

SPECIFICATION

DEVICE NAME : Power MOSFET

TYPE NAME : 2SK903-MR

SPEC. No. : **MS5F3095**

Fuji Electric Co.,Ltd.

This Specification is subject to change without notice.

	DATE	NAME	APPROVED	Fuji Electric Co.,Ltd.	
DRAWN	Sep-18-95	Y. Terasaki		DWGNO.	MS5F3095
CHECKED	Sep-18-95	M. Tsunoda			

1. Scope
This specifies Fuji power MOSFET 2SK903-MR
2. Construction N-channel enhancement mode power MOSFET
3. Application for switching
4. Outview TO-220F 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}	800	V	
Drain-gate voltage	V_{DGR}	800	V	$R_{GS}=20\text{K}\Omega$
Continuous Drain current	I_D	± 3	A	
Pulsed drain current	I_{Dpulss}	± 12	A	
Gate-source voltage	V_{GS}	± 20	V	
Maximum power dissipation	P_D	40	W	
Operating and storage temperature range	T_{ch}	150	$^\circ\text{C}$	
	T_{sto}	-55 ~ +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}	$I_D=1\text{mA}$ $V_{GS}=0\text{V}$	800			V	
Gate threshold voltage	$V_{GS(th)}$	$I_D=10\text{mA}$ $V_{DS}=V_{GS}$	2.1	3.0	4.0	V	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=800\text{V}$ $V_{GS}=0\text{V}$	$T_{ch}=25^\circ\text{C}$		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	$R_{DS(on)}$	$I_D=1.5\text{A}$ $V_{GS}=10\text{V}$		3.0	4.0	Ω	

Fuji Electric Co., Ltd.

DWG. NO.

MS5F3095

2/10

Y 0257-R-003a

Dynamic ratings

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Forward transconductance	g_{fs}	$I_D = 1.5A$ $V_{DS} = 25V$	2.0	4.0		S
Input capacitance	C_{iss}	$V_{DS} = 25V$ $V_{GS} = 0V$ $f = 1MHz$		900	1400	pF
Output capacitance	C_{oss}			90	140	pF
Reverse transfer capacitance	C_{rss}			35	60	pF
Turn-on time	$t_{d(on)}$	$V_{CC} = 30V$ $V_{GS} = 10V$ $I_D = 2.1A$ $R_{GS} = 50\Omega$		20	30	ns
	t_r			40	60	ns
Turn-off time	$t_{d(off)}$			150	250	ns
	t_f			60	90	ns

Reverse diode

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Diode forward on-voltage	V_{SD}	$I_F = 2 \times I_{DR}$ $V_{GS} = 0V, T_{ch} = 25^\circ C$		1.0	1.35	V
Reverse recovery time	t_{rr}	$I_F = I_{DR}$ $V_{GS} = 0V$ $-di_F/dt = 100A/\mu s$ $T_{ch} = 25^\circ C$		400		ns
Reverse recovery charge	Q_{rr}			4		μC

7. Thermal resistance

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th_{ch-c}}$				3.125	$^\circ C/W$
	$R_{th_{ch-a}}$				62.5	$^\circ C/W$

Fuji Electric Co.,Ltd.

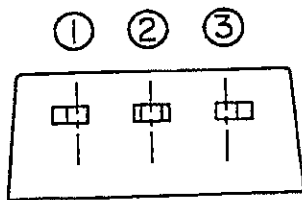
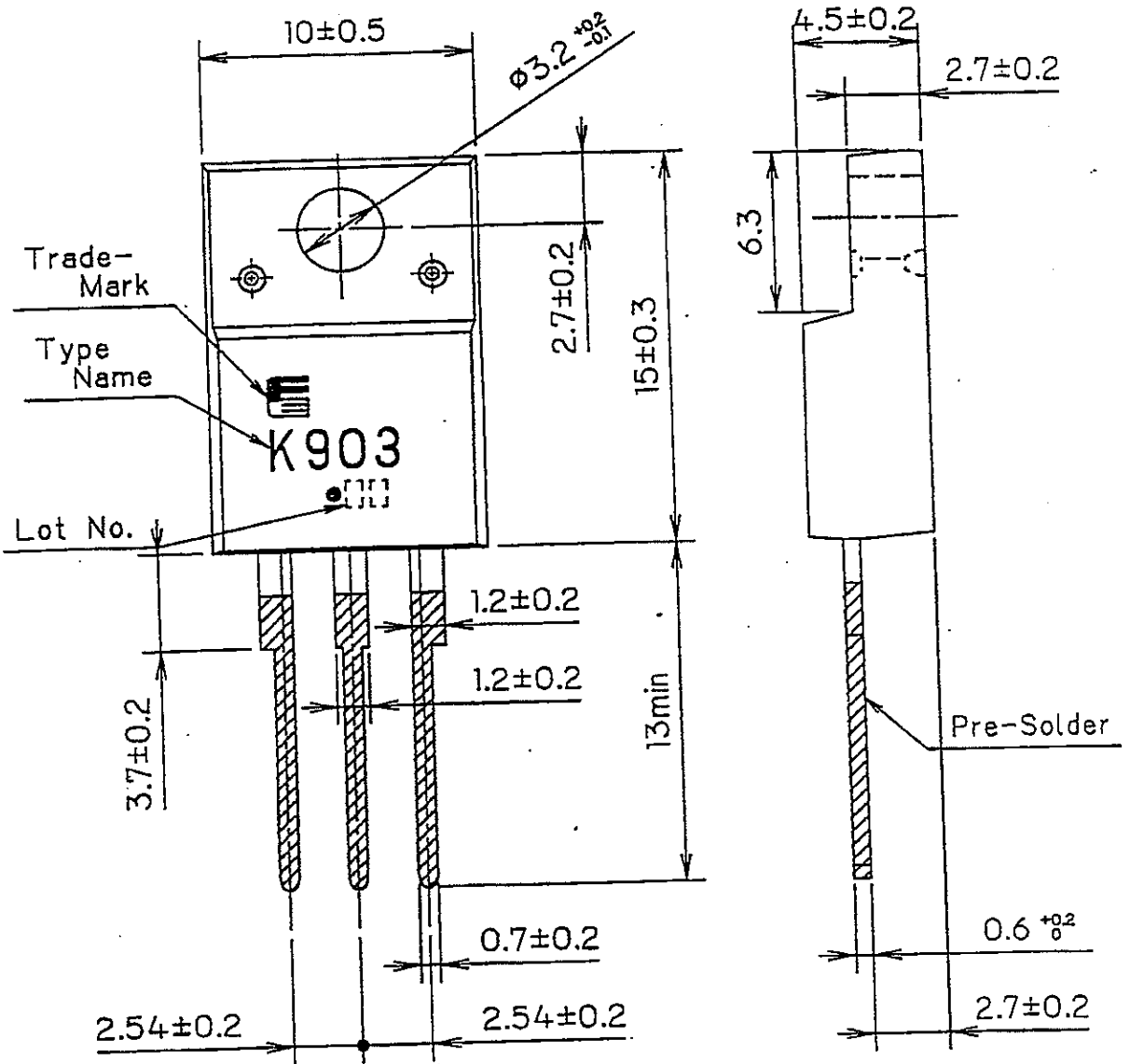
DWG.NO.

MS5F3095

3/10

Y 0257-R-003a

FUJI POWER MOS FET
TYPE : 2SK903-MR



CONNECTION

- ① GATE
- ② DRAIN
- ③ SOURCE

DIMENSIONS ARE IN MILLIMETERS.

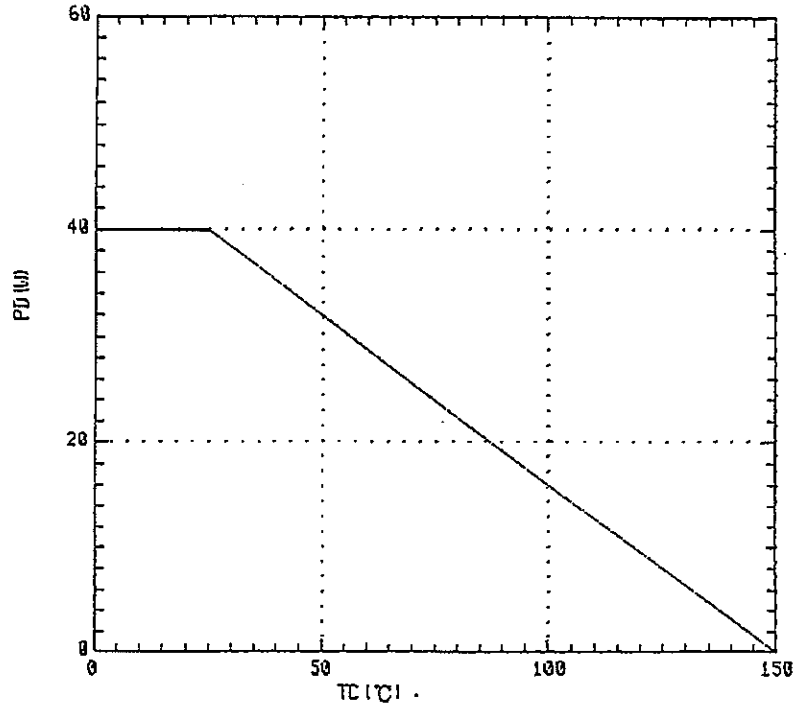
Fuji Electric Co., Ltd.

DWG. NO.

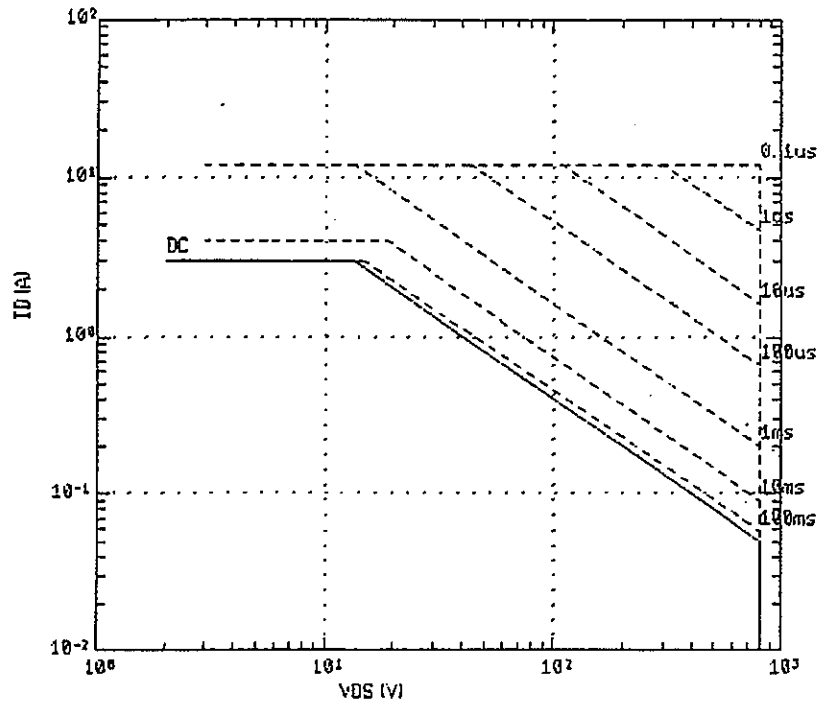
MS5 F 3095

4/10

Power Dissipation
 $PD=f(TC)$



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



Fuji Electric Co., Ltd.

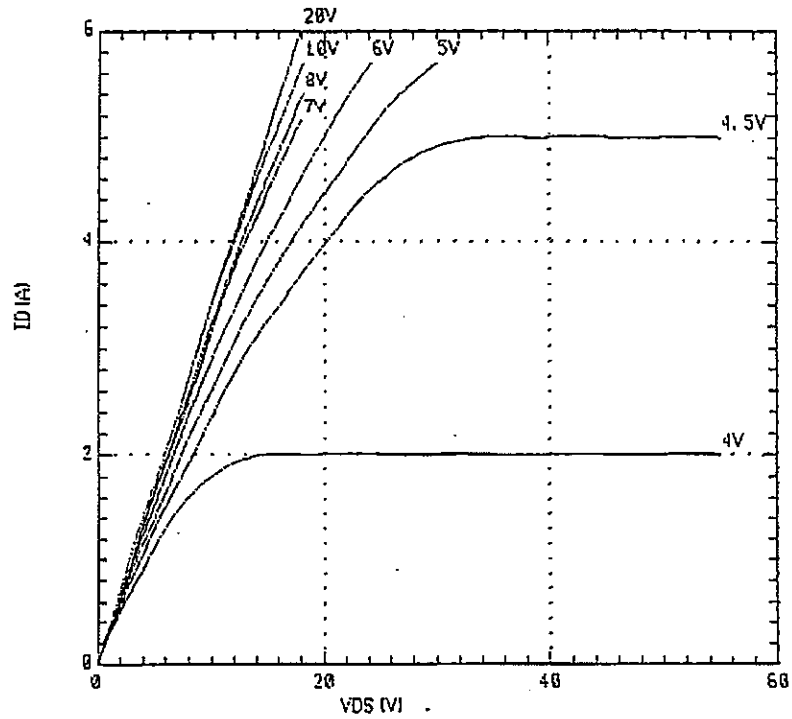
DWG. NO.

MS5F3095

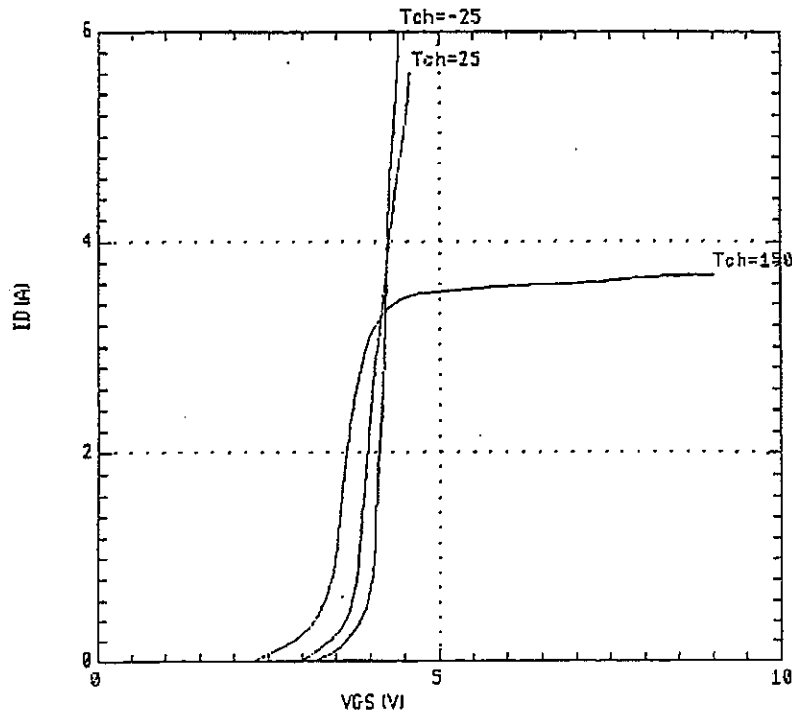
5/10

Y 0257-R-003a

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



Typical Transfer Characteristic
 $I_D = f(V_{GS}) : 80 \mu s$ pulse test, $V_{DS} = 25V$



Fuji Electric Co., Ltd.

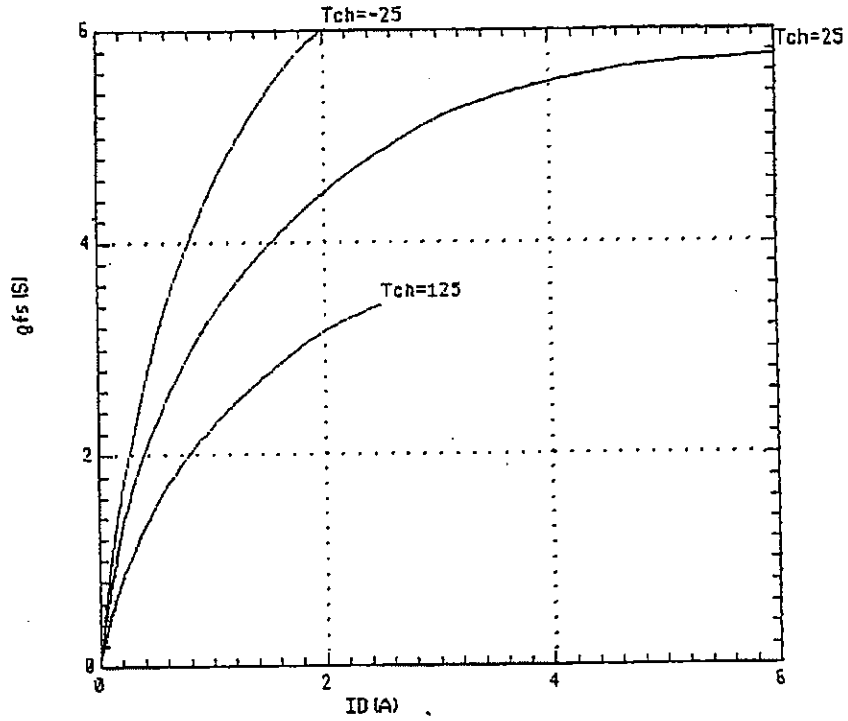
DWG. NO.

MS5 F 3095

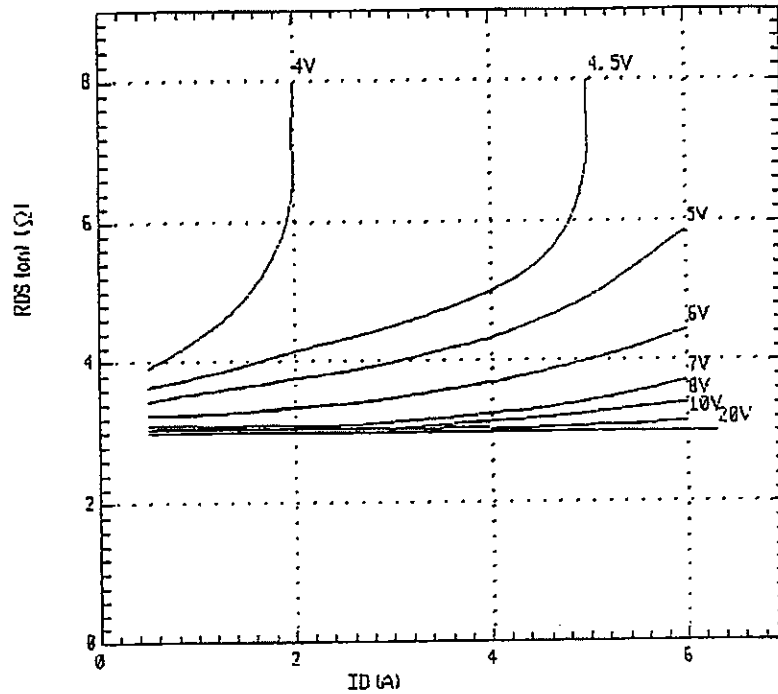
6/10

Y 0257-R-003a

Typical Transconductance
 $g_{fs} = f(I_D) : 80 \mu s$ pulse test, $V_{DS} = 25V$



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



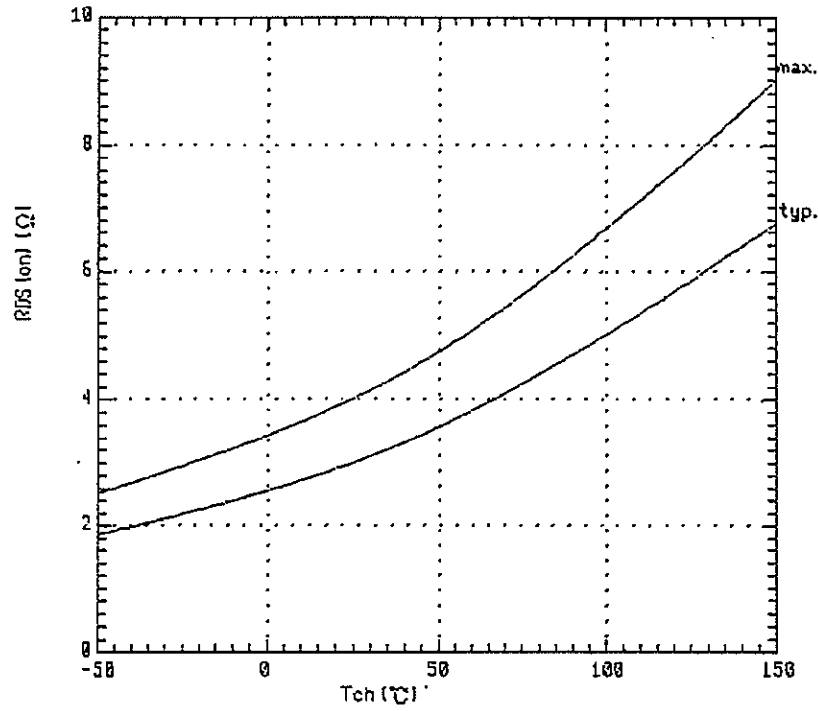
Fuji Electric Co., Ltd.

DWG. NO.

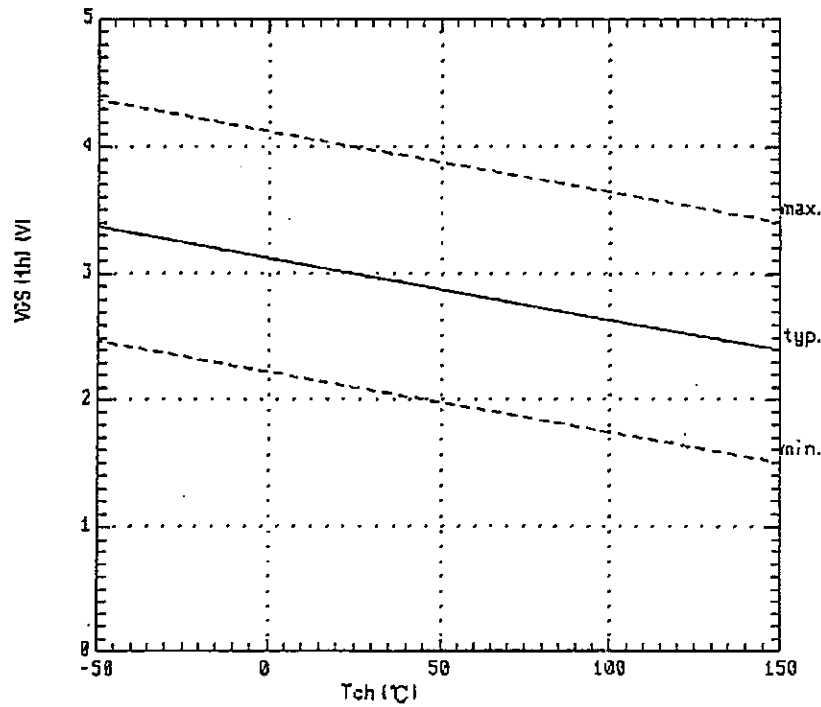
MS5F3095

7/10

Drain-source on-state resistance
 $R_{DS(on)} = f(T_{ch}) : I_D = 1.5A, V_{GS} = 10V$



Gate threshold voltage
 $V_{GS(th)} = f(T_{ch}) : V_{DS} = V_{GS}, I_D = 10mA$



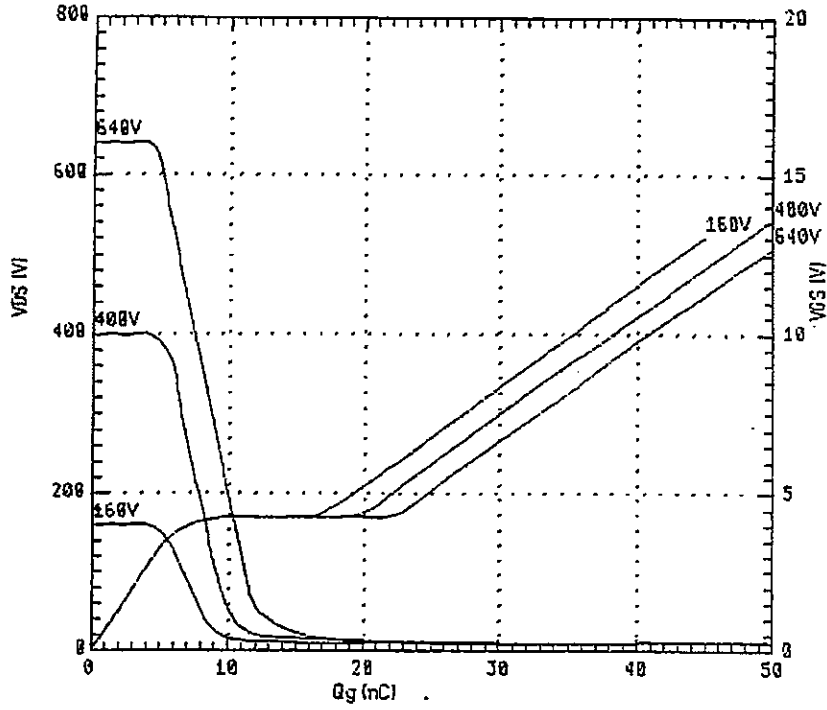
Fuji Electric Co., Ltd.

DWG. NO.

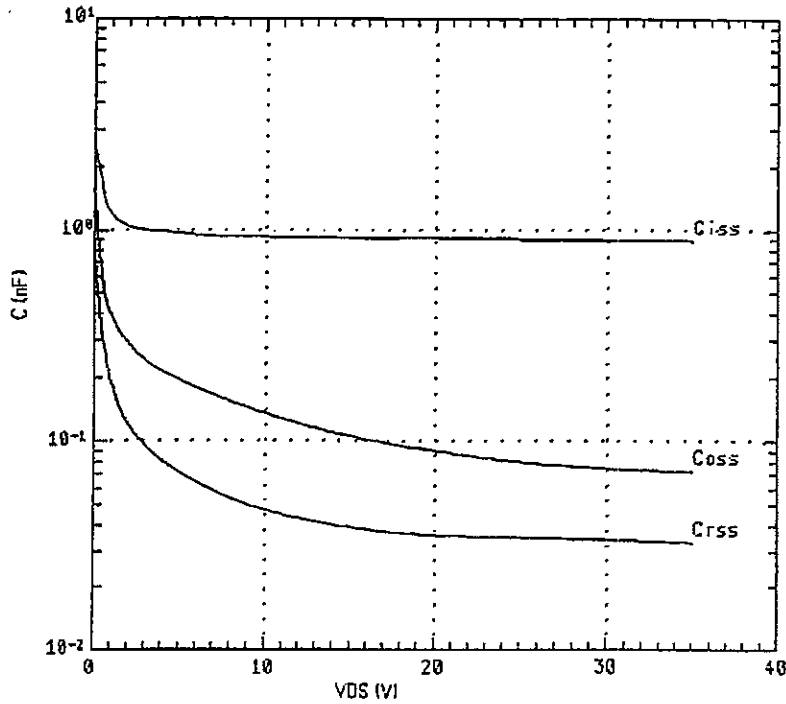
MS5F3095

8/10

Typical gate charge characteristics
 $V_{GS} = f(Q_g) : I_D = 3A, T_{ch} = 25^\circ C$



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



Fuji Electric Co., Ltd.

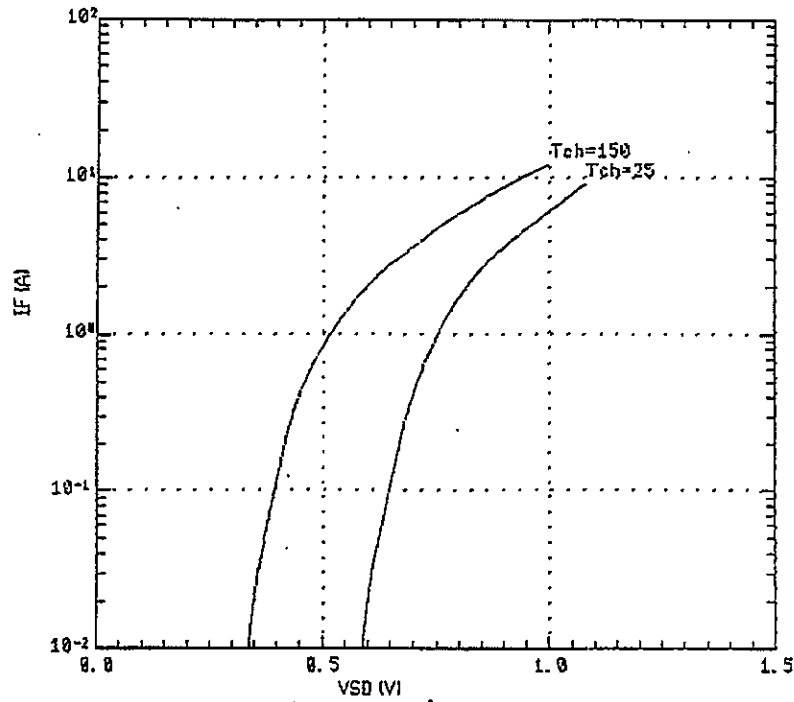
DWG. NO.

MS5F3095

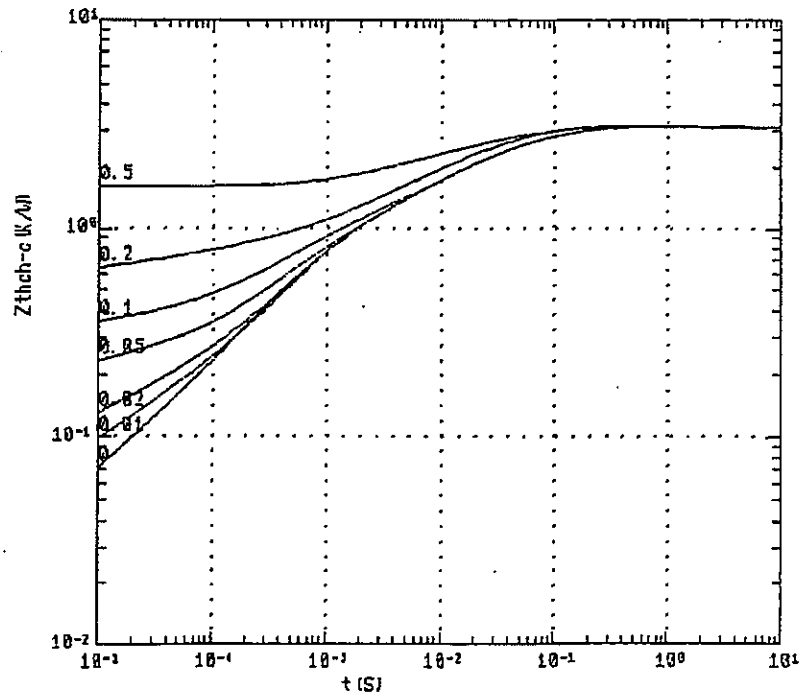
9/10

Y 0257-R-003a

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



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



Fuji Electric Co., Ltd.

DWG. NO.

MS5F3095

10/10

Y 0257-R-003a