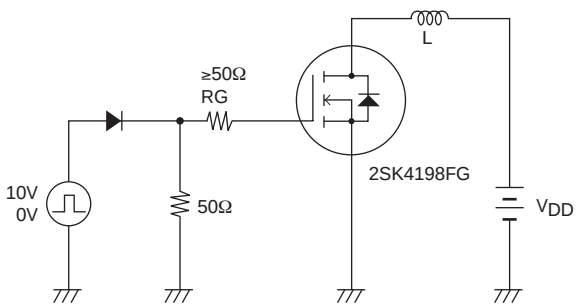
7529-001




## Switching Time Test Circuit




## Avalanche Resistance Test Circuit



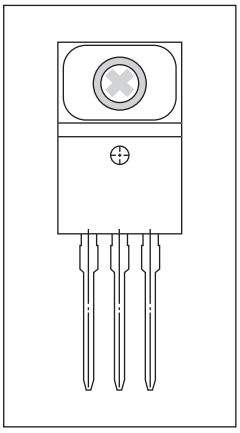
For this package, a part of inner electrode is exposed. Please refer to the package outline for the detailedstructure.
So when mounting the device, please pay enough attention to the isolation with the heatsink.
According to the device mounting method, sometimes the insulation voltage may be decreased.
(refer to the below insulation characteristics)

## Insulation / Ta=25°C / RH75%

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Lead & resin insulation * | $V_{ISO}1$ | Metal spacer Refer to Fig.1 | | 1600 | | Vrms |
| | $V_{ISO}2$ | Washer 5.8mm Refer to Fig.2 | | 2100 | | Vrms |
| | $V_{ISO}3$ | Insulated screw, Insulated washer | | 3900 | | Vrms |

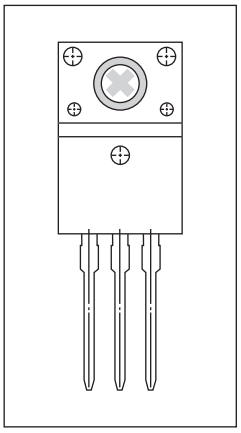
* : AC voltage measurement

Fig.1



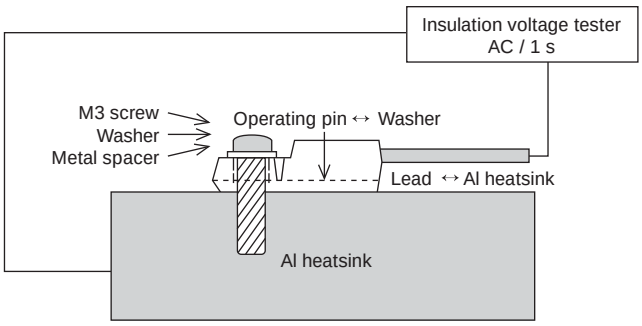
IT14077

Fig.2

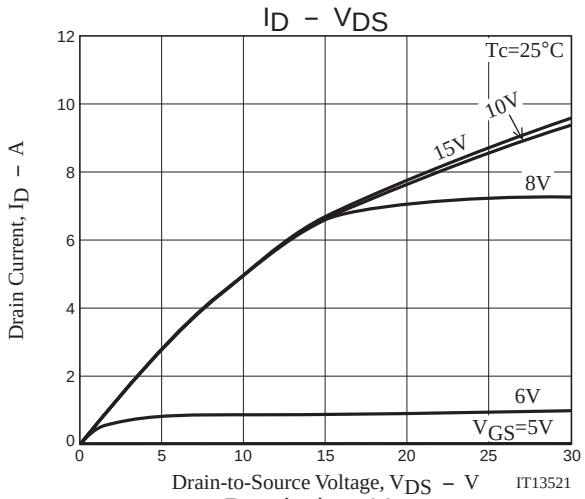


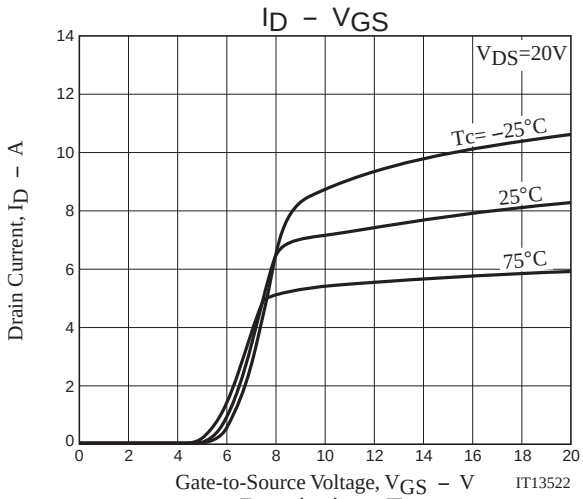
IT14078

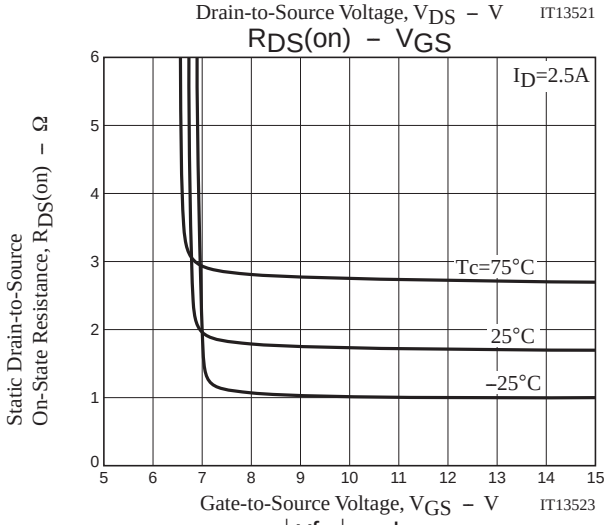
## Insulation Measuring Diagram

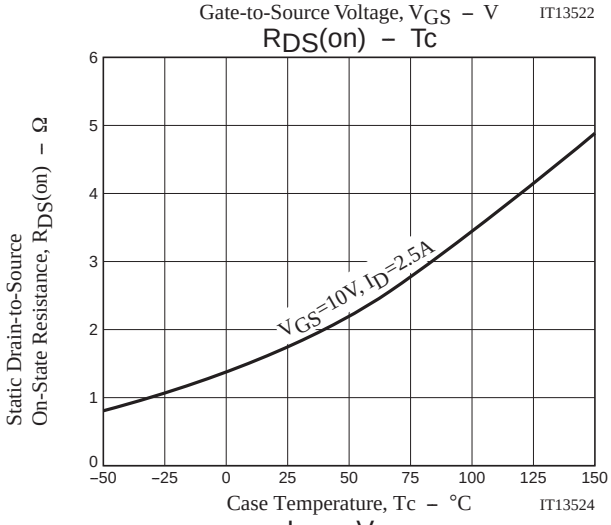


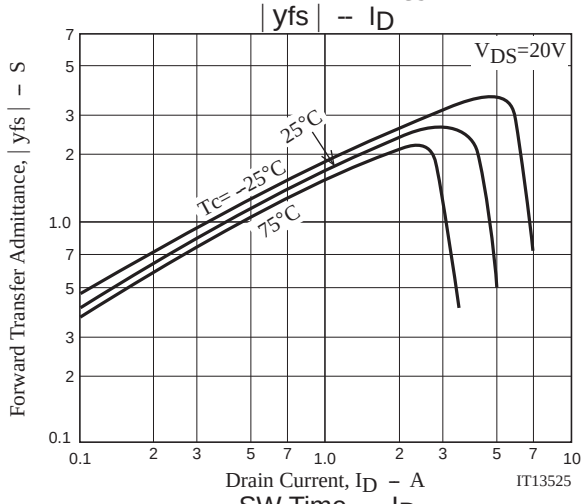

IT14079

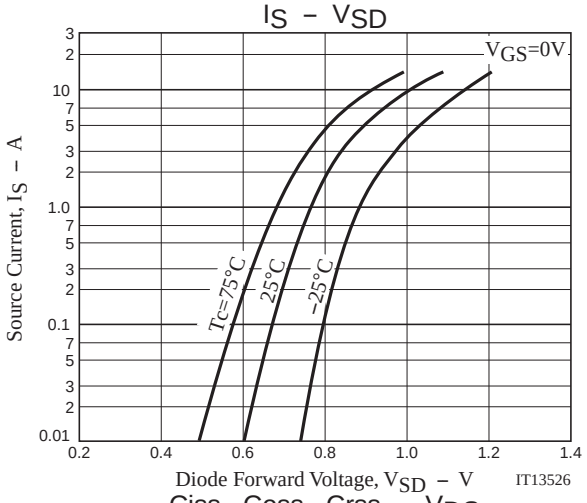

ID – VDS
Tc=25°C
10V
15V
8V
6V
VGS=5V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT13521

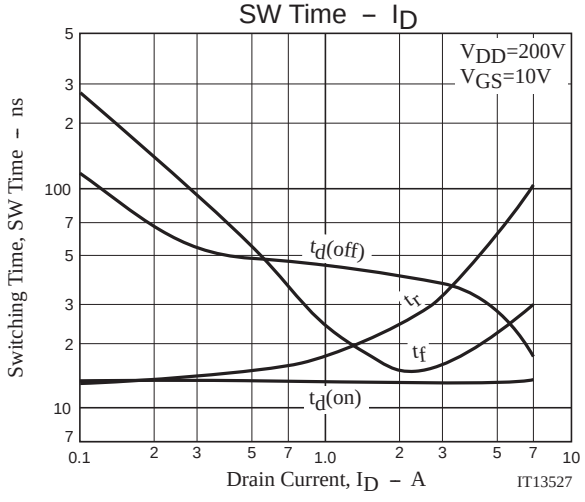

ID – VGS
VDS=20V
Tc= –25°C
25°C
75°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT13522

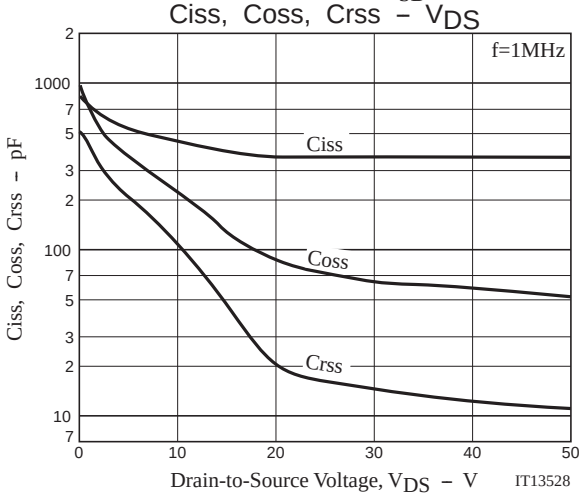

RDS(on) – VGS
ID=2.5A
Tc=75°C
25°C
–25°C
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Gate-to-Source Voltage, VGS – V
IT13523

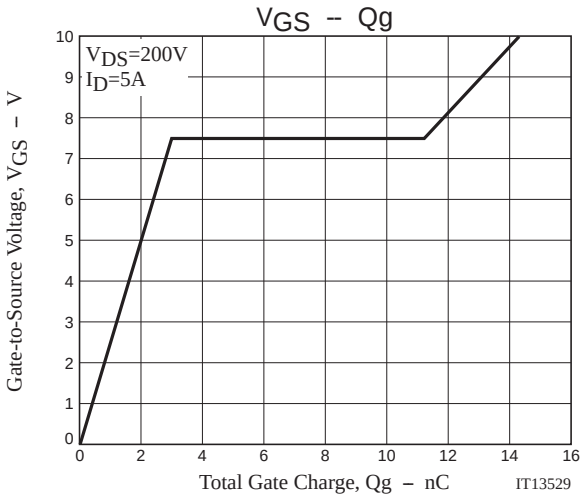

RDS(on) – Tc
VGS=10V, ID=2.5A
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Case Temperature, Tc – °C
IT13524

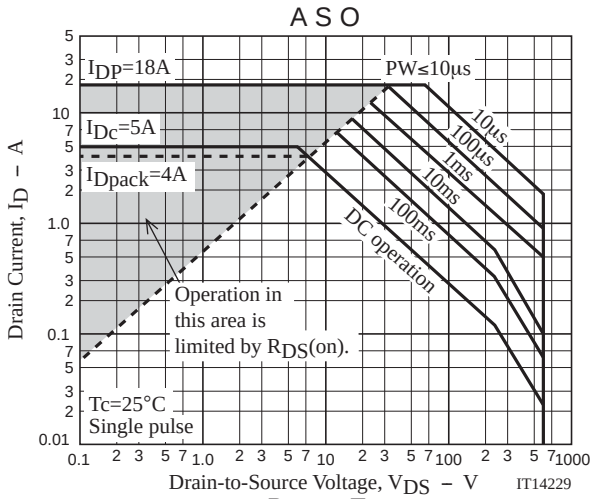

| yfs | – ID
VDS=20V
25°C
Tc= –25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT13525

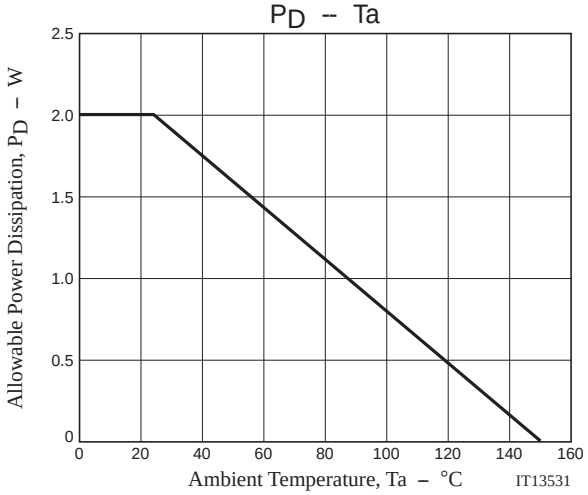

IS – VSD
VGS=0V
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT13526

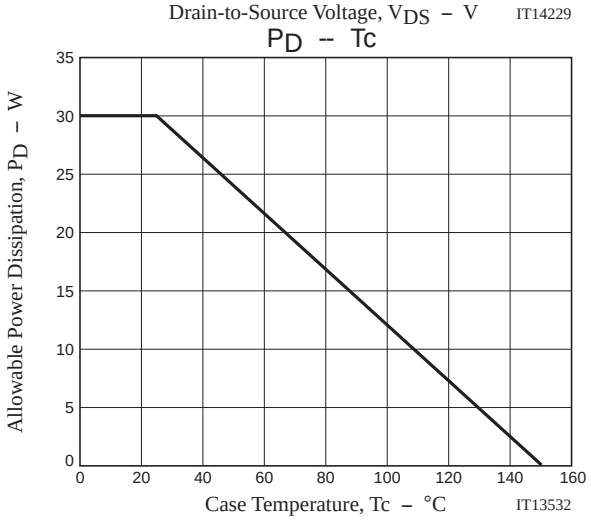

SW Time – ID
VDD=200V
VGS=10V
td(off)
tr
tf
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT13527

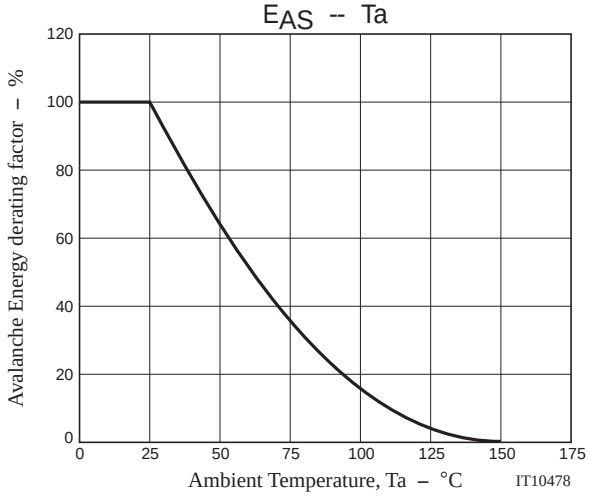

Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT13528


VGS – Qg
VDS=200V
ID=5A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT13529


A S O
IDP=18A
PW≤10μs
IDc=5A
IDpack=4A
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
IT14229


PD -- Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT13531


PD -- Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT13532


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

Note on usage : Since the 2SK4198FG is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.



This catalog provides information as of November, 2008. Specifications and information herein are subject to change without notice.