

SPECIFICATION

Device Name : Intelligent Power MOSFET

Type Name : F5018-S

Spec. No. : **MS5 F3728**

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Fuji Electric Co., Ltd.
Matsumoto Factory

	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.	
DRAWN	July-31-1996	N. Yagawa	<i>[Signature]</i>	DWG. NO.	MS5 F3728
CHECKED	July-27-1996	S. Furukata			

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1. Scope
This specifies Fuji Intelligent Power MOSFET F 5 0 1 8 - S
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. (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_{DSS}	4 0	V	DC
Gate-source voltage	V_{GSS}	DC - 0.3 ~ 7.0	V	DC
Continuous drain current	I_D	8	A	$T_c = 25^\circ\text{C}$
Maximum power dissipation	P_D	1 5	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_{DSS}	$I_D = 1 \text{ mA}$ $V_{GS} = 0 \text{ V}$	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	$I_{GS(n)}$	*			5 0 0	μA
	$I_{GS(un)}$	**			8 0 0	μA
Drain-source on-state resistance	$R_{DS(on)}$	$I_D = 5 \text{ A}$			1 4 0	m Ω
		$V_{GS} = 5 \text{ V}$				
Forward on voltage	V_{SD}	$I_F = 24 \text{ A}$			2. 0	V

* Under normal operation ** Under self protection

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

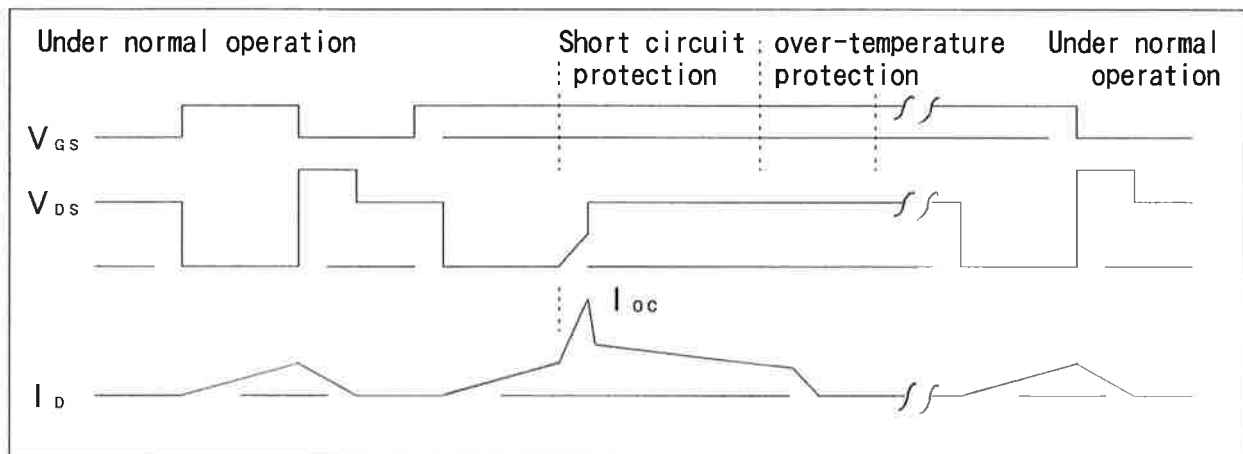
7. Thermal resistance

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th(j-c)}$	Junction-case			8.3	$^{\circ}\text{C/W}$
	$R_{th(j-a)}$	Junction-ambient			125	$^{\circ}\text{C/W}$

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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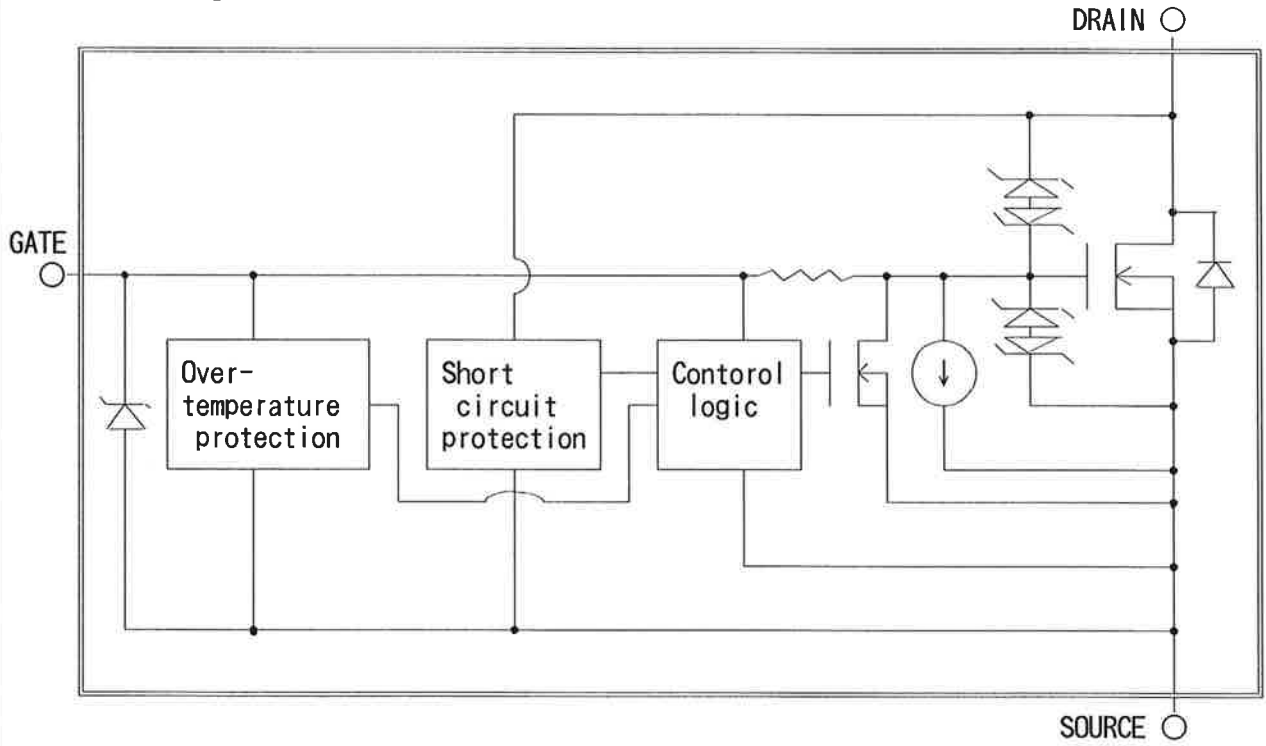
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1 0. Block diagram



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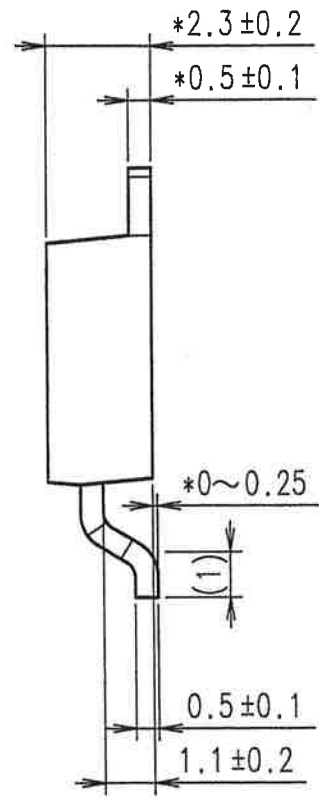
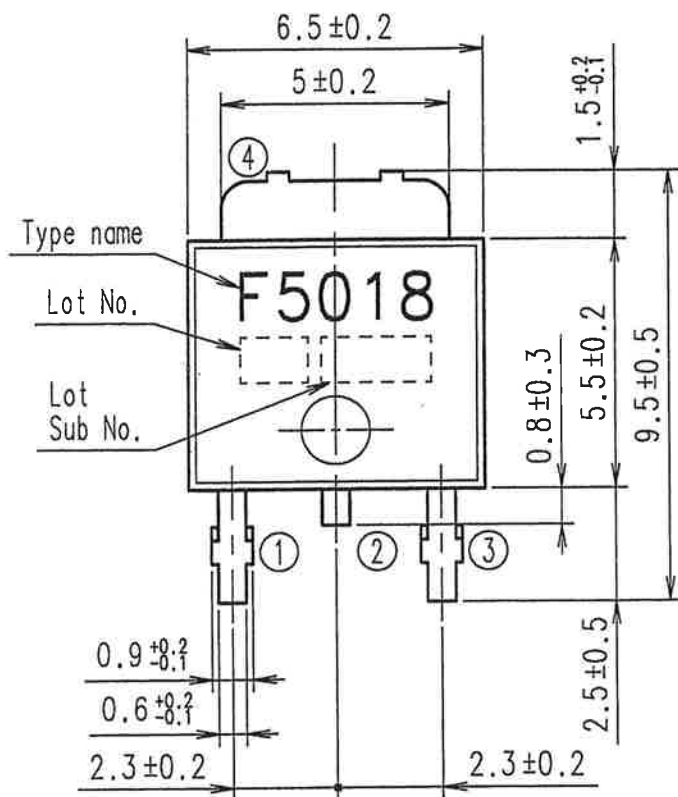
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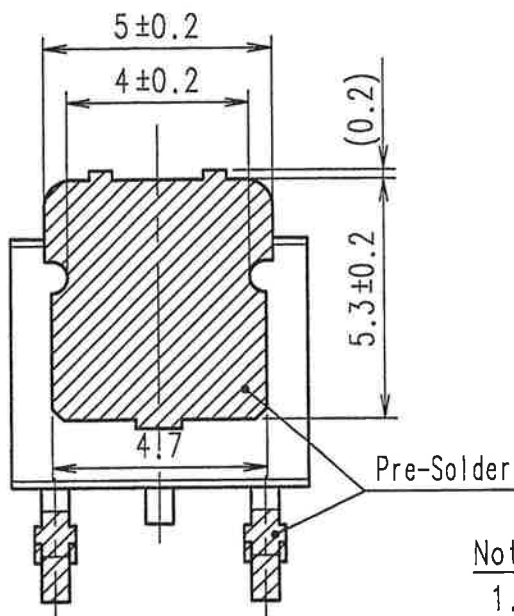
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FUJI INTELLIGENT POWER MOS FET

Type: F5018-S



BOTTOM VIEW



CONNECTION

- ① GATE
- ② ④ DRAIN
- ③ SOURCE

JEDEC: TO-252
EIAJ: SC-63

Notes

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

DIMENSIONS ARE IN MILLIMETERS. (a)

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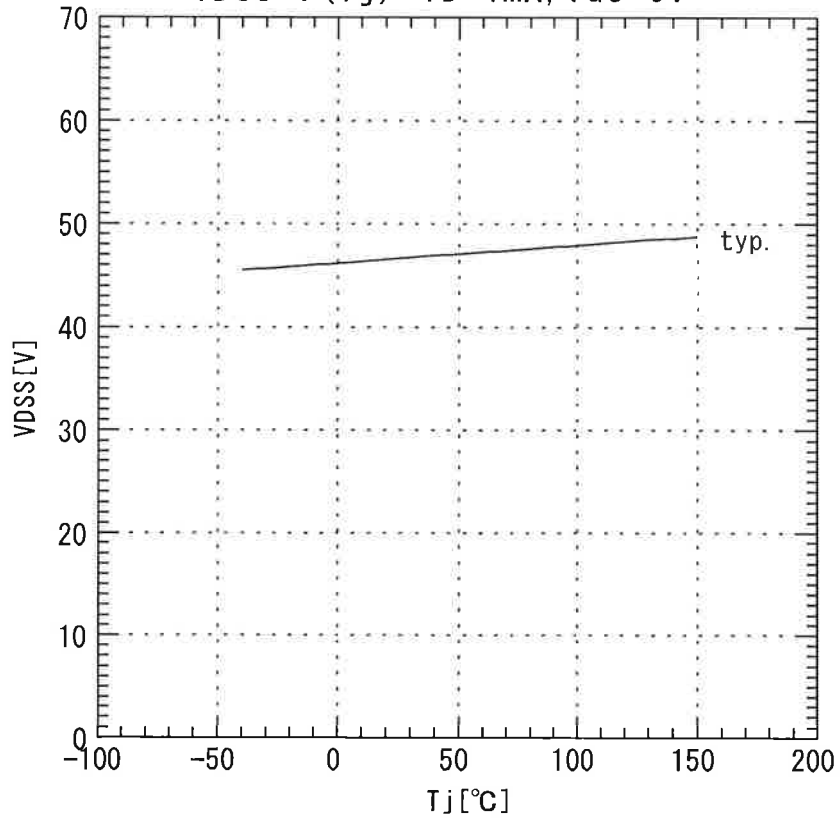
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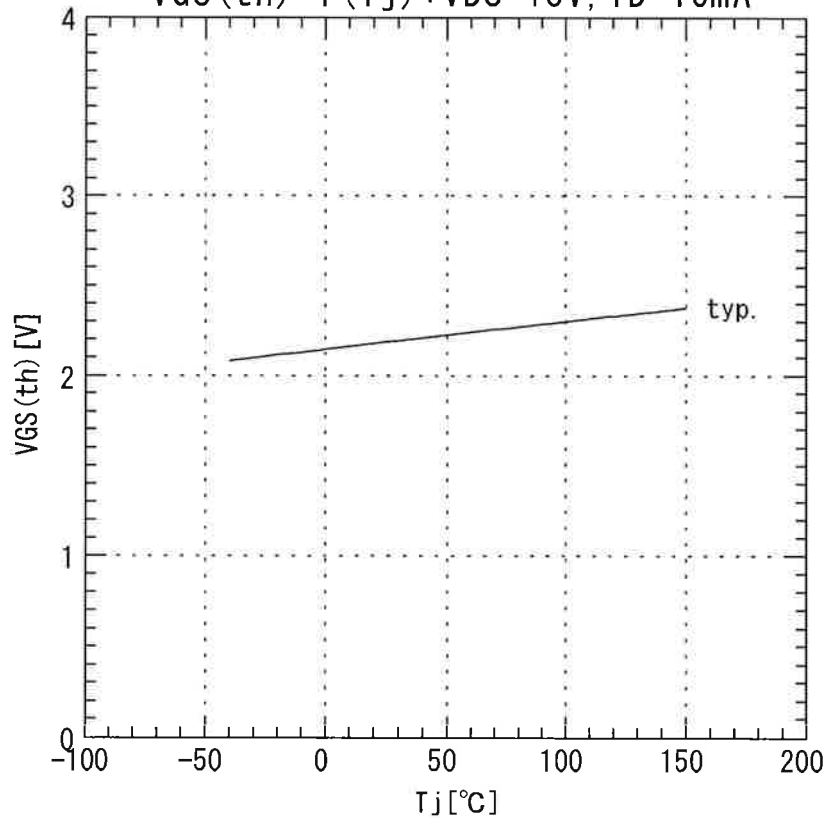
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Drain-source clamp voltage $V_{DSS}=f(T_j) : I_D=1mA, V_{GS}=0V$



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



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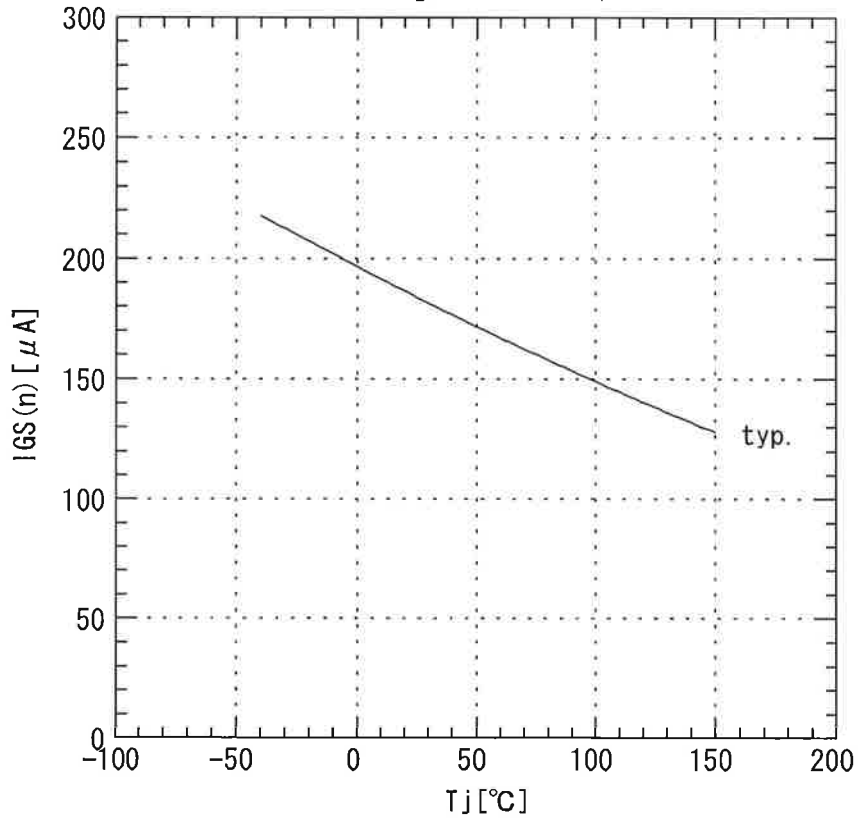
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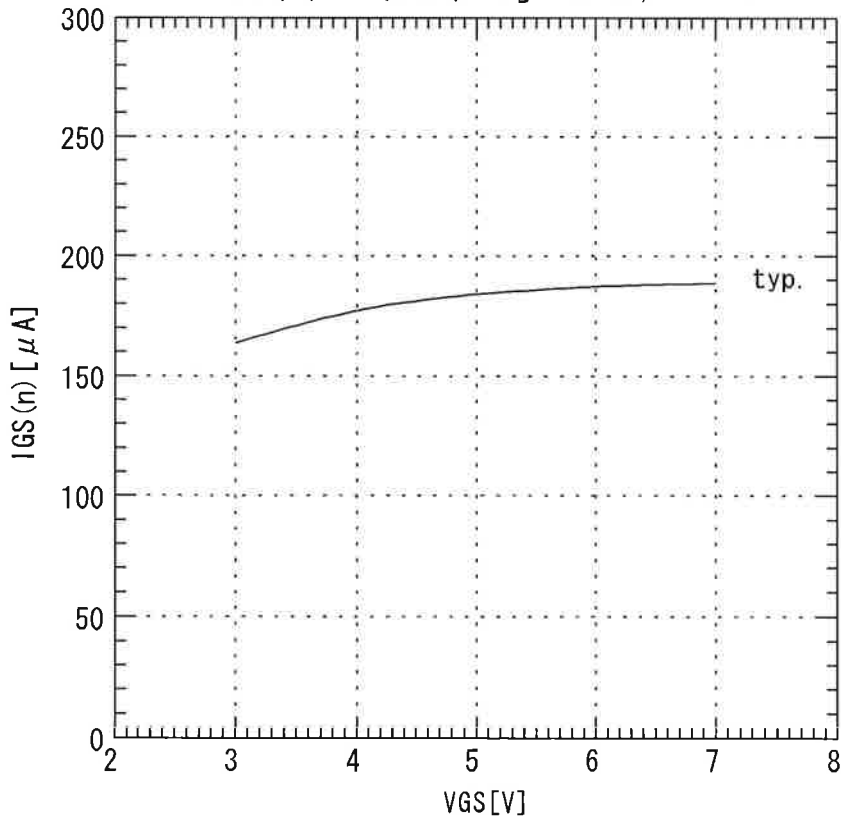
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Gate-source leakage current $I_{GS}(n) = f(T_j) : V_{GS} = 5V, V_{DS} = 0V$



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



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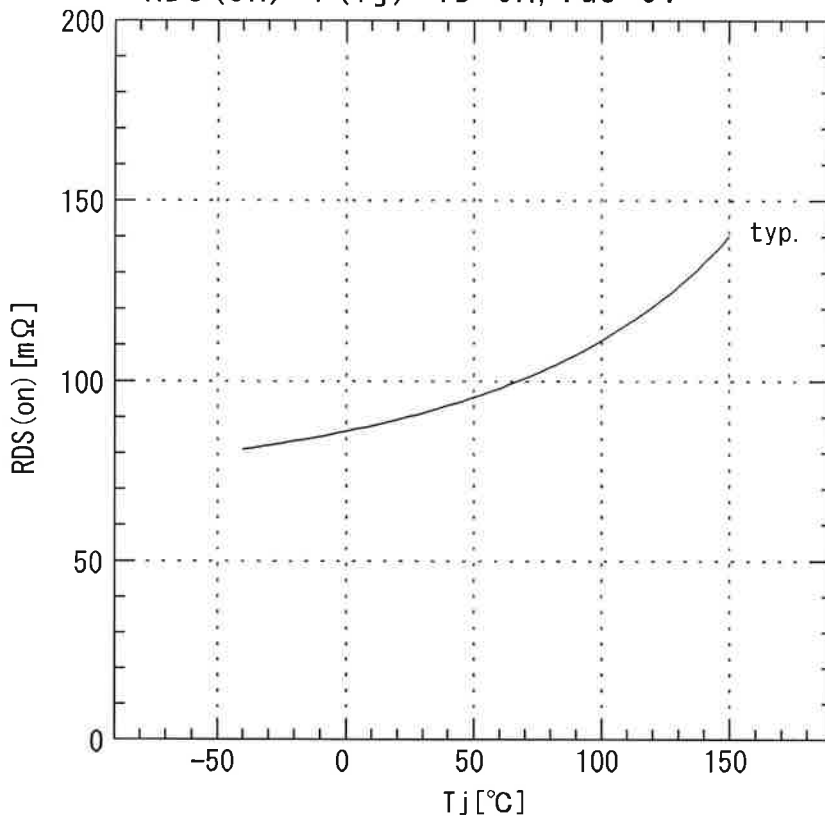
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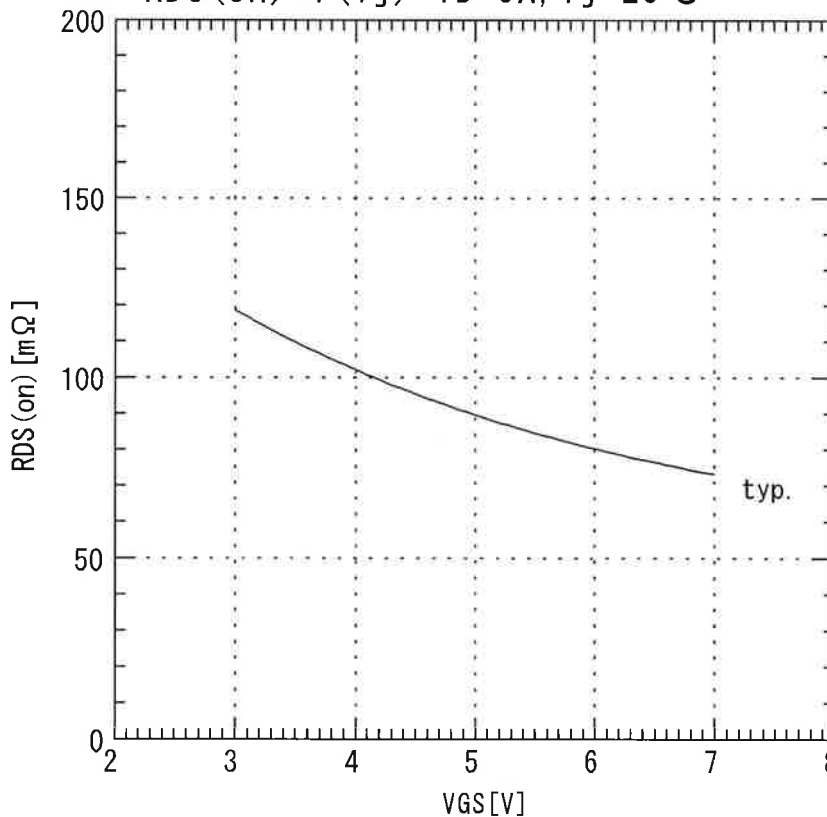
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Drain-source on-state resistance
 $R_{DS(on)} = f(T_j) : I_D = 5A, V_{GS} = 5V$

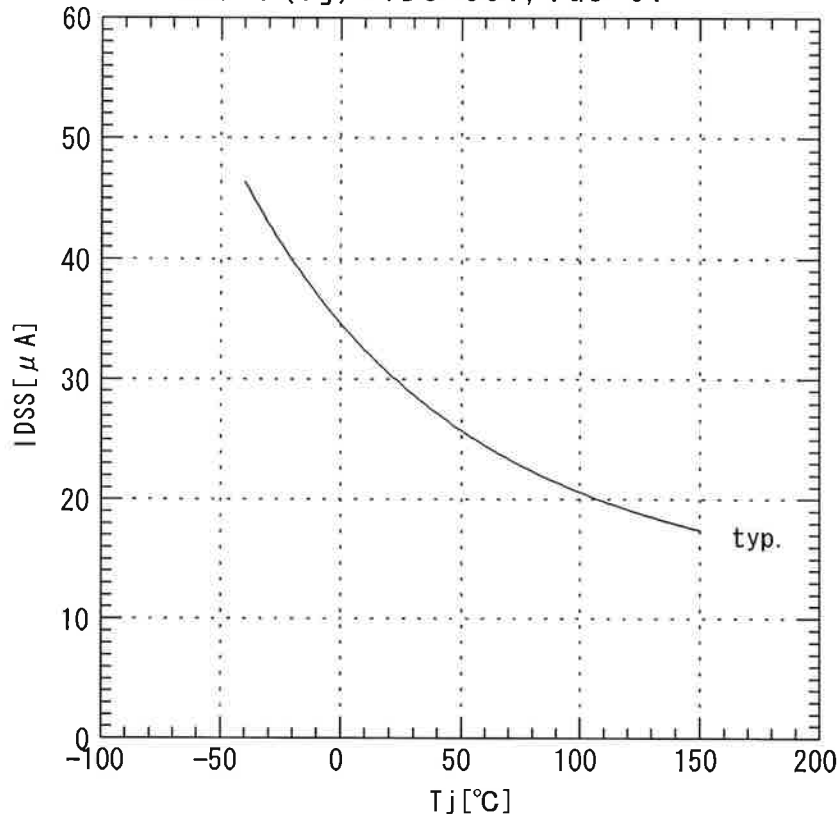


Drain-source on-state resistance
 $R_{DS(on)} = f(T_j) : I_D = 5A, T_j = 25^\circ C$

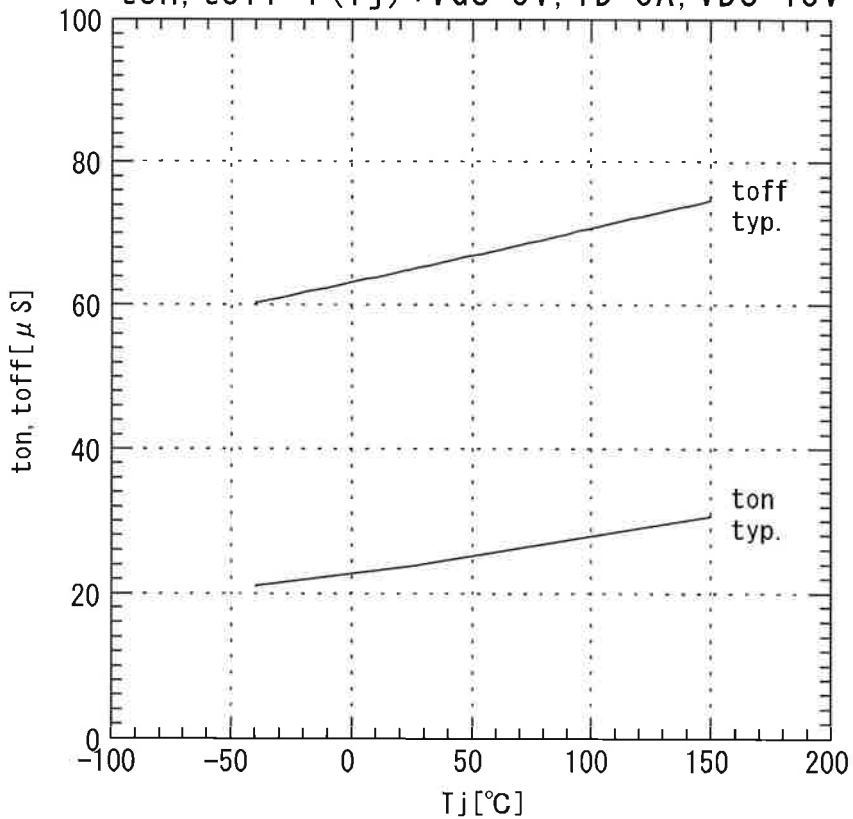


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Zero gate voltage drain current
 $I_{DSS} = f(T_j) : V_{DS} = 30V, V_{GS} = 0V$



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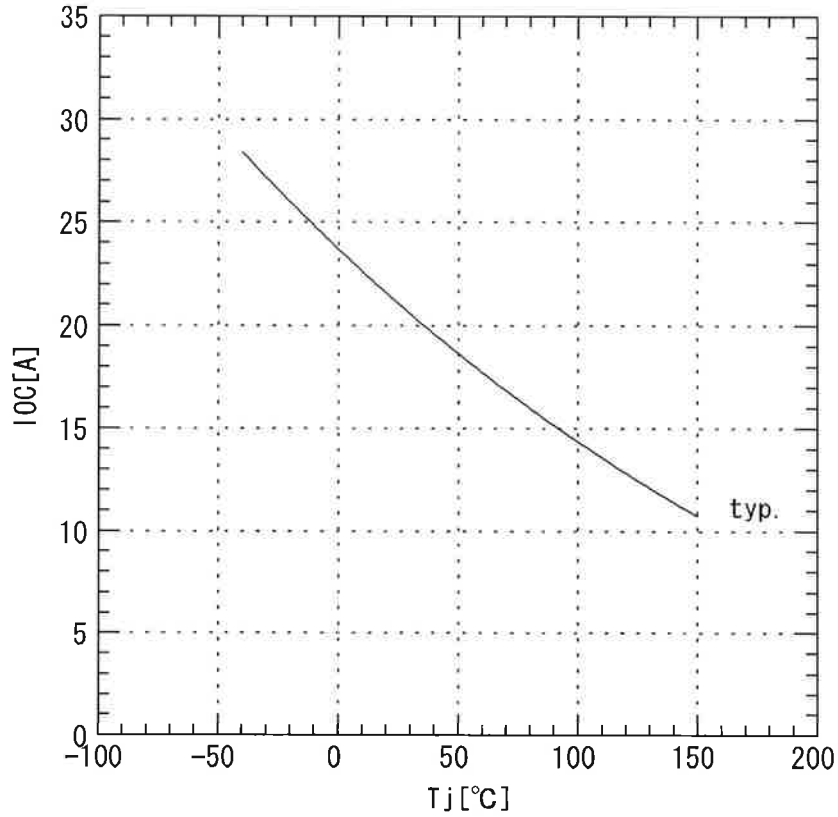
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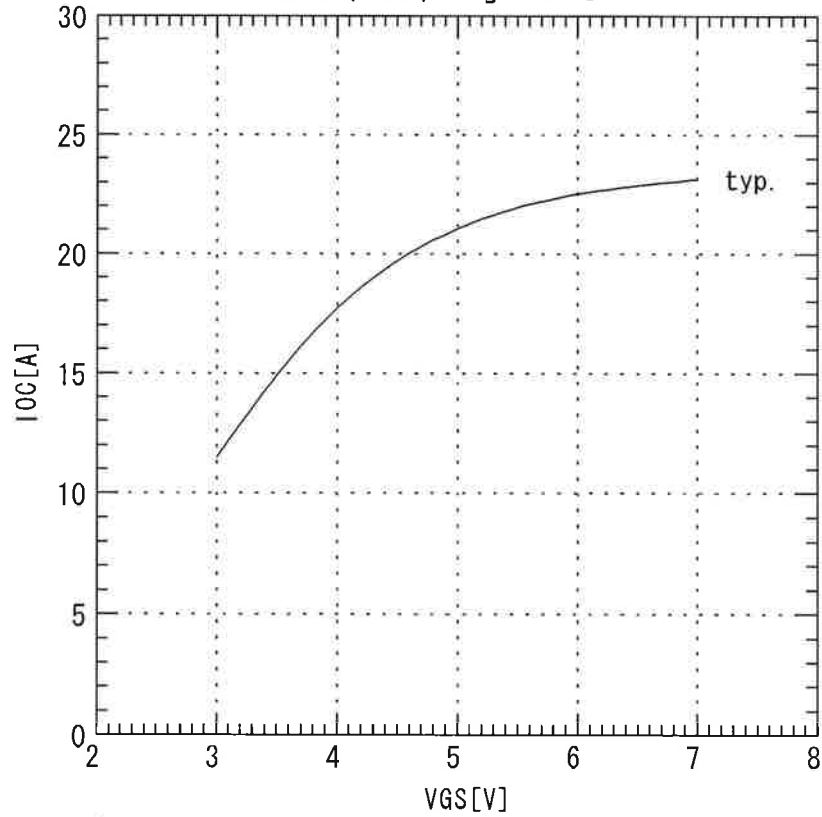
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Short circuit detection
 $I_{OC}=f(T_j) : V_{GS}=5V$



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



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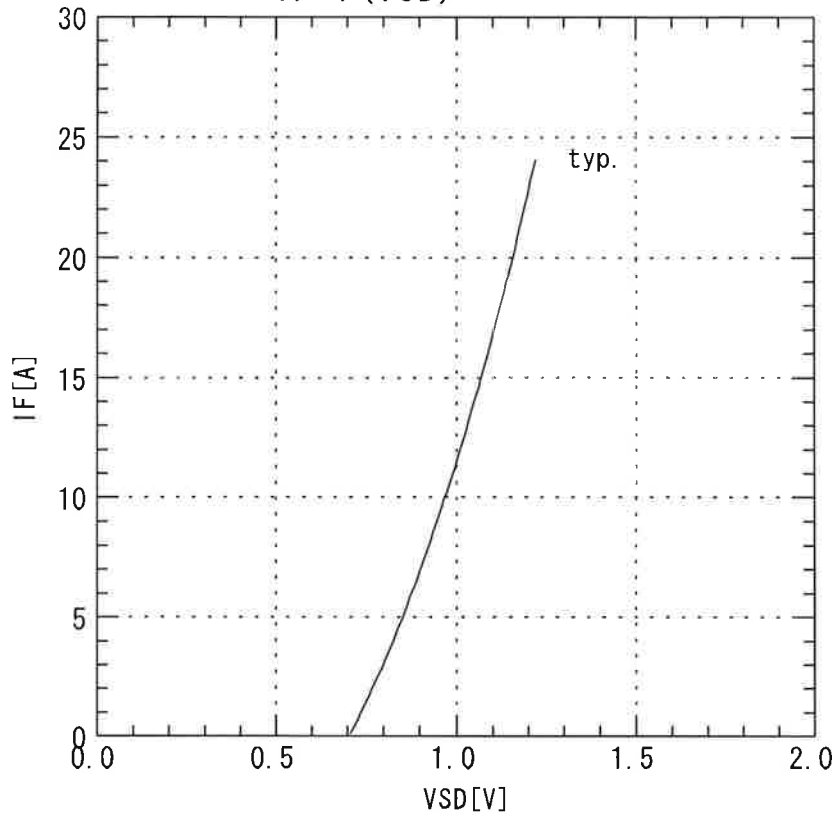
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Forward on voltage $IF=f(VSD)$



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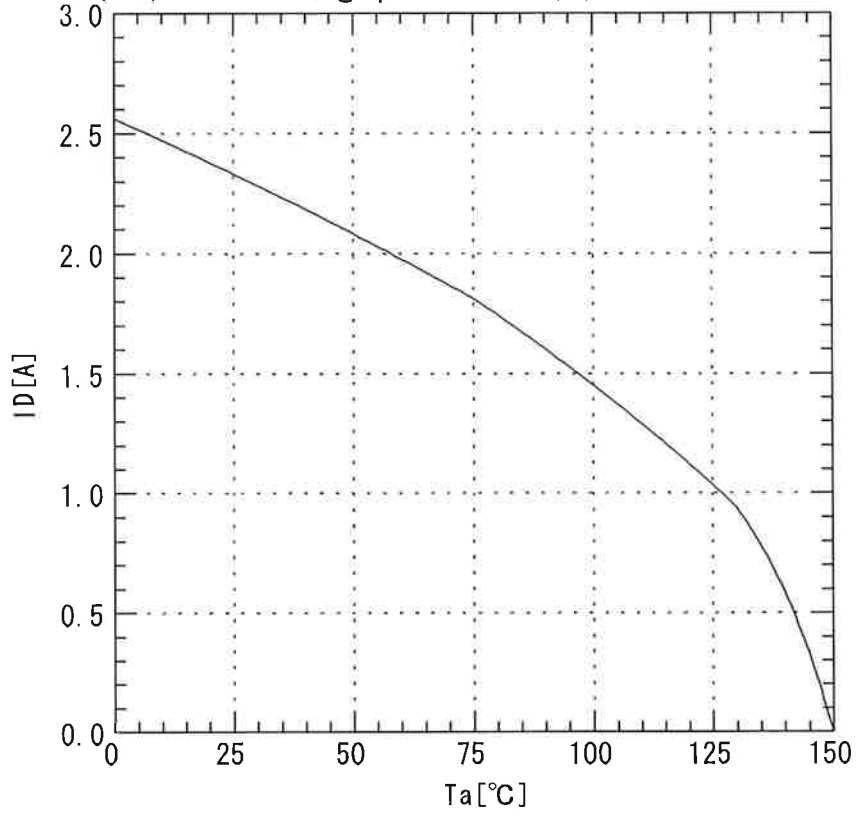
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Continuous drain current VS Ambient temperature
 $I_D = f(T_a)$: Mounting pad size (a) = 7mm



Mounting pad size VS Drain current ratio
 Drain current ratio = $f(\text{Mounting pad size})$

