

SPECIFICATION

Device Name : Intelligent Power MOSFET

Type Name : F 5 0 1 9

Spec. No. : **MS5 F4286**

Fuji Electric Co., Ltd.
Matsumoto Factory

	DATE	NAME	APPROVED		Fuji Electric Co., Ltd.	
DRAWN	March - 19 - 1998	S. Kinuchi			DWG. NO.	MS5 F4286
CHECKED	March - 19 - 1998	S. Furukawa				
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CH 5110

2/13

1. Scope
This specifies Fuji Intelligent Power MOSFET F 5 0 1 9 - S
2. Construction
Self-Isolation Structure
Output Part; N-channel enhancement mode power MOSFET
3. Application
For switching
4. Outview
T pack S-type. (See to 6/13 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}	4 0	V	D C
Gate-source voltage	V_{GS}	D C - 0.3 ~ 7.0	V	D C
Continuous drain current	I_D	1 2	A	$T_c = 25^\circ\text{C}$
Maximum power dissipation	P_D	3 0	W	$T_c = 25^\circ\text{C}$
Operating junction temperature	T_j	1 5 0	$^\circ\text{C}$	_____
Storage temperature range	T_{stg}	- 5 5 ~ 1 5 0	$^\circ\text{C}$	_____

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}	$I_D = 1 \text{ mA}$ $V_{GS} = 0 \text{ V}$	4 0		6 0	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	$V_{GS(p)}$		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	$R_{DS(on)}$	$I_D = 5 \text{ A}$ $V_{GS} = 5 \text{ V}$			140	m Ω
Forward on voltage	V_{SD}	$I_F = 24 \text{ A}$			2.0	V

* Under normal operation ** Under self protection

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DWG. NO.

MS5F4286

3/13

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Turn-on time	t_{on}	$V_{DS} = 13\text{ V}$ $R_L = 2.6\ \Omega$ $V_{GS} = 5\text{ V}$			200	μS
Turn-off time	t_{off}				200	μS
Over-temperature protection	T_{trip}	$V_{GS} = 5\text{ V}$	150		210	$^{\circ}\text{C}$
Short circuit protection	I_{sc}	$V_{GS} = 5\text{ V}$	12		32	A
Single pulse inductive load switch-off energy dissipation	E_{CL}	$I_o = 8\text{ A}$ $T_J = 150^{\circ}\text{C}$	100			mJ

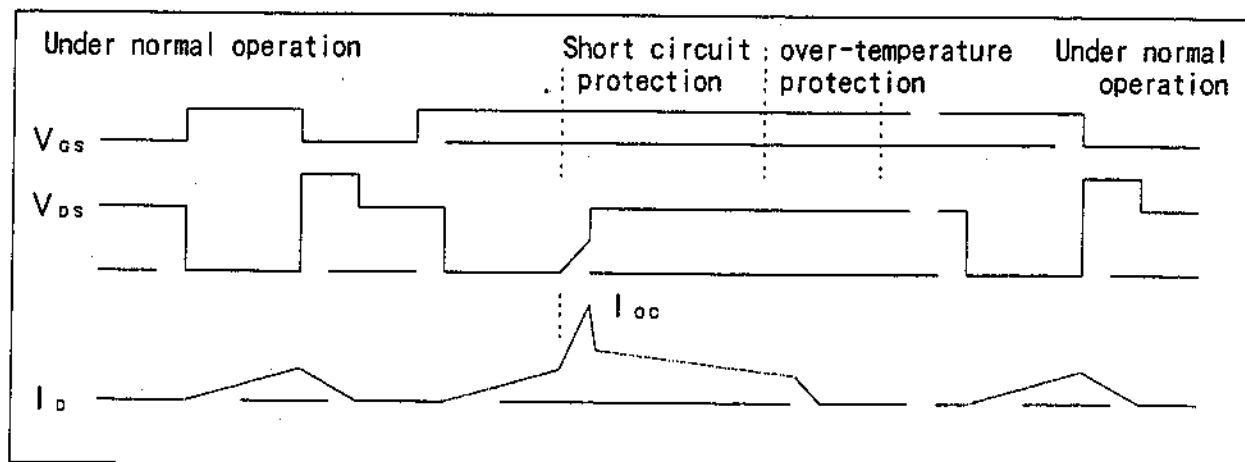
7. Thermal resistance

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th(j-c)}$	Junction-case			4.2	$^{\circ}\text{C/W}$
	$R_{th(j-a)}$	Junction-ambient			100	$^{\circ}\text{C/W}$

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



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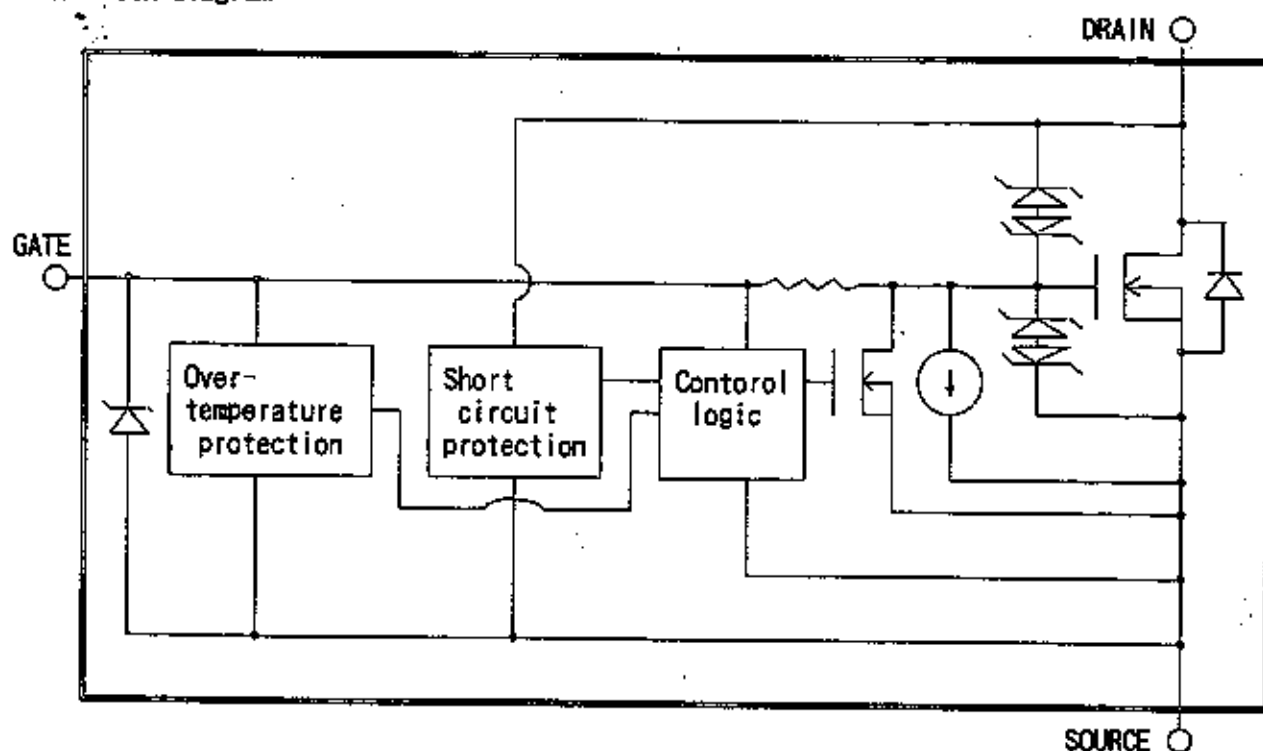
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4/13

H04-004-03

1 0. Block diagram



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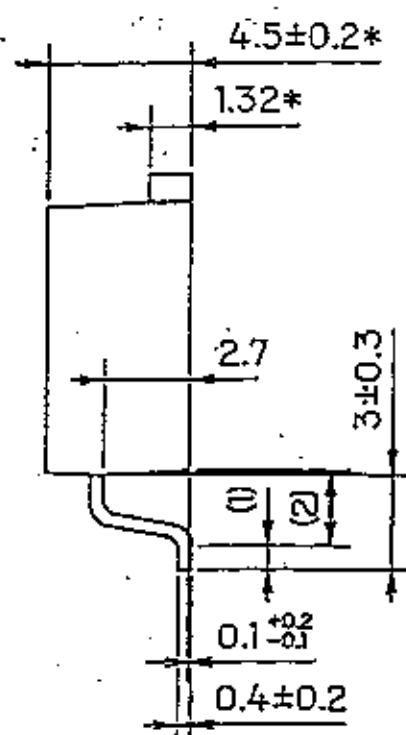
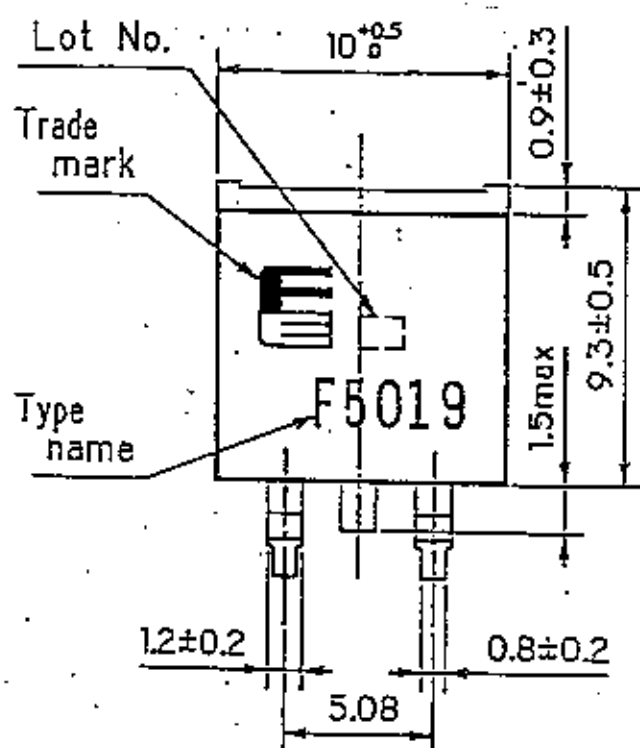
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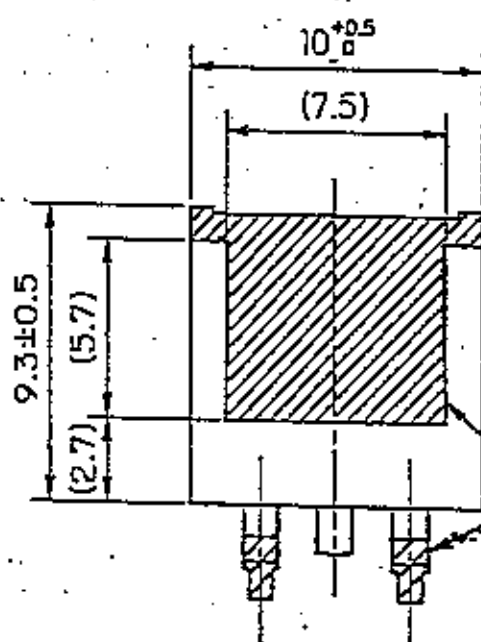
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FUJI POWER MOS FET

TYPE : F5019



BOTTOM VIEW



CONNECTION

- ① GATE
- ② DRAIN
- ③ SOURCE

PRE SOLDER

Notes

1. () : REFERENCE DIMENSIONS.
2. * : DO NOT INCLUDE SOLDER.

DIMENSIONS ARE IN MILLIMETERS.

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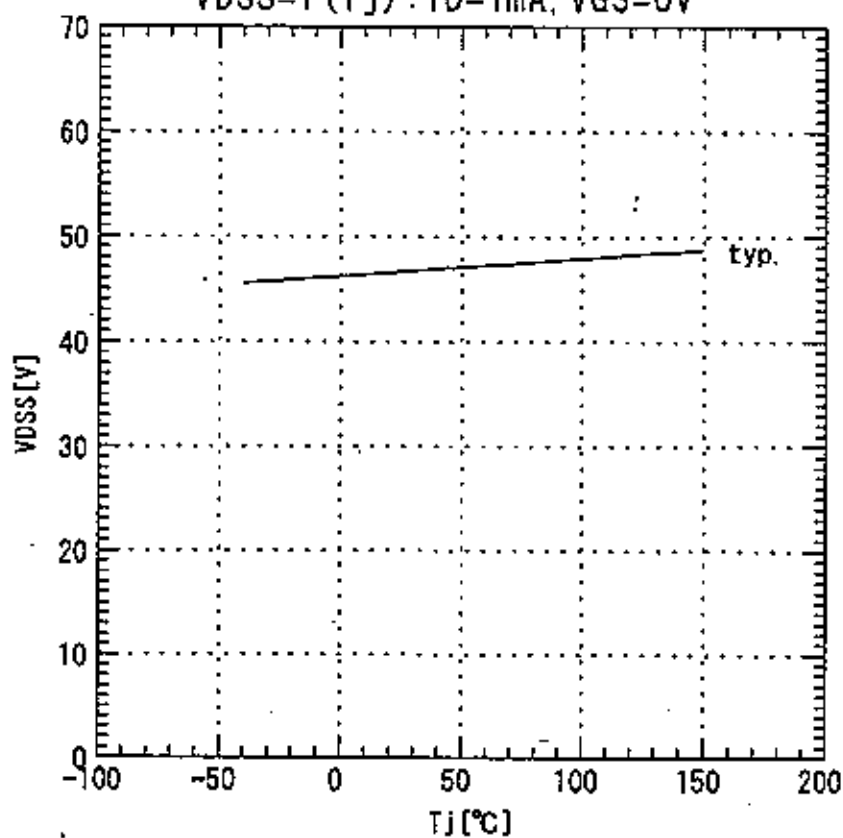
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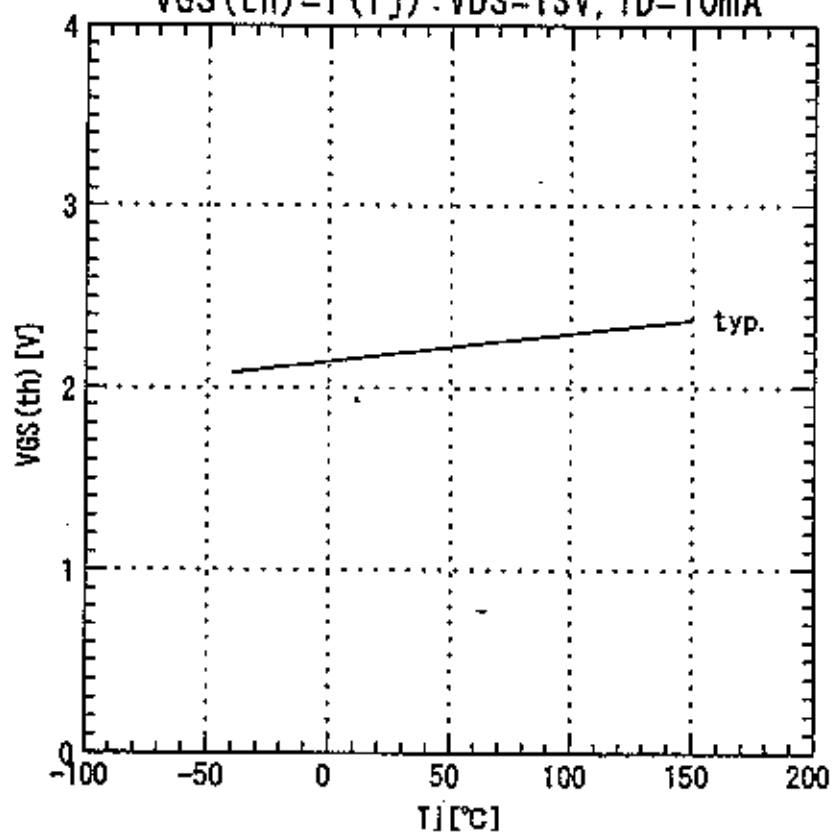
6/13

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Drain-source clamp voltage
 $V_{DSS}=f(T_j) : I_D=1\text{mA}, V_{GS}=0\text{V}$

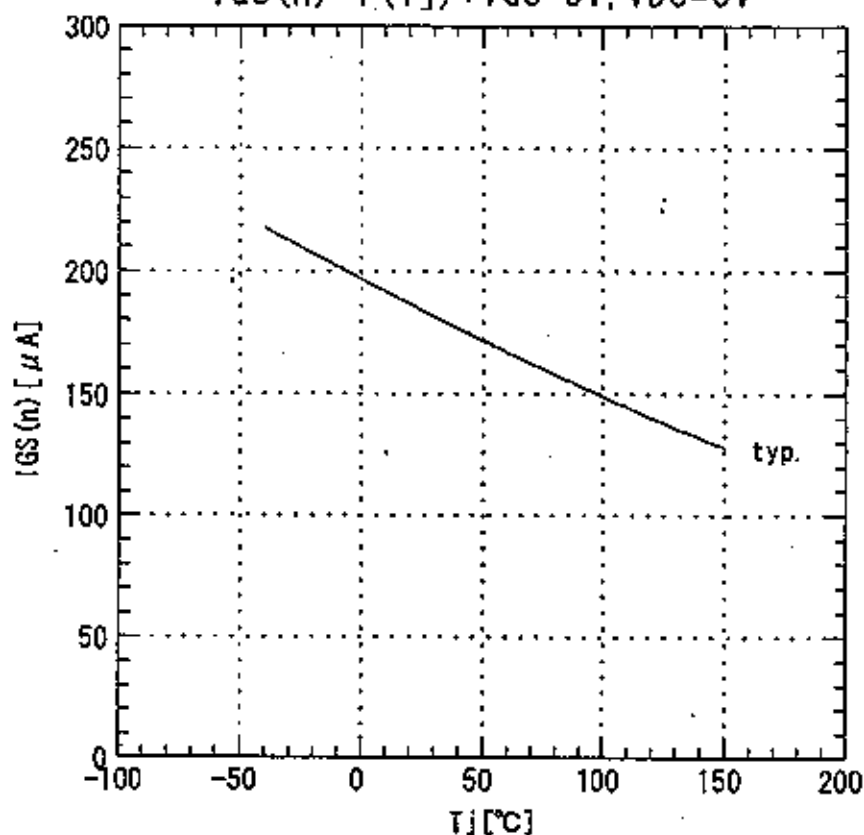


Gate threshold voltage
 $V_{GS(th)}=f(T_j) : V_{DS}=13\text{V}, I_D=10\text{mA}$

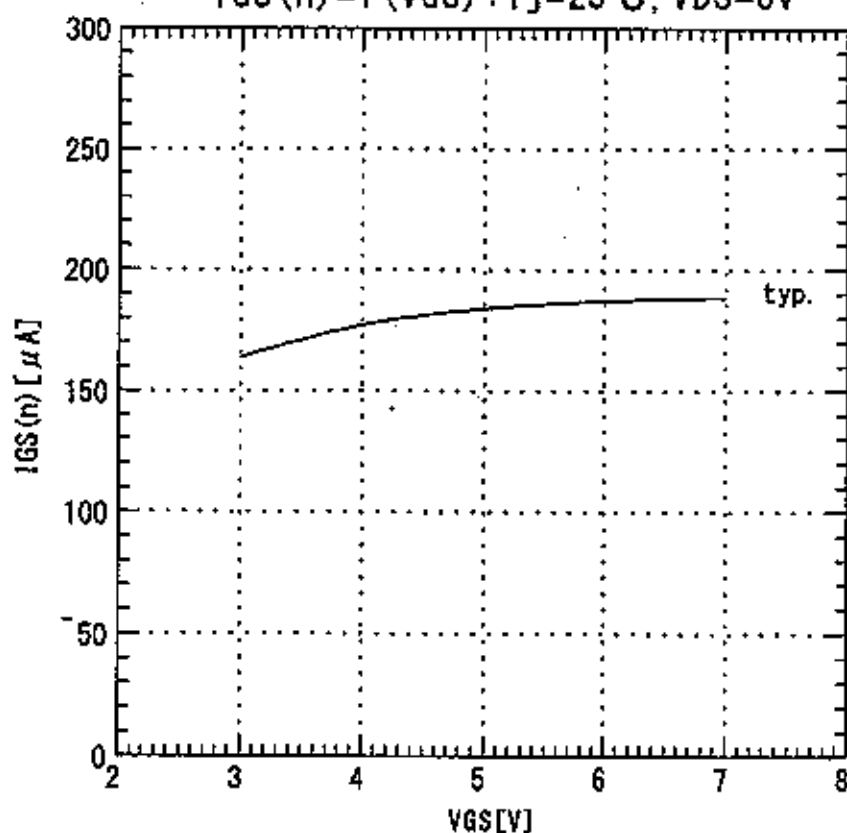


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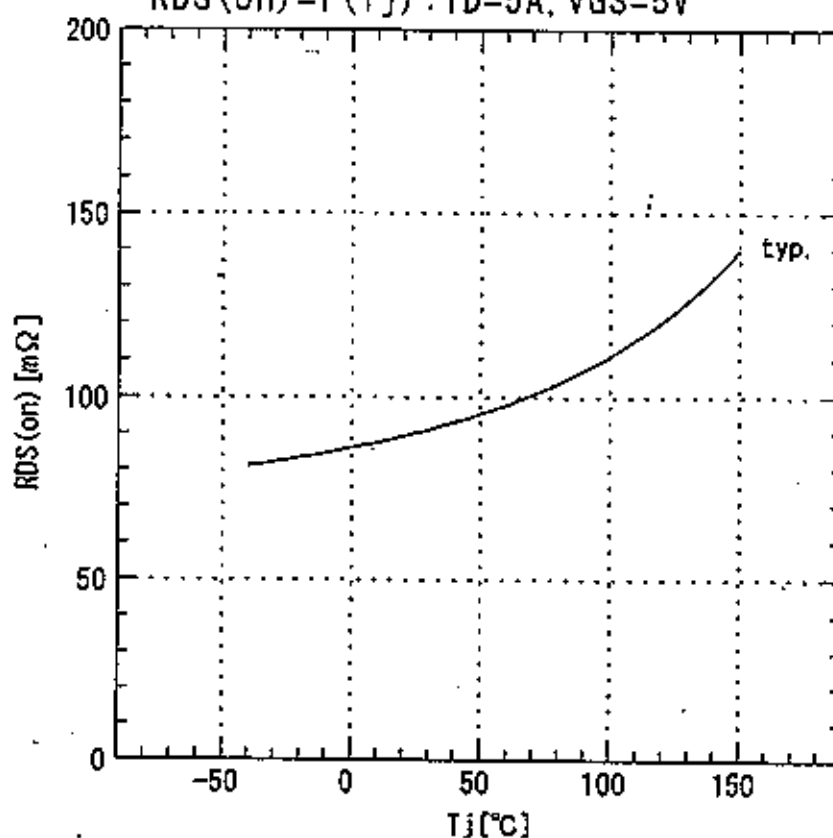
Gate-source leakage current
 $I_{GS}(n) = f(T_j) : V_{GS} = 5V, V_{DS} = 0V$



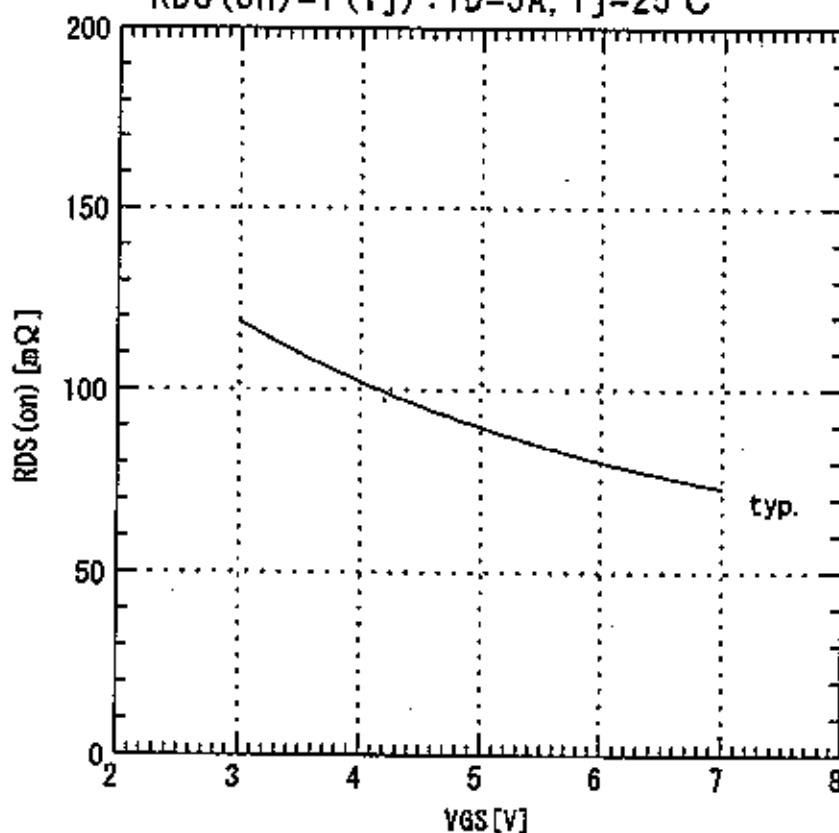
Gate-source leakage current
 $I_{GS}(n) = f(V_{GS}) : T_j = 25^\circ C, V_{DS} = 0V$



Drain-source on-state resistance
 $R_{DS(on)} = f(T_j) : I_D = 5A, V_{GS} = 5V$

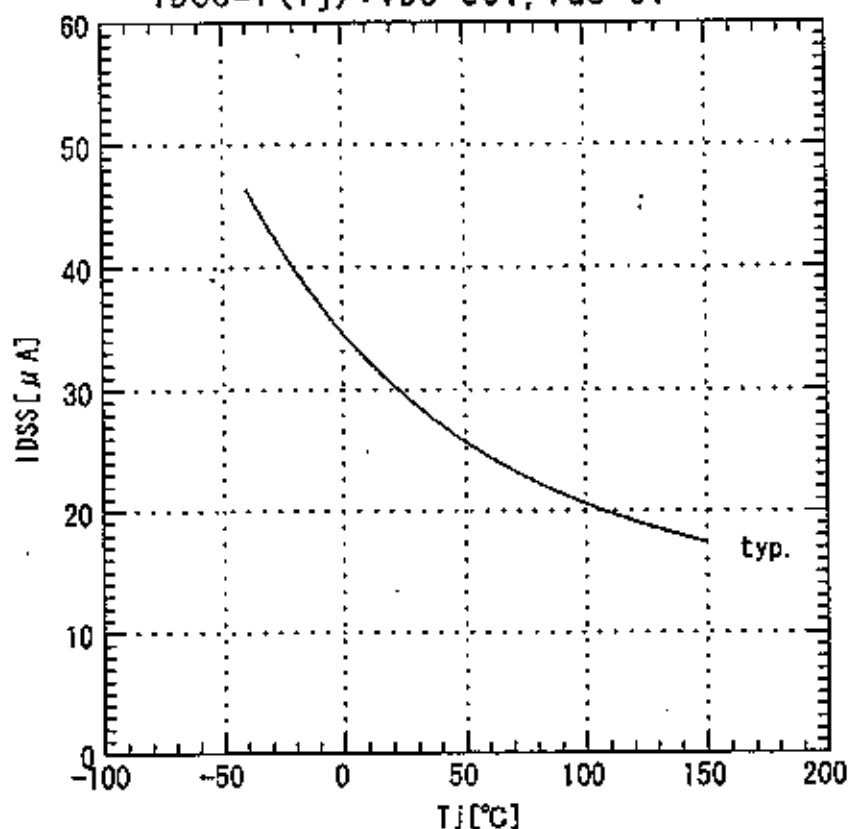


Drain-source on-state resistance
 $R_{DS(on)} = f(V_{GS}) : I_D = 5A, T_j = 25^\circ C$

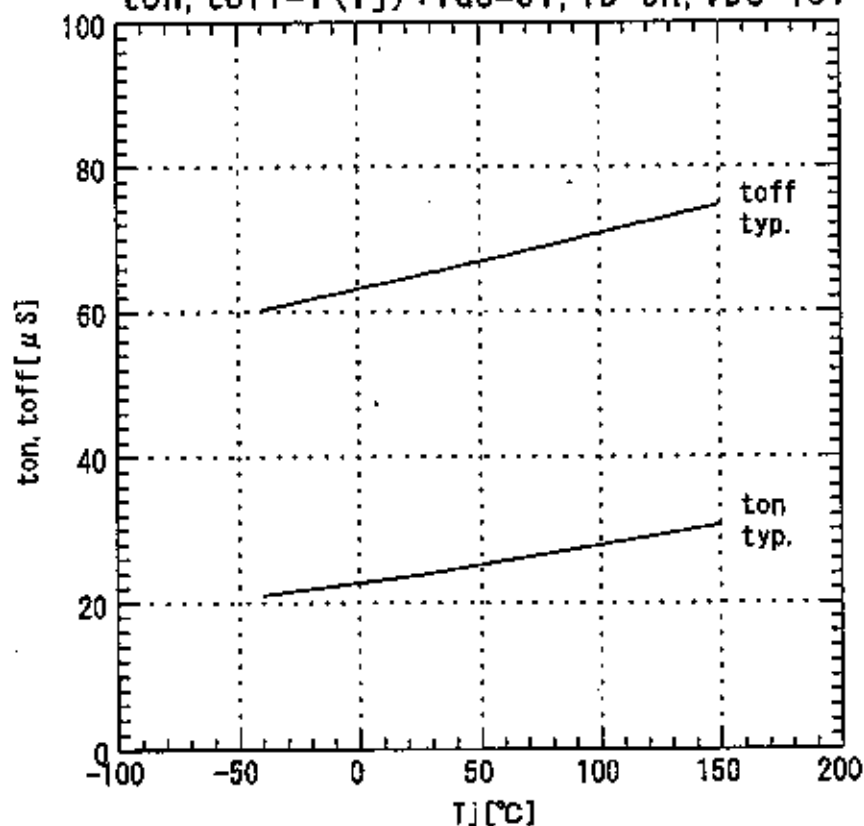


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Zero gate voltage drain current
 $I_{DSS}=f(T_j) : V_{DS}=30V, V_{GS}=0V$

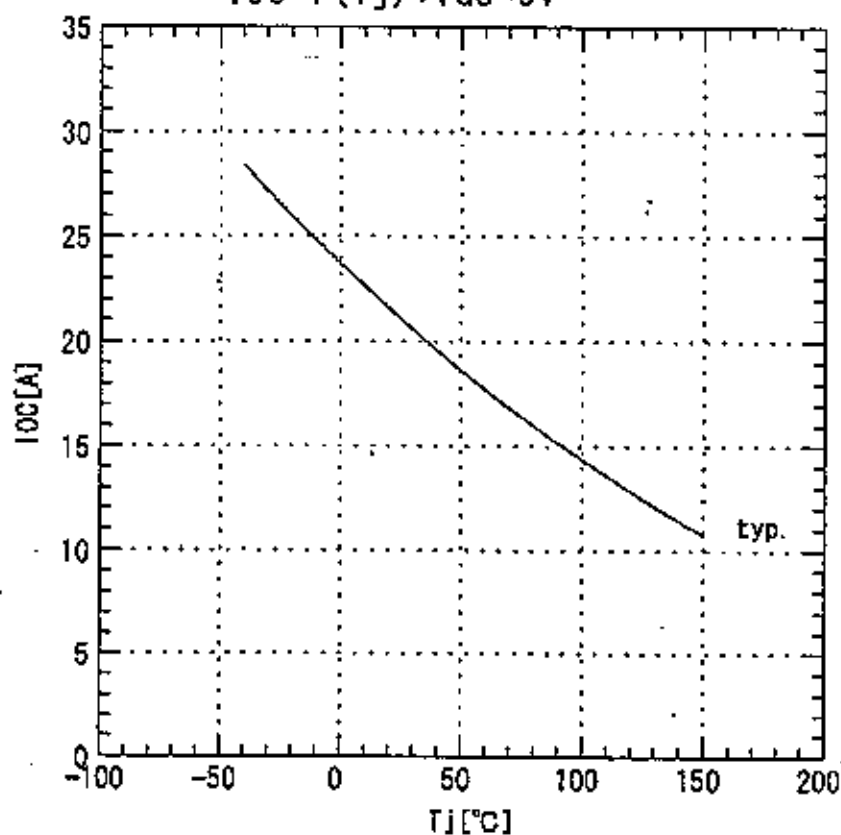


Turn-on time, Turn-off time
 $t_{on}, t_{off}=f(T_j) : V_{GS}=5V, I_D=5A, V_{DS}=13V$

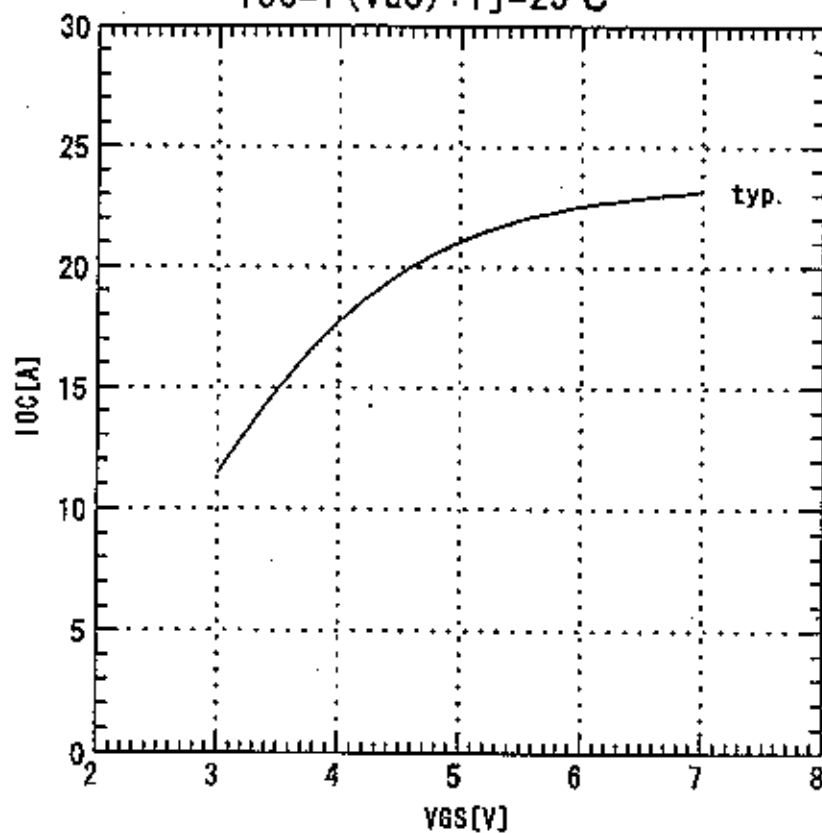


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Short circuit detection
 $I_{OC}=f(T_j) : V_{GS}=5V$



Short circuit detection
 $I_{OC}=f(V_{GS}) : T_j=25^{\circ}C$



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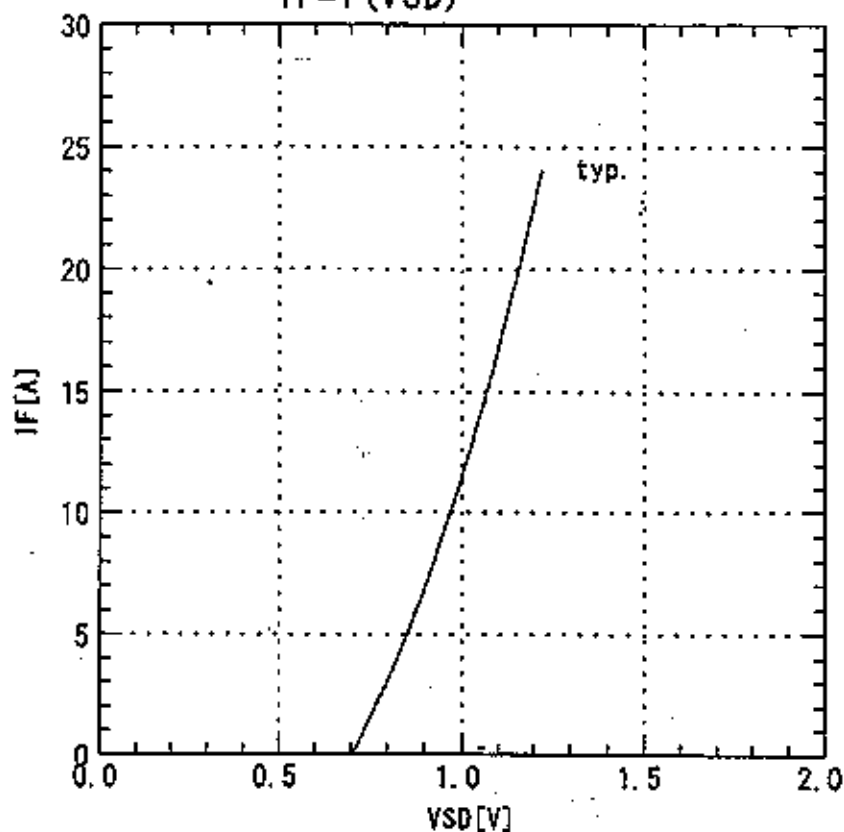
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MS5F4286

1/3

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Forward on voltage
 $I_F = f(V_{SD})$



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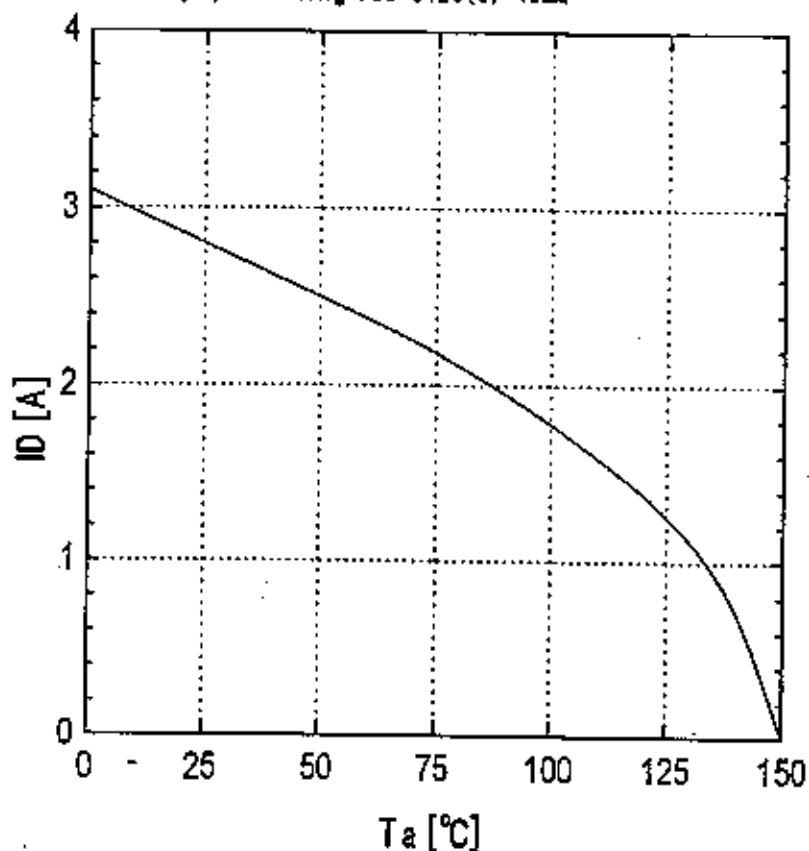
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12/13

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Continuous Drain Current VS Ambient Temperature
 $I_D = f(T_a)$: Mounting Pad Size(a)=10mm



Mounting Pad Size VS Drain Current Ratio
 Drain Current Ratio = f (Mounting Pad Size)

