

SPECIFICATION

Device Name : Intelligent Power MOSFET .

Type Name : F5023 .

MS5F4431

Spec. No. : .

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Fuji Electric Co.,Ltd.
Matsumoto Factory

| | DATE | NAME | APPROVED | Fuji Electric Co.,Ltd. | |
|---------|--------------|---------------------|--------------------|------------------------|------|
| DRAWN | Oct-22-1998 | <i>R. Zaegawa</i> | <i>S. Furukata</i> | MS5F4431 | 1/10 |
| CHECKED | Oct.-22-1999 | <i>S. Kinoshita</i> | | | |
| | | | | | |

- 1.Scope This specifies Fuji Intelligent power MOSFET F5023
- 2.Construction Self-Isolation structure
Output part; N-channel enhancement mode power MOSFET
- 3.Application For switching
- 4.Outview TO-220 (EIAJ SC-46) (See to 6/10)

5.Absolute maximum ratings (at Tc=25°C, unless otherwise specified.)

| Description | Symbol | Characteristics | Unit | Conditions |
|--------------------------------|------------------|-----------------|------|------------|
| Drain-Source Voltage | V _{DSS} | 40 | V | DC |
| Gate-Source Voltage | V _{GSS} | DC-0.3~7.0 | V | DC |
| Continuous Drain Current | I _D | 12 | A | |
| Maximum Power Dissipation | P _D | 30 | W | |
| Operating junction temperature | T _J | 150 | °C | |
| Storage temperature range | T _{stg} | -55 ~ 150 | °C | |

6.Electrical characteristics (at Tc=25°C, unless otherwise specified.)

| Description | Symbol | Conditions | Characteristics | | | Unit |
|-------------------------------------|---|--|-----------------|------|------------|----------|
| | | | min. | typ. | max. | |
| Drain-Source clamp Voltage | V _{DSS} | I _D =1mA V _{GS} =0V | 40 | | 60 | V |
| Gate Threshold Voltage | V _{GS(th)} | I _D =10mA V _{DS} =13V | 1.0 | | 2.8 | V |
| Operation Gate Voltage | V _{GS(p)} | | 3.0 | | 7.0 | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =30V V _{GS} =0V V _{DS} =13V V _{GS} =0V | | | 100 1.0 | μA mA |
| Gate-Source Leakage Current | I _{GS(n)} I _{GS(un)} | V _{GS} =5V | ** *** | | 500 800 | μA μA |
| Drain-Source On-State Resistance | R _{DS(on)} | I _D =5A V _{GS} =5V | | | 140 | mΩ |

** Under normal operation *** Under self protection

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| Description | Symbol | Conditions | Characteristics | | | Unit |
|--|------------|-----------------------------------|-----------------|------|------|-------------|
| | | | min. | typ. | max. | |
| Turn-On Time | t_{on} | $V_{DS}=13V$ $I_D=5A$ | | | 200 | μS |
| Turn-Off Time | t_{off} | $V_{GS}=5V$ | | | 200 | μS |
| Over-Temperature Protection | T_{trip} | $V_{GS}=5V$ | 150 | | | $^{\circ}C$ |
| Short Circuit Protection | I_{oc} | $V_{GS}=5V$ | 12 | | | A |
| Single Pulse Inductive Load Switch -Off Energy Dissipation | E_{CL} | $T_j=150^{\circ}C$ $V_{GS}=5V$ | 100 | | | mJ |

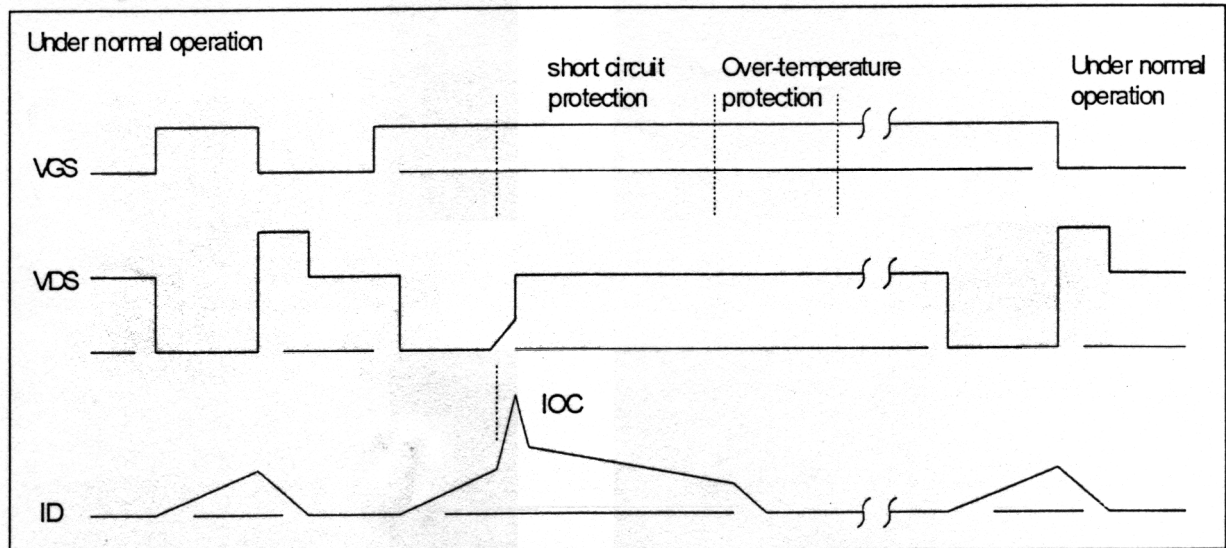
7. Thermal resistance

| Description | Symbol | Conditions | Characteristics | | | Unit |
|--------------------|---------------|------------------|-----------------|------|------|---------------|
| | | | min. | typ. | max. | |
| Thermal Resistance | $R_{th(j-a)}$ | Junction-Ambient | | | 75 | $^{\circ}C/W$ |

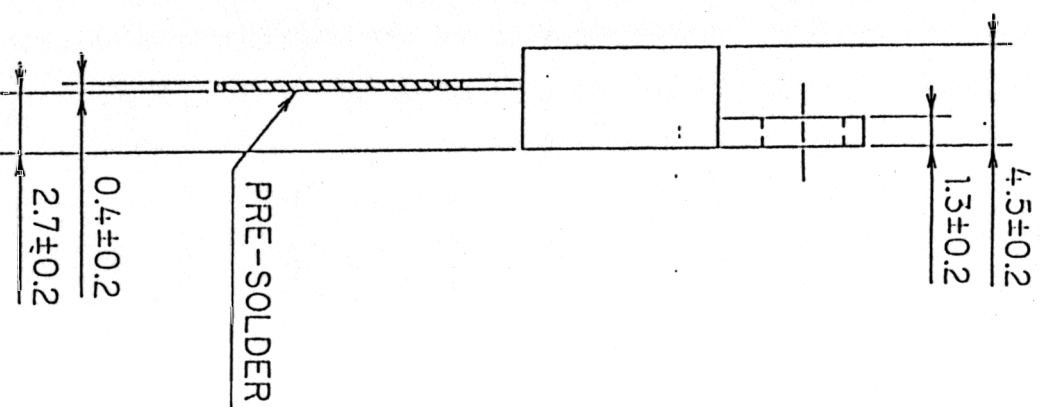
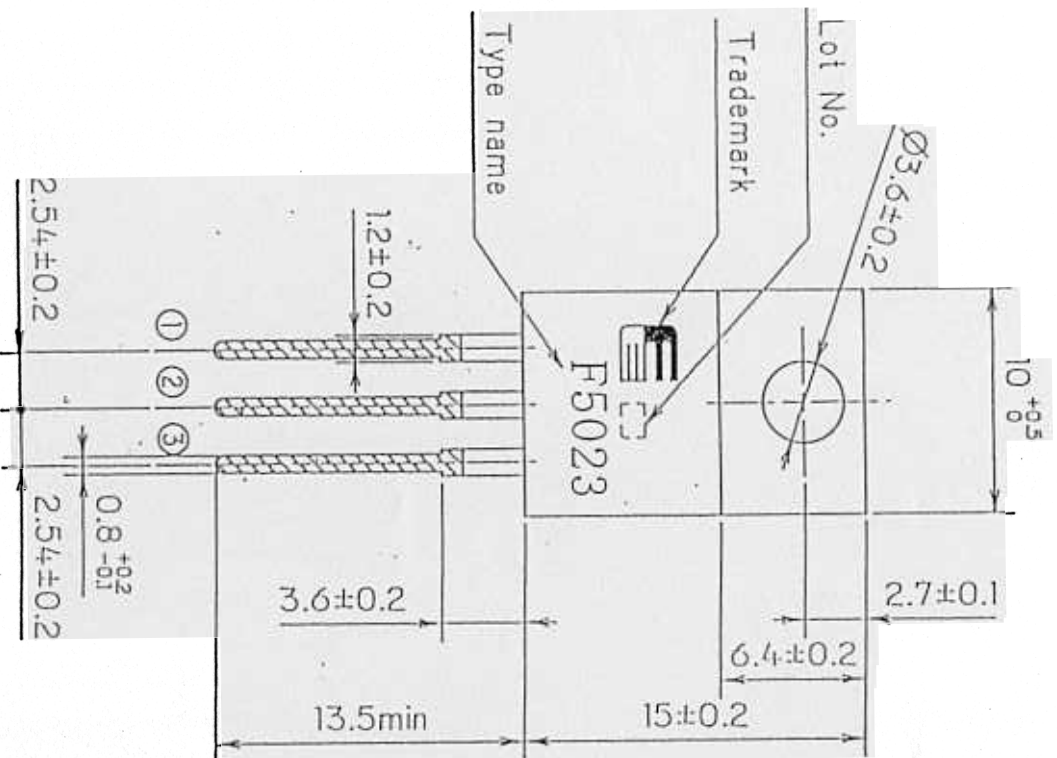
8. Electrostatic discharge

| Description | Conditions | Characteristics | | | Unit |
|--------------|---------------------|-----------------|------|------|------|
| | | min. | typ. | max. | |
| Drain-Source | 150pF, 150 Ω | ± 15 | | | kV |
| Gate-Source | | ± 0.5 | | | kV |

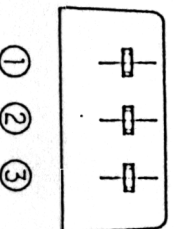
9. Timing chart



MOSFET Type: F5023



CONNECTION



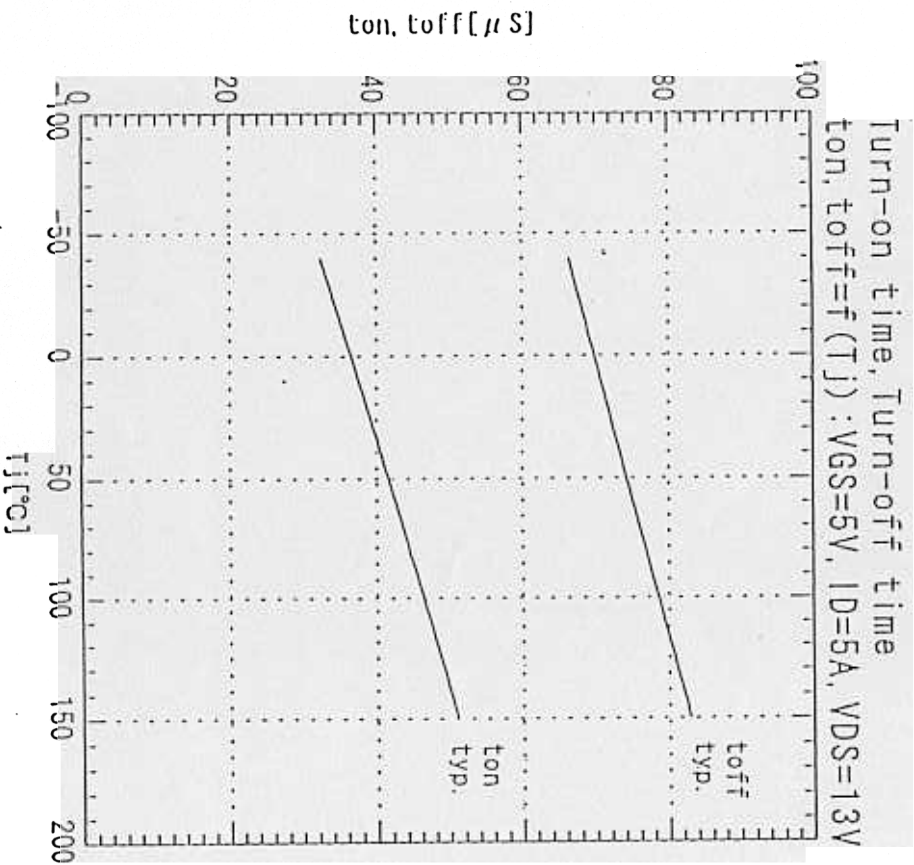
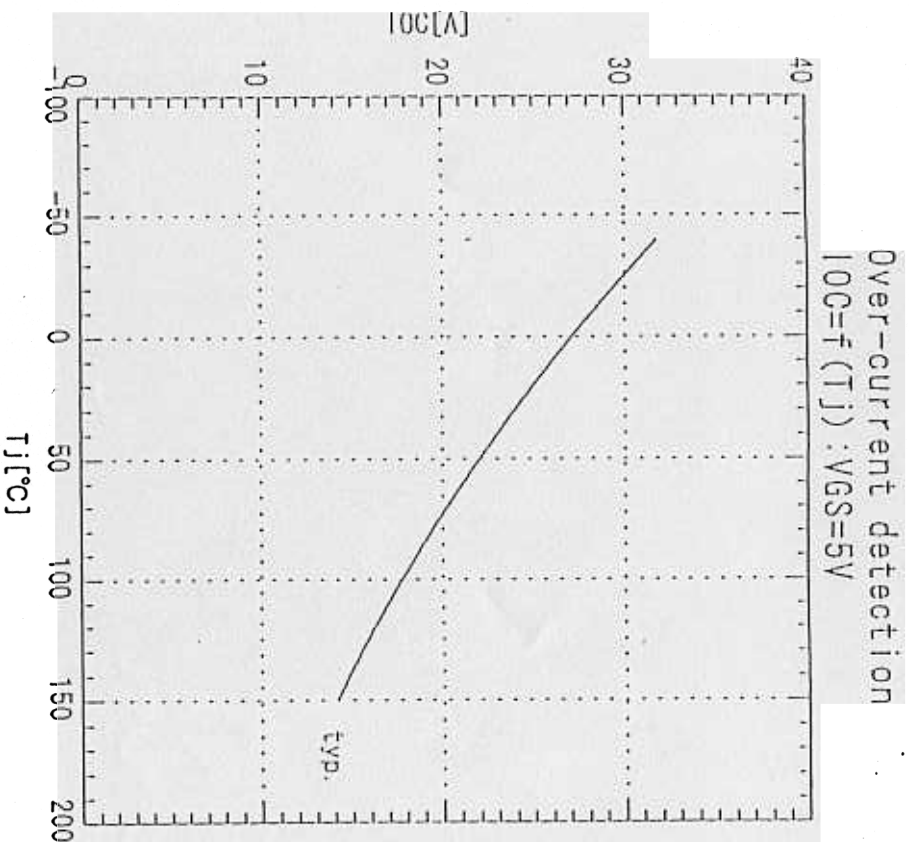
- ① GATE
- ② DRAIN
- ③ SOURCE

JEDEC : TO-220AB

DIMENSIONS ARE IN MILLIMETERS.

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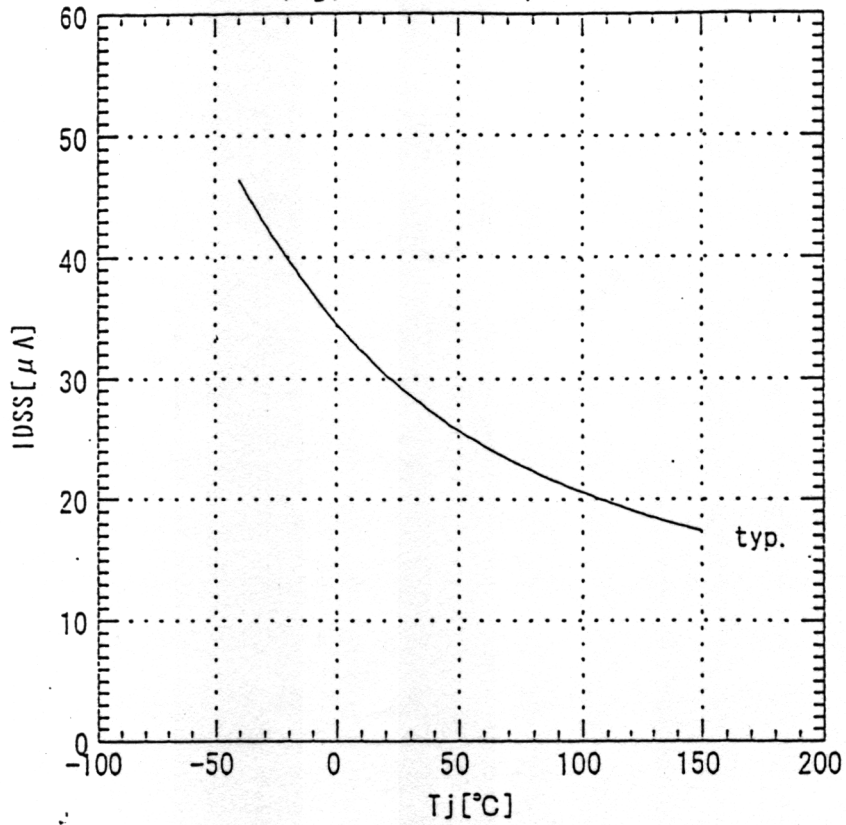
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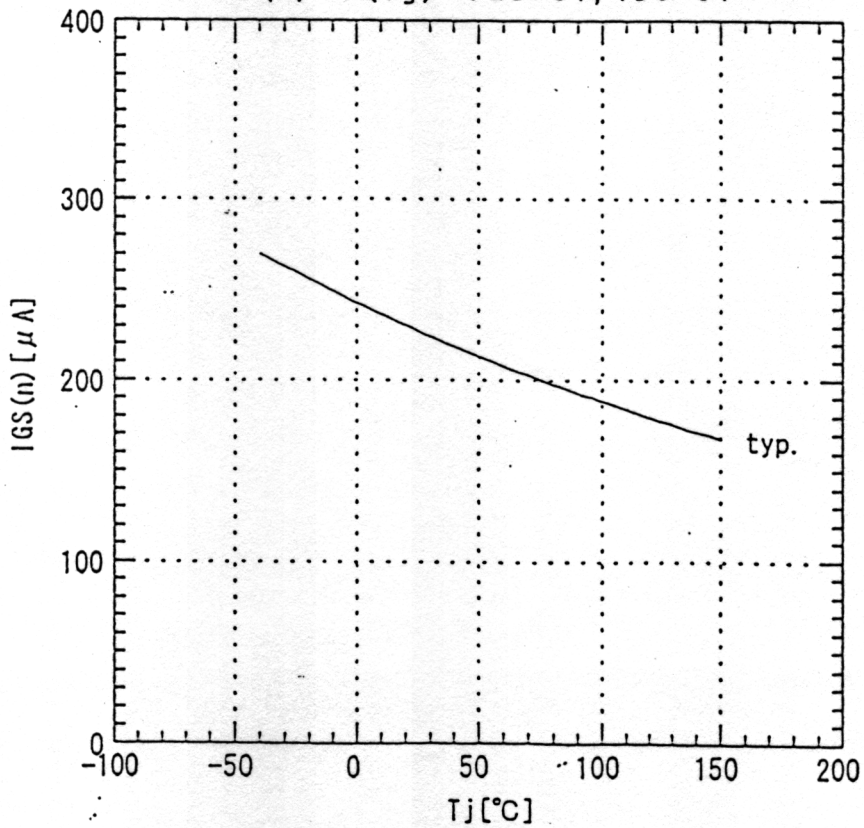
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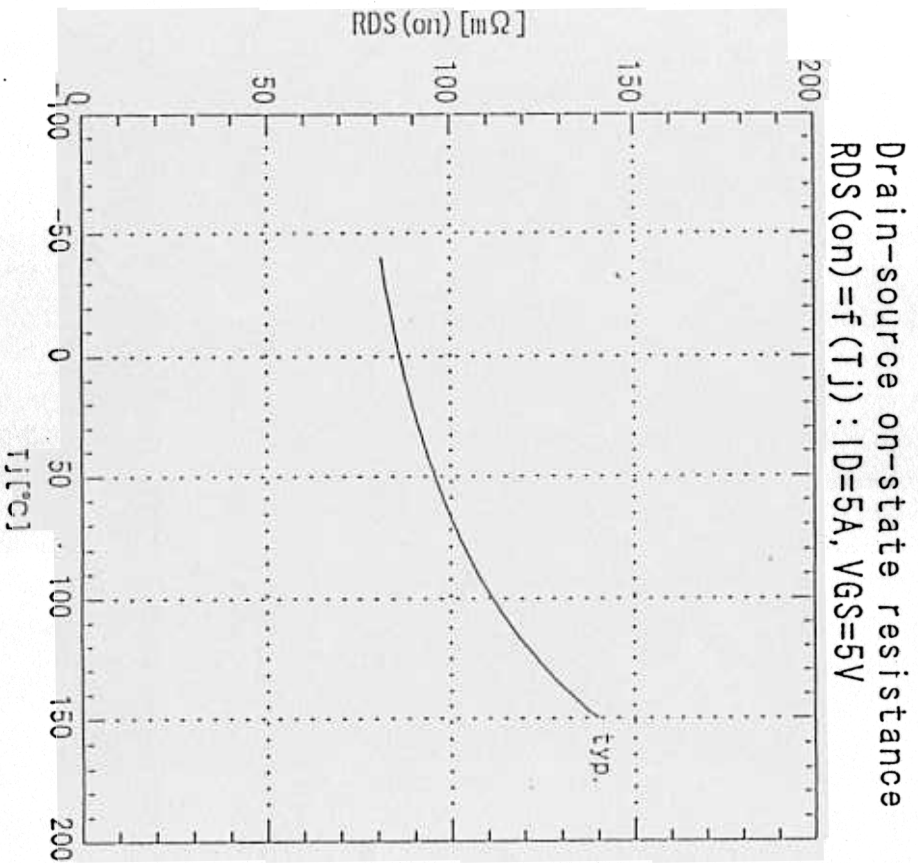
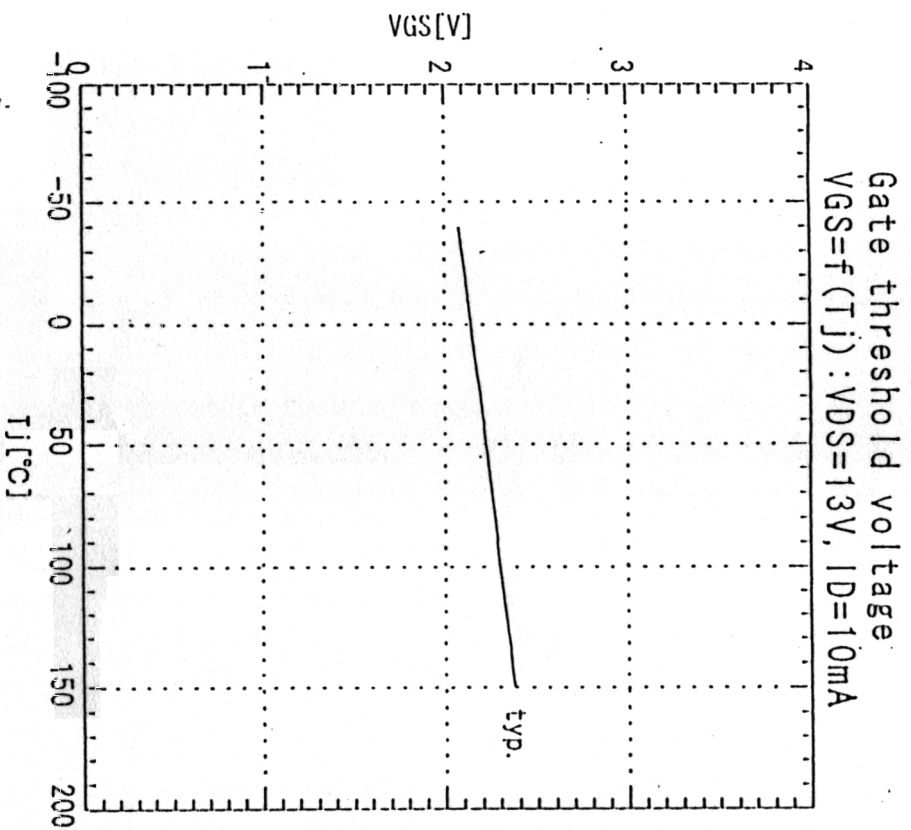
Zero gate voltage drain current
 $I_{DSS}=f(T_j) : V_{DS}=30V, V_{GS}=0V$



Gate-source leakage current
 $I_{GS}(n)=f(T_j) : V_{GS}=5V, V_{DS}=0V$



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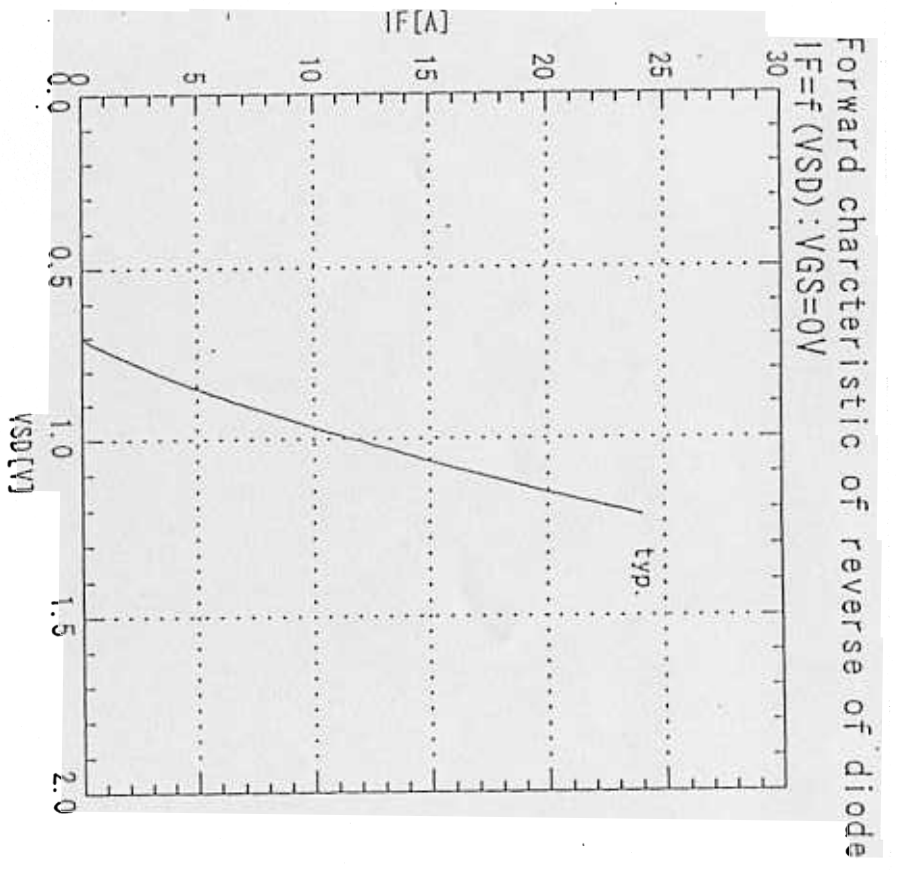
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