

Fuji power MOSFET Specification

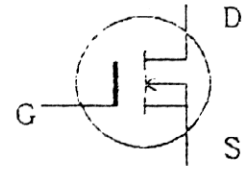
2SK1503-01

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

This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

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

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	$^\circ C/W$

DATE	NAME	APPROVED	Fuji Electric Co.,Ltd.		
DRAWN	-		DWG.NO.	MT5 F4259	2/9
CHECKED	-				
REVISIONS					

This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

Fig.1 Test circuit

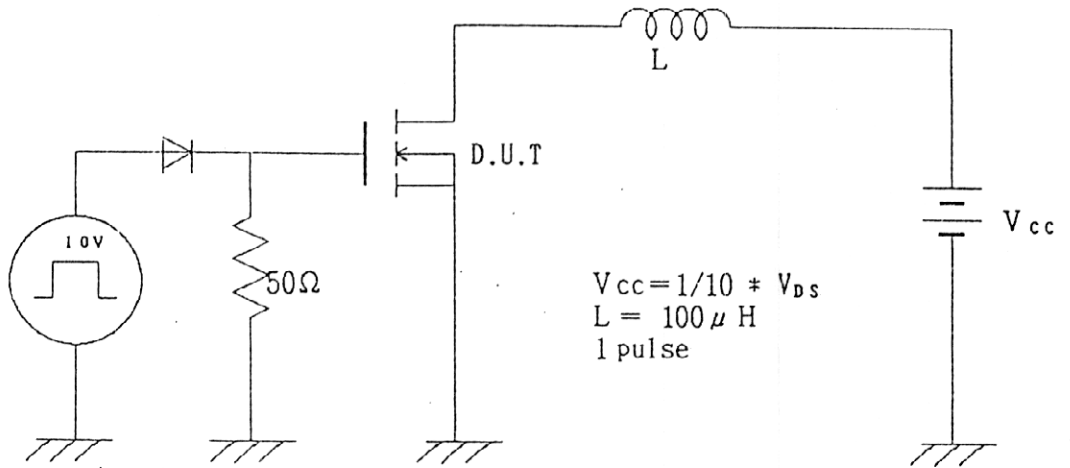
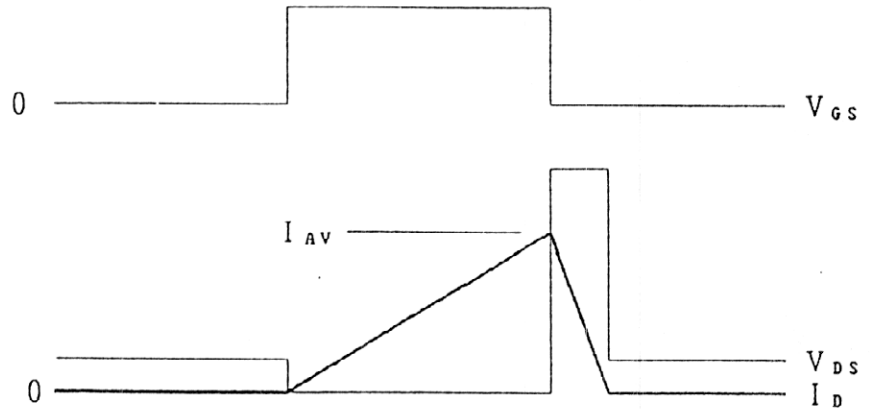


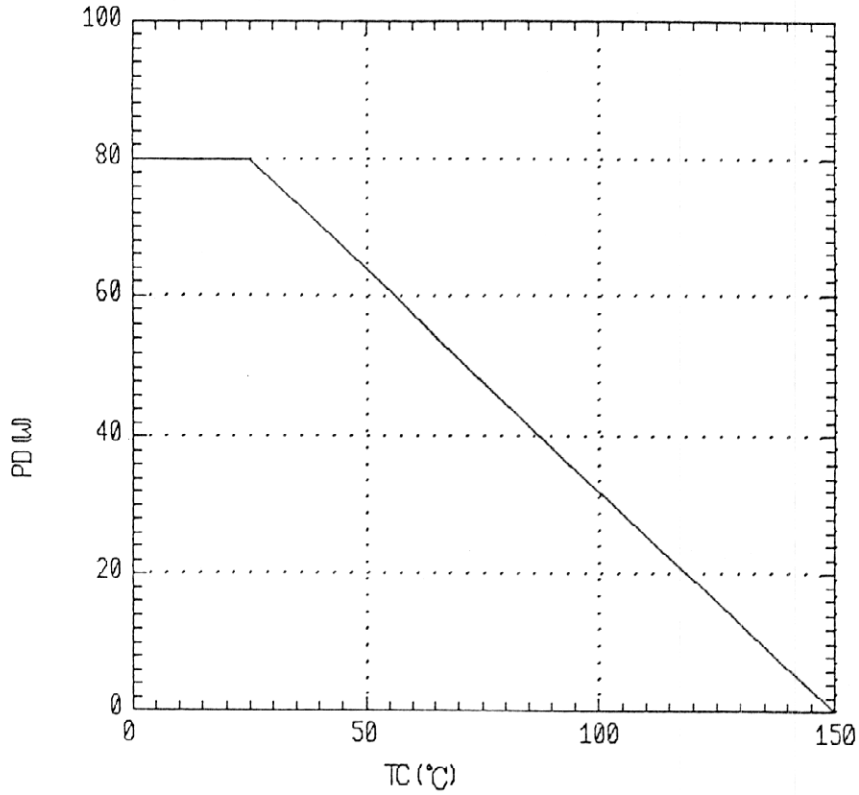
Fig.2 Operating waveforms



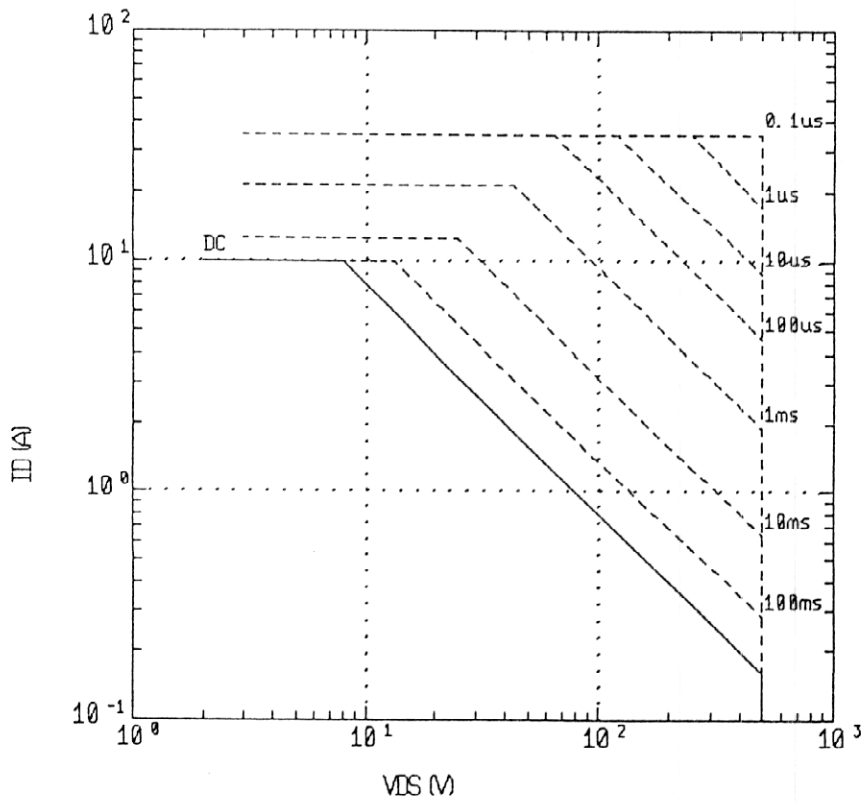
This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.
DRAWN	- -			DWG. NO. MT5 F 4259 3/9
CHECKED	- -			
REVISIONS				

Power Dissipation
 $PD=f(TC)$



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



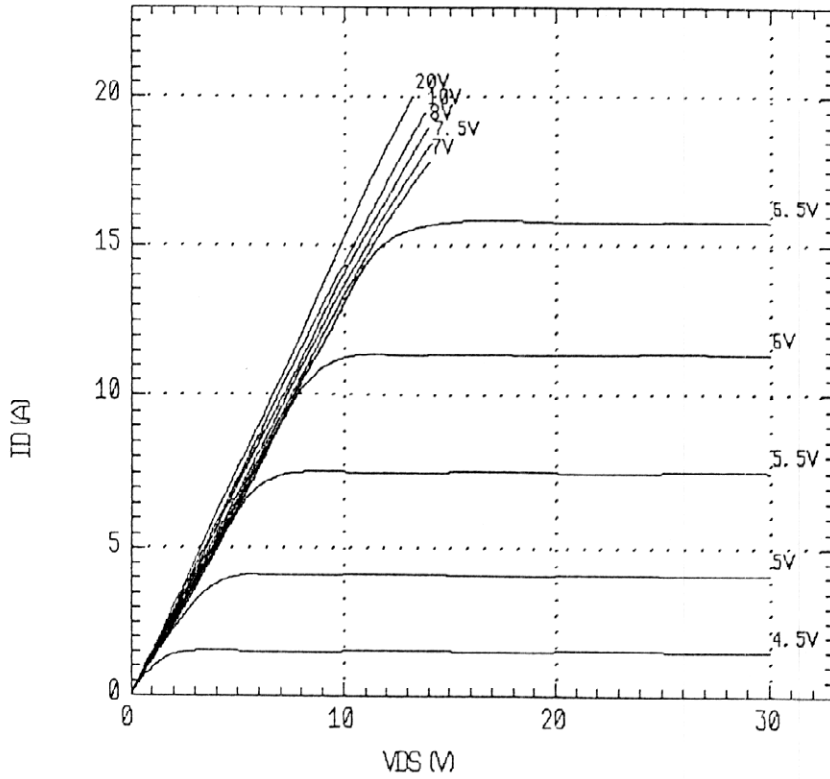
This material and the information herein is the property of Fuji Electric Co. Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

	DATE	NAME	APPROVED
DRAWN	- -		
CHECKED	- -		
REVISIONS			

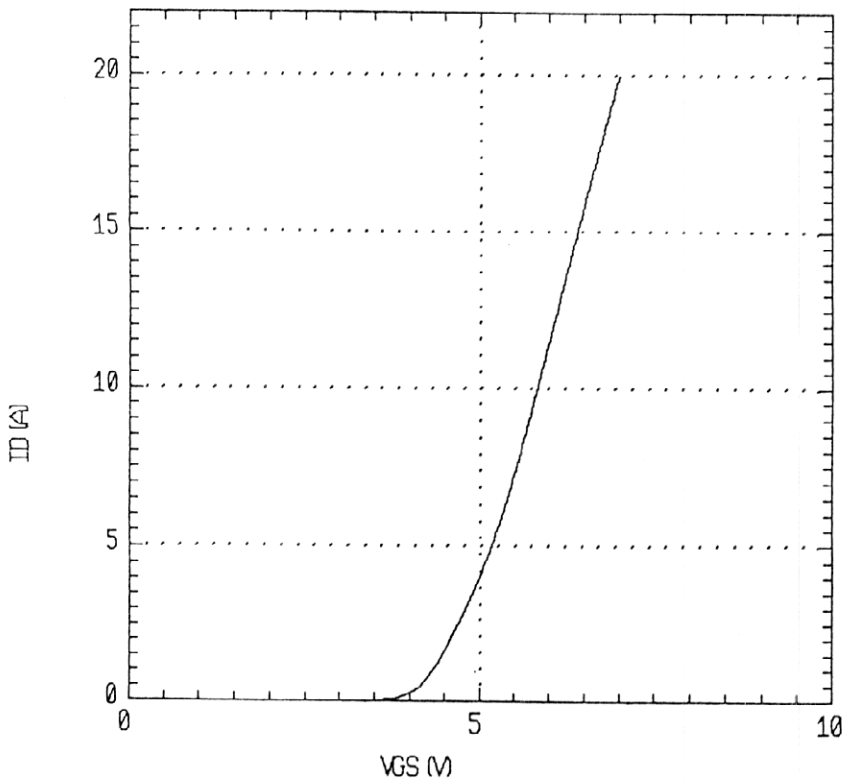
Fuji Electric Co.,Ltd.

DWG. NO. **MT5 F4259** 4/9

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



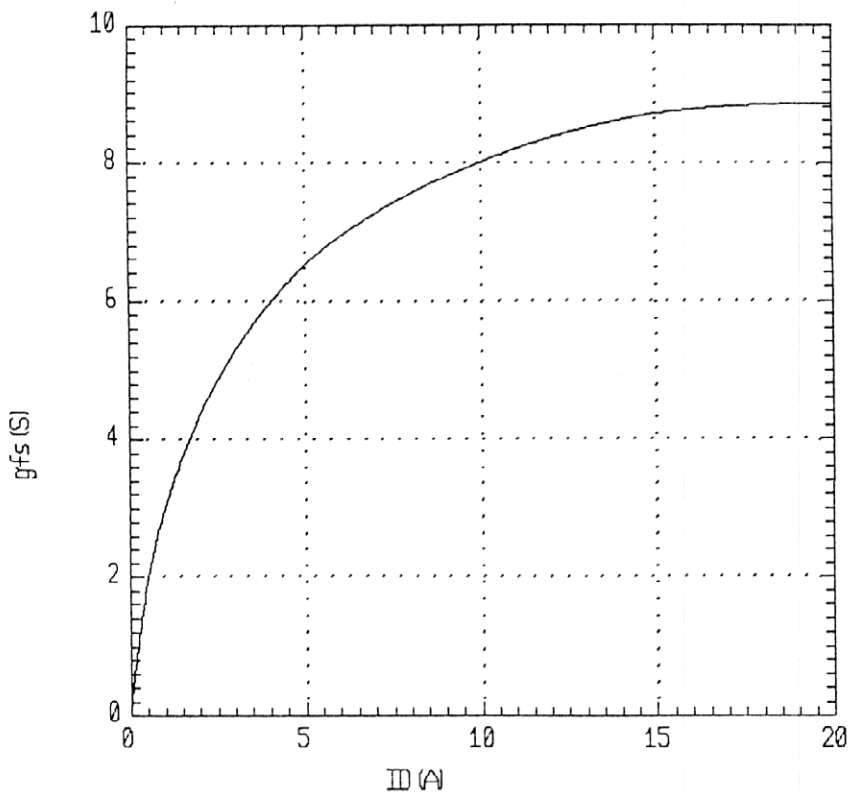
Typical Transfer Characteristics
 $I_D=f(V_{GS}): 80\mu s$ pulse test, $V_{DS}=25V$, $T_{ch}=25^\circ C$



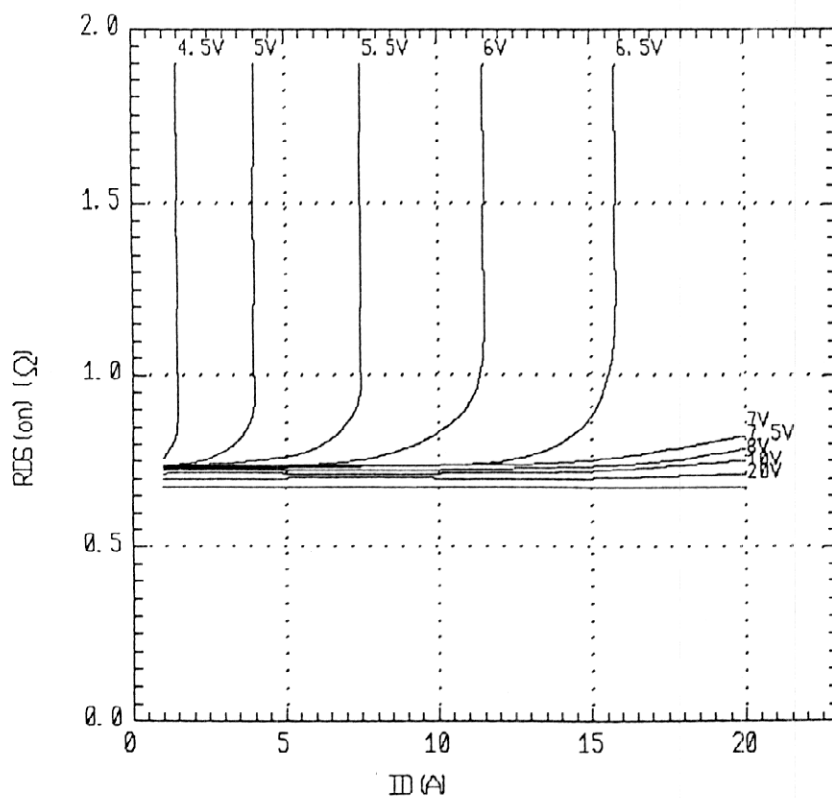
This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party, nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

	DATE	NAME	APPROVED	Fuji Electric Co.,Ltd.	
DRAWN	- -			DWG. NO.	MT5 F 4259
CHECKED	- -				
REVISIONS					

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



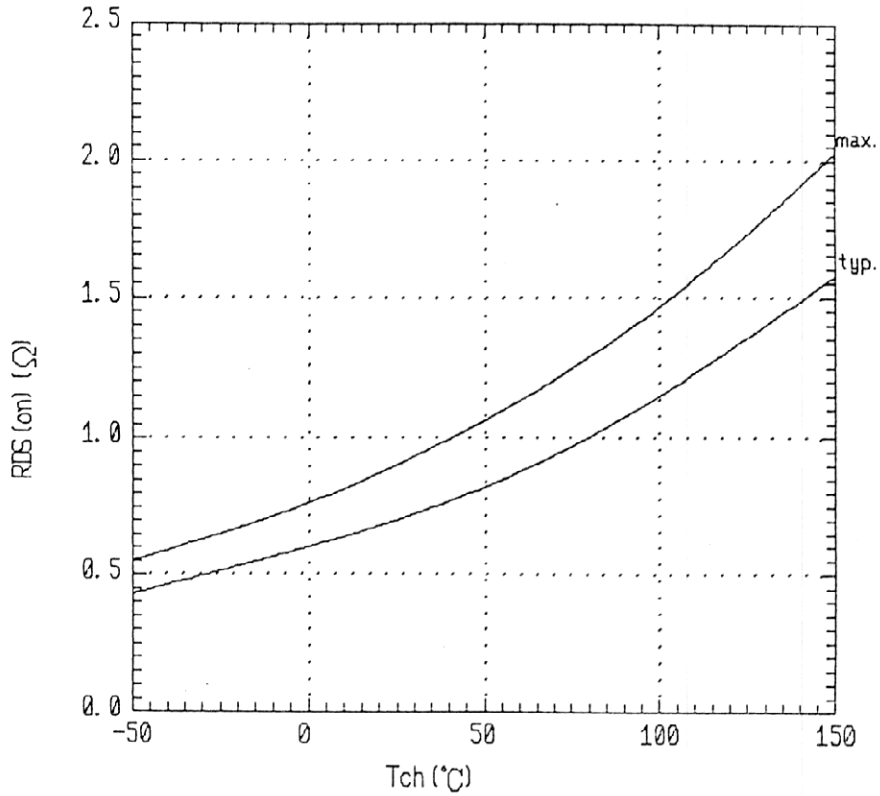
Typical Drain-source on-state resistance
 $R_{DS(on)} = f(I_D)$: 80 μ s pulse test, $T_{ch} = 25^\circ C$



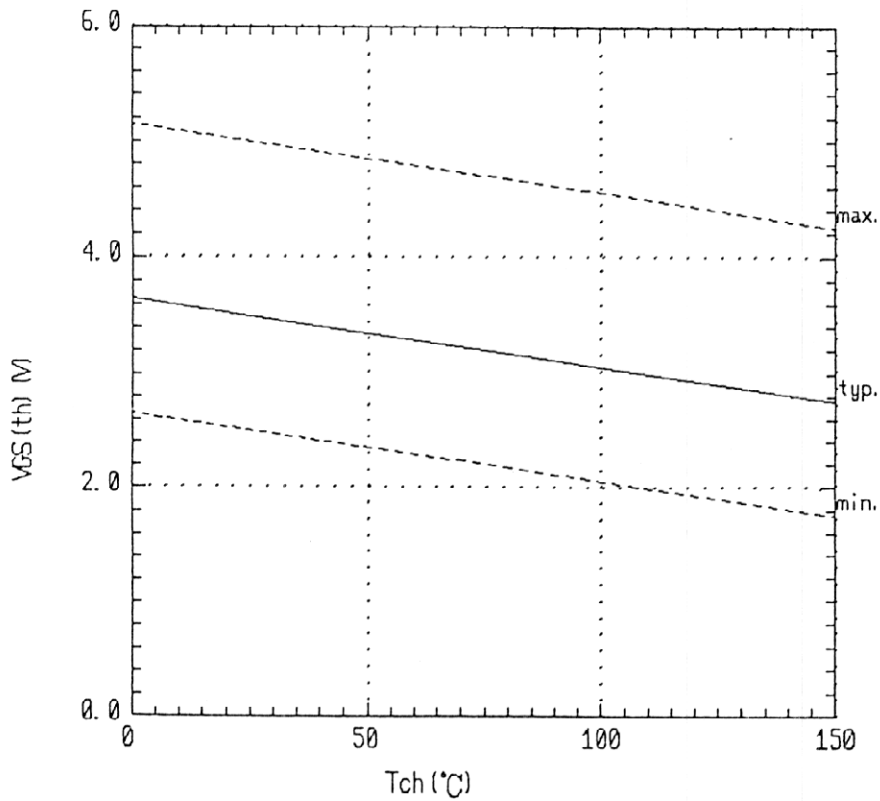
This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party, nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

REVISIONS	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.	DWG. NO.	MT5 F 4259	6/9
	DRAWN	-	-				
	CHECKED	-	-				

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



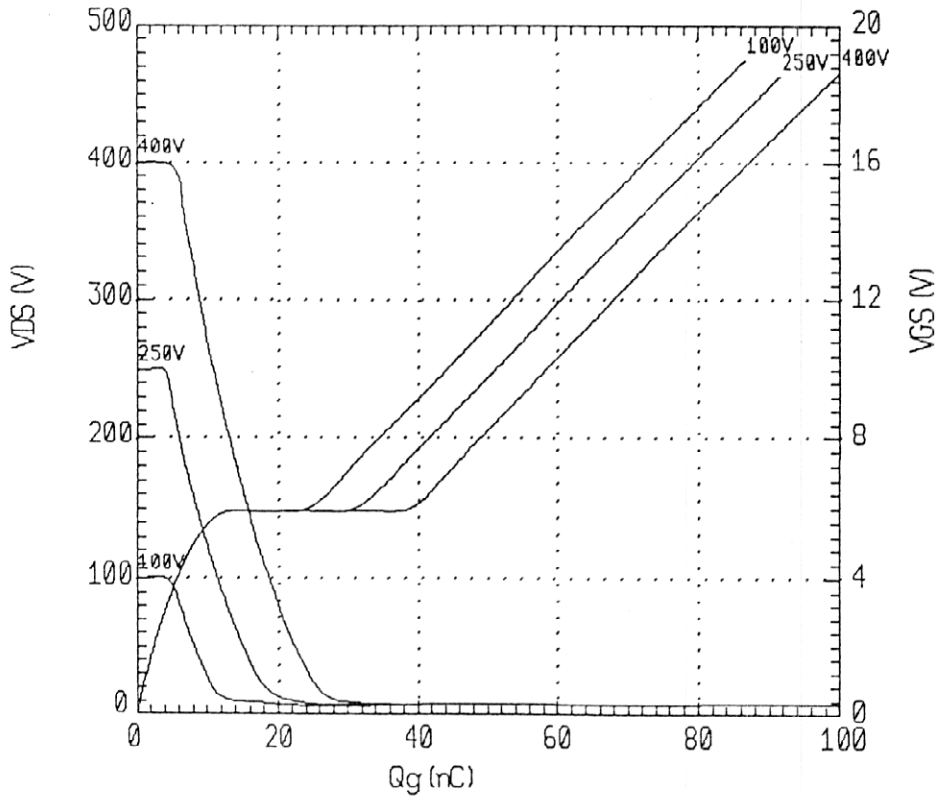
Gate threshold voltage
 $V_{GS(th)} = f(T_{ch}) : V_{DS} = V_{GS}, I_D = 1mA$



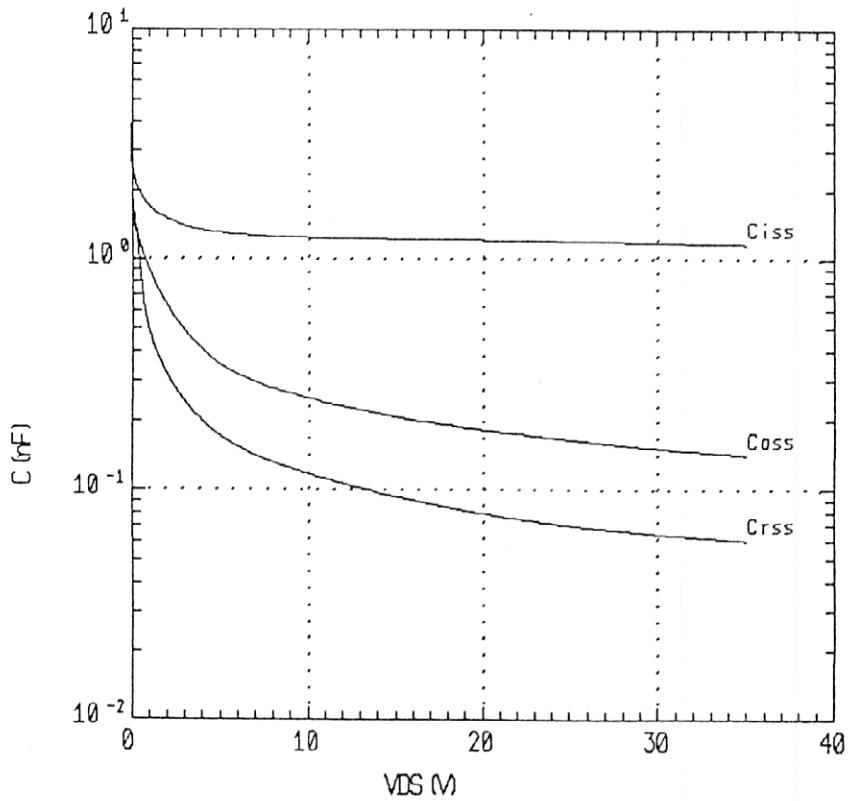
This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

DRAWN	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.
	CHECKED			
REVISIONS				DWG. NO. MT5 F 4259 7/9

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



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



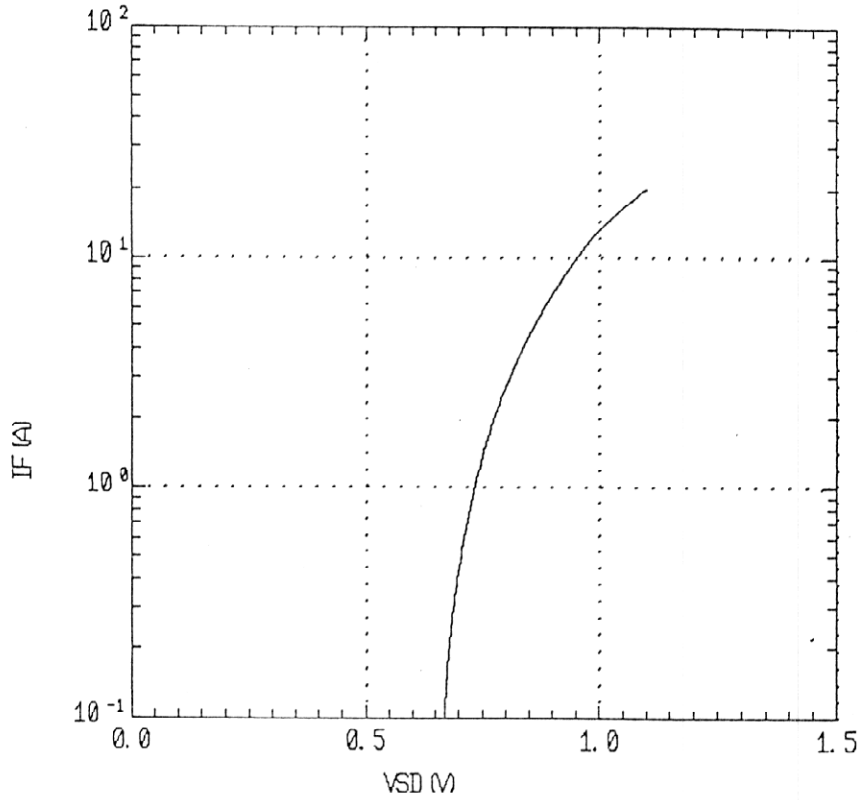
This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

	DATE	NAME	APPROVED
DRAWN	- -		
CHECKED	- -		
REVISIONS			

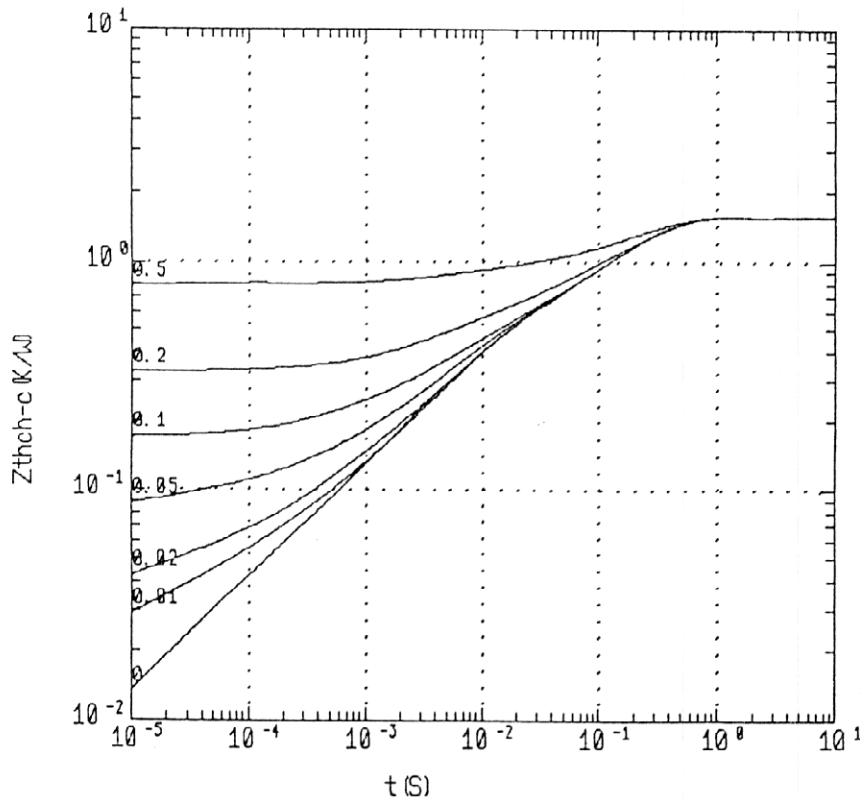
Fuji Electric Co., Ltd.

DWG. NO. **MT5 F 4259** 8/9

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: $D = t/T$

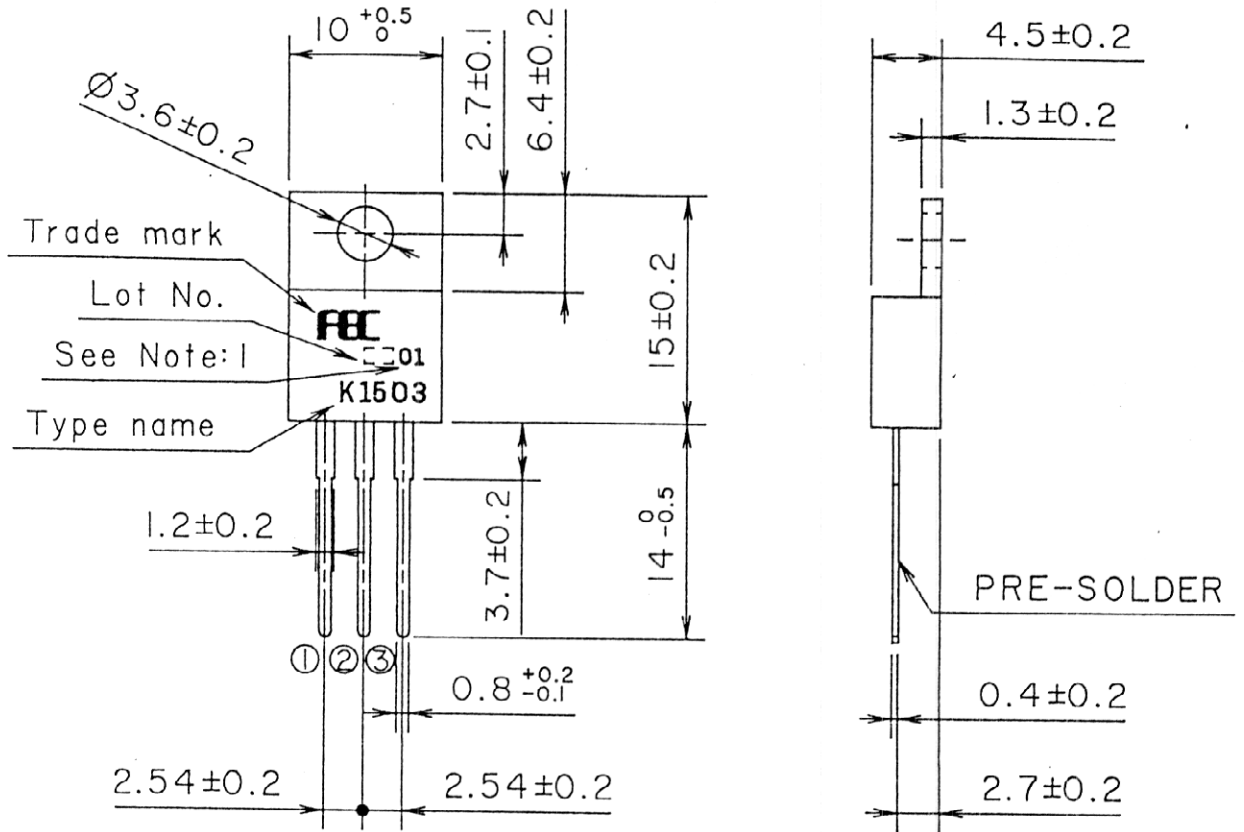


This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

				Fuji Electric Co., Ltd.	
	DATE	NAME	APPROVED	DWG. NO. MT5 F4259	9/9
DRAWN	- -				
CHECKED	- -				
REVISIONS					

FUJI POWER MOS FET

TYPE : 2SKI503-01



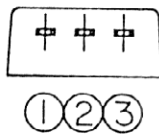
DIMENSIONS ARE IN MILLIMETERS.

CONNECTION

- ① GATE
- ② DRAIN
- ③ SOURCE

JEDEC : TO-220AB

Note 1. Guaranteed mark of avalanche ruggedness.



	DATE	NAME	APPROVED	MS.T0220. 2SKI503-01E	Fuji Electric Co.,Ltd.	DWG NO.	MK5C27595
DRAWN	1992-02-21	HIRAGURI	M.				
CHECKED	1992-02-21	MARUYAMA	Miyagi				
REVISIONS							

This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party, nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.