

# 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.	<b>MS5F3095</b>	1/10
CHECKED	Sep-18-'95	M. Kojisawa					



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	$I_D$	$\pm 3$	A	
Pulsed drain current	$I_{Dpul}$	$\pm 12$	A	
Gate-source voltage	$V_{GS}$	$\pm 20$	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	$B V_{DSS}$	$I_D = 1\text{mA}$ $V_{GS} = 0\text{V}$	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	$\mu\text{A}$
	$I_{DSS}$		$T_{ch} = 125^\circ\text{C}$	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	$\Omega$

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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

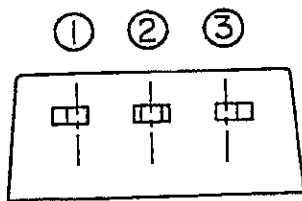
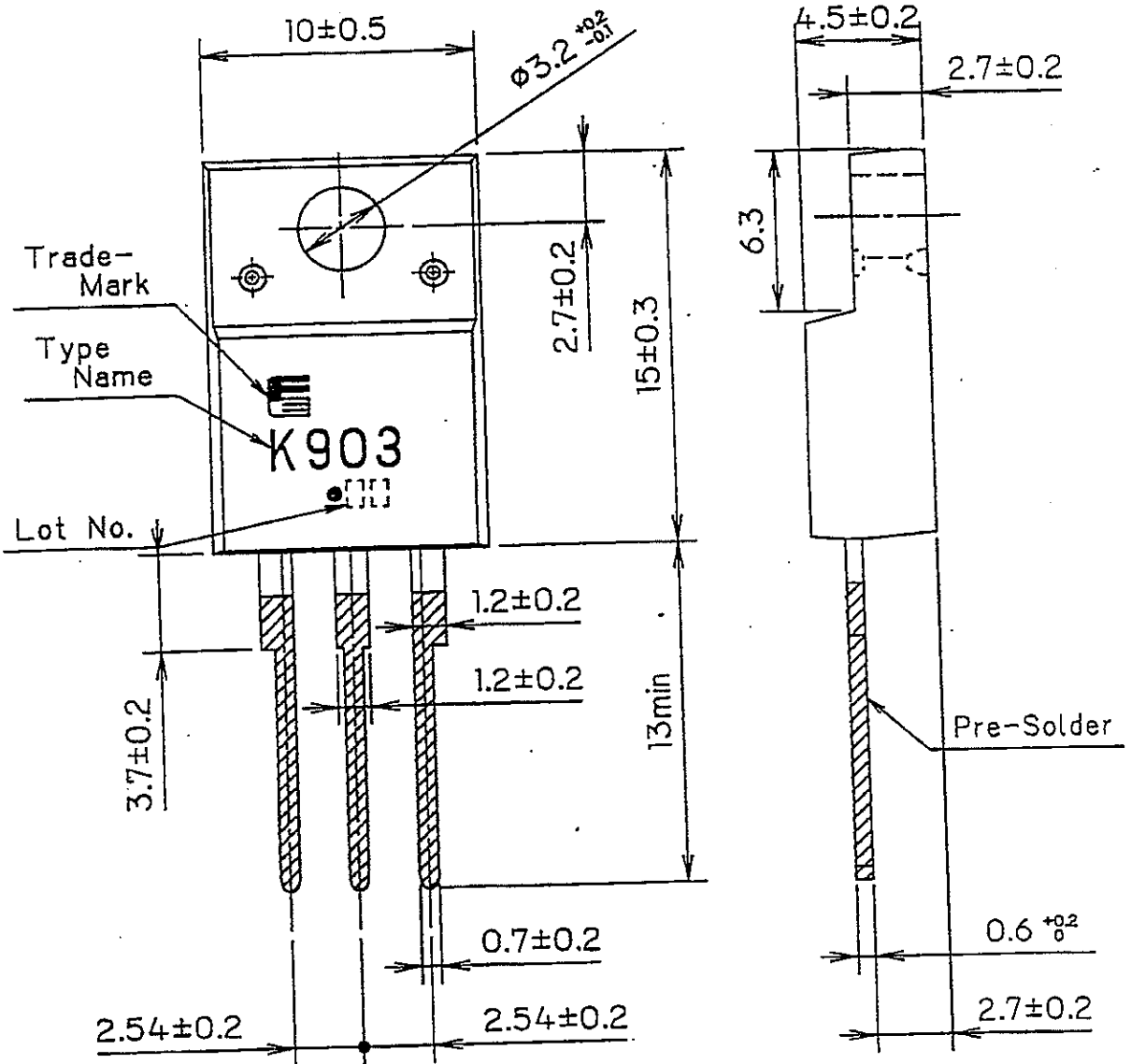
Reverse diode

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	$\mu C$

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 POWER MOS FET**  
**TYPE : 2SK903-MR**



**CONNECTION**

- ① GATE
- ② DRAIN
- ③ SOURCE

DIMENSIONS ARE IN MILLIMETERS.

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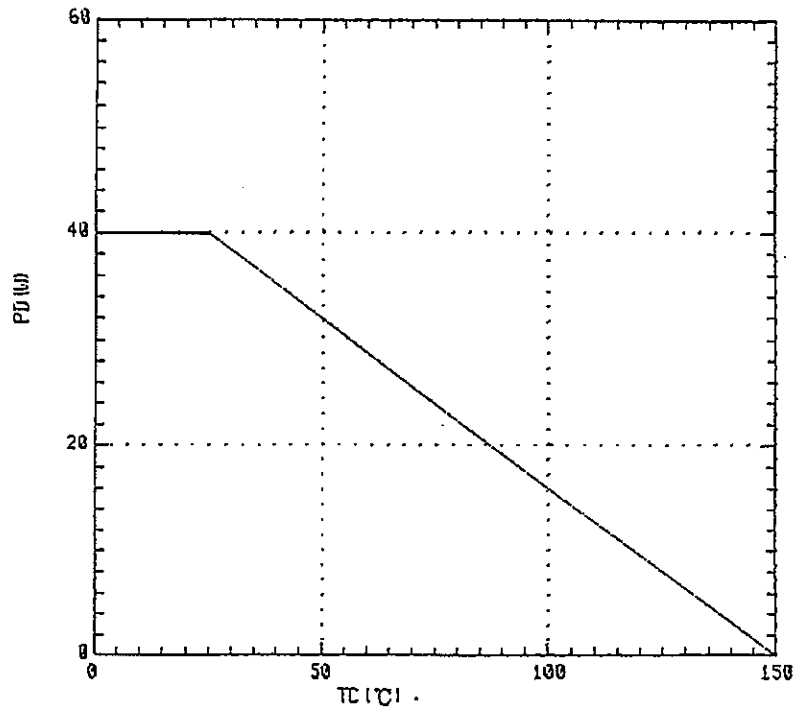
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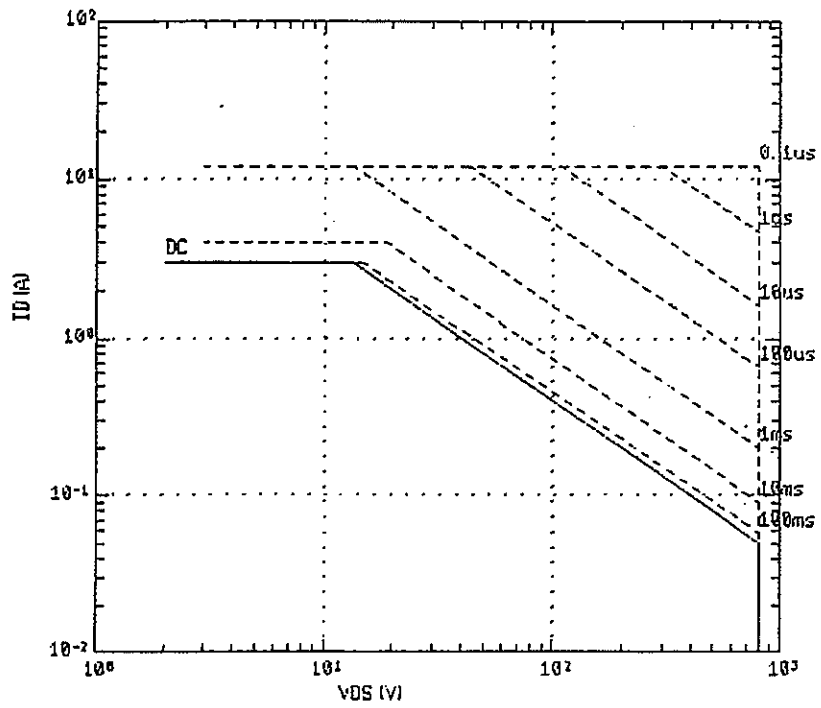
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Power Dissipation  
 $PD=f(TC)$



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



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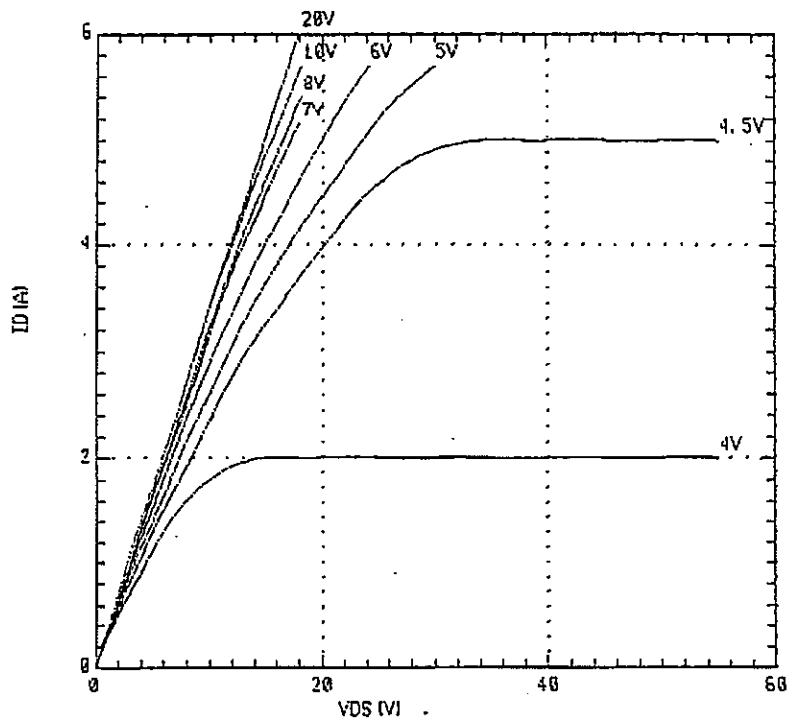
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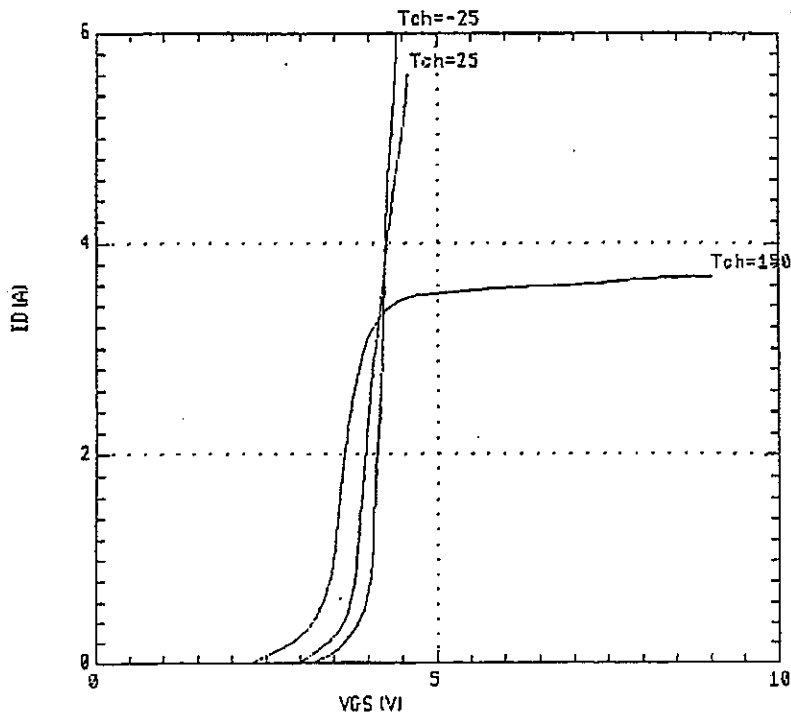
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Typical output characteristics  
 $I_D = f(V_{DS})$ : 80  $\mu$ s pulse test,  $T_{ch} = 25^\circ\text{C}$



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



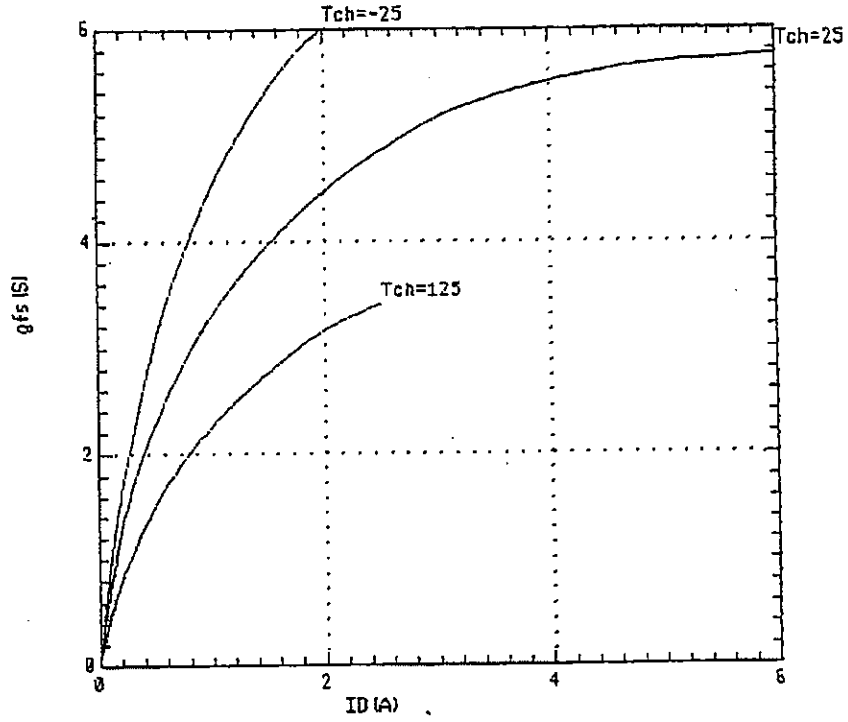
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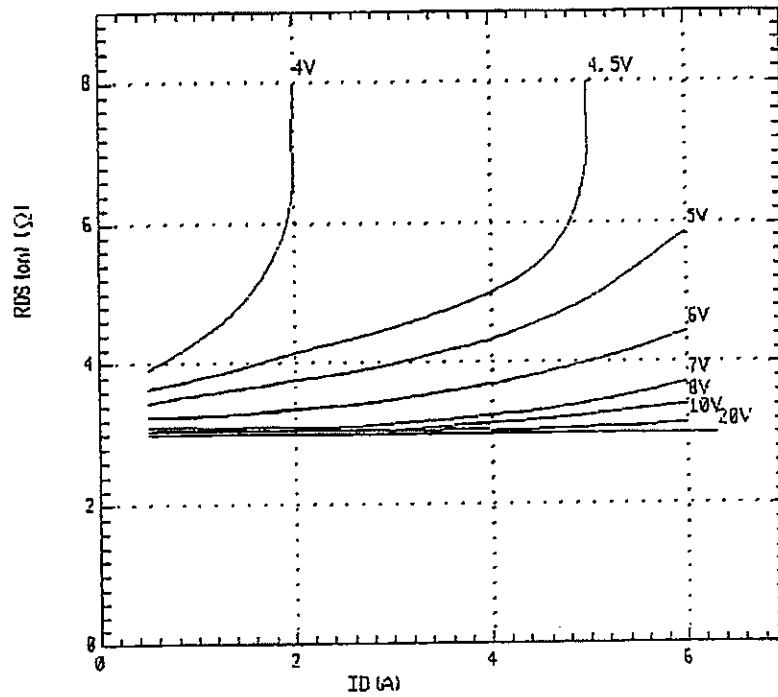
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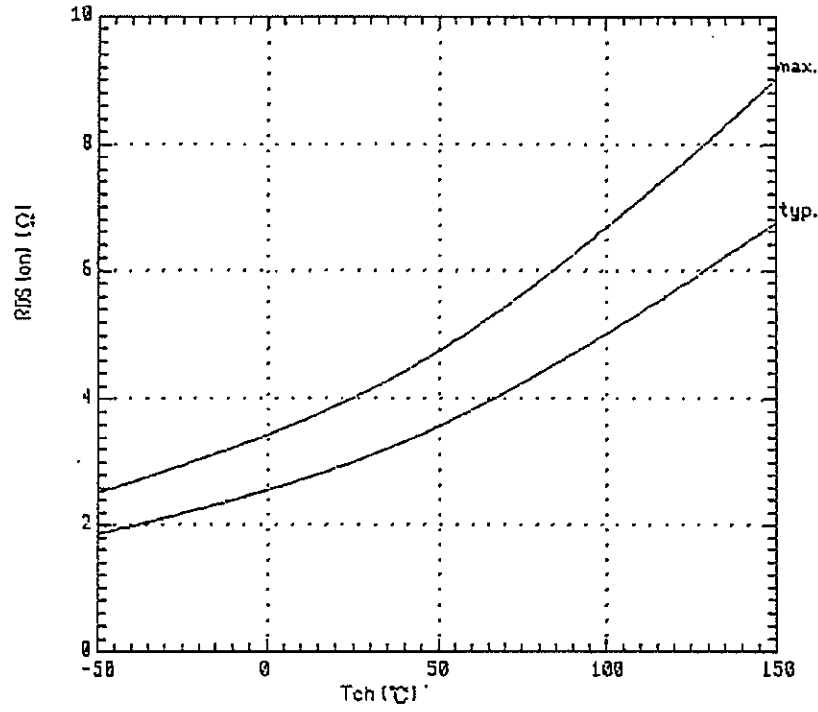

Typical Transconductance  
 $g_{fs}=f(I_D): 80 \mu s$  pulse test,  $V_{DS}=25V$



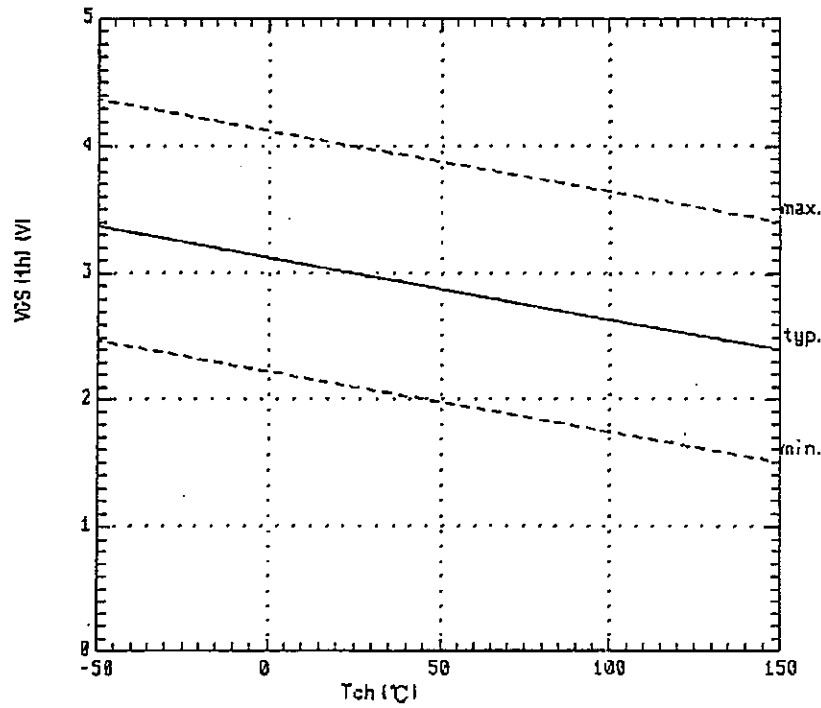
Typical Drain-source on-state resistance  
 $R_{DS(on)}=f(I_D): 80 \mu s$  pulse test,  $T_{ch}=25^\circ C$



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

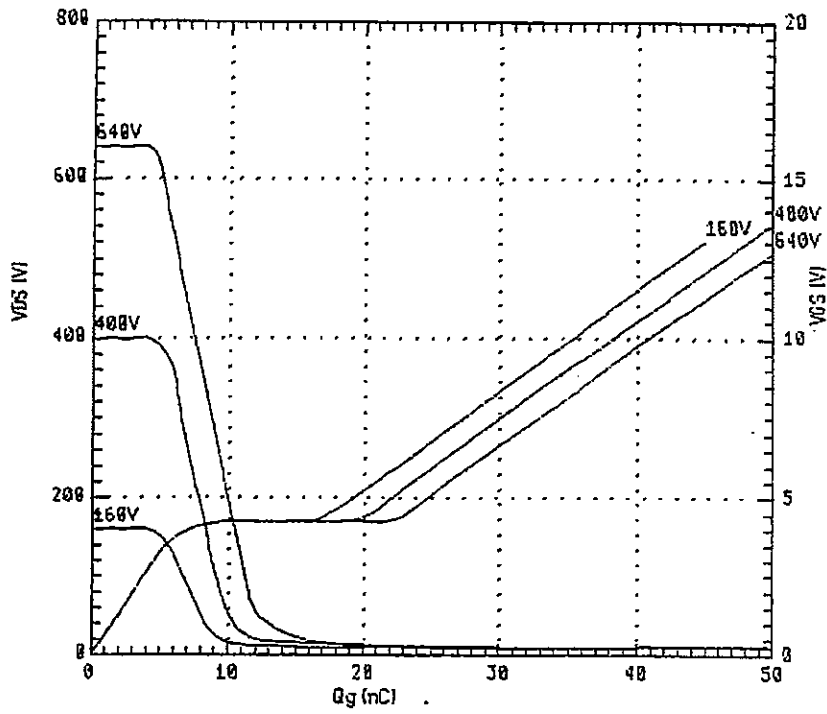


Gate threshold voltage  
 $V_{GS(th)} = f(T_{ch}) : V_{DS} = V_{GS}, I_D = 10mA$

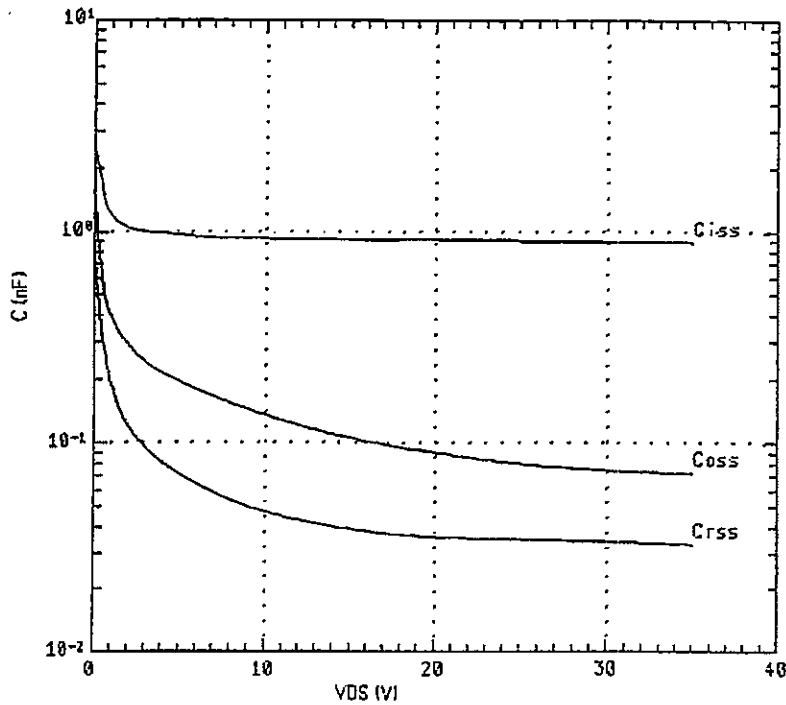




Typical gate charge characteristics  
 $V_{GS} = f(Q_g) : I_D = 3A, T_{ch} = 25^\circ C$



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



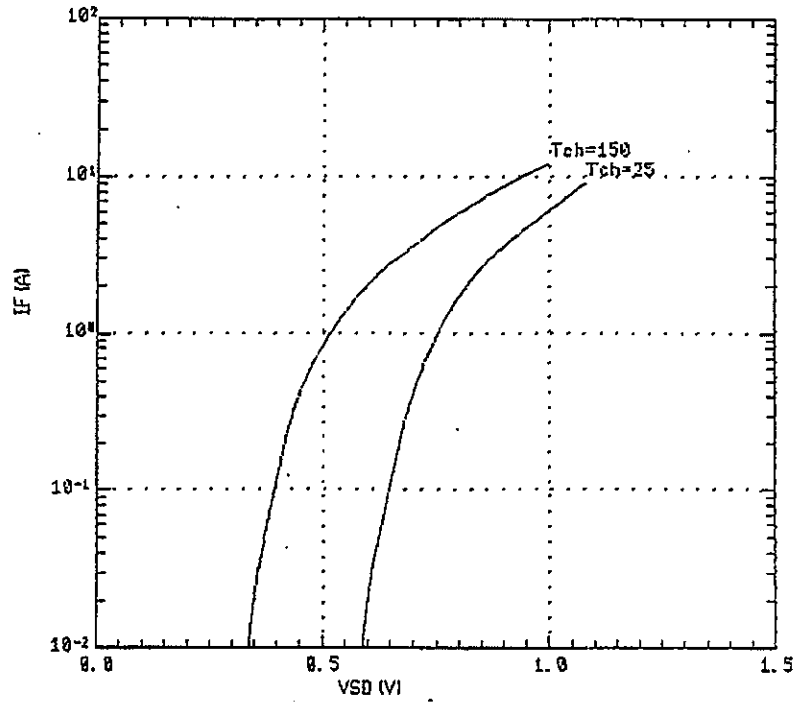
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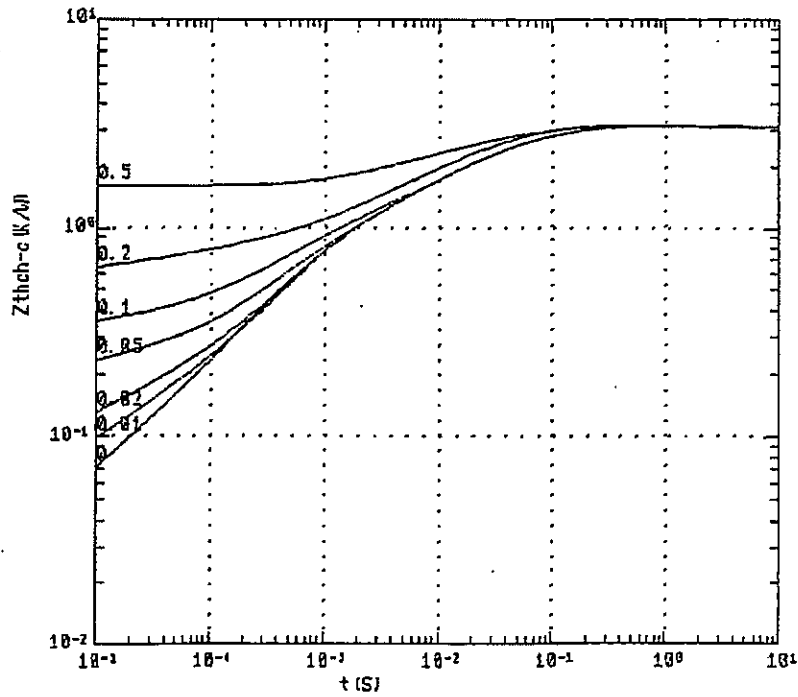
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Forward characteristic of reverse diode  
 $I_F = f(V_{SD}) : 80 \mu s$  pulse test,  $V_{GS} = 0V$



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



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