

SPECIFICATION

DEVICE NAME : Power MOSFET

TYPE NAME : 2SK1390-R

SPEC. No. _____ :

F u j i E l e c t r i c C o . , L t d .

This Specification is subject to change without notice.

	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.	
DRAWN				DWG. NO.	1/10
CHECKED					

1. Scope

This specifies Fuji power MOSFET 2SK1390-R

2. Construction N-channel enhancement mode power MOSFET

3. Application for switching

4. Outview TO-3PF Outview See to 4/10 page

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

Description	Symbol	Characteristics	Unit	Remarks
Drain-source voltage	V_{DS}	60	V	
Drain-gate voltage	V_{DGR}	60	V	$R_{GS}=20\text{K}\Omega$
Continuous Drain current	I_D	± 50	A	
Pulsed drain current	I_{DPULSE}	± 200	A	
Gate-source voltage	V_{GS}	± 20	V	
Maximum power dissipation	P_D	80	W	
Operating and storage temperature range	T_{CH}	150	$^\circ\text{C}$	
	T_{STG}	$-55 \sim +150$	$^\circ\text{C}$	

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

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Drain-source breakdown voltage	BV_{DSS}	$I_D = 1\text{mA}$ $V_{GS} = 0\text{V}$	60			V
Gate threshold voltage	$V_{GS(th)}$	$I_D = 1\text{mA}$ $V_{DS} = V_{GS}$	1.0	1.5	2.5	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 60\text{V}$ $V_{GS} = 0\text{V}$ $T_{CH} = 25^\circ\text{C}$		10	500	μA
	I_{DSS}	$T_{CH} = 125^\circ\text{C}$		0.2	1.0	mA
Gate-source leakage current	I_{GSS}	$V_{GS} = \pm 20\text{V}$ $V_{DS} = 0\text{V}$		10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$I_D = 25\text{A}$	$V_{GS} = 4\text{V}$	0.022	0.040	Ω
			$V_{GS} = 10\text{V}$	0.015	0.025	

Dynamic ratings

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Forward transconductance	g_{fs}	$I_D = 25A$ $V_{DS} = 25V$	20	36		S
Input capacitance	C_{iss}	$V_{DS} = 25V$ $V_{GS} = 0V$ $f = 1MHz$		2600	3900	pF
Output capacitance	C_{oss}			800	1200	pF
Reverse transfer capacitance	C_{rss}			400	600	pF
Turn-on time	$t_{d(on)}$	$V_{CC} = 30V$ $V_{GS} = 10V$ $I_D = 50A$ $R_{GS} = 25\Omega$		20	30	ns
	t_r			130	200	ns
Turn-off time	$t_{d(off)}$			400	600	ns
	t_f			170	250	ns

Reverse diode

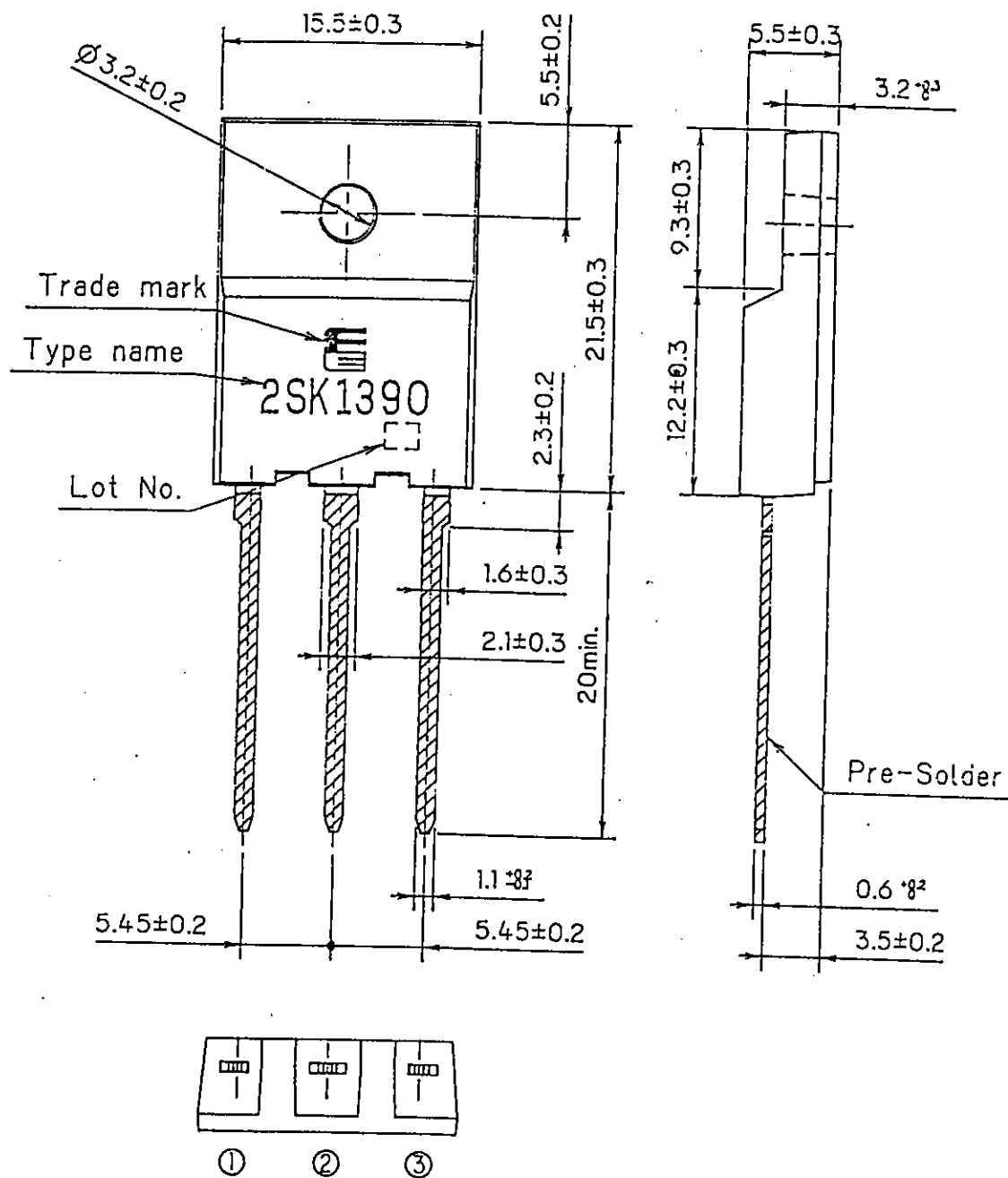
Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Diode forward on-voltage	V_{SD}	$I_F = 2 \times I_{DR}$ $V_{GS} = 0V, T_{ch} = 25^\circ C$		1.35	2.00	V
Reverse recovery time	t_{rr}	$I_F = I_{DR}$ $V_{GS} = 0V$ $-dI_F/dt = 100A/\mu s$ $T_{ch} = 25^\circ C$		100		ns
Reverse recovery charge	Q_{rr}			0.5		μC

7. Thermal resistance

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th_{ch-c}}$				1.56	$^\circ C/W$
	$R_{th_{ch-a}}$				30.0	$^\circ C/W$

FUJI POWER MOSFET

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CONNECTION

- ① GATE
- ② DRAIN
- ③ SOURCE

DIMENSIONS ARE IN MILLIMETERS.

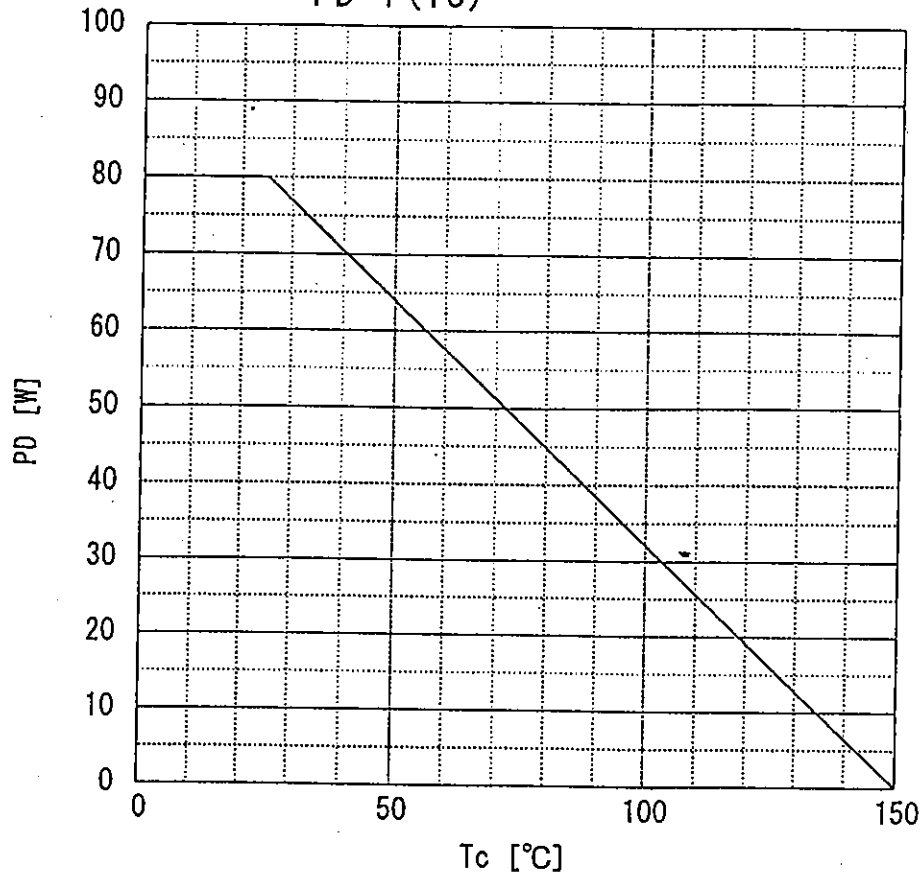
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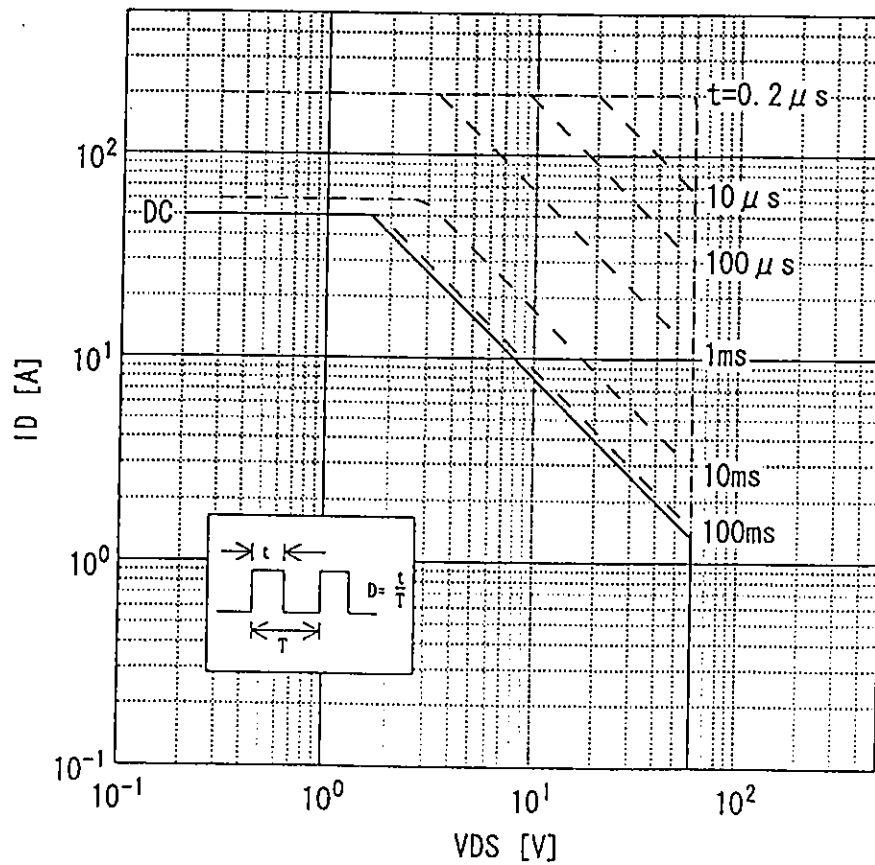
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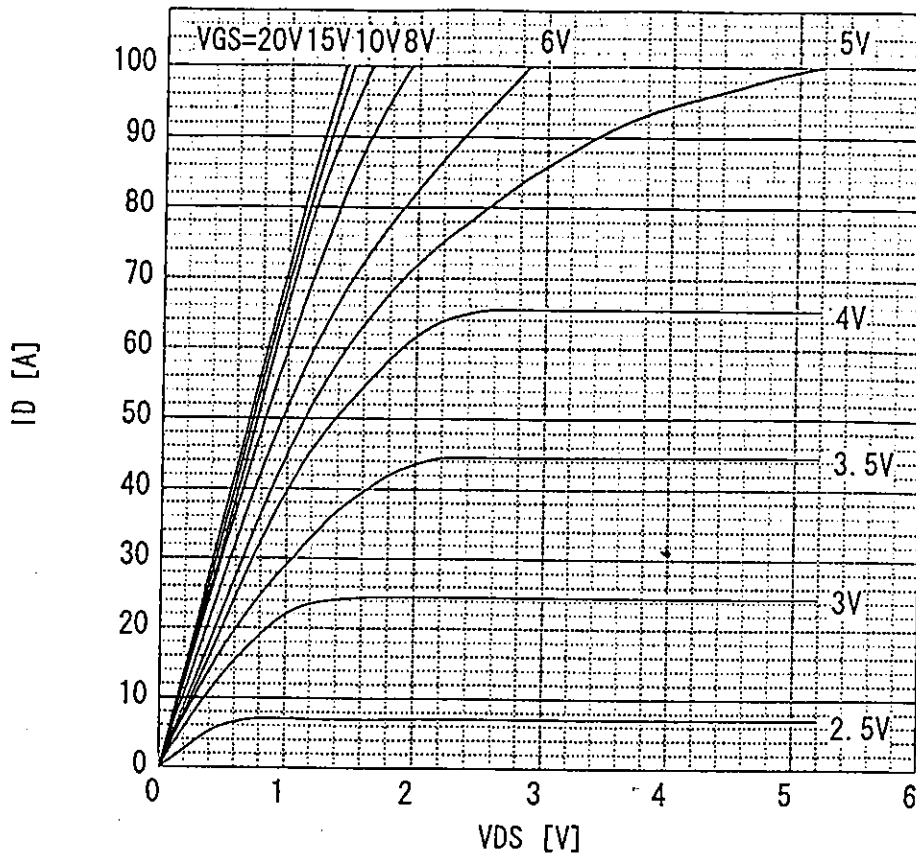
Power Dissipation $PD=f(T_c)$



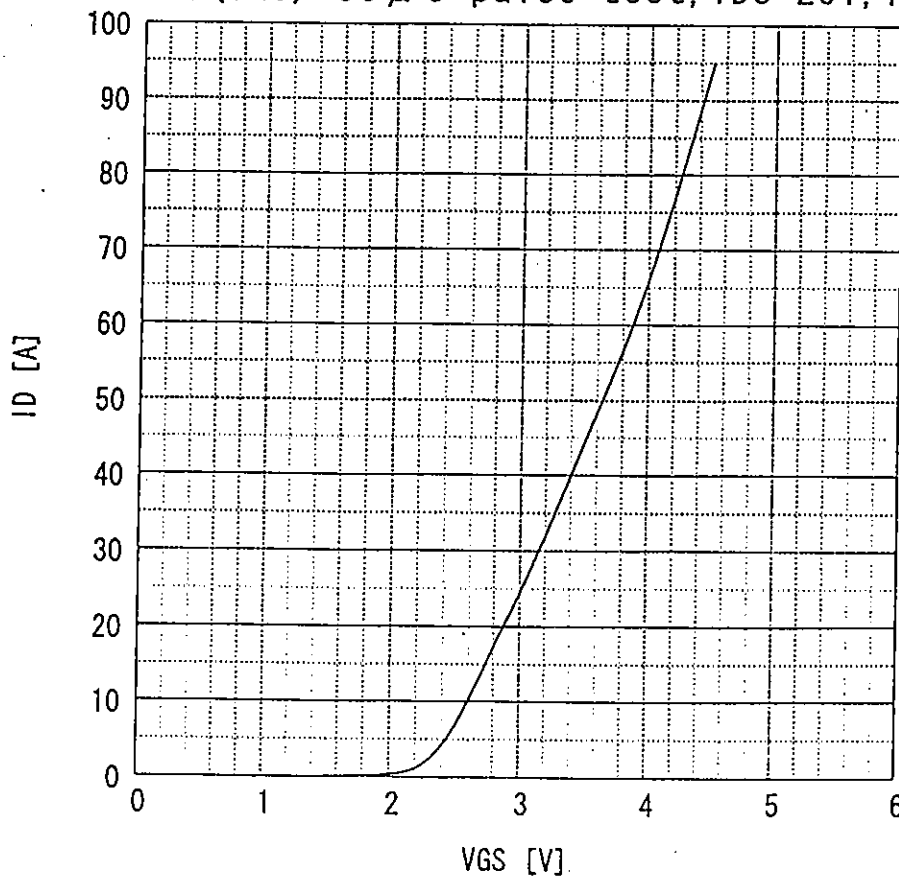
Safe operating area $ID=f(V_{DS}) : D=0.01, T_c=25^\circ C$



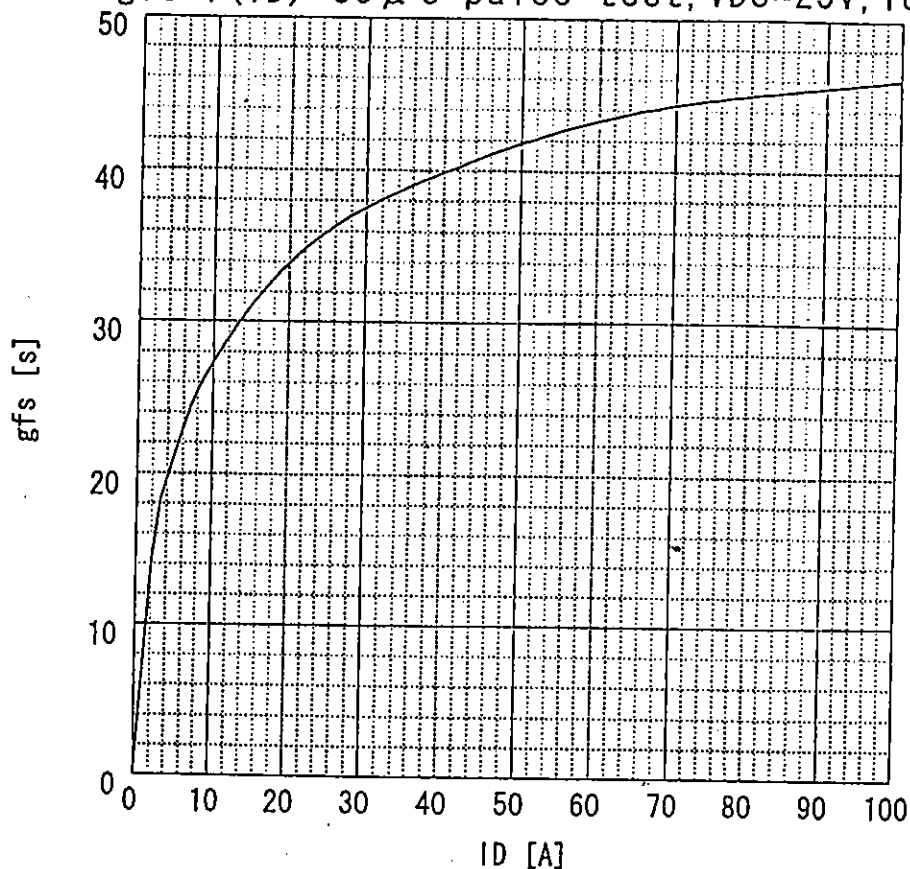
Typical output characteristics
 $I_D = f(V_{DS}) : 80 \mu s$ pulse test, $T_c = 25^\circ C$



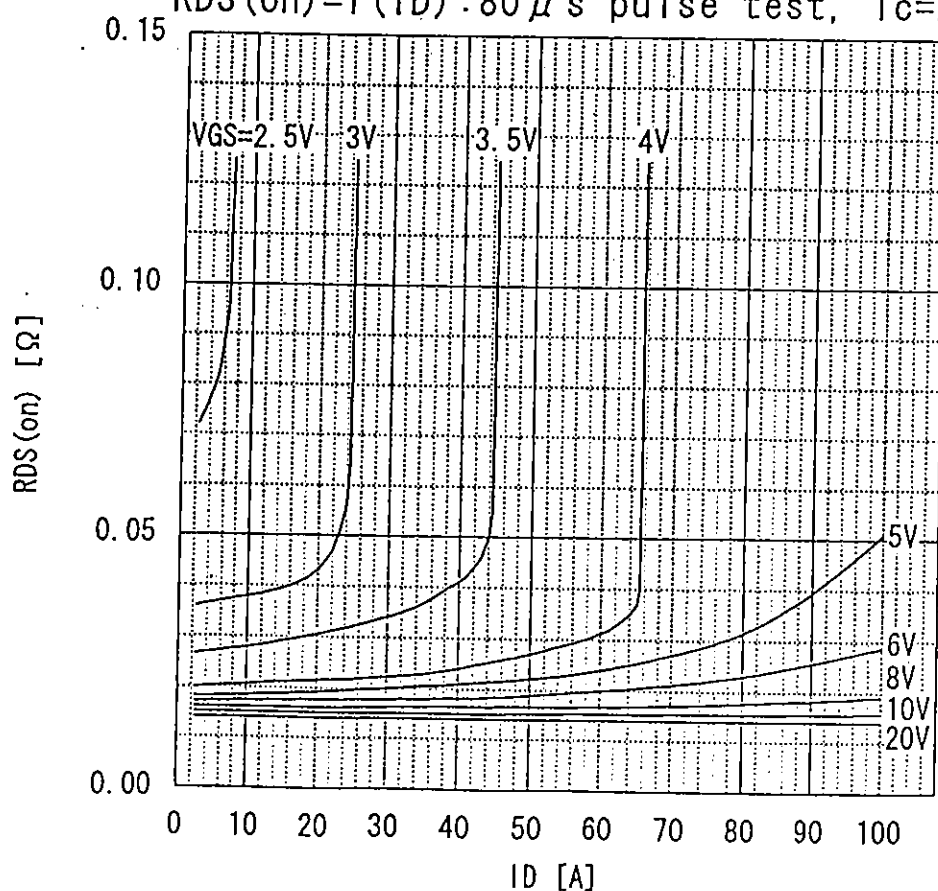
Typical transfer characteristic
 $I_D = f(V_{GS}) : 80 \mu s$ pulse test, $V_{DS} = 25V$, $T_{ch} = 25^\circ C$



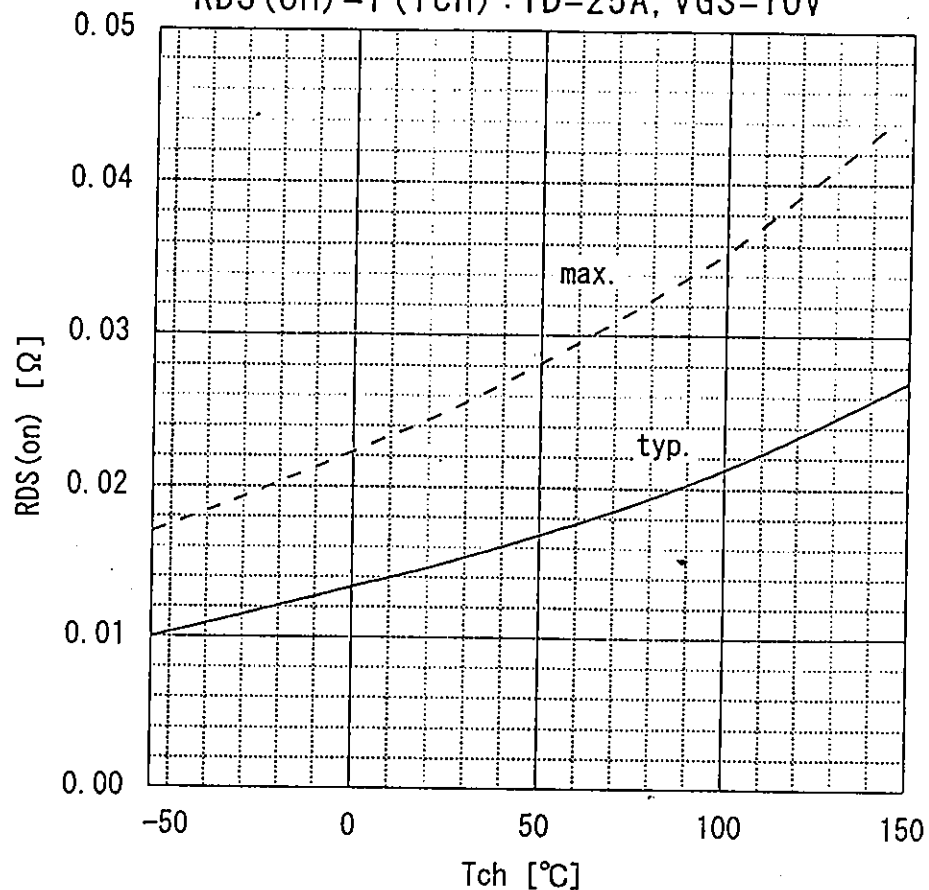
Typical forward transconductance
 $g_{fs}=f(I_D): 80\mu s$ pulse test, $V_{DS}=25V$, $T_{ch}=25^\circ C$



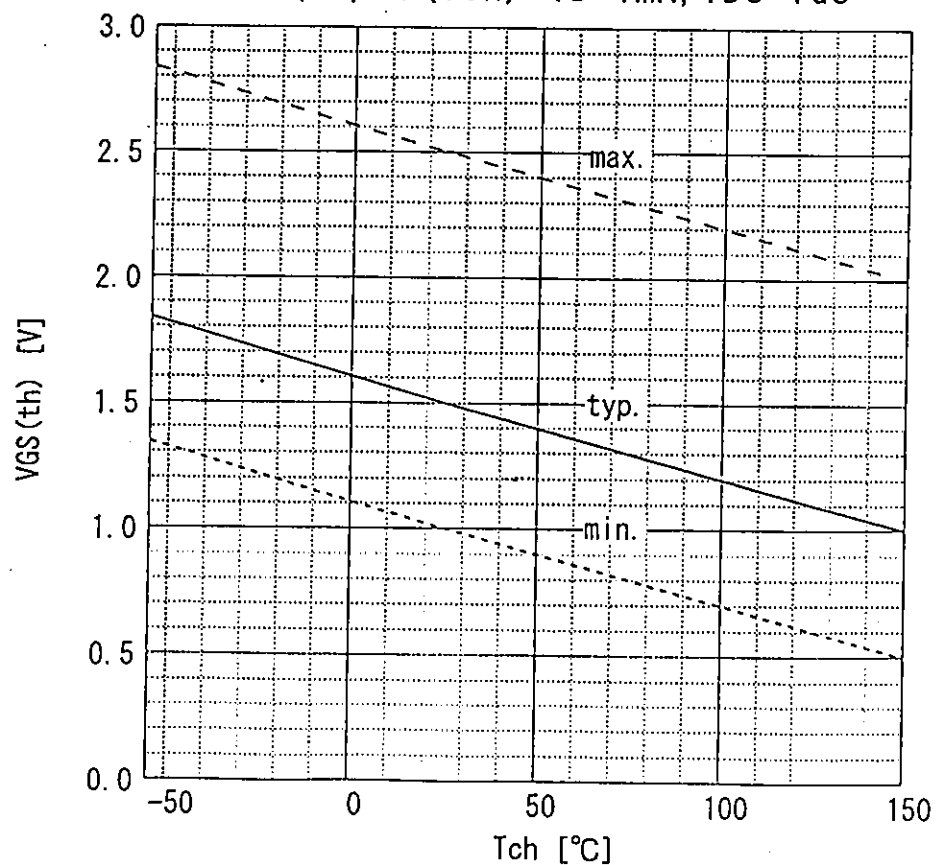
Typical drain-source on-state resistance
 $R_{DS(on)}=f(I_D): 80\mu s$ pulse test, $T_c=25^\circ C$



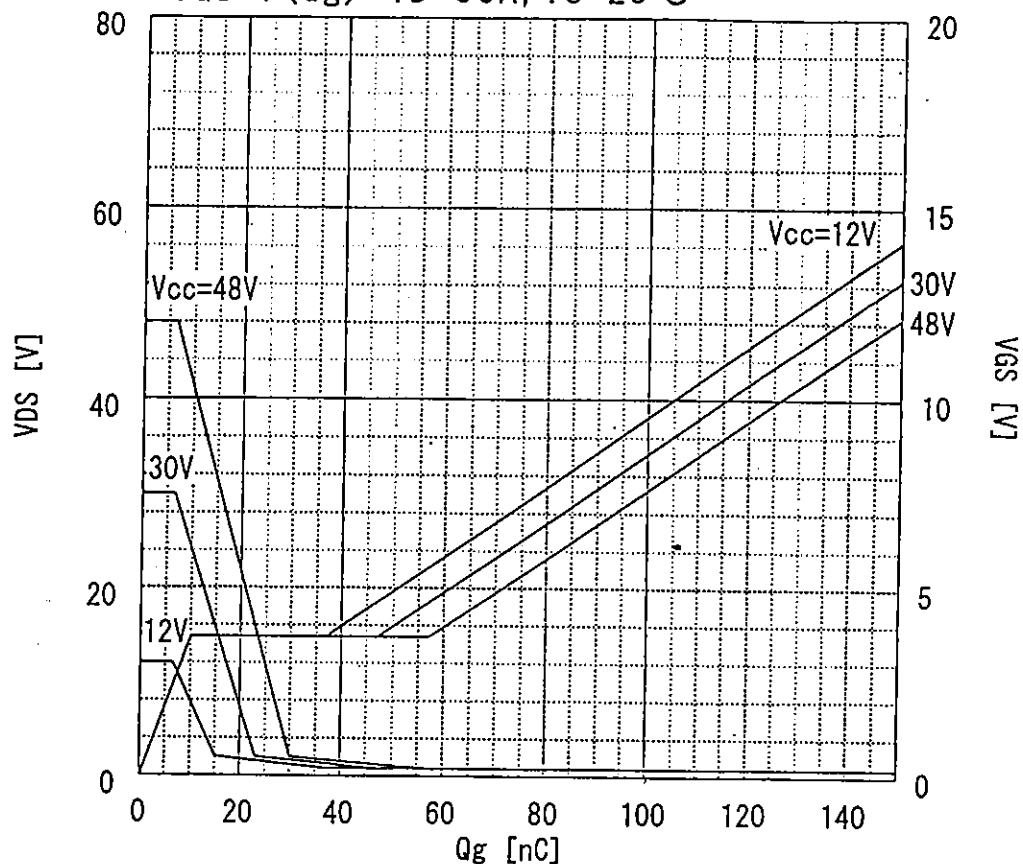
Drain-source on-state resistance
 $R_{DS(on)} = f(T_{ch}) : I_D = 25A, V_{GS} = 10V$



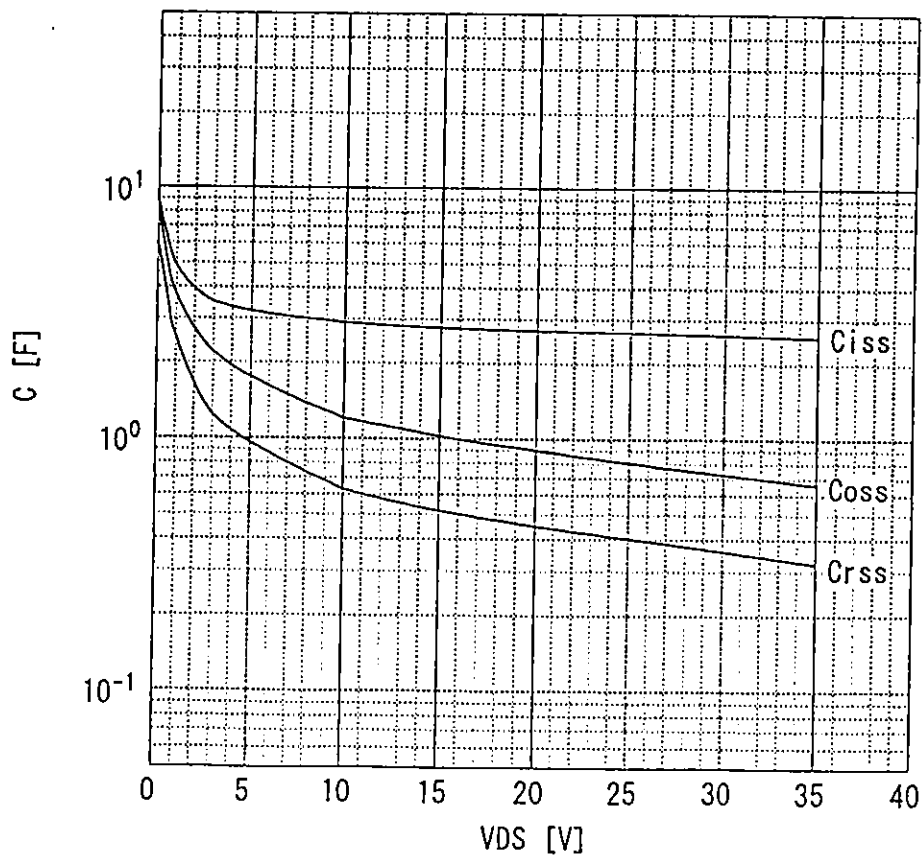
Gate threshold voltage
 $V_{GS(th)} = f(T_{ch}) : I_D = 1mA, V_{DS} = V_{GS}$



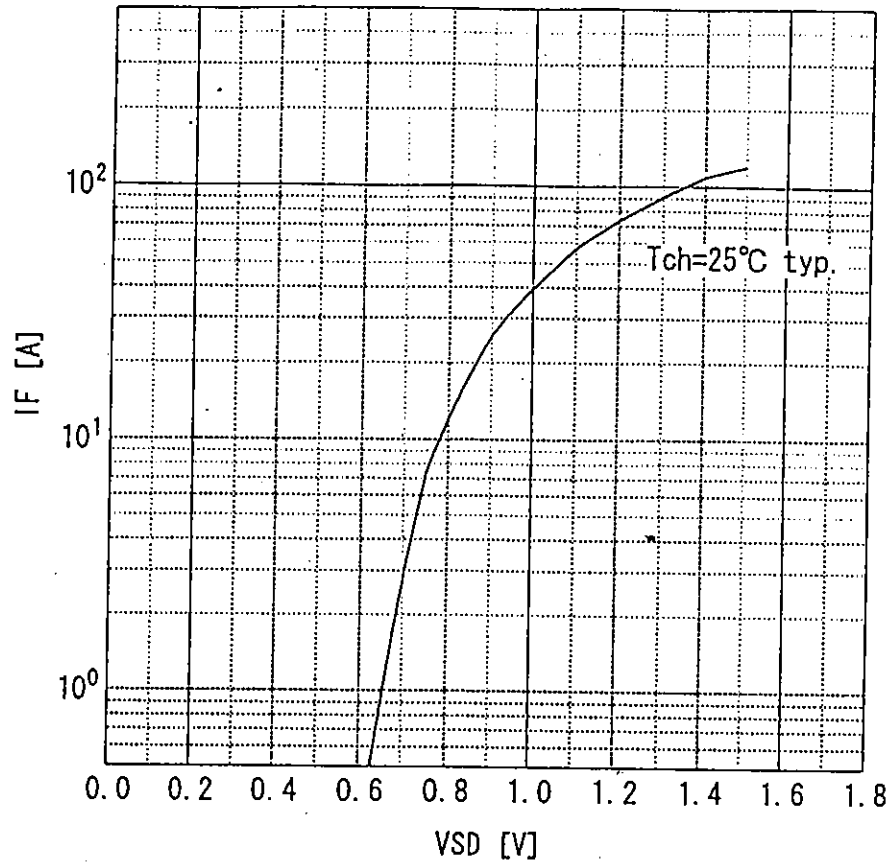
Typical gate charge characteristic
 $V_{GS}=f(Q_g) : I_D=50A, T_c=25^{\circ}C$



Typical capacitances
 $C=f(V_{DS}) : V_{GS}=0V, f=1MHz$



Forward characteristic of reverse of diode
 $I_F = f(V_{SD}) : 80 \mu s$ pulses test, $V_{GS} = 0V$



Transient thermal impedande
 $Z_{thch} = f(t)$ parameter: $D = t/T$

