

SPECIFICATION

Device Name : Intelligent Power MOSFET

Type Name : F 5 0 3 3

Spec. No. : **MS5 F 4 2 9 2**

This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, nor be disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

Fuji Electric Co., Ltd.
Matsumoto Factory

	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.	
DRAWN	April - 2 - 1998	S. Kuroki		DWG. NO.	MS5 F 4 2 9 2 1/2
CHECKED	April 2 - 1998	S. Kuroki	S. Kuroki		

... *... ..*

S. prostrata *S. fruticosa*

This material and the information herein is the property of Epi Electric Co., Ltd. They shall be neither reproduced, copied, altered, or distributed in any way whatsoever for the use of any third person except for the marketing purposes without the express written consent of Epi Electric Co., Ltd.

QWGA00	MS5 F4292	2/12			
--------	-----------	------	--	--	--

 $\frac{2}{12}$

HQ4-004-06

This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third person nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

1. Scope
This specifies Fuji Intelligent Power MOSFET F5033

2. Construction
Self-Isolation Structure
Output Part: N-channel enhancement mode power MOSFET

3. Application
For switching

4. Outview
SQP-8(EIAJ SC-87) Outview See to 6/12 page)

5. Absolute maximum ratings (at $T_j=25^{\circ}\text{C}$, unless otherwise specified.)

Description	Symbol	Characteristics	Unit	Conditions
Drain-source voltage	V_{DS}	40	V	DC
Gate-source voltage	V_{GS}	DC-0.3~7.0	V	DC
Continuous drain current	I_D	1	A	—
Maximum power dissipation	P_D	1.5	W	†
Operating junction temperature	T_j	150	$^{\circ}\text{C}$	—
Storage temperature range	T_{stg}	-55~150	$^{\circ}\text{C}$	—

† Surface Mounted on 1000mm²PCB(FR-4)

6. Electrical characteristics (at $T_j=25^{\circ}\text{C}$, unless otherwise specified.)

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Drain-source clamp voltage	V_{DS}	$I_D = 1\text{mA}$ $V_{GS} = 0\text{V}$	40		60	V
Gate threshold voltage	$V_{GS(th)}$	$I_D = 10\text{mA}$ $V_{DS} = 13\text{V}$	1.0		2.8	V
Operation gate voltage	$V_{GS(on)}$		3.5		7.0	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 30\text{V}$ $V_{GS} = 0\text{V}$			1.0	mA
Gate-source leakage current	$I_{GS(n)}$	$V_{GS} = 5\text{V}$			500	μA
	$I_{GS(un)}$				800	μA
Drain-source on-state resistance	$R_{DS(on)}$	$I_D = 0.5\text{A}$ $V_{GS} = 5\text{V}$			600	m Ω

* Under normal operation ** Under self protection

Fuji Electric Co., Ltd.

DWG NO.

MS5F4292

3/12

H04-004-03

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Turn-on time	t_{on}	$V_{DS} = 13\text{ V}$ $I_D = 0.5\text{ A}$			50	μS
Turn-off time	t_{off}	$V_{DS} = 5\text{ V}$			50	μS
Over-temperature protection	T_{trip}	$V_{DS} = 5\text{ V}$	150			$^{\circ}\text{C}$
Short circuit protection	I_{sc}	$V_{DS} = 5\text{ V}$	1			A
Single pulse inductive load switch-off energy dissipation	E_{CL}	$T_J = 150^{\circ}\text{C}$	25			mJ

7. Thermal resistance

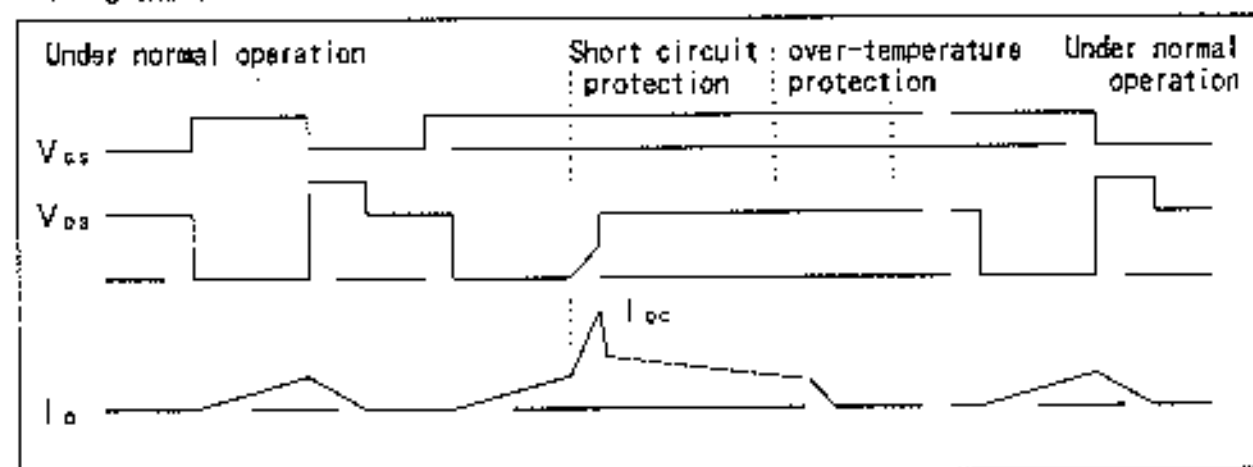
Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th(j-a)}$	Junction-ambient *			83	$^{\circ}\text{C/W}$

* Surface Mounted on 1000mm²PCB(FR-4)

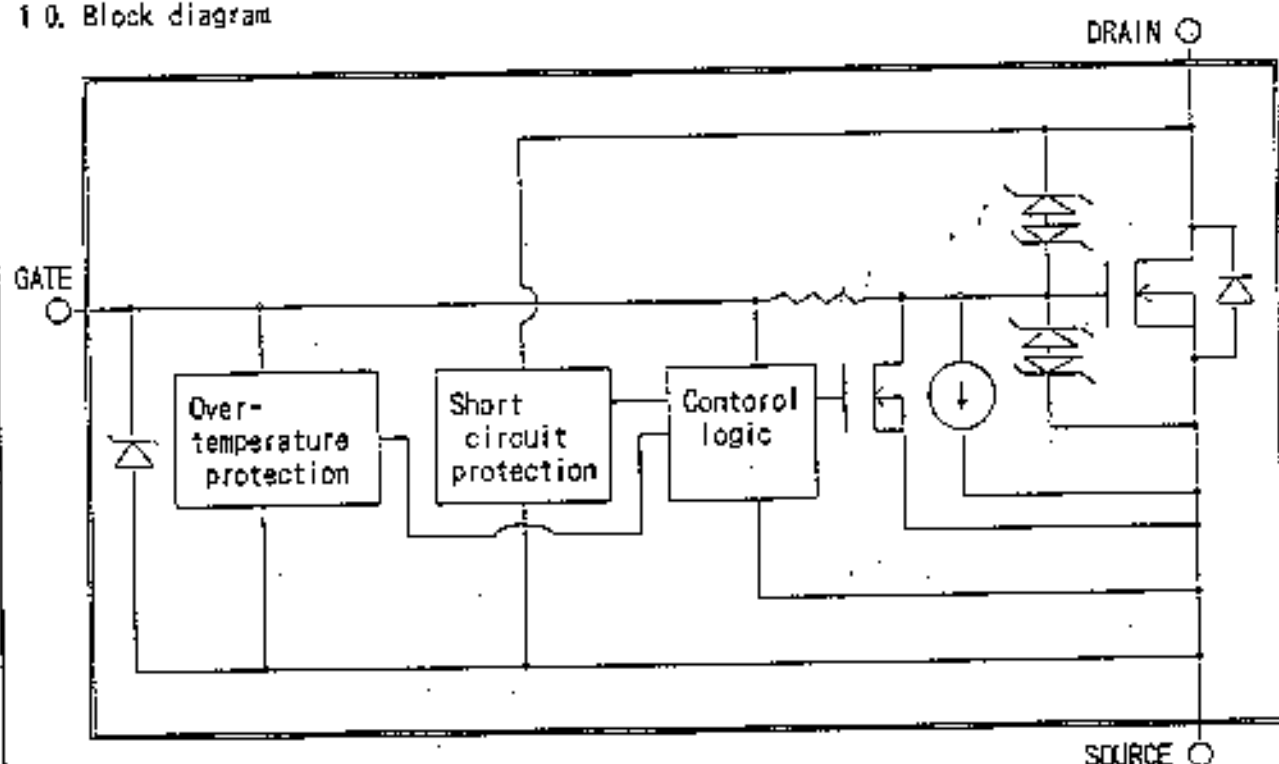
8. Electrostatic discharge

Description	Conditions	Characteristics			Unit
		Min.	Typ.	Max.	
Drain-source	150 pF, 150 Ω	± 15			kV
Gate-source		± 0.5			kV

9. Timing chart



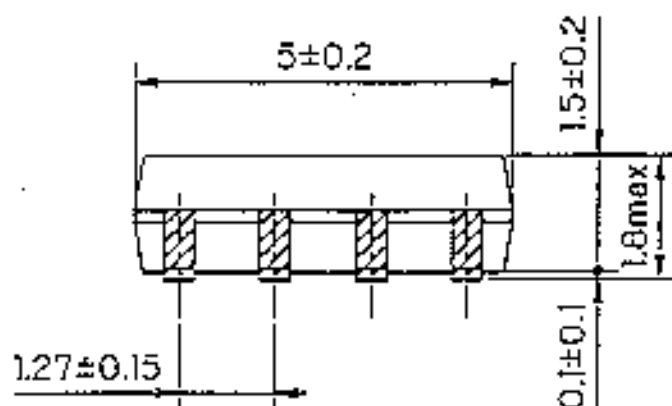
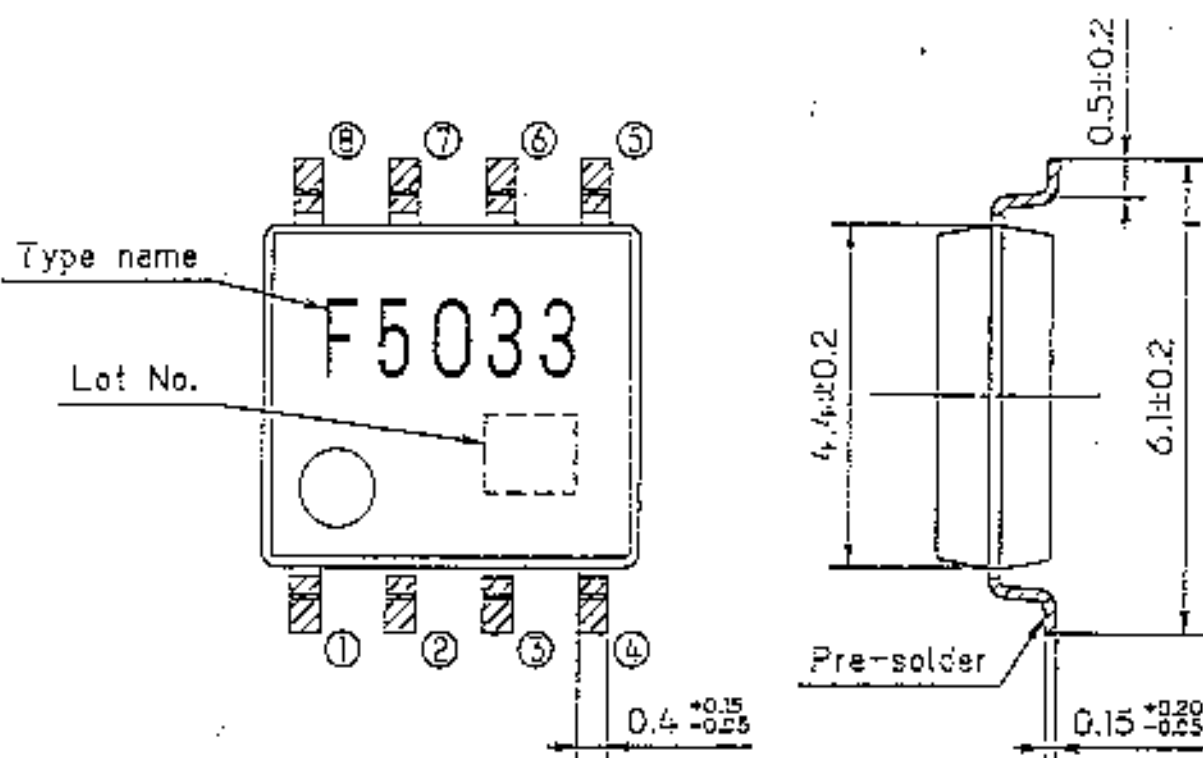
10. Block diagram



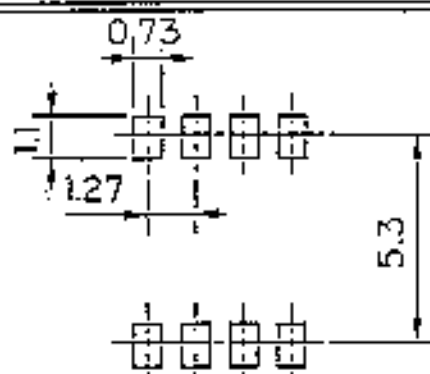
This manual and the information herein is the property of Fuji Electric Co., Ltd. They shall be handled, reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third person used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

FUJI INTELLIGENT POWER MOS FET

TYPE : F5033



RECOMMENDED PATTERN OF SOLDERING PADS.



CONNECTION

- ① SOURCE 1
- ② GATE 1
- ③ SOURCE 2
- ④ GATE 2
- ⑤ ⑥ DRAIN 2.
- ⑦ ⑧ DRAIN 1

EIAJ : SC-87

DIMENSIONS ARE IN MILLIMETERS.

Fuji Electric Co., Ltd.

MS5F4292

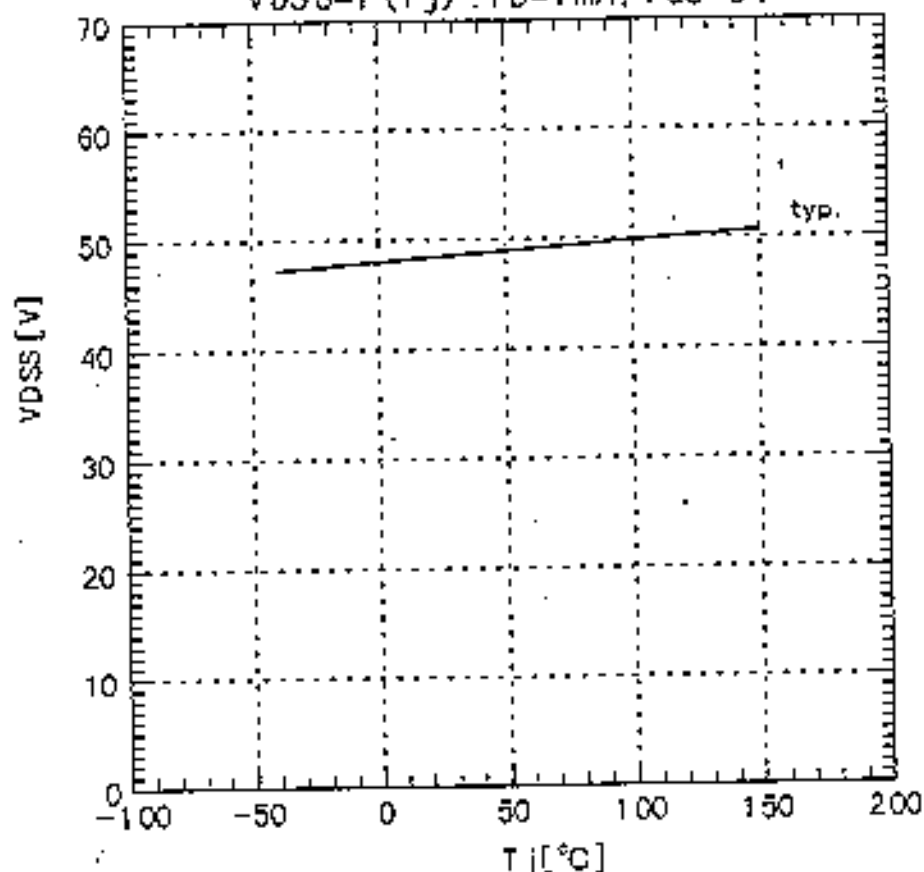
MS5F4292

6/12

This material and the information herein is the property of
 Fuji Electric Co., Ltd. They shall be neither reproduced, copied,
 used, or disclosed in any way without the prior written
 permission of Fuji Electric Co., Ltd.

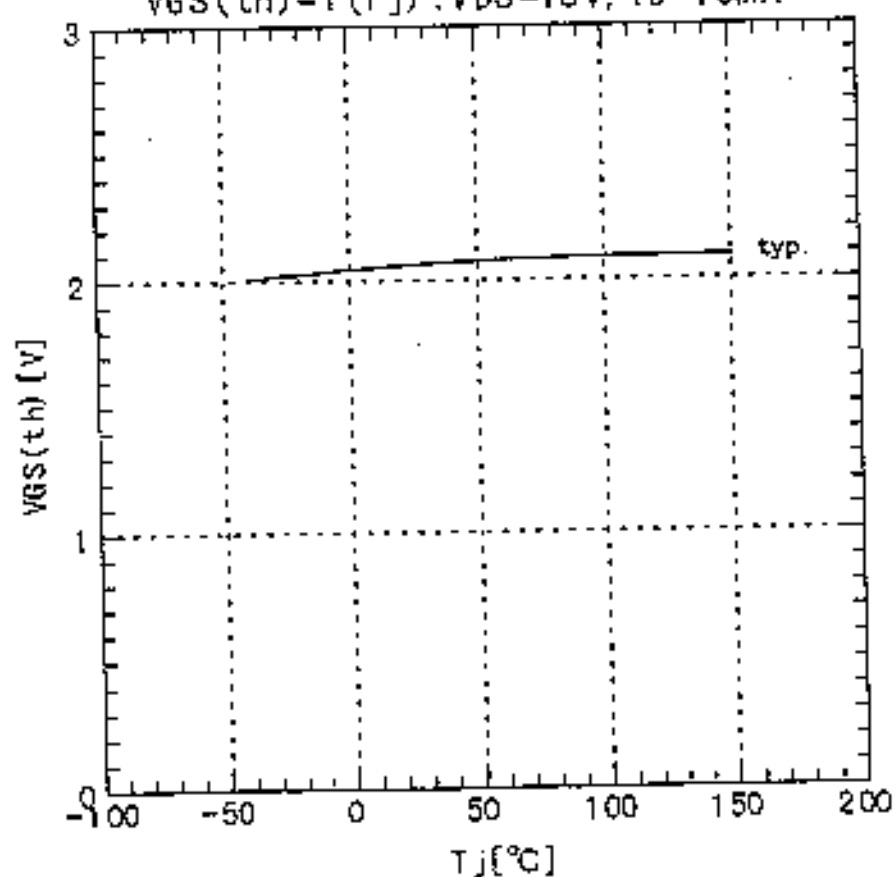
Drain-source clamp voltage

$$V_{DS} = f(T_j) : I_D = 1 \text{ mA}, V_{GS} = 0 \text{ V}$$



Gate threshold voltage

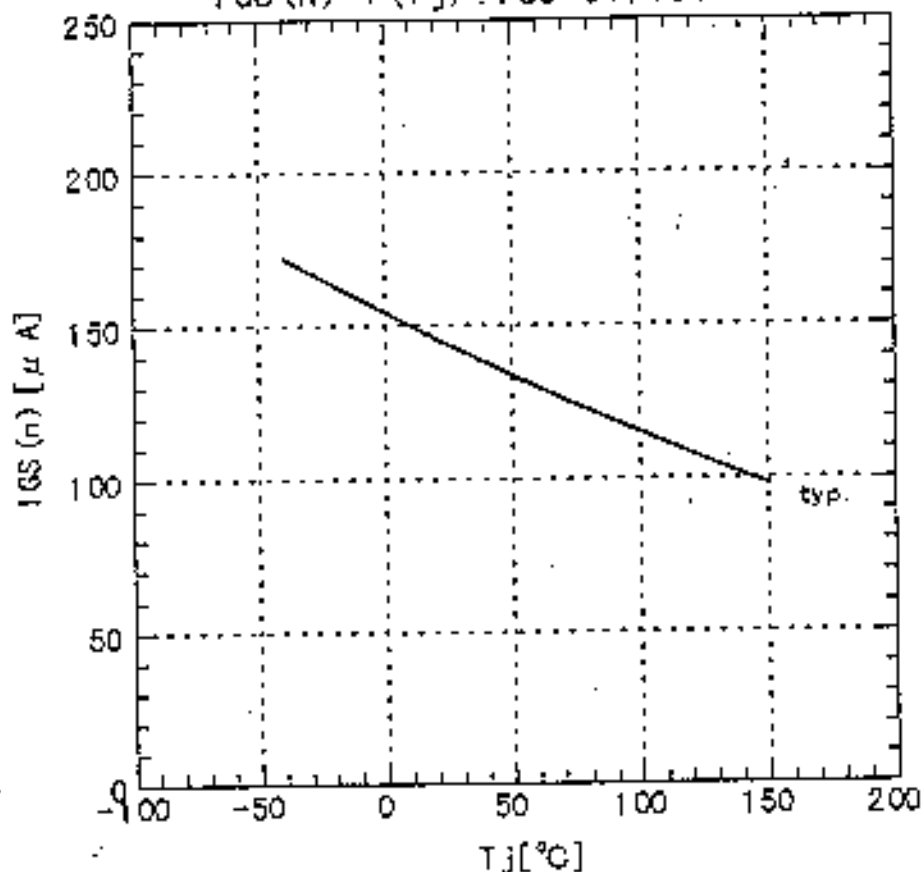
$$V_{GS(th)} = f(T_j) : V_{DS} = 13 \text{ V}, I_D = 10 \text{ mA}$$



This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, sent, or disclosed in any way without prior written permission from Fuji Electric Co., Ltd. for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

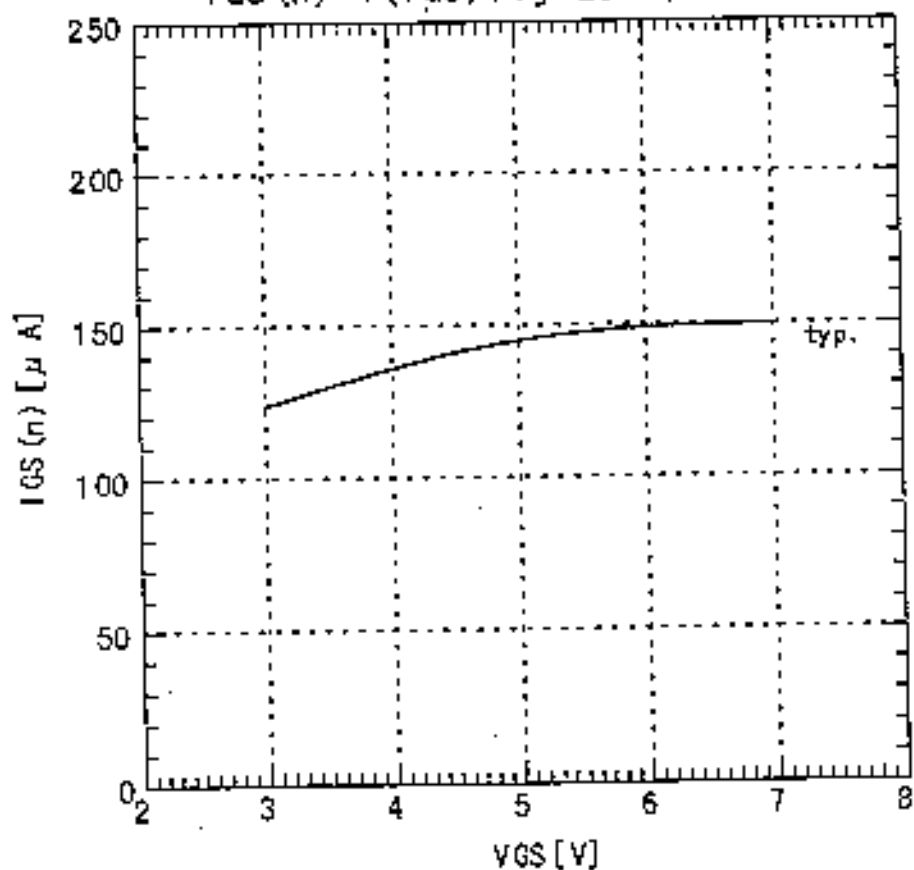
Gate-source leakage current

$$I_{GS}(n) = f(T_j) : V_{GS} = 5V, V_{DS} = 0V$$

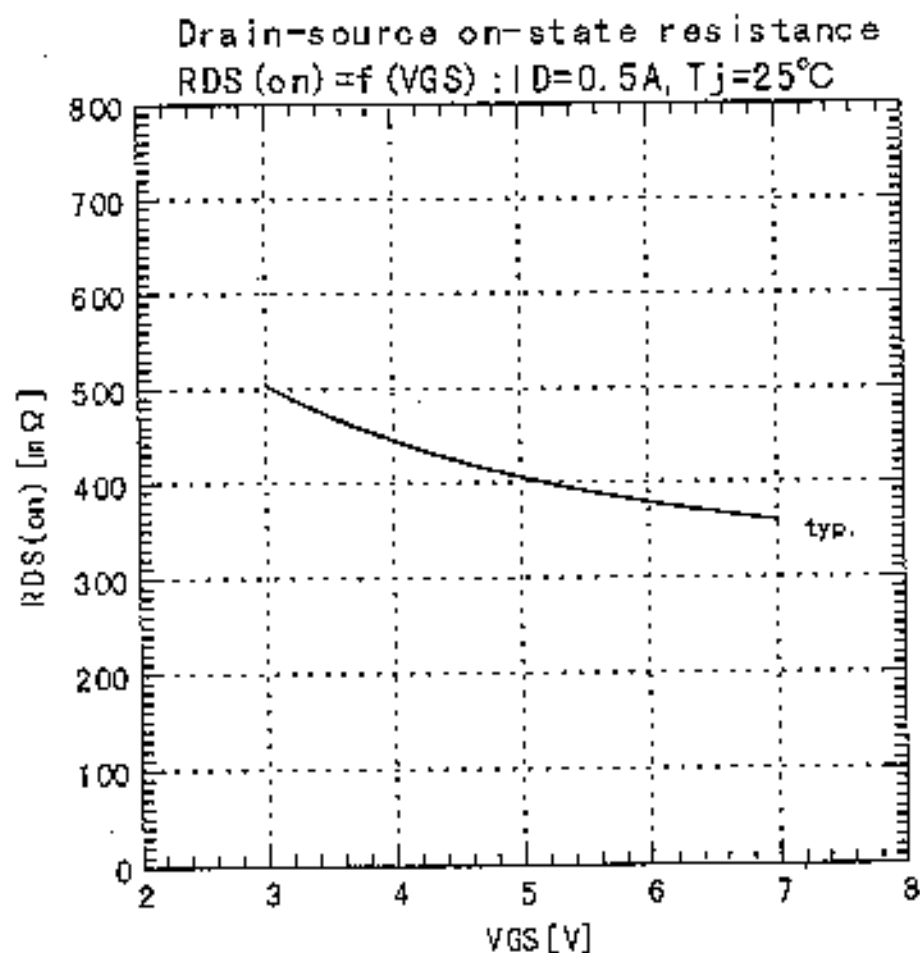
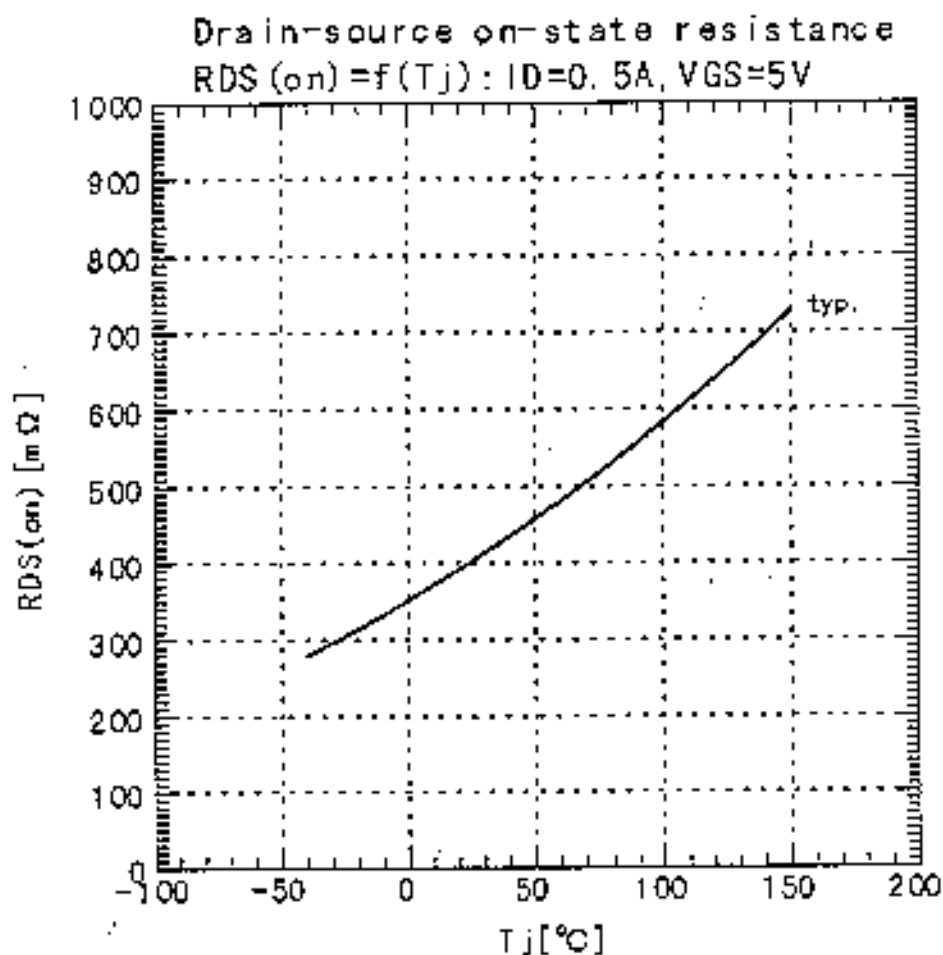


Gate-source leakage current

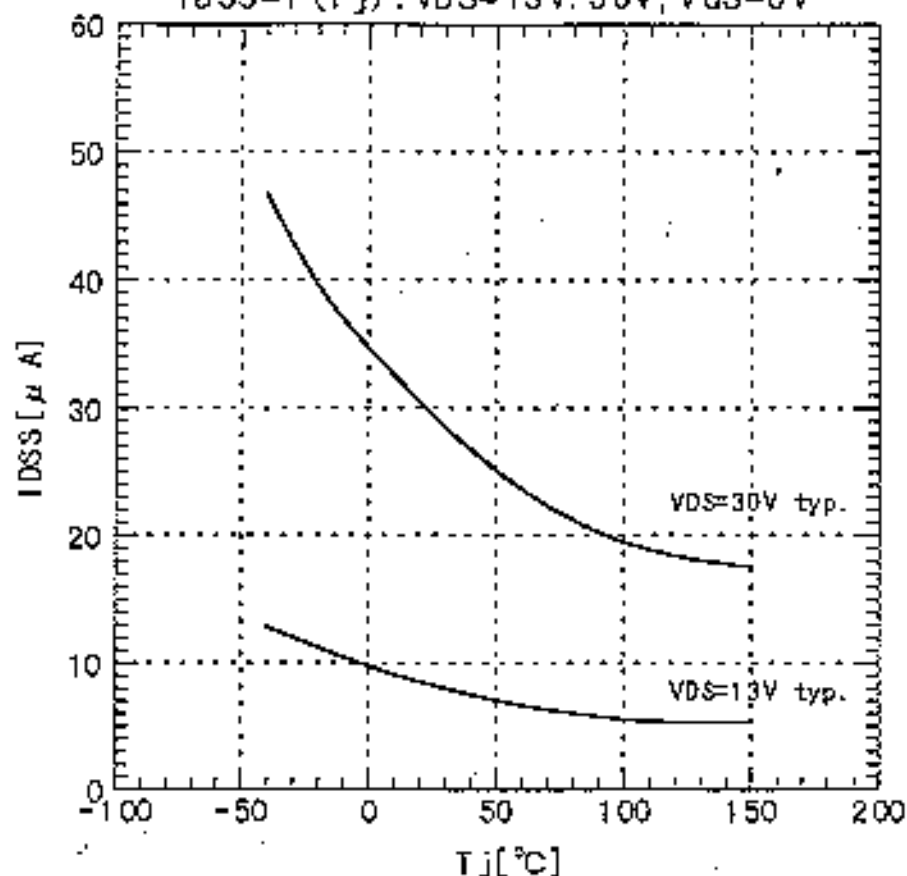
$$I_{GS}(n) = f(V_{GS}) : T_j = 25^{\circ}C, V_{DS} = 0V$$



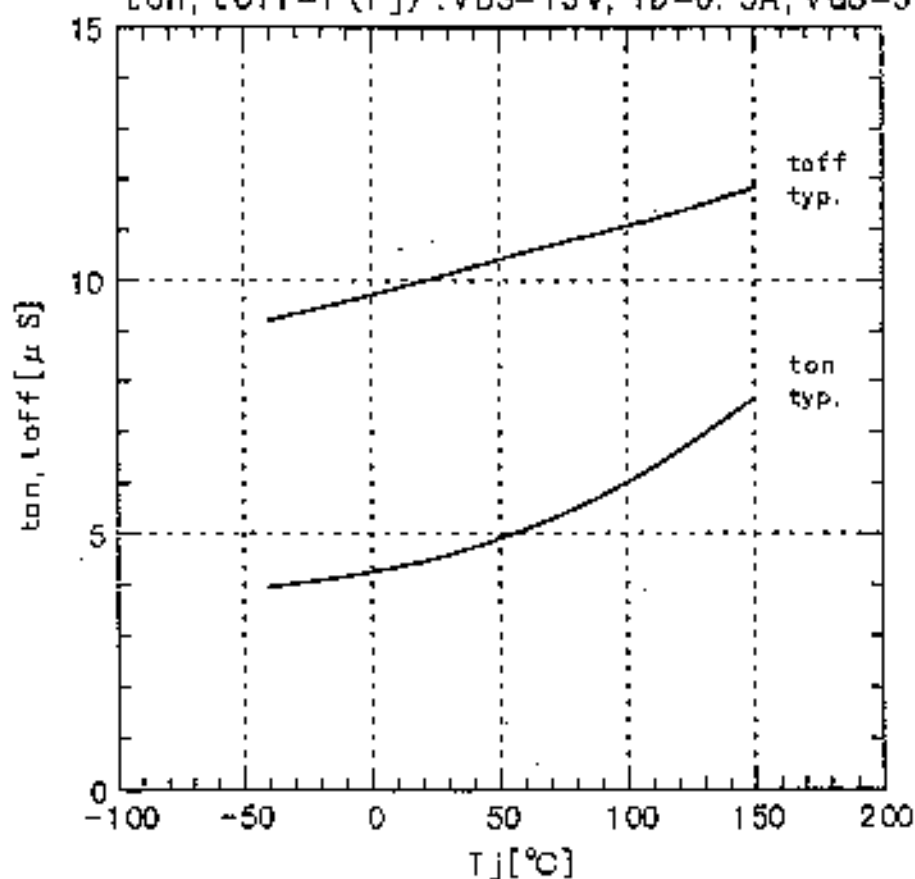
This catalog and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing products without the express agreement of Fuji Electric Co., Ltd.



Zero gate voltage drain current
 $I_{DSS}=f(T_j) : V_{DS}=13V, 30V, V_{GS}=0V$



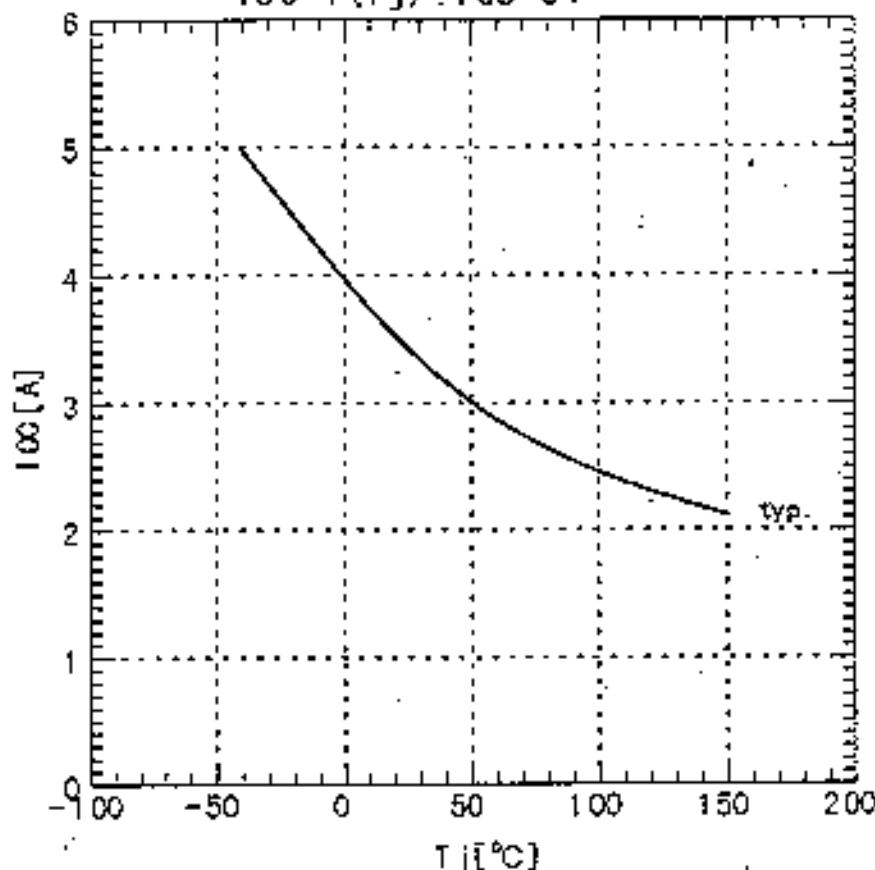
Turn-on time, Turn-off time
 $t_{on}, t_{off}=f(T_j) : V_{DS}=13V, I_D=0.5A, V_{GS}=5V$



This material and the information herein is the property of Fuji Electric Co., Ltd. It may not be without permission, copied, sent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

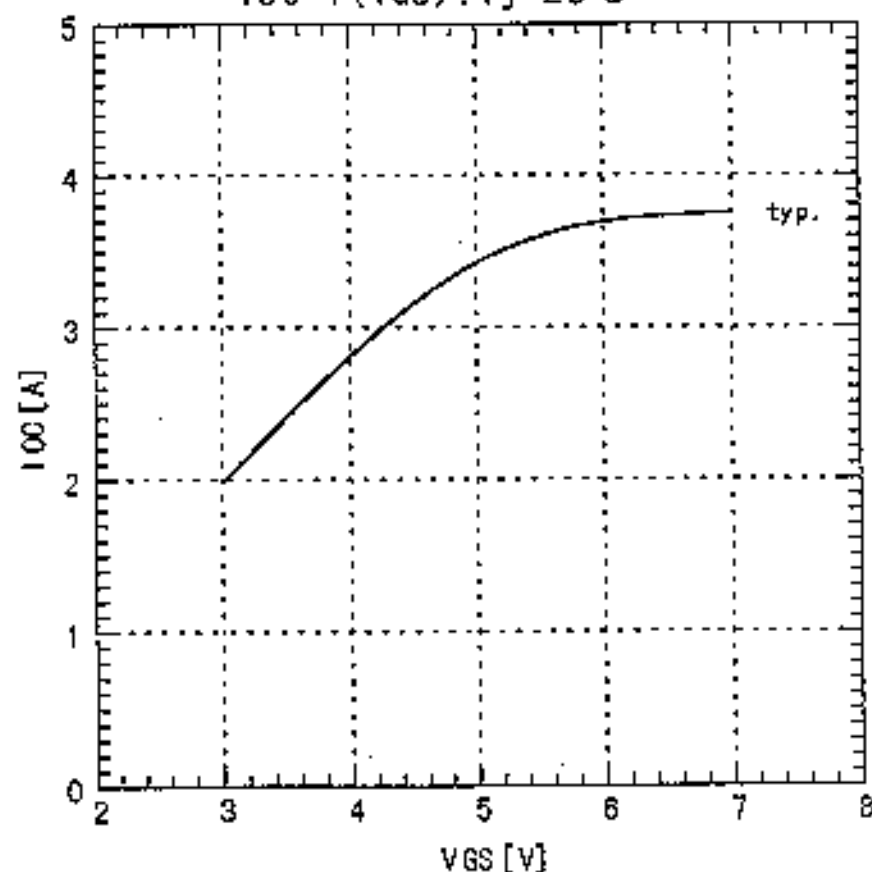
Short circuit protection

$$I_{SC} = f(T_j) : V_{GS} = 5V$$

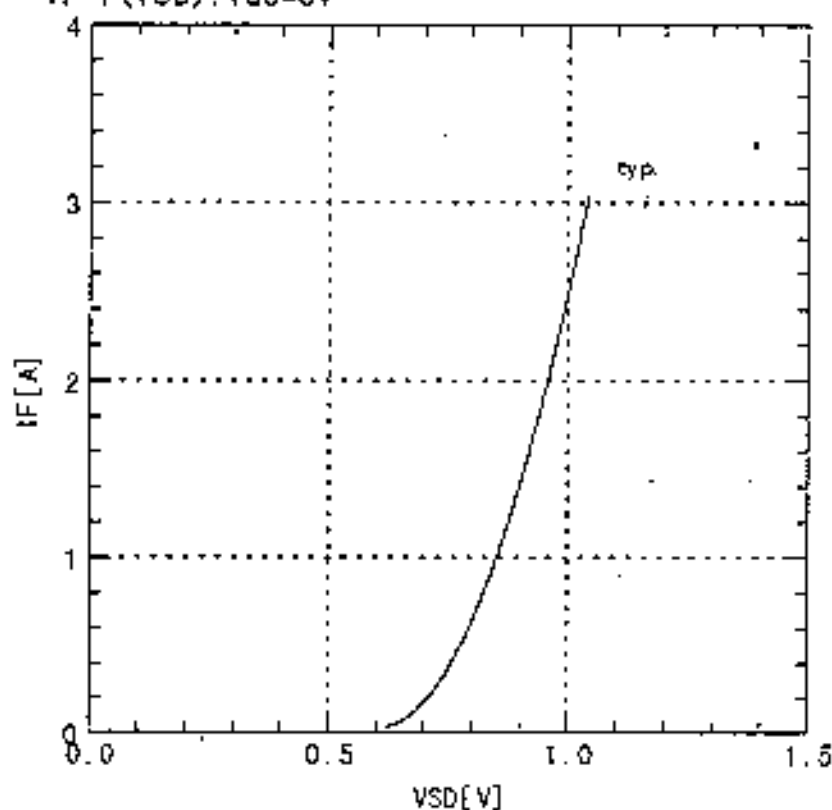


Short circuit protection

$$I_{SC} = f(V_{GS}) : T_j = 25^{\circ}C$$



Forward characteristic of reverse of diode
 $I_F = f(V_{SD}) : V_{GS} = 0V$



Continuous drain current VS Ambient temperature
 $I_D = f(T_a) : \text{Mounting Pad Size } (\beta) = 5mm$

