

Fuji power MOSFET Specification

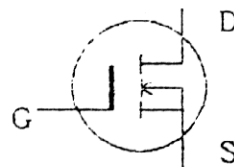
2SK1503-01

1. Scope

This specifies Fuji power MOSFET 2SK1503-01

2. Outline

- I) Construction N-channel enhancement mode power MOSFET
- II) Application for switching
- III) Outview T0-220 (MK5C27595)



3. Absolute maximum ratings at Tc=25 °C (unless otherwise specified)

Description	Symbol	Characteristics	Unit	Remarks
Drain-source voltage	V_{DS}	500	V	
Drain-gate voltage	V_{DGR}	500	V	$R_{GS} = 20 K\Omega$
Continuous Drain current	I_D	10	A	
Pulsed drain current	I_{Dpulse}	35	A	
Gate-source voltage	V_{GS}	± 30	V	
Maximum power dissipation	P_D	80	W	
Operating and storage temperature range	T_{ch} T_{stg}	150 -55 ~ +150	$^{\circ}C$ $^{\circ}C$	

4. Electrical characteristics at Tc=25°C (unless otherwise specified)

Static ratings

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Drain-source breakdown voltage	$B V_{DSS}$	$I_D = 1 mA$ $V_{GS} = 0 V$	500			V
Gate threshold voltage	$V_{GS(th)}$	$I_D = 1 mA$ $V_{DS} = V_{GS}$	2.5	3.5	5.0	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 500V$ $V_{GS} = 0V$	$T_{ch} = 25^{\circ}C$	10	500	μA
	I_{DSS}			$T_{ch} = 125^{\circ}C$	0.2	1.0
Gate-source leakage current	I_{GSS}	$V_{GS} = \pm 30V$ $V_{DS} = 0V$		10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$I_D = 5 A$ $V_{GS} = 10 V$		0.7	0.9	Ω

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DATE	NAME	APPROVED	Fuji Electric Co.,Ltd.	
DRAWN Feb.-21-'92	Y. Maruyama			
CHECKED Feb.-24-'92	K. Kajisawa		DWG. NO.	MT5F4259 1/9
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Dynamic ratings

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Forward transconductance	g_{fs}	$I_D = 5 A$ $V_{DS} = 25 V$	4.0	6.5		S
Input capacitance	C_{iss}	$V_{DS} = 25 V$ $V_{GS} = 0 V$ $f = 1 MHz$		1200	1800	pF
Output capacitance	C_{oss}			160	240	pF
Reverse transfer capacitance	C_{rss}			70	100	pF
Turn-on time	$t_{d(on)}$	$V_{CC} = 300V$ $V_{GS} = 10V$ $I_D = 10A$ $R_{GS} = 25\Omega$		30	45	ns
	t_r			80	120	ns
Turn-off time	$t_{d(off)}$			160	240	ns
	t_f			80	120	ns

Reverse diode

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Avalanche capability	I_{AV}	$L = 100 \mu H, T_{ch} = 25^\circ C$ *see Fig1 and 2	10			A
Continuous reverse drain current	I_{DR}	$T_c = 25^\circ C$			10	A
Pulsed reverse drain current	I_{DRM}	$T_c = 25^\circ C$			35	A
Diode forward on-voltage	V_{SD}	$I_F = 2 \times I_{DR}$ $V_{GS} = 0 V, T_{ch} = 25^\circ C$		1.1	1.65	V
Reverse recovery time	t_{rr}	$I_F = I_{DR}$ $-dI_F/dt = 100A/\mu S$ $T_{ch} = 25^\circ C$		500		ns
Reverse recovery charge	Q_{rr}				3.5	

5. Thermal resistance

Description	Symbol	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th_{ch-c}}$				1.56	$^\circ C/W$
	$R_{th_{ch-a}}$				75.0	$^\circ C/W$

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Fig.1 Test circuit

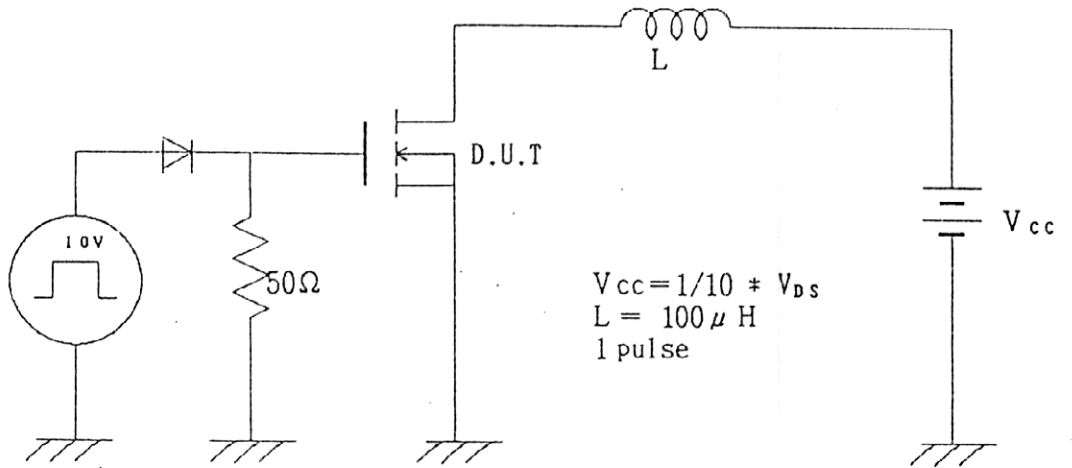
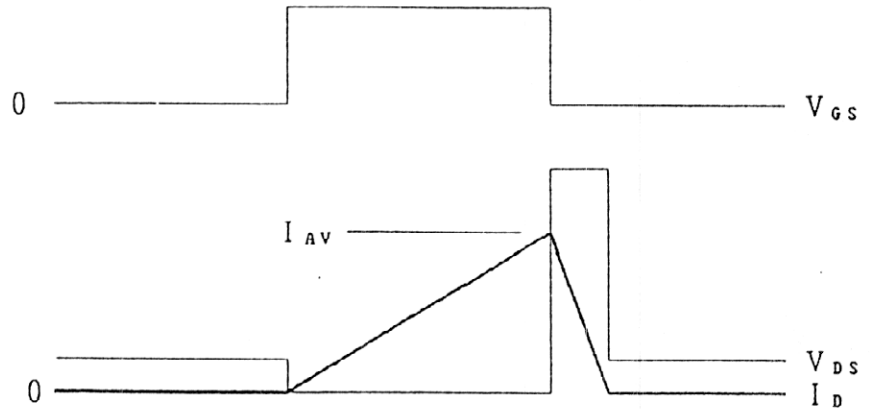


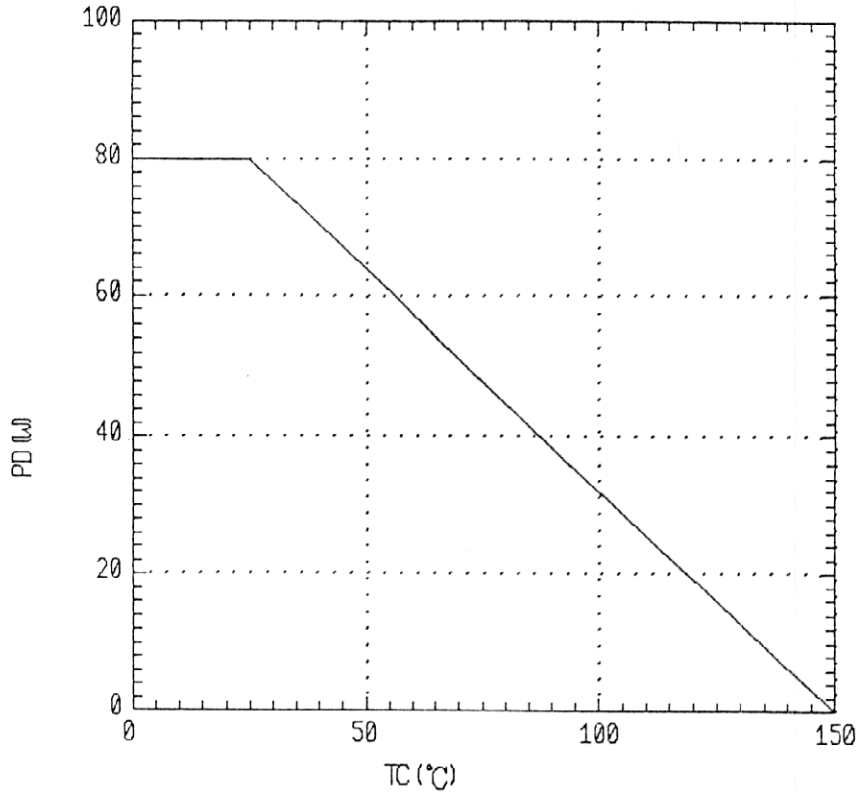
Fig.2 Operating waveforms



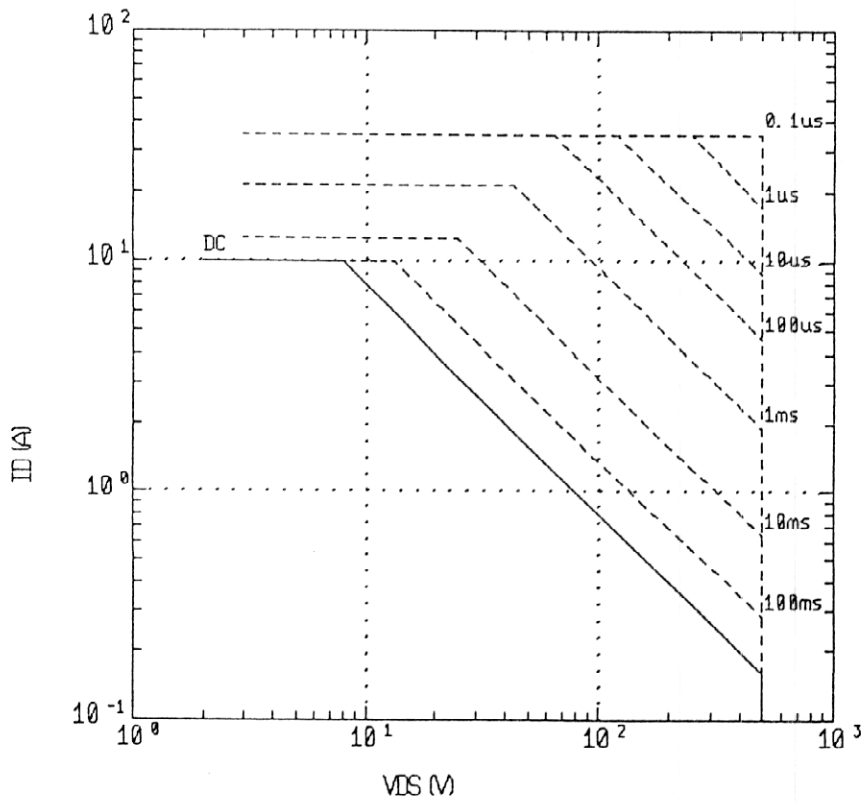
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Power Dissipation
 $PD=f(TC)$



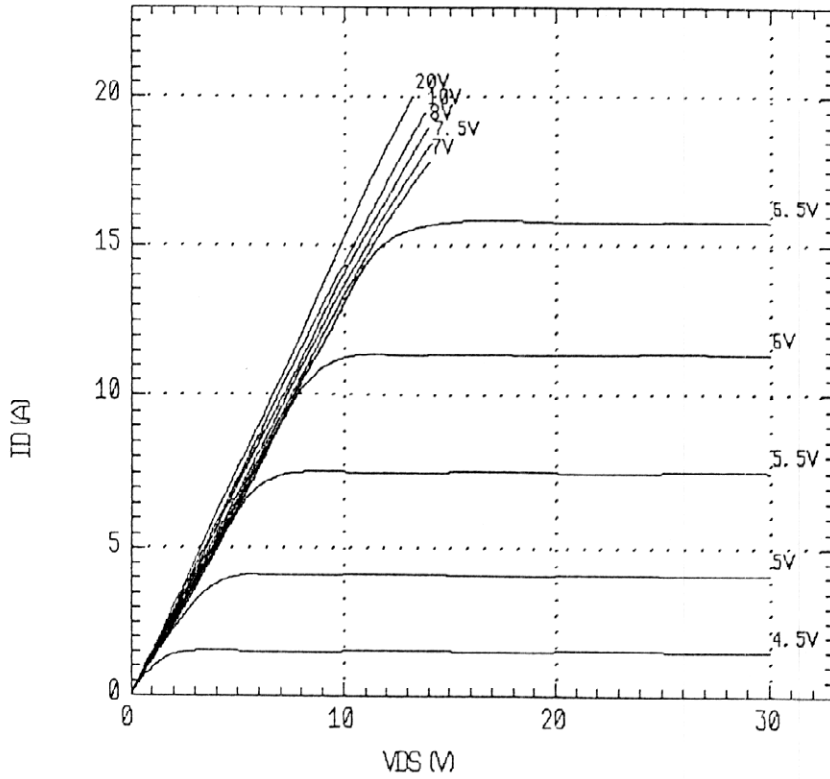
Safe operating area
 $ID=f(VDS): D=0.01, Tc=25^{\circ}C$



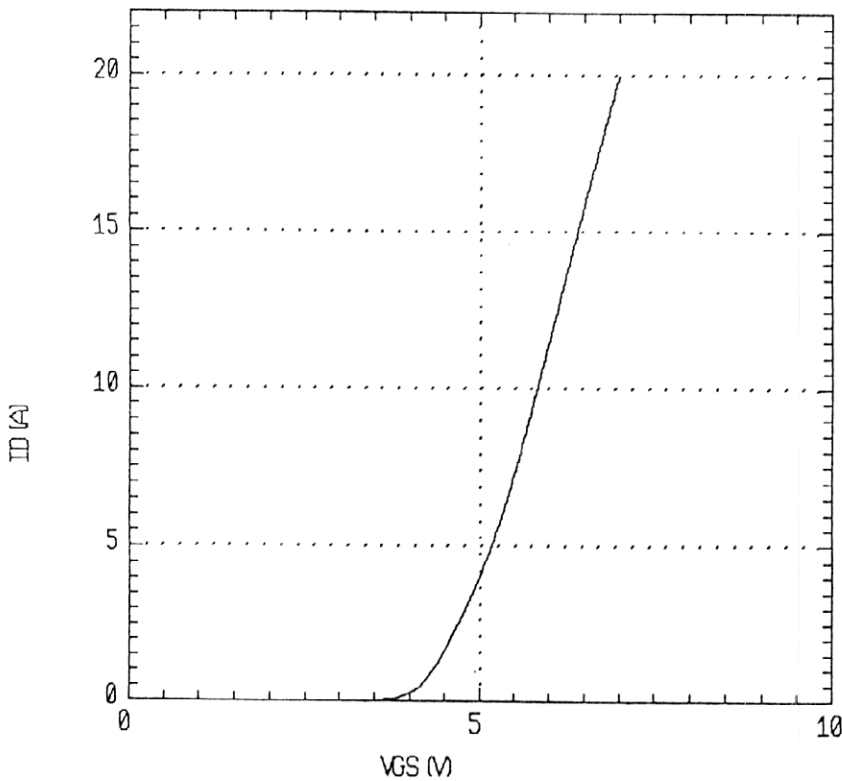
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Typical output characteristics
 $I_D=f(V_{DS}):80\mu s$ pulse test, $T_{ch}=25^\circ C$



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

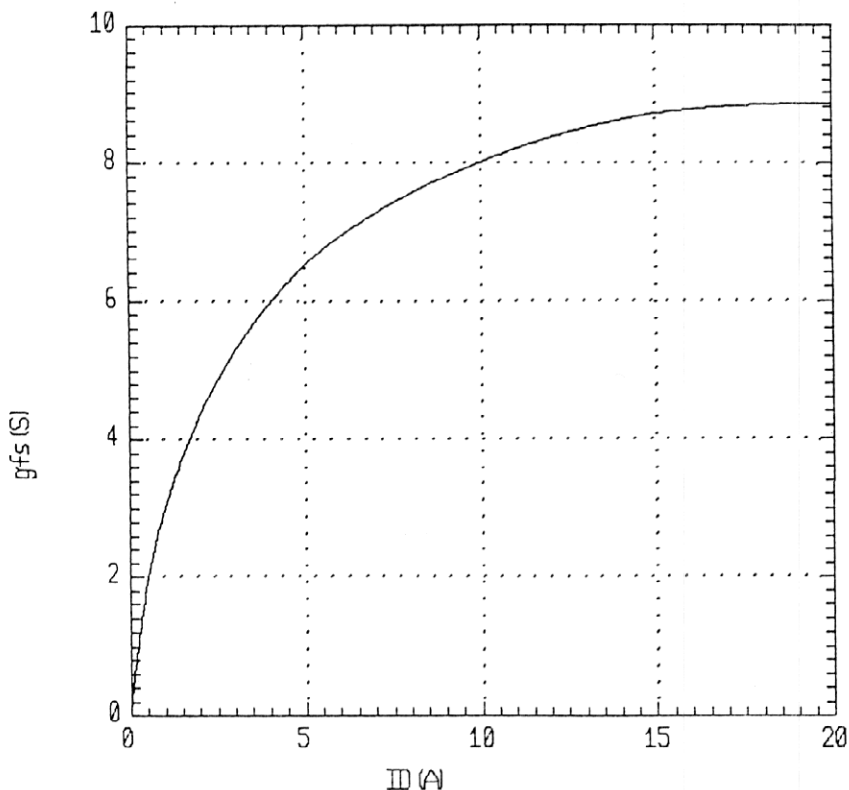


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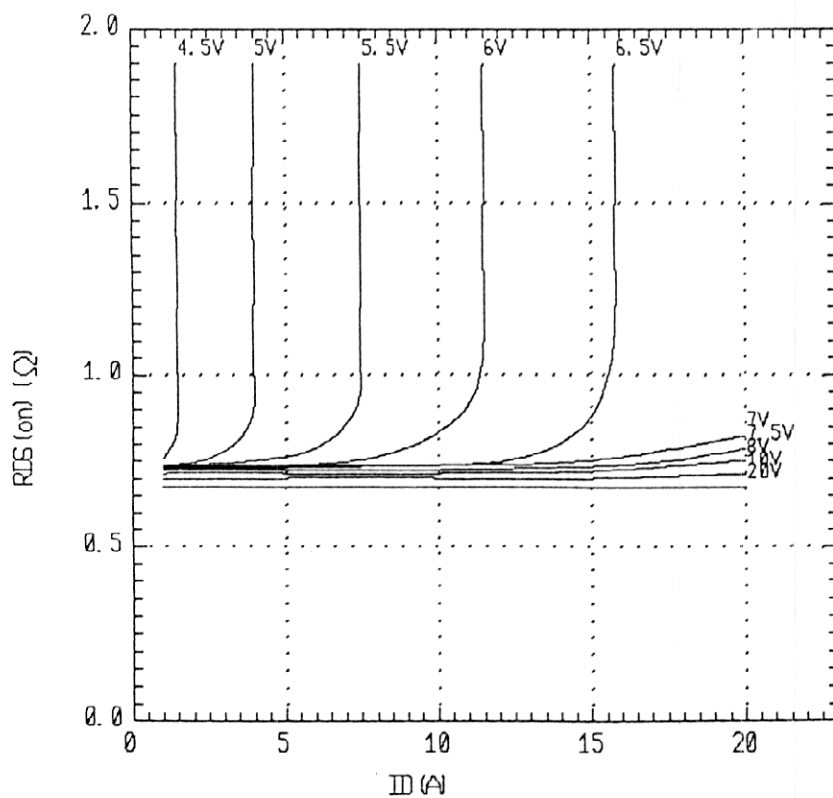
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Typical Transconductance
 $g_{fs} = f(I_D)$: 80 μ s pulse test, $V_{DS} = 25V$, $T_{ch} = 25^\circ C$



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

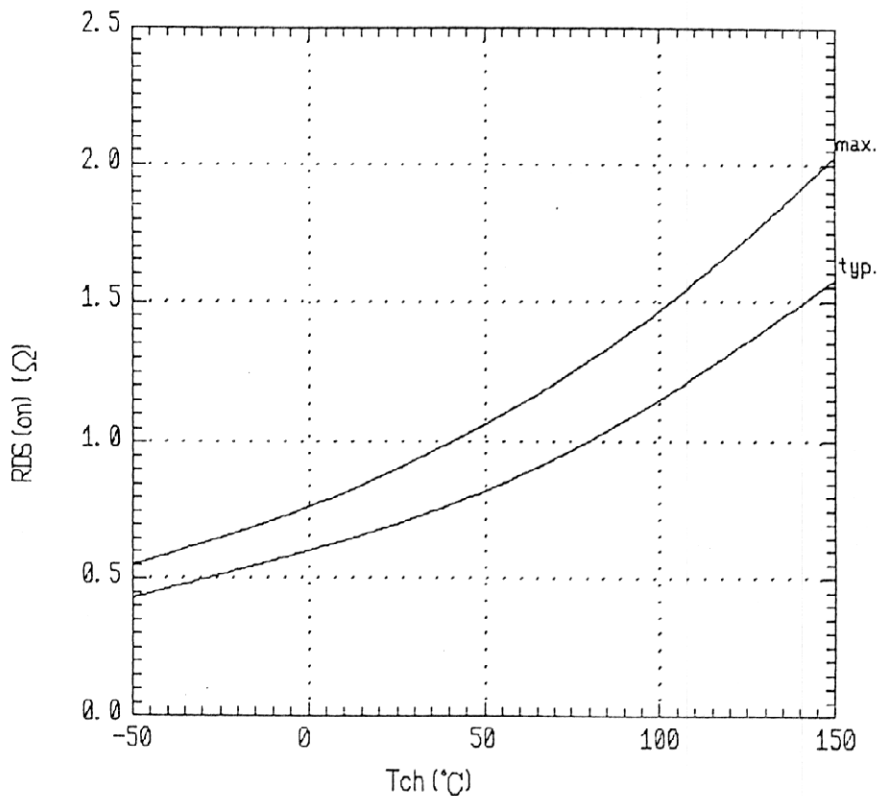


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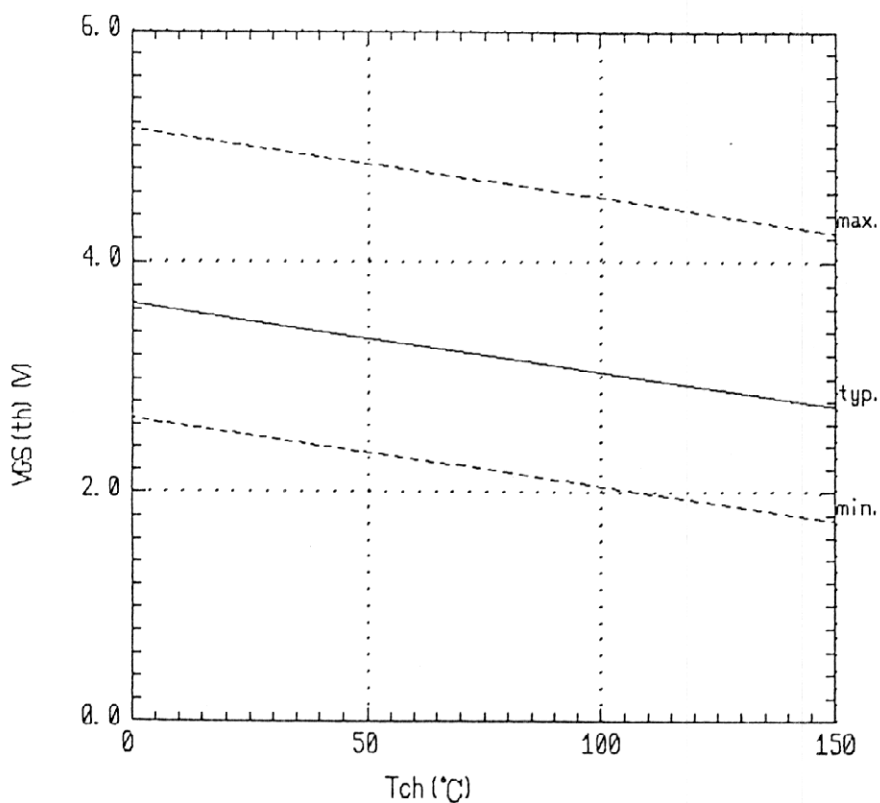
Drain-source on-state resistance

$R_{DS(on)} = f(T_{ch}) : I_D = 5A, V_{GS} = 10V$



Gate threshold voltage

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

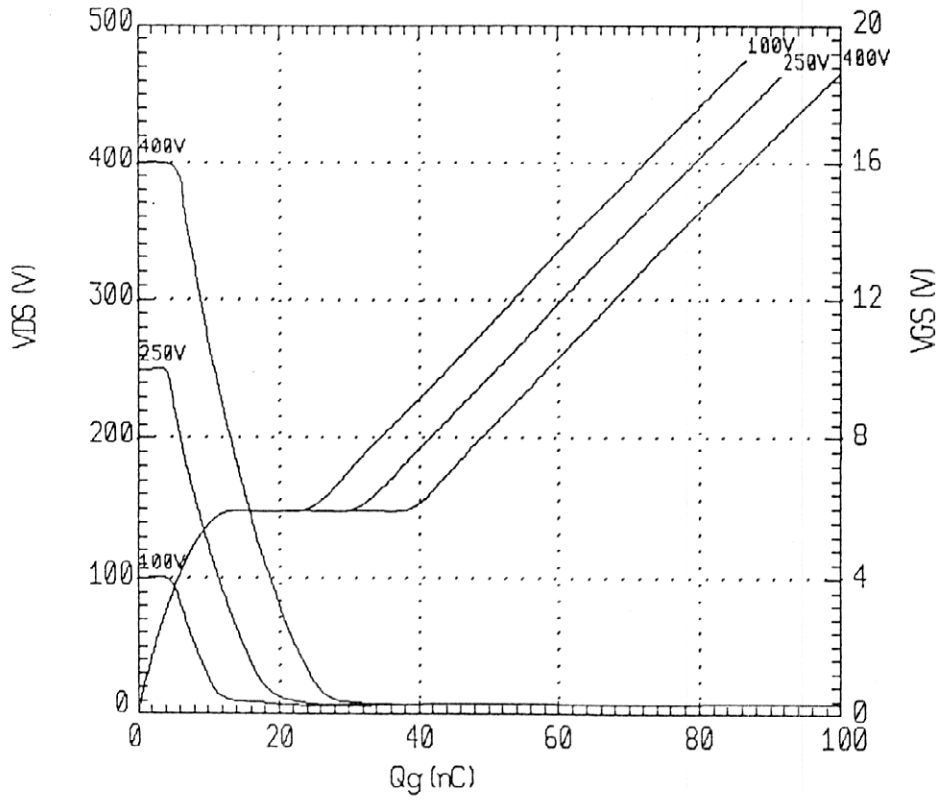


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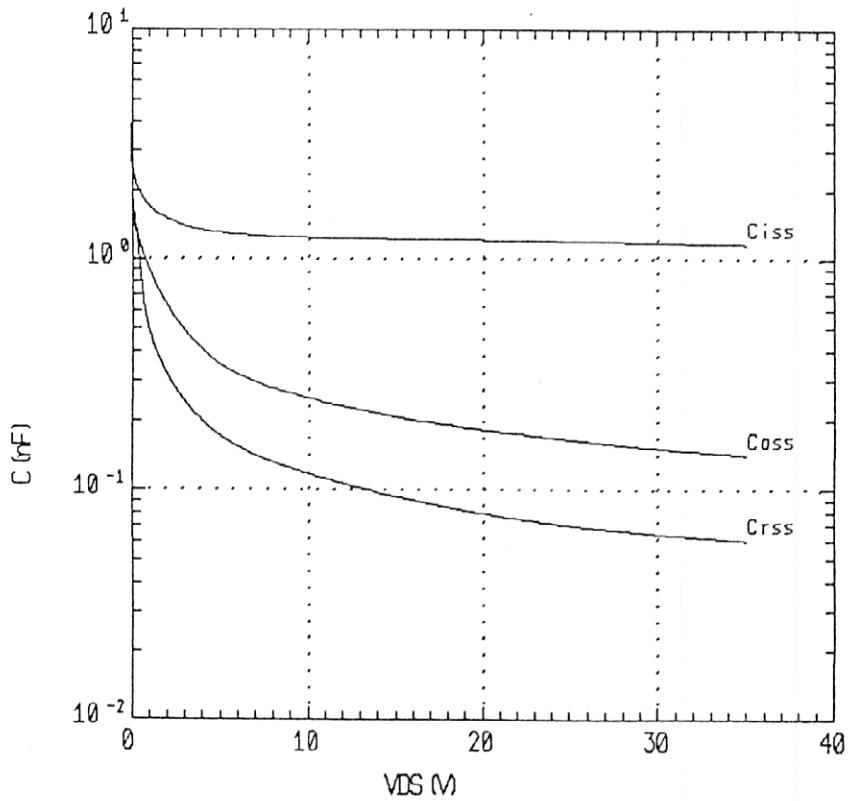
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Typical gate charge characteristics
 $V_{GS} = f(Q_g) : I_D = 10A$



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



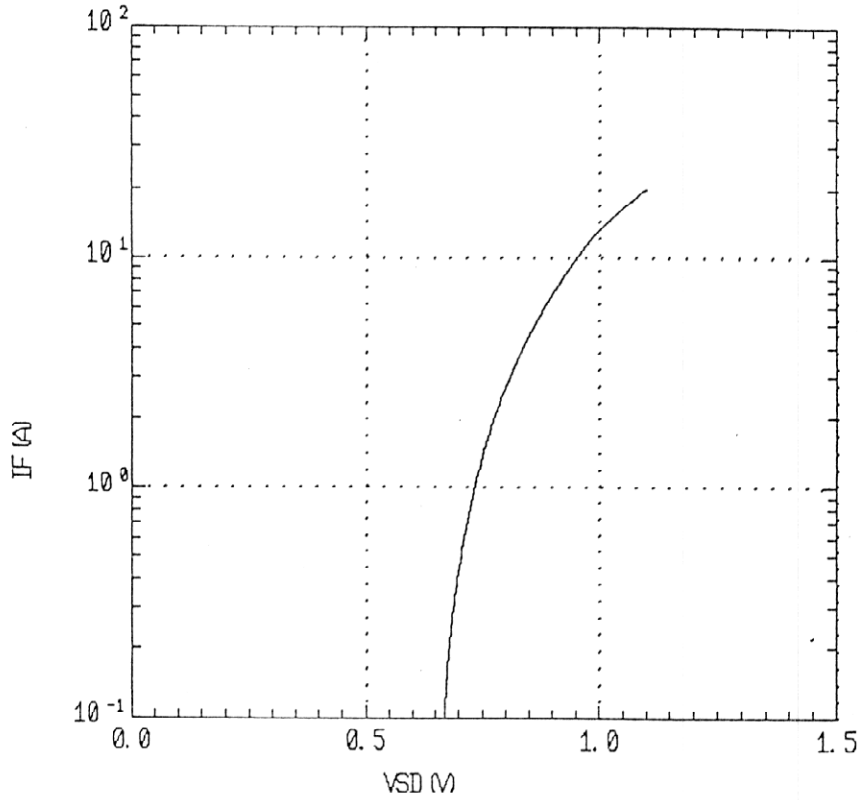
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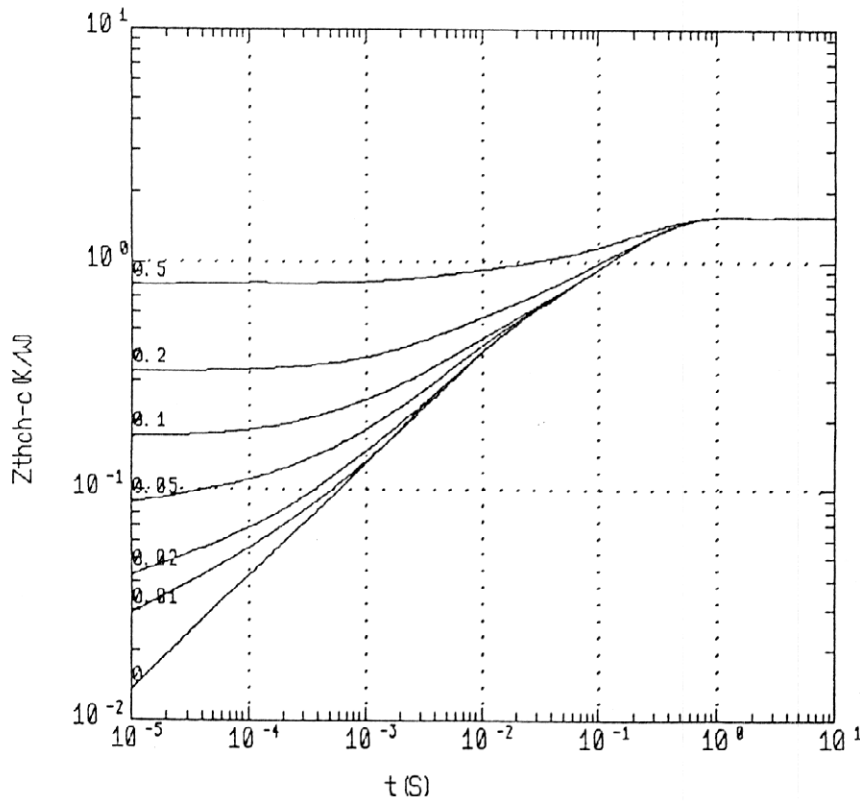
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Forward characteristic of reverse diode
 $I_F = f(V_{SD}) : 80 \mu s$ pulse test, $T_{ch} = 25^\circ C$



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

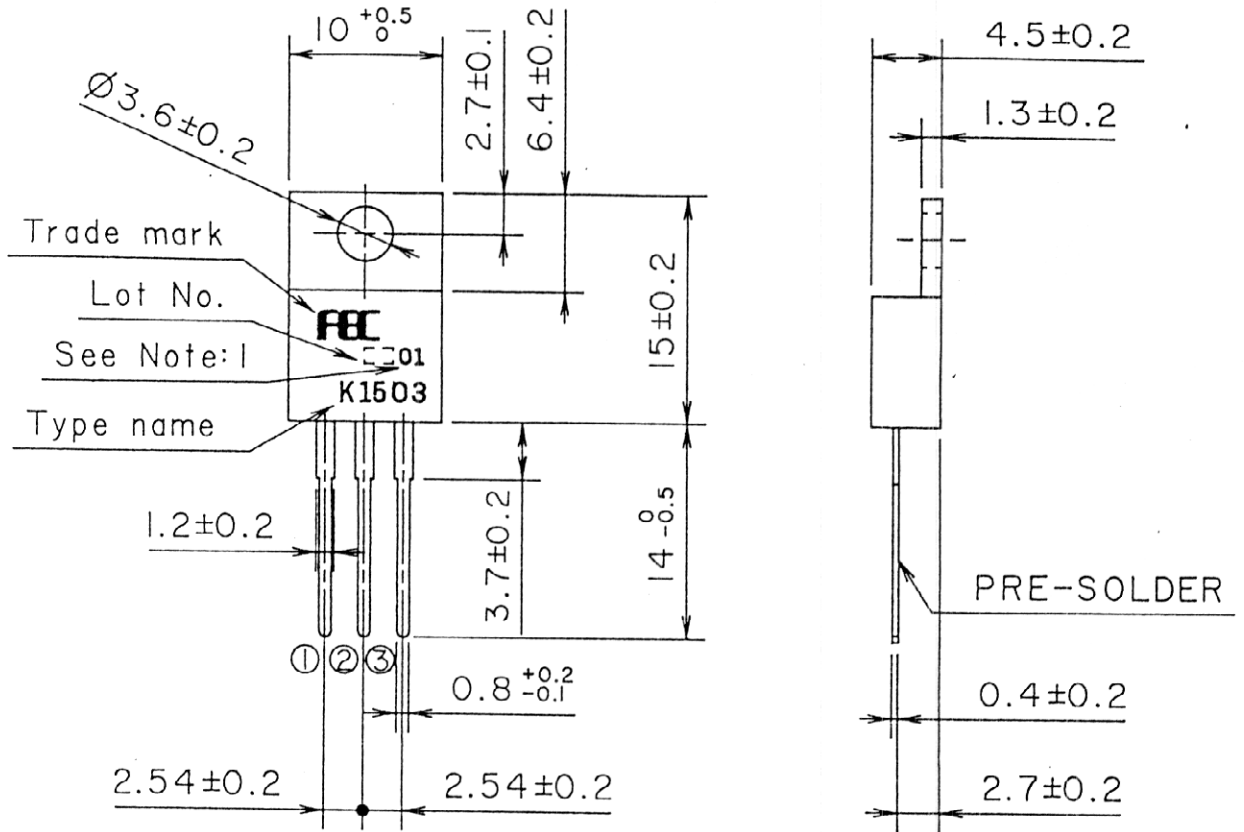


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FUJI POWER MOS FET

TYPE : 2SK1503-01



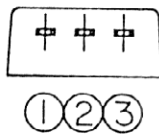
DIMENSIONS ARE IN MILLIMETERS.

CONNECTION

- ① GATE
- ② DRAIN
- ③ SOURCE

JEDEC : TO-220AB

Note 1. Guaranteed mark of avalanche ruggedness.



	DATE	NAME	APPROVED	MS.T0220. 2SK1503-01E	Fuji Electric Co.,Ltd.	DWG NO.	MK5C27595
DRAWN	1992-02-21	HIRAGURI	M.				
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