

SPECIFICATION

Device Name : Intelligent Power MOSFET

Type Name : F 5 0 3 3

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

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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		

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S. prostrata *S. fruticosa*

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DWYG.MD.

MS5 F4292

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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

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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

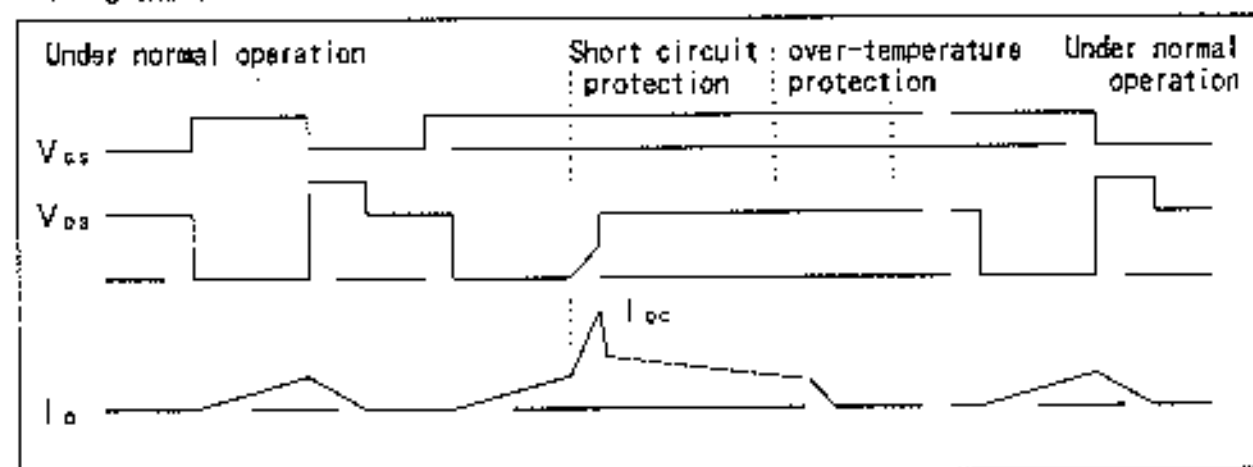
Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th(j-a)}$	Junction-ambient *			83	$^{\circ}\text{C/W}$

* Surface Mounted on 1000mm²PCB(FR-4)

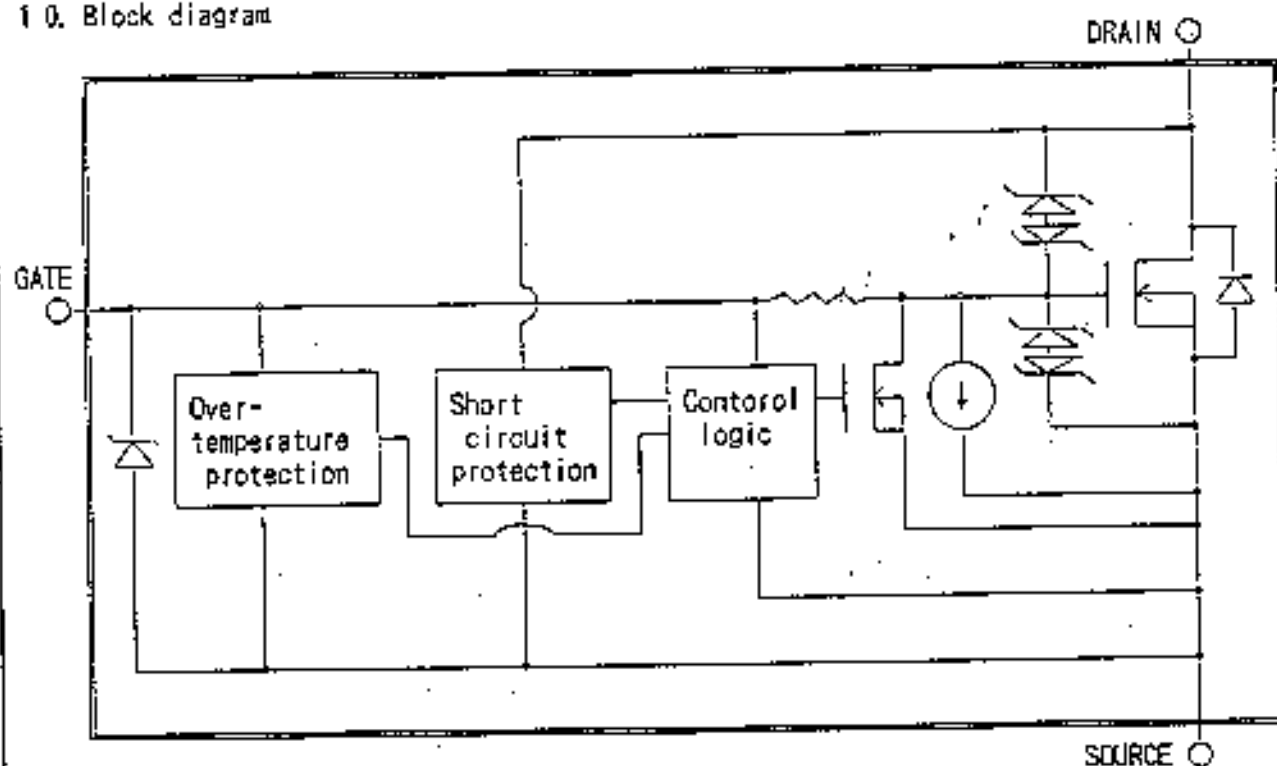
8. Electrostatic discharge

Description	Conditions	Characteristics			Unit
		Min.	Typ.	Max.	
Drain-source	150 pF, 15.0 Ω	± 15			kV
Gate-source		± 0.5			kV

9. Timing chart



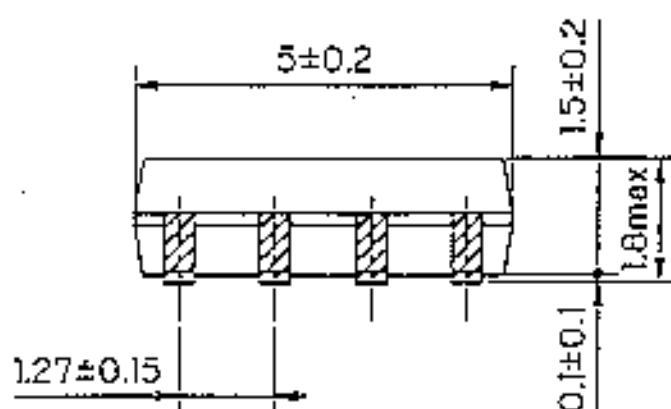
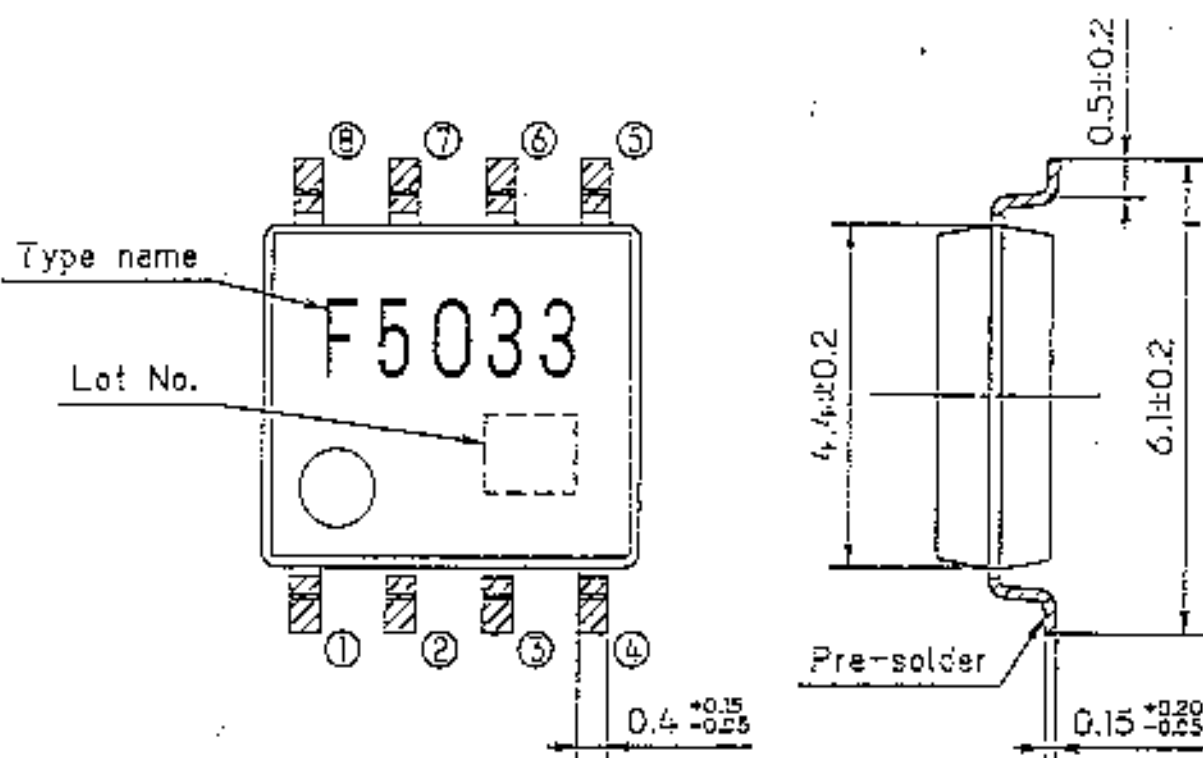
10. Block diagram



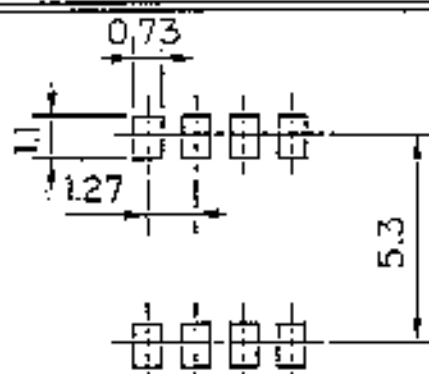
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FUJI INTELLIGENT POWER MOS FET

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.

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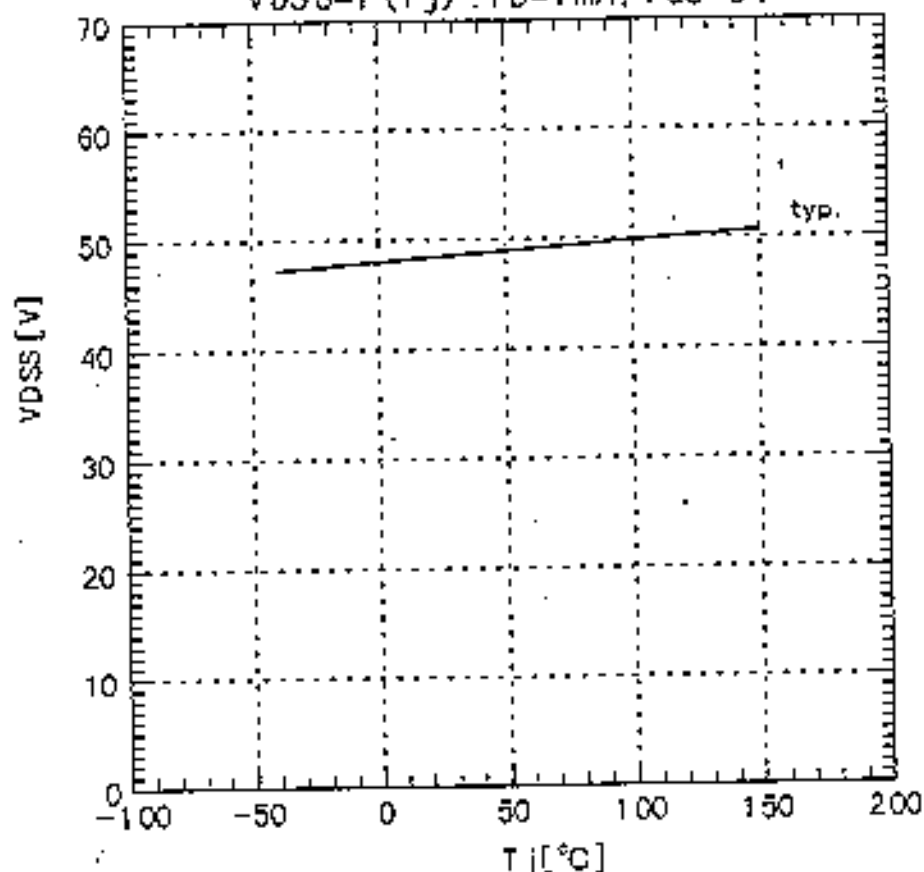
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6/12

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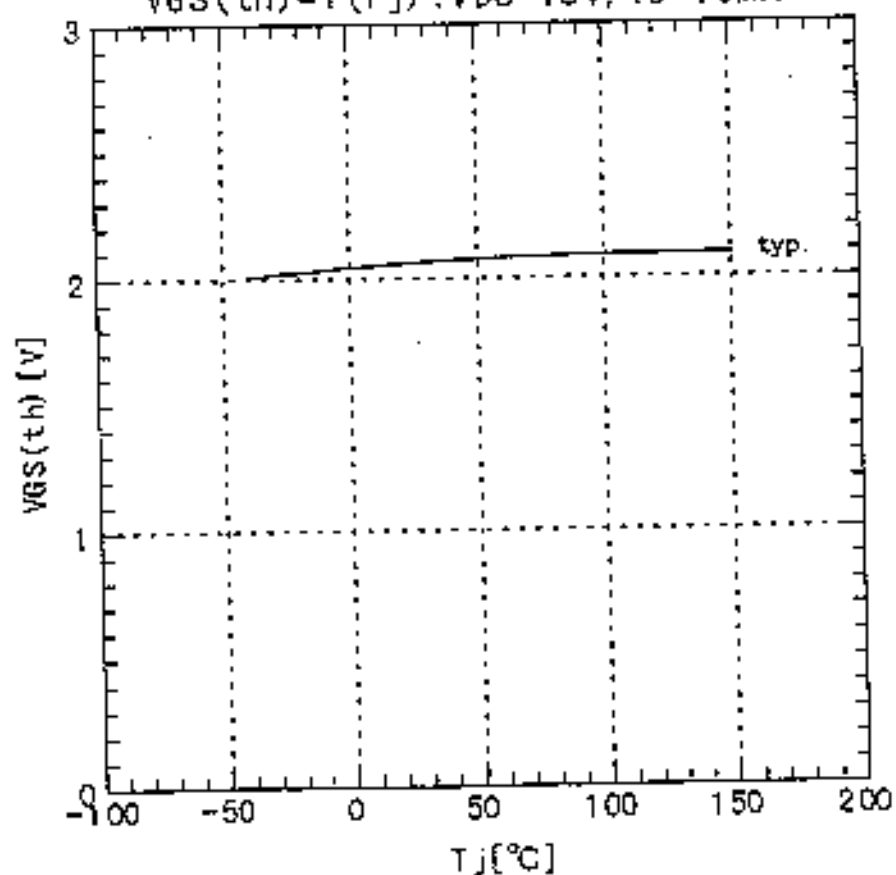
Drain-source clamp voltage

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



Gate threshold voltage

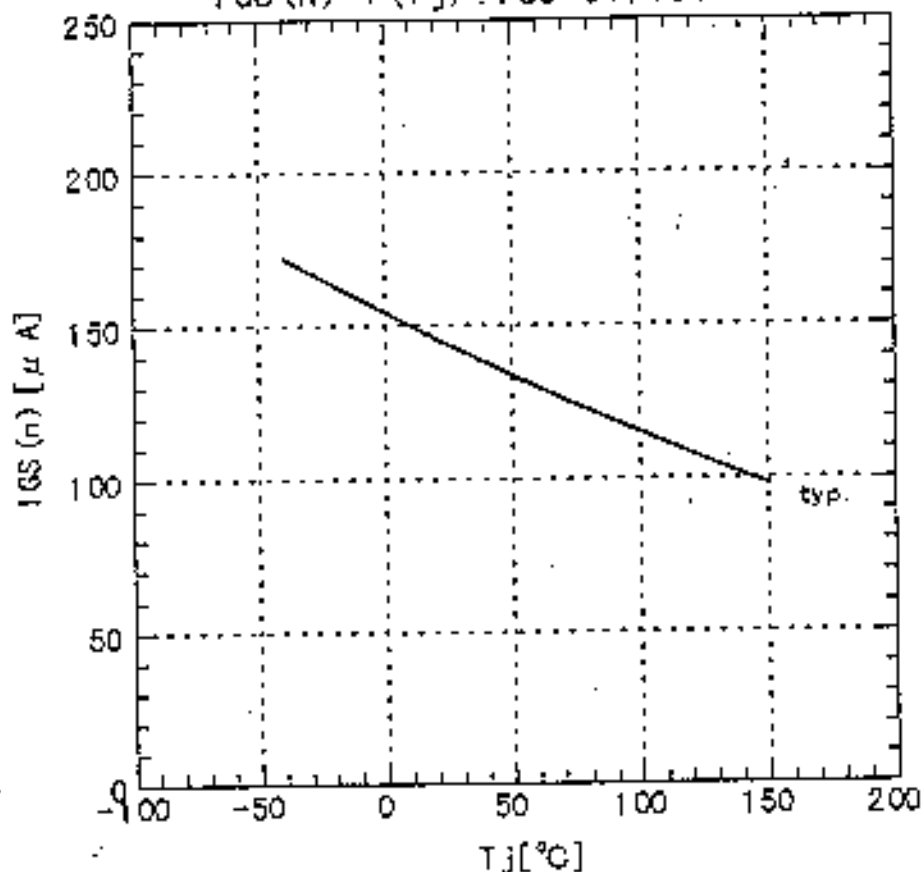
$$V_{GS(th)} = f(T_j) : V_{DS} = 13 \text{ V}, I_D = 10 \text{ mA}$$



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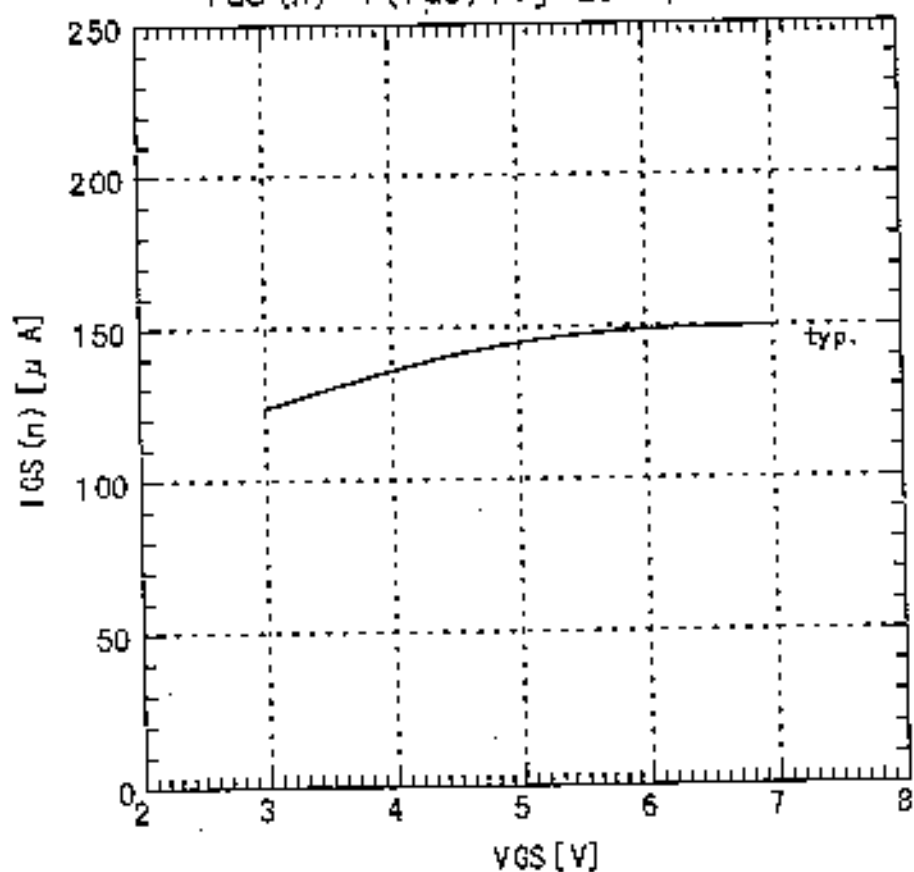
Gate-source leakage current

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

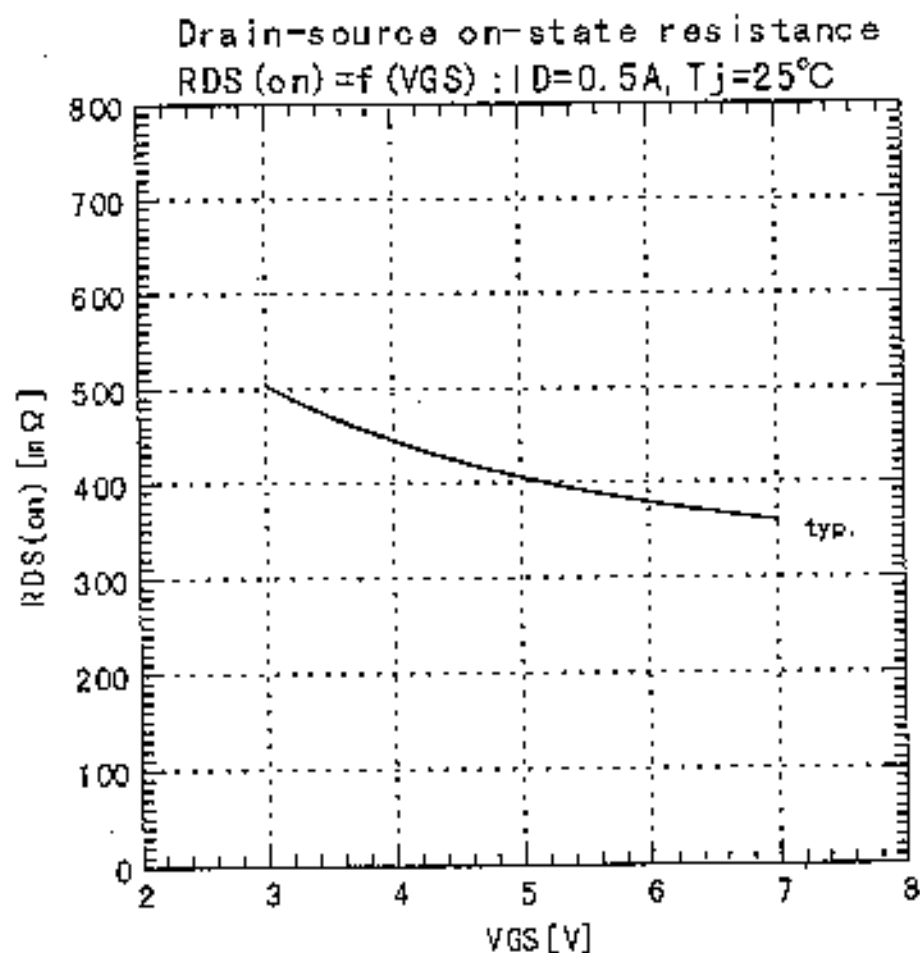
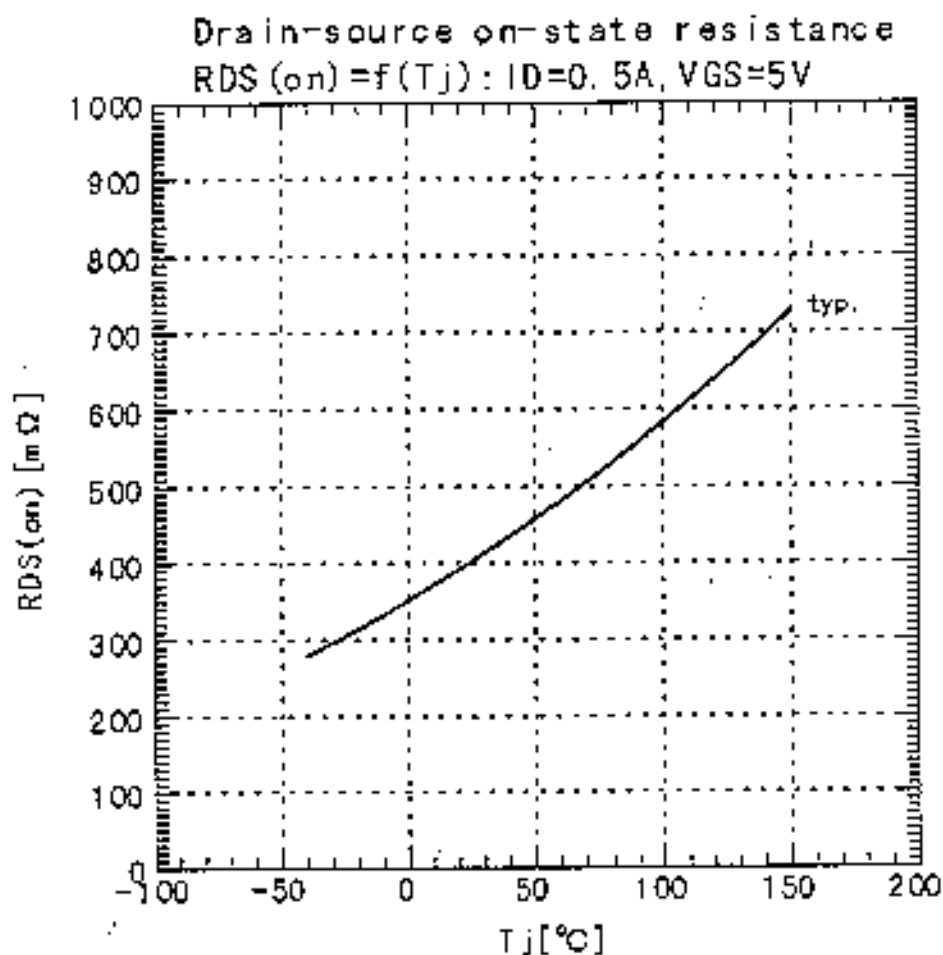


Gate-source leakage current

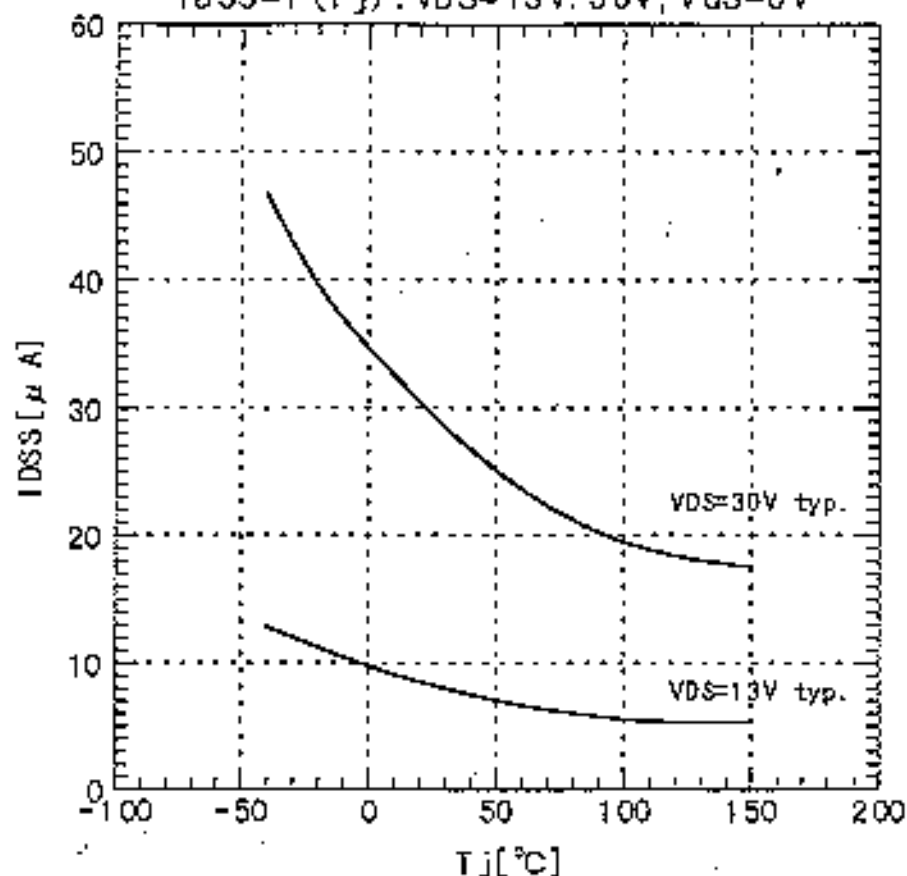
$I_{GS}(n) = f(V_{GS}) : T_j = 25^{\circ}C, V_{DS} = 0V$



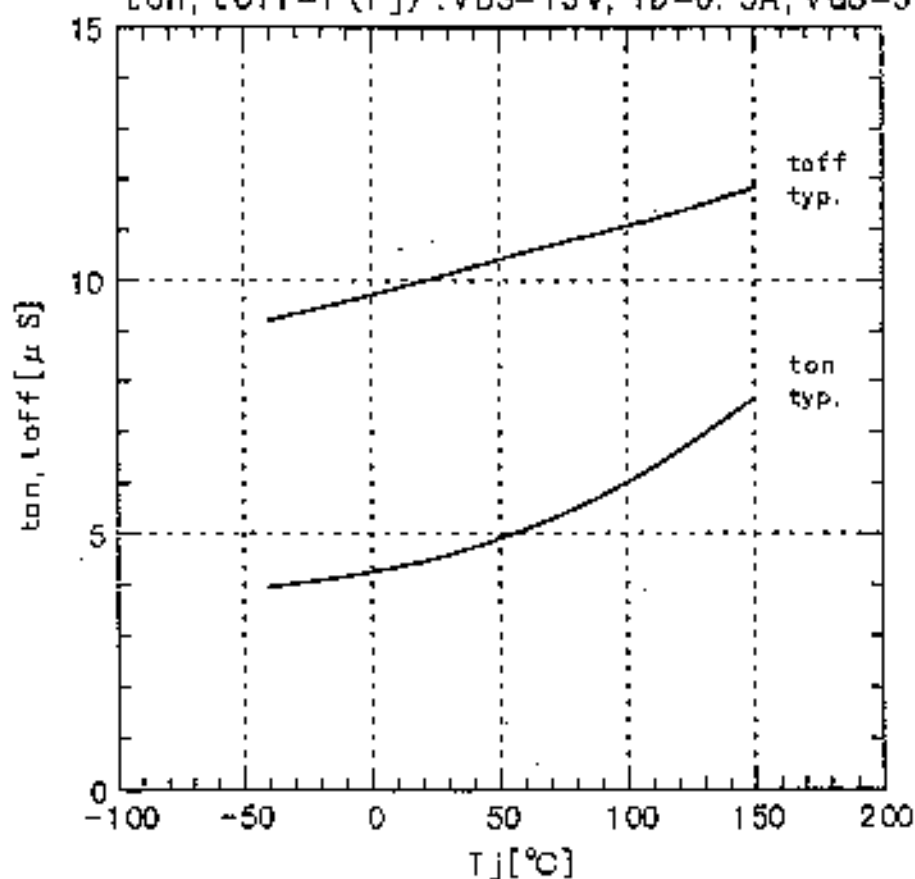
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Zero gate voltage drain current
 $I_{DSS}=f(T_j) : V_{DS}=13V, 30V, V_{GS}=0V$



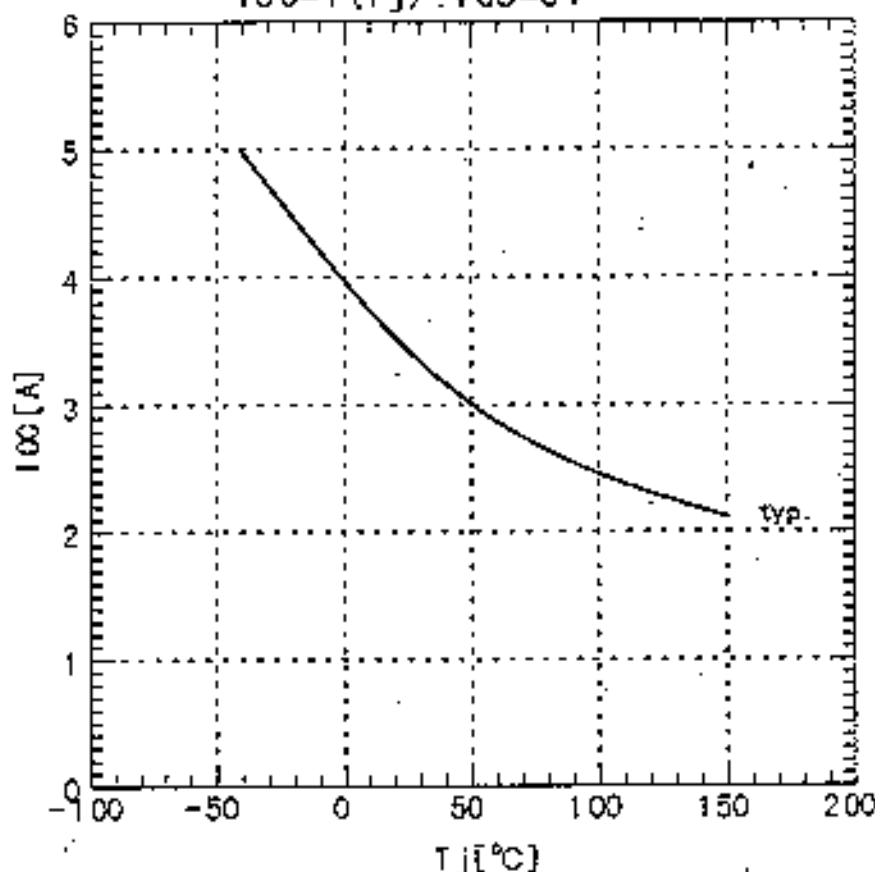
Turn-on time, Turn-off time
 $t_{on}, t_{off}=f(T_j) : V_{DS}=13V, I_D=0.5A, V_{GS}=5V$



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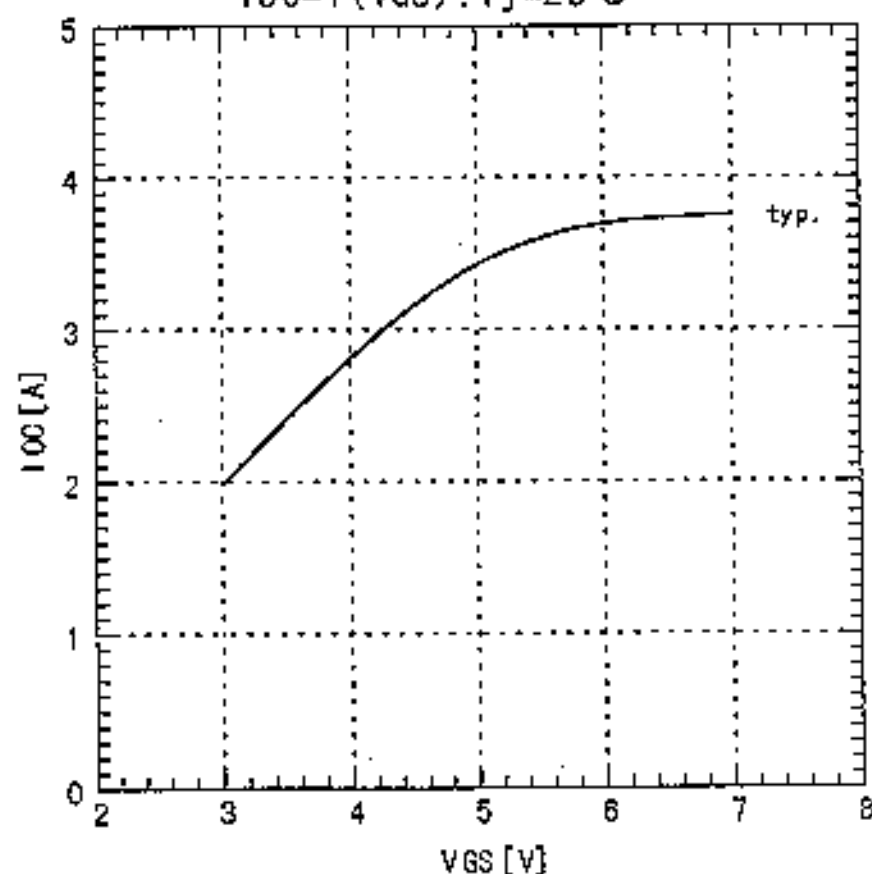
Short circuit protection

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

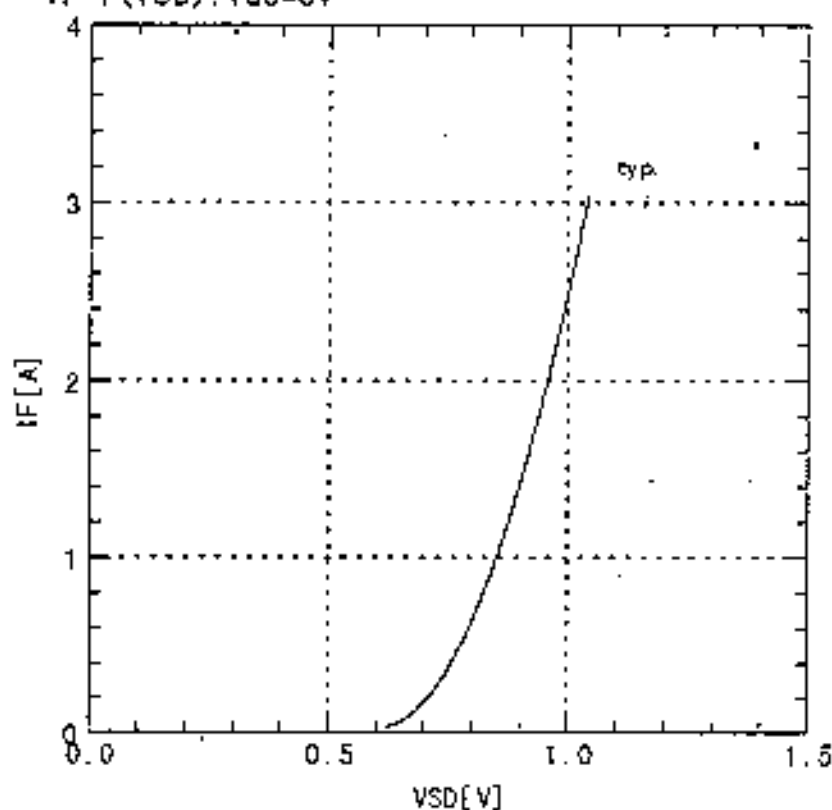


Short circuit protection

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



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



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

