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SPECIFICATION

Device Name : Intelligent Power MOSFET

Type Name : F5020

Spec. No. : **MS5F4291**

Fuji Electric Co., Ltd.
Matsumoto Factory

	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.	
DRAWN	4.1.2.88	S. Iwaki		DWG. NO.	MS5F4291 1/2
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1. Scope
This specifies Fuji Intelligent Power MOSFET F5020
2. Construction
Self-Isolation Structure
Output Part; N-channel enhancement mode power MOSFET
3. Application
For switching
4. Outview
K-pack (EIAJ SC-63) S-type (Outview See to 6/(2 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	3	A	
Maximum power dissipation	P_D	10	W	
Operating junction temperature	T_j	150	$^{\circ}\text{C}$	—
Storage temperature range	T_{stg}	-55~150	$^{\circ}\text{C}$	—

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}	$I_D = 1\text{mA}$ $V_{GS} = 0\text{V}$	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}	$V_{GS} = 30\text{V}$ $V_{DS} = 0\text{V}$			1.0	mA
Gate-source leakage current	$I_{GS(n)}$	$V_{GS} = 5\text{V}$			500	μA
	$I_{GS(wh)}$				800	μA
Drain-source on-state resistance	$R_{DS(on)}$	$I_D = 5\text{A}, V_{GS} = 5\text{V}$			400	m Ω
		$I_D = 5\text{A}, V_{GS} = 3\text{V}$			600	

† Under normal operation ‡ Under self protection

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Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Turn-on time	t_{on}	$V_{DS} = 13V$ $R_L = 2.5\Omega$ $V_{GS} = 5V$			100	μS
Turn-off time	t_{off}				100	μS
Over-temperature protection	T_{trip}	$V_{GS} = 5V$	150			$^{\circ}C$
Short circuit protection	I_{sc}	$V_{GS} = 5V$	5			A
Single pulse inductive load switch-off energy dissipation	E_{sc}	$I_D = 8A$ $T_J = 150^{\circ}C$	100			mJ

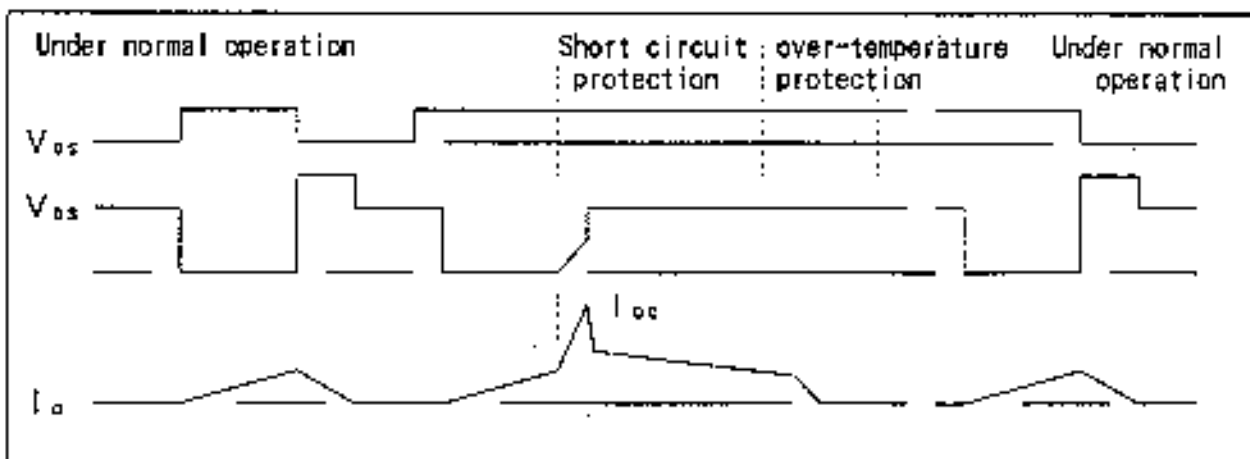
7. Thermal resistance

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th(j-c)}$	Junction-case			12.5	$^{\circ}C/W$
Thermal resistance	$R_{th(j-a)}$	Junction-ambient *			12.5	$^{\circ}C/W$

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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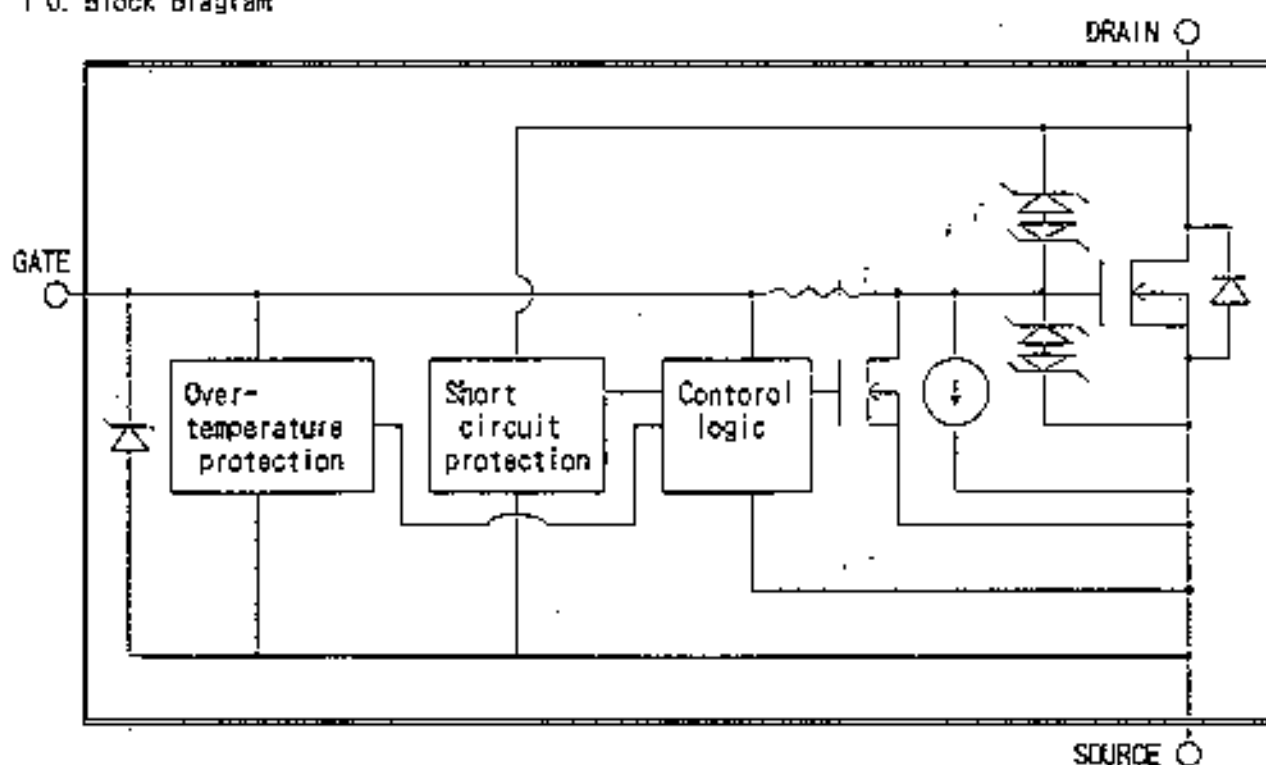
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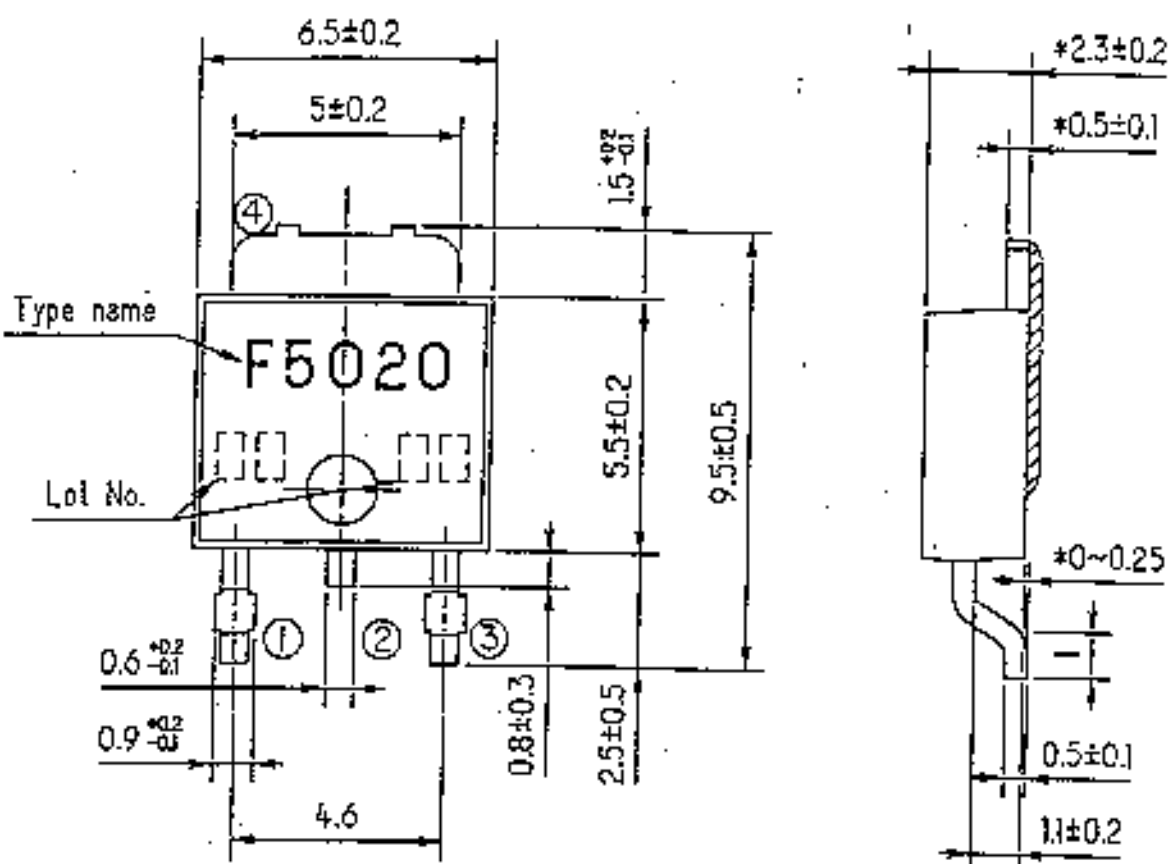
1 0. Block diagram



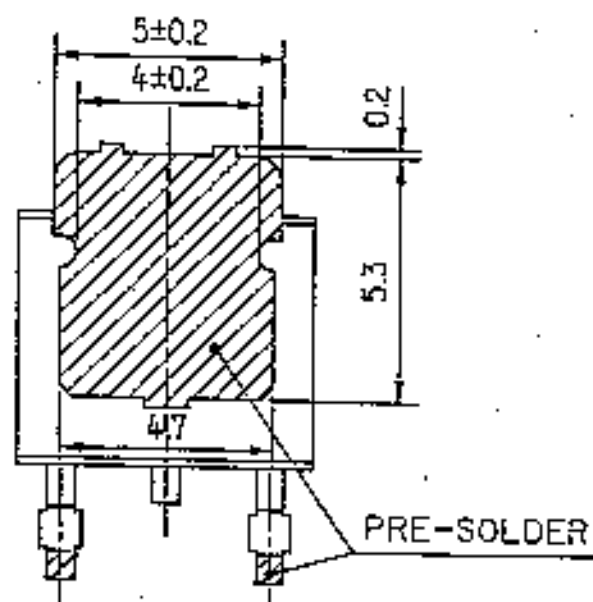
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MOSFET Type : F5020

OUT VIEW



BACK VIEW



CONNECTION

- ① GATE
- ②④ DRAIN
- ③ SOURCE

JEDEC:TO-252
EIAJ:SC-63

Dimension of * marks are excluded the thickness solder.

DIMENSIONS ARE IN MILLIMETERS.

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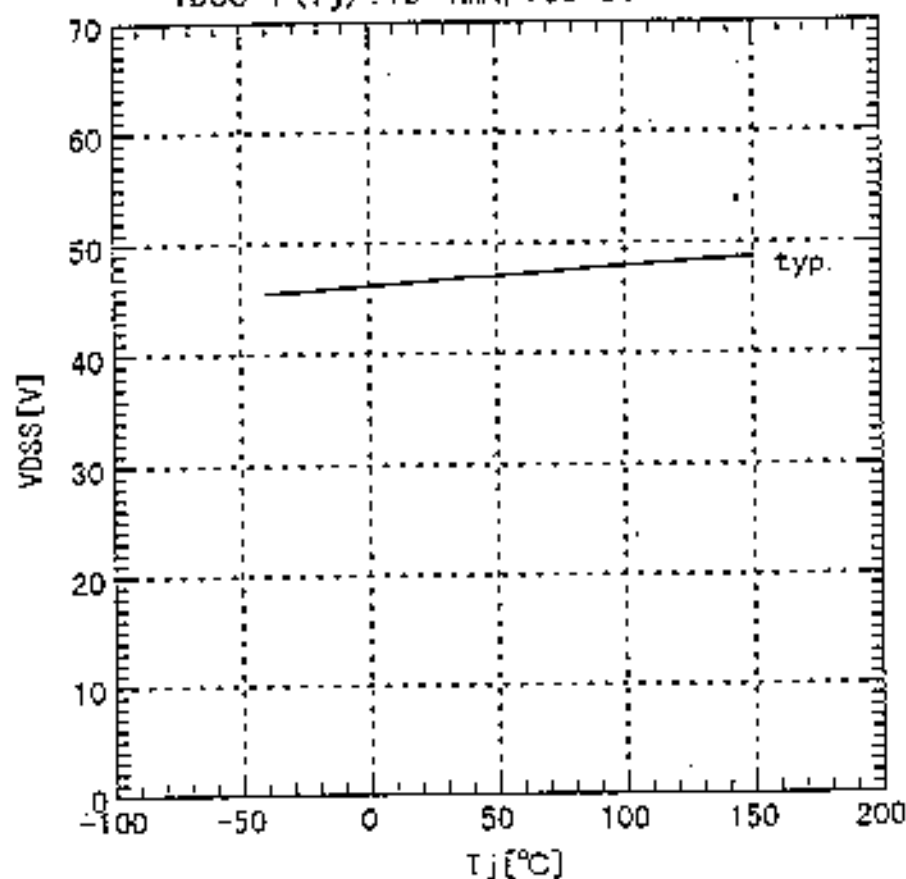
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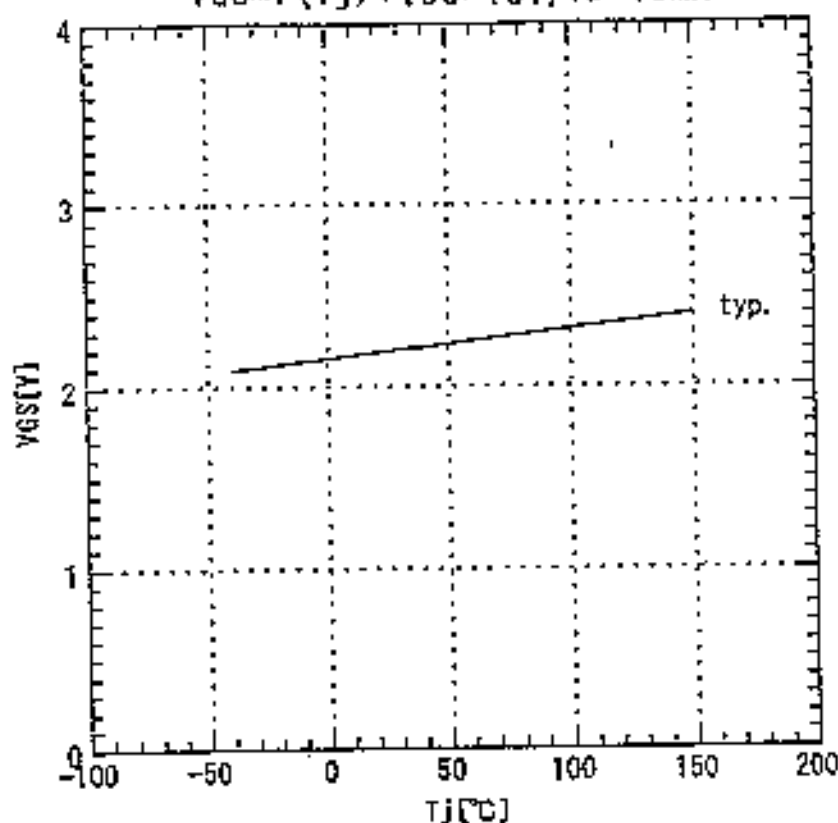
Drain-source breakdown voltage

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



Gate threshold voltage

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



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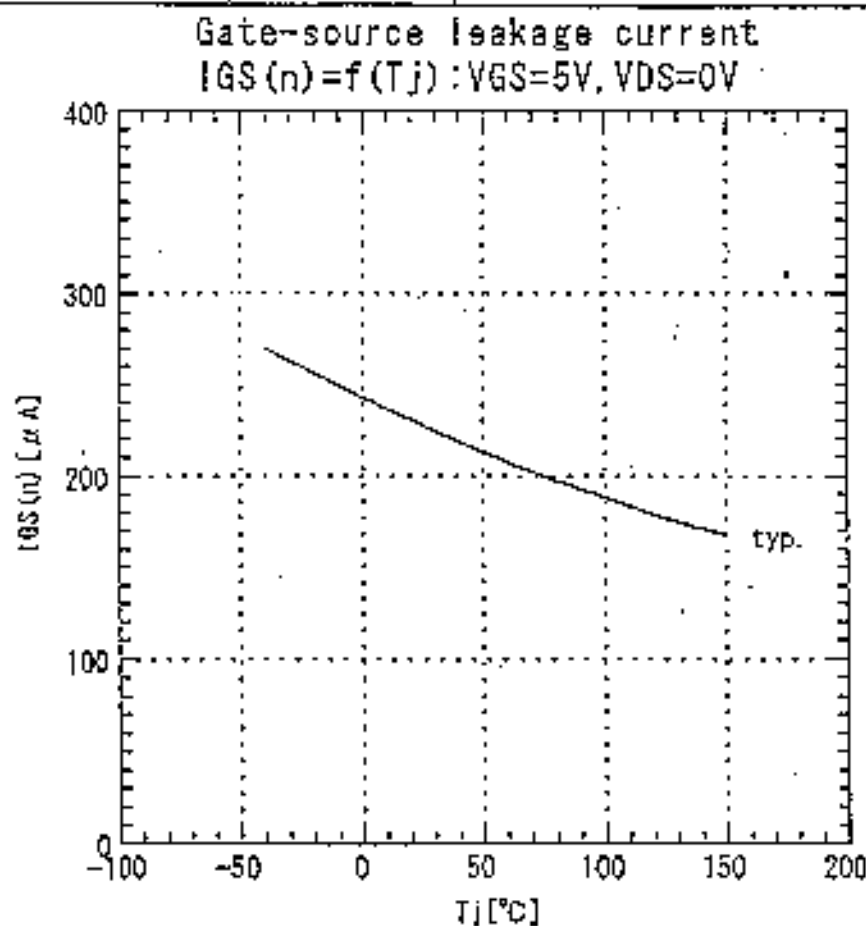
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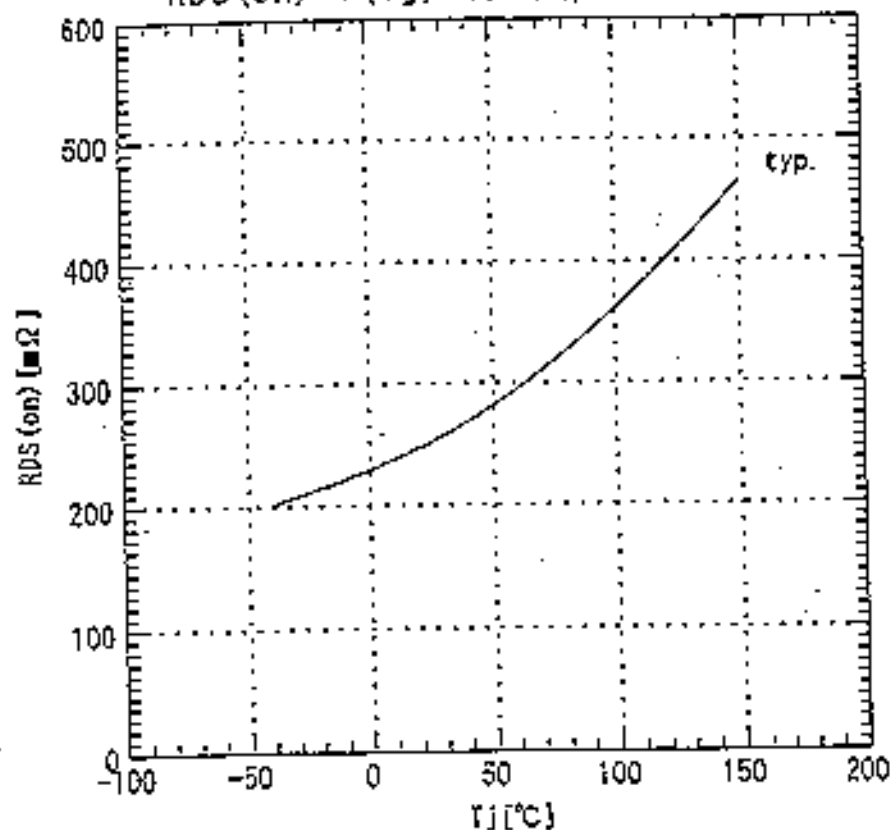
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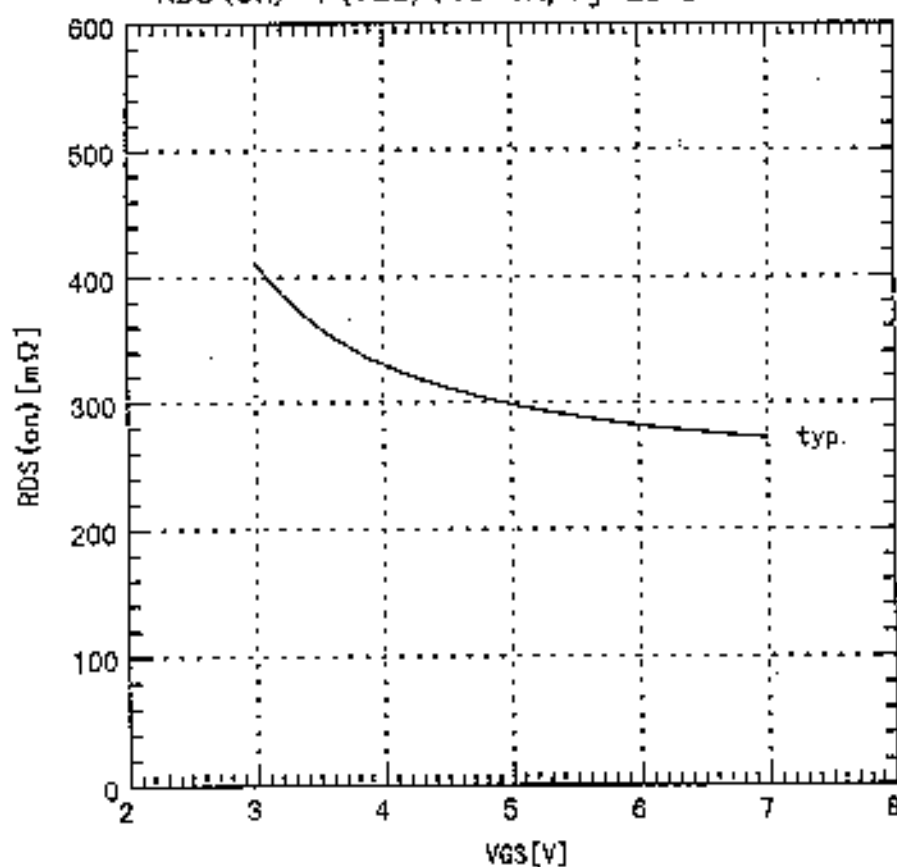
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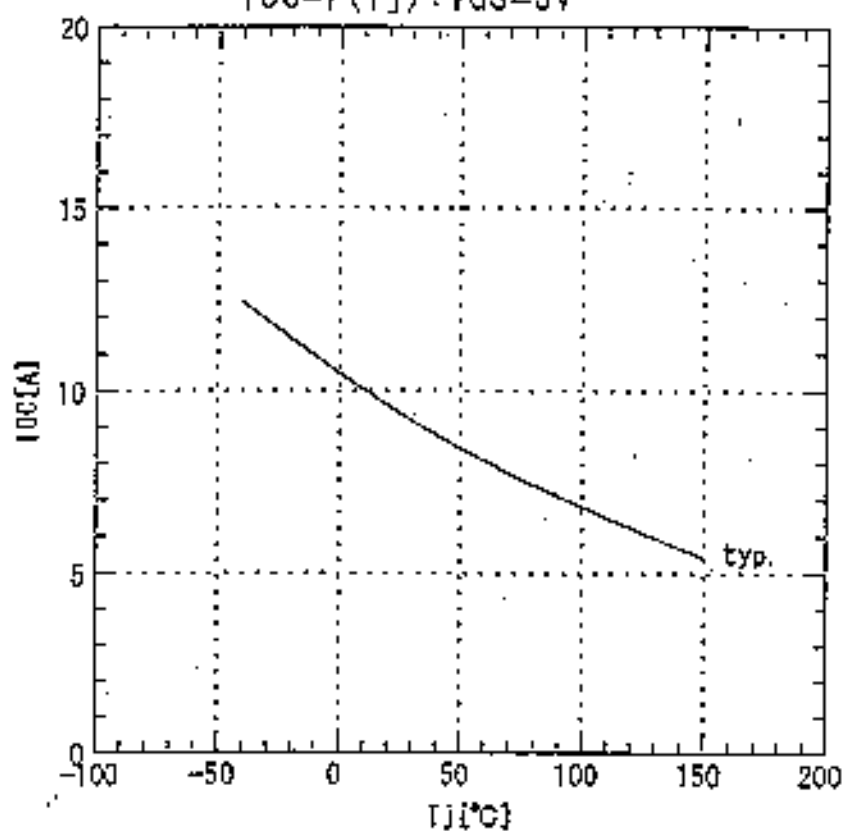
Drain-source on-state resistance
 $R_{DS(on)} = f(T_j) : I_D = 1A, V_{GS} = 5V$



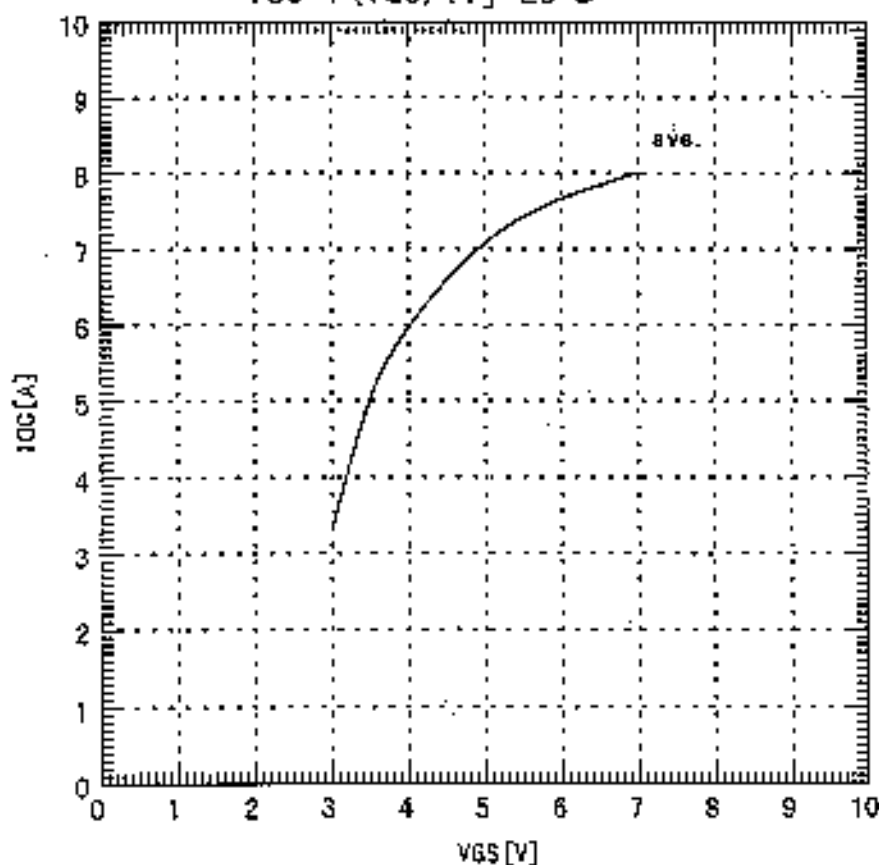
Drain-source on-state resistance
 $R_{DS(on)} = f(V_{GS}) : I_D = 1A, T_j = 25^\circ C$



Over-current detection
 $I_{OC}=f(T_J):V_{GS}=5V$

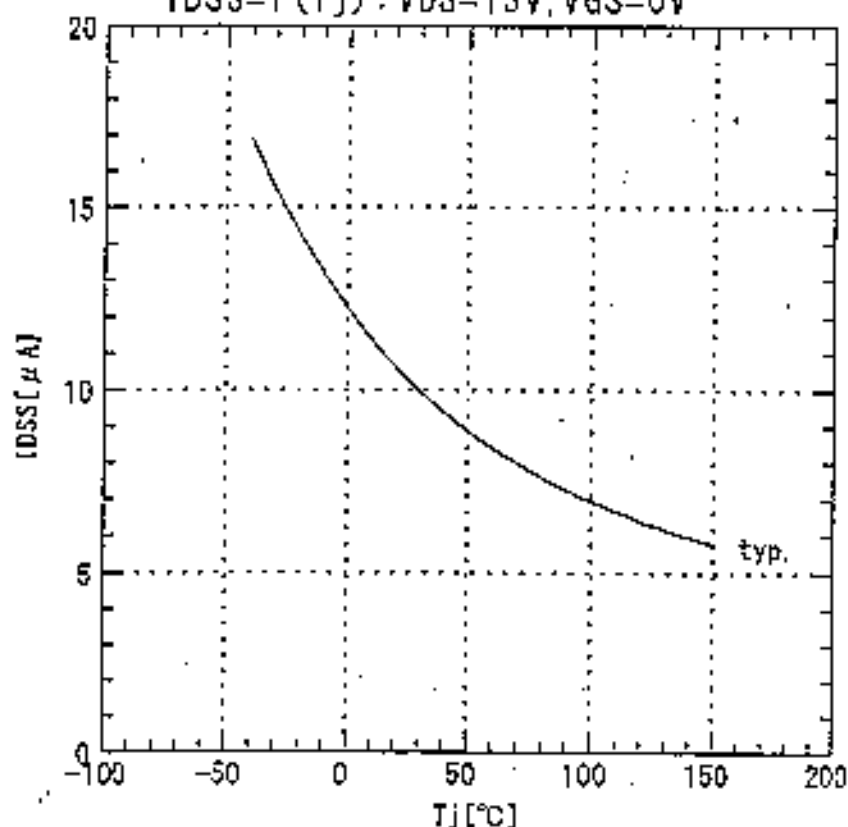


Over-current detection
 $I_{OC}=f(V_{GS}):T_J=25^{\circ}C$

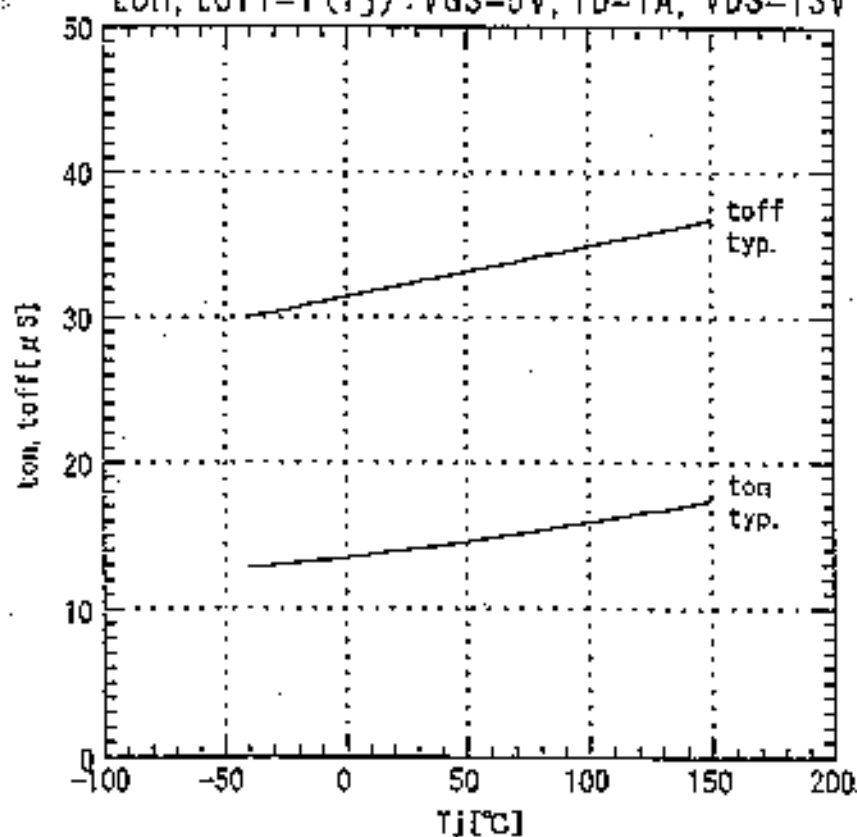


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Zero gate voltage drain current
 $I_{DSS}=f(T_j): V_{DS}=13V, V_{GS}=0V$



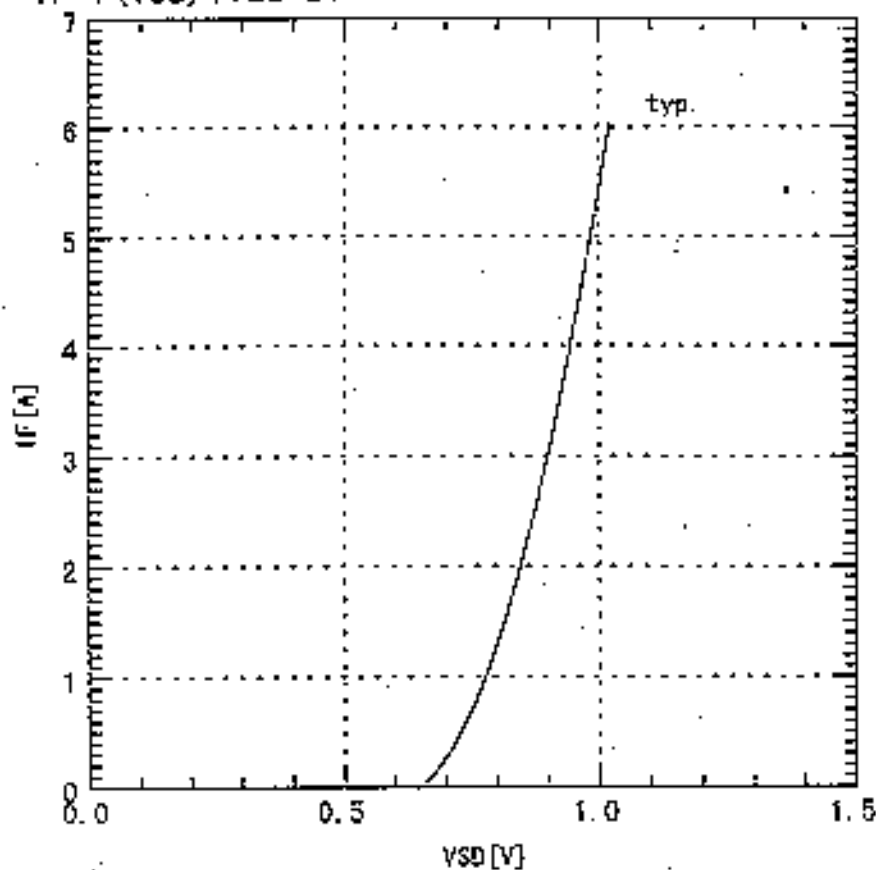
Turn-on time, Turn-off time
 $t_{on}, t_{off}=f(T_j): V_{GS}=5V, I_D=1A, V_{DS}=13V$



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Forward characteristic of reverse of diode

$$I_F = f(V_{SD}) : V_{GS} = 0V$$



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