

SPECIFICATION

Device Name : Power MOSFET

Type Name : 2SK3102-01R

Spec. No. : **MS5 F4207**

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Fuji Electric Co.,Ltd.
Matsumoto Factory

	DATE	NAME	APPROVED	Fuji Electric Co.,Ltd.	
DRAWN	Feb.-13-'98	C. Ota		DWG.NO. MS5 F4207	1/12
CHECKED	Feb.-15-'98	<i>[Signature]</i>	<i>[Signature]</i>		

- 1.Scope** This specifies Fuji Power MOSFET 2SK3102-01R
- 2.Construction** N-Channel enhancement mode power MOSFET
- 3.Applications** for Switching
- 4.Outview** TO-3PF Outview See to 5/12 page

5.Absolute Maximum Ratings at Tc=25°C (unless otherwise specified)

Description	Symbol	Characteristics	Unit	Remarks
Drain-Source Voltage	V_{DS}	600	V	
Continuous Drain Current	I_D	± 10	A	
Pulsed Drain Current	I_{DP}	± 36	A	
Gate-Source Voltage	V_{GS}	± 35	V	
Repetitive or non-repetitive	I_{AR}	10	A	$T_{ch} \leq 150^\circ\text{C}$
Avalanche energy	E_{AS}	433.7	mj	
Maximum Power Dissipation	P_D	80	W	
Operating and Storage	T_{ch}	150	$^\circ\text{C}$	
Temperature range	T_{stg}	-55 to +150	$^\circ\text{C}$	

*L=7.95mH, Vcc=60V

6.Electrical Characteristics at Tc=25°C (unless otherwise specified)

Static Ratings

Description	Symbol	Conditions	min.	typ.	max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=1\text{mA}$ $V_{GS}=0\text{V}$	600			V
Gate Threshold Voltage	$V_{GS(th)}$	$I_D=1\text{mA}$ $V_{DS}=V_{GS}$	3.5	4.0	4.5	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=600\text{V}$ $V_{GS}=0\text{V}$ $T_{ch}=25^\circ\text{C}$		10	500	μA
		$T_{ch}=125^\circ\text{C}$		0.2	1.0	mA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30\text{V}$ $V_{DS}=0\text{V}$		10	100	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	$I_D=5\text{A}$ $V_{GS}=10\text{V}$		0.85	1	Ω

Dynamic Ratings

Description	Symbol	Conditions	min.	typ.	max.	Unit
Forward Transconductance	g_{fs}	$I_D=5A$ $V_{DS}=25V$	3.0	6.0		S
Input Capacitance	C_{iss}	$V_{DS}=25V$		1100	1700	pF
Output Capacitance	C_{oss}	$V_{GS}=0V$		170	260	
Reverse Transfer Capacitance	C_{rss}	$f=1MHz$		75	120	
Turn-On Time	$t_d(on)$	$V_{cc}=300V$		25	40	ns
	t_r	$V_{GS}=10V$		70	110	
Turn-Off Time	$t_d(off)$	$I_D=10A$		75	120	
	t_f	$R_{GS}=10\Omega$		40	60	

Reverse Diode

Description	Symbol	Conditions	min.	typ.	max.	Unit
Avalanche Capability	I_{AV}	$L=1.19mH$ $T_{ch}=25^\circ C$ See Fig.1 and Fig.2	10			A
Diode Forward On-Voltage	V_{SD}	$I_F=2 \times I_{DR}$ $V_{GS}=0V$ $T_{ch}=25^\circ C$		1.0	1.5	V
Reverse Recovery Time	t_{rr}	$I_F=I_{DR}$ $V_{GS}=0V$		500		ns
Reverse Recovery Charge	Q_{rr}	$-di/dt=100A/\mu s$ $T_{ch}=25^\circ C$		6.5		μC

7.Thermal Resistance

Description	Symbol	min.	typ.	max.	Unit
Channel to Case	$R_{th}(ch-c)$			1.56	$^\circ C/W$
Channel to Ambient	$R_{th}(ch-a)$			30.0	$^\circ C/W$

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Fig.1 Test circuit

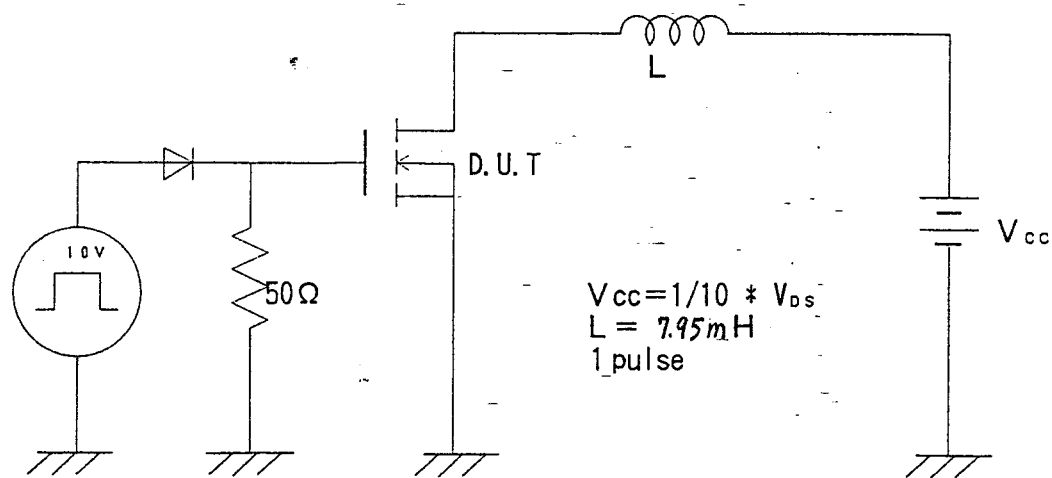
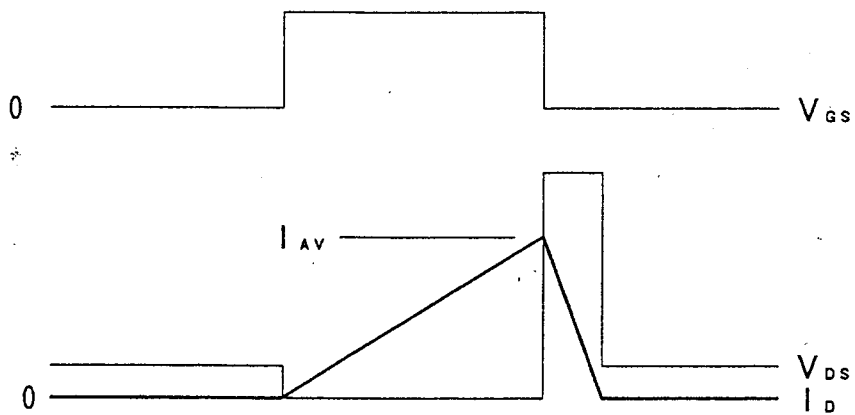
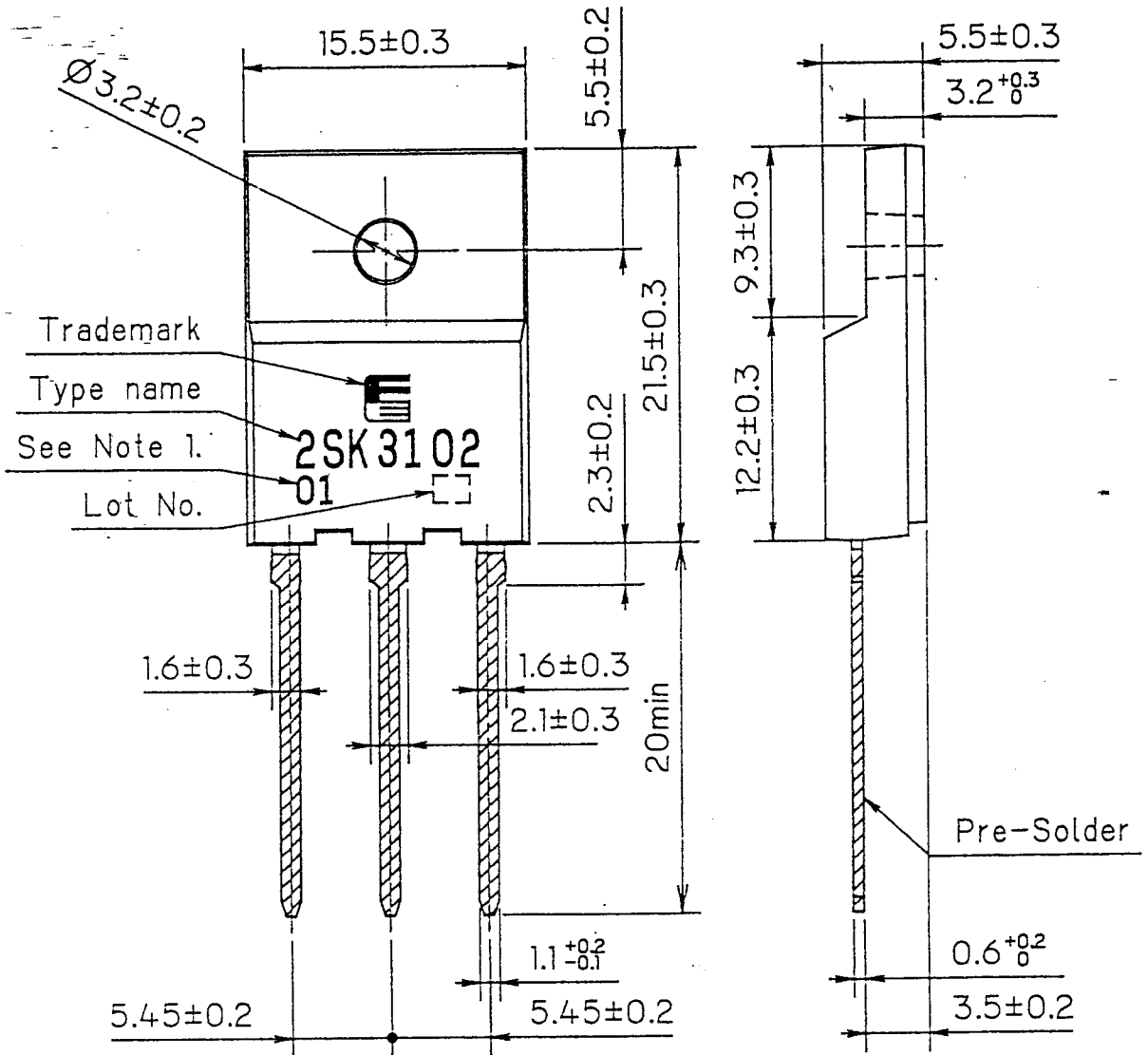


Fig.2 Operating waveforms

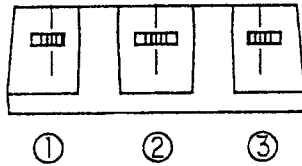


FUJI POWER MOSFET

TYPE : 2SK3102-01R



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CONNECTION

Note 1. Guaranteed mark of avalanche ruggedness.

- ① GATE
- ② DRAIN
- ③ SOURCE

DIMENSIONS ARE IN MILLIMETERS.

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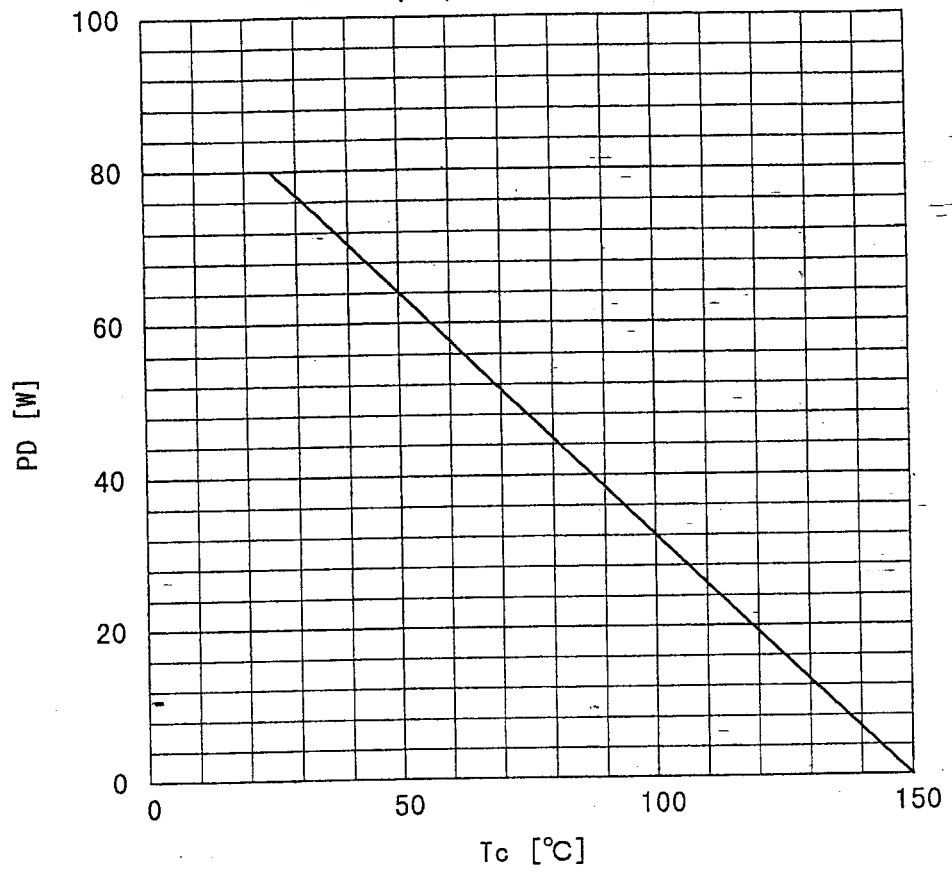
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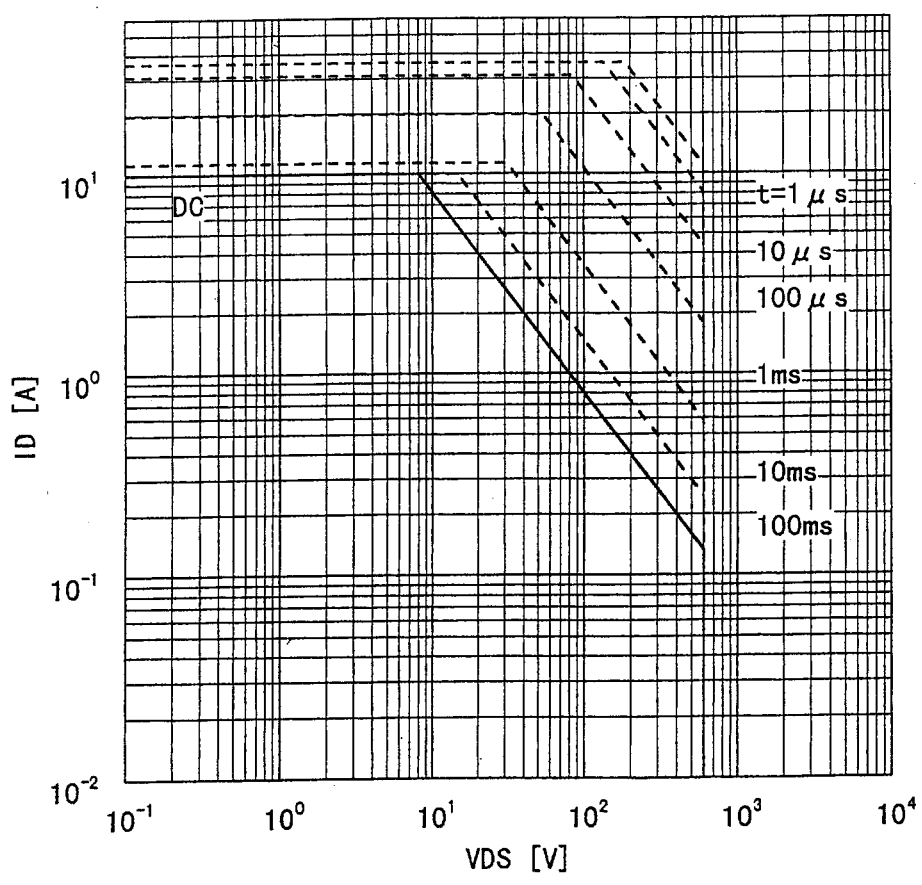
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Power Dissipation
 $PD=f(T_c)$



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



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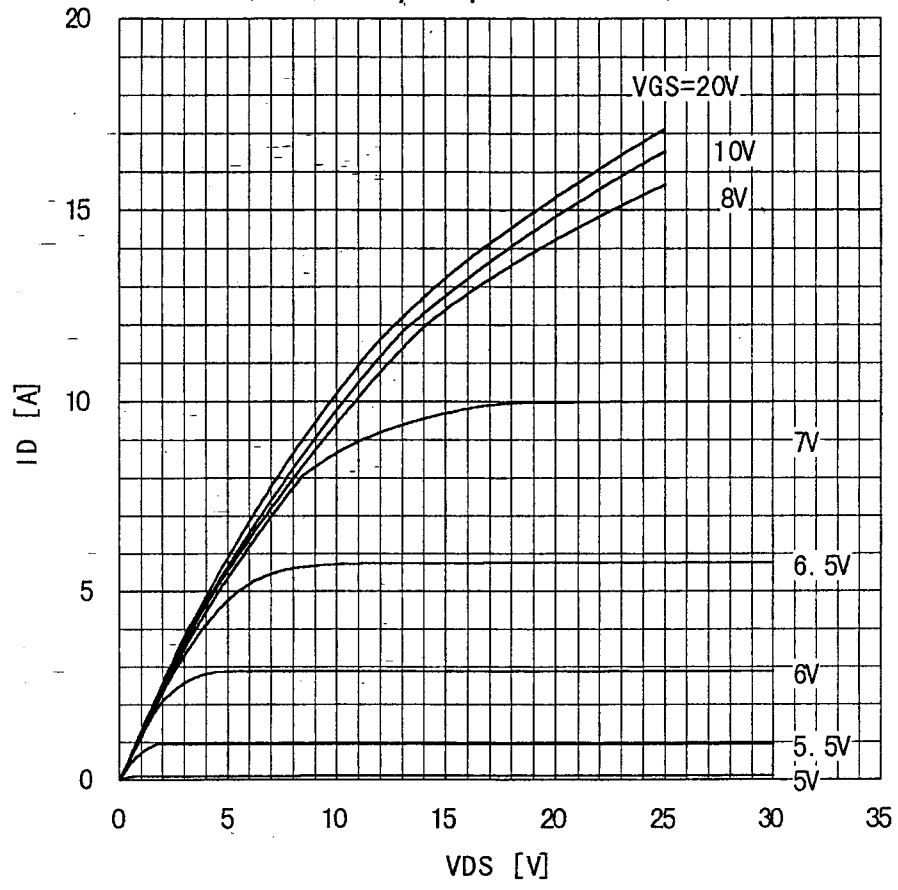
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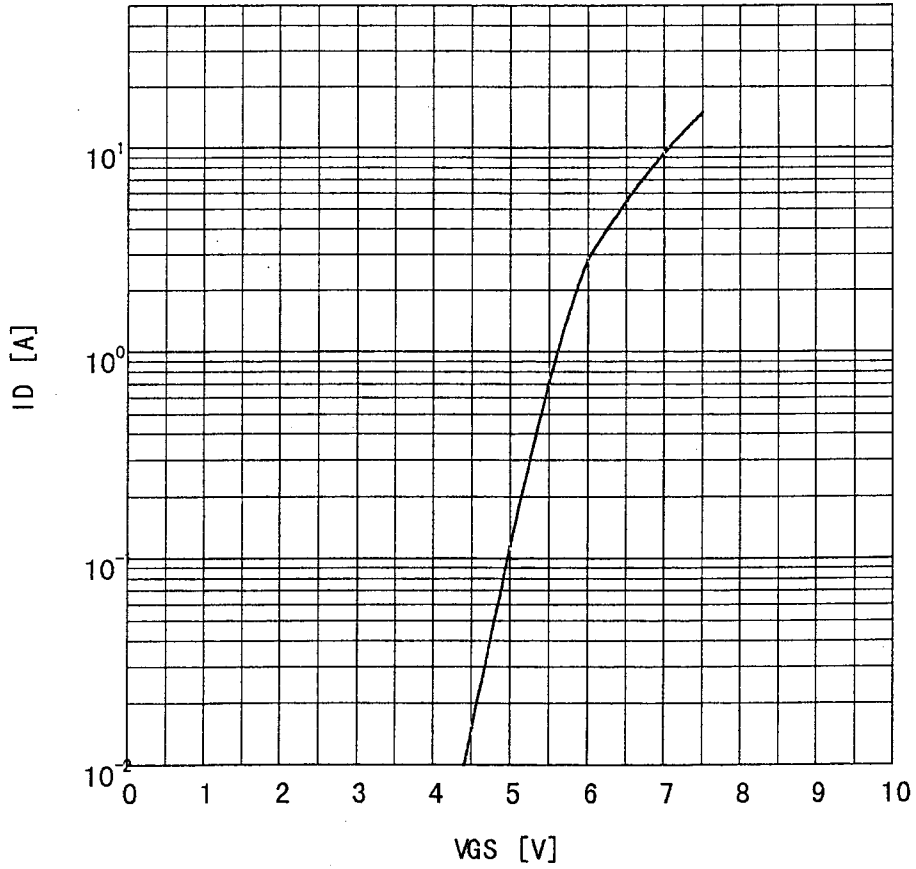
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Typical output characteristics
 $I_D = f(V_{DS}) : 80 \mu s$ pulse test, $T_c = 25^\circ C$



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



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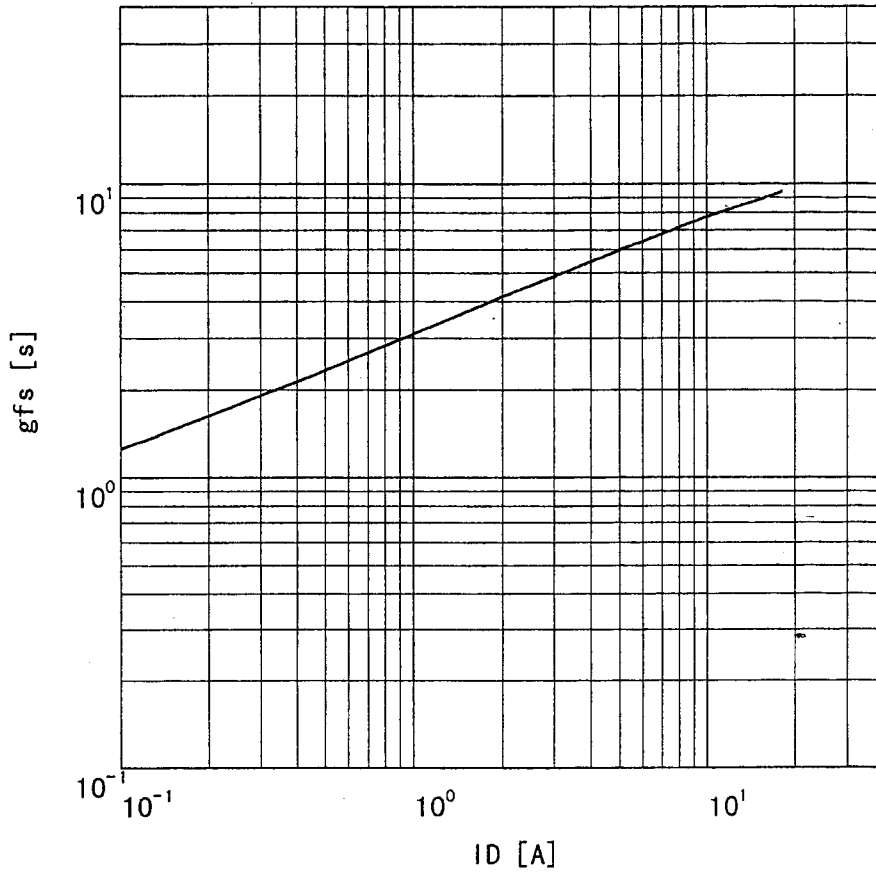
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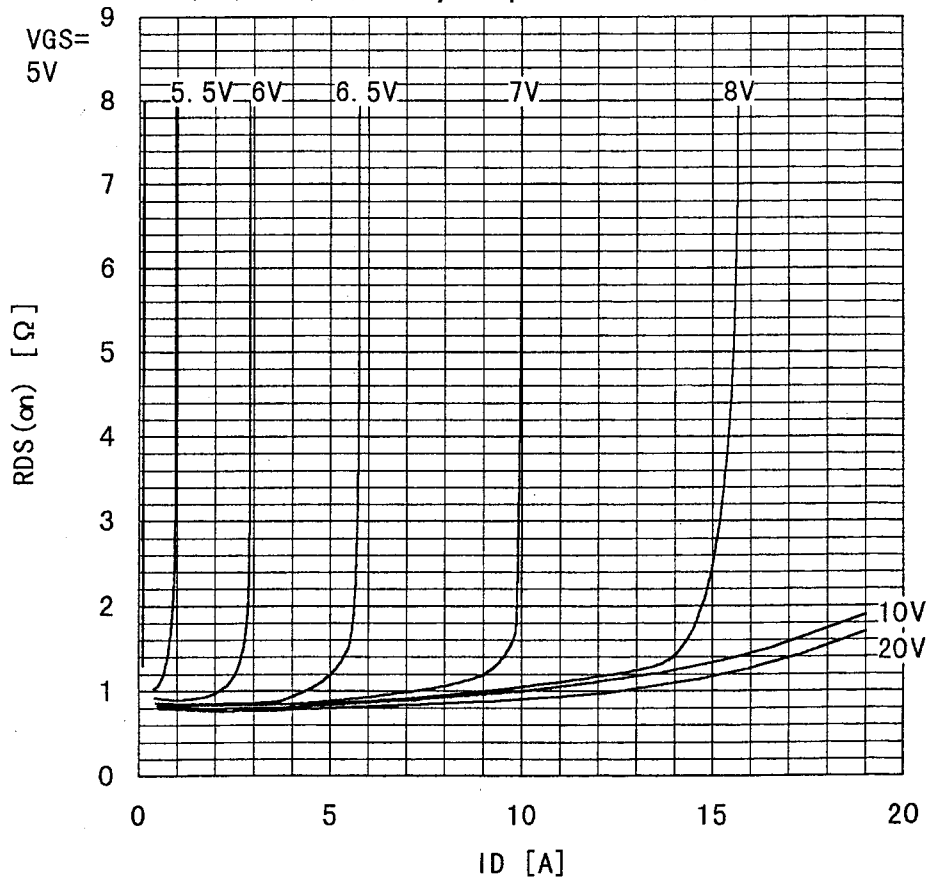
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Typical forward transconductance
 $g_{fs} = f(I_D) : 80 \mu s$ pulse test, $V_{DS} = 25V$, $T_{ch} = 25^\circ C$



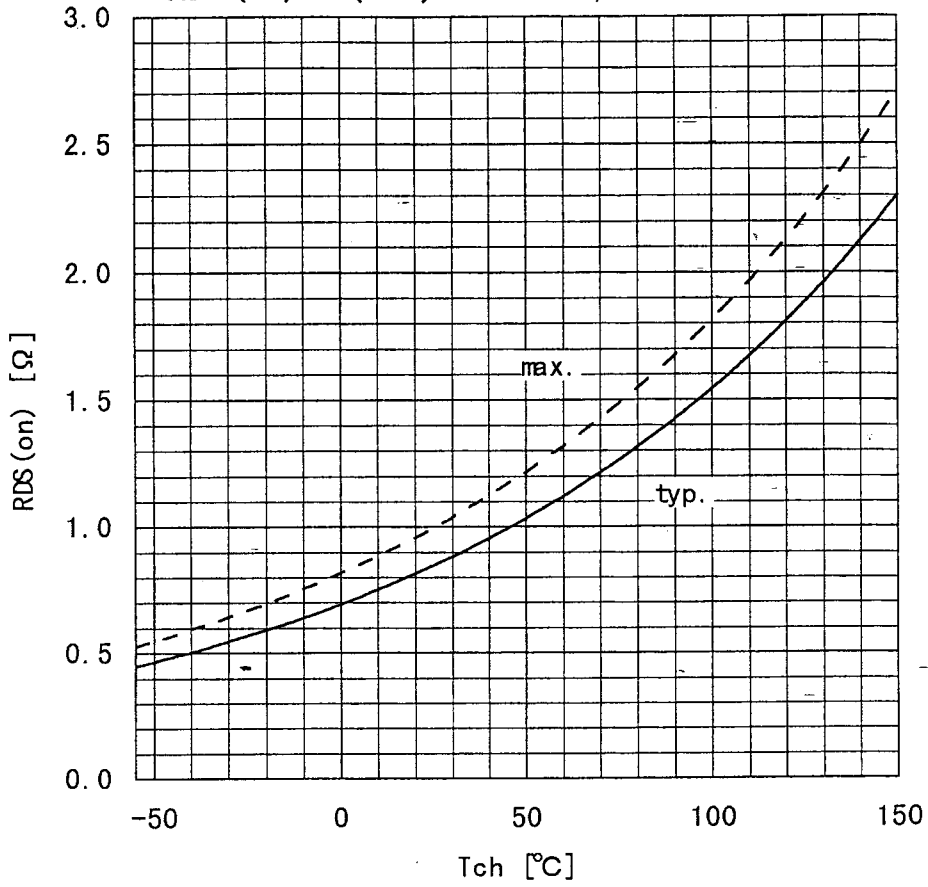
Typical drain-source on-state resistance
 $R_{DS(on)} = f(I_D) : 80 \mu s$ pulse test, $T_c = 25^\circ C$



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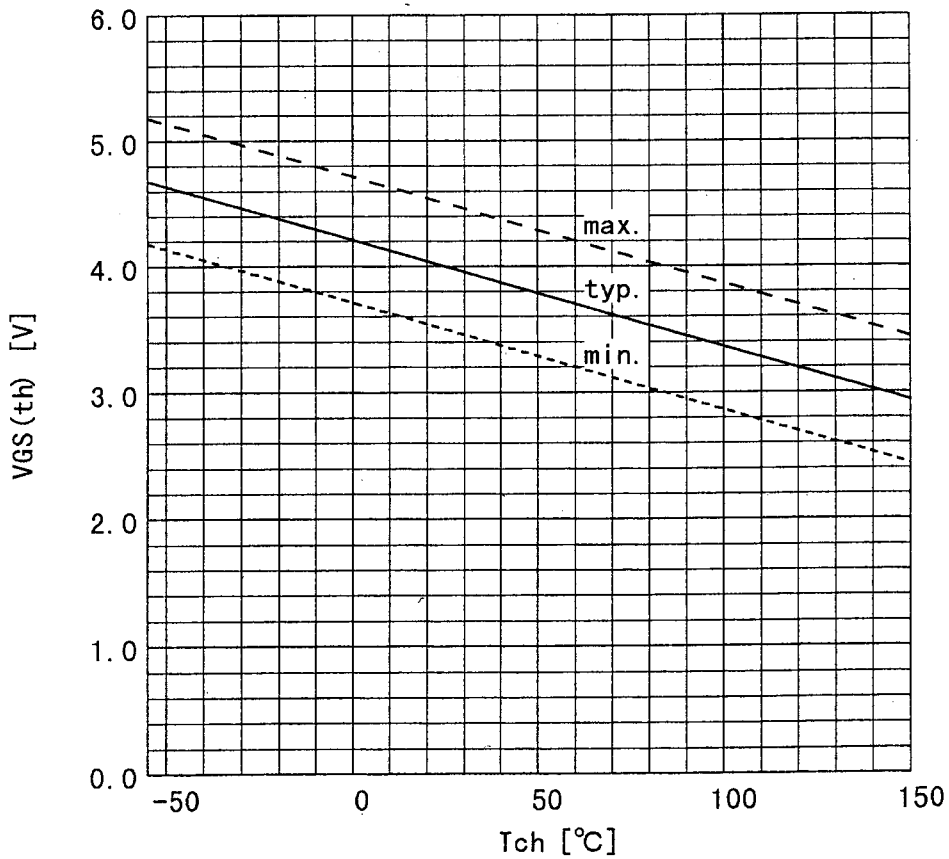
Drain-source on-state resistance

$R_{DS(on)} = f(T_{ch}) : I_D = 4.5A, V_{GS} = 10V$



Gate threshold voltage

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



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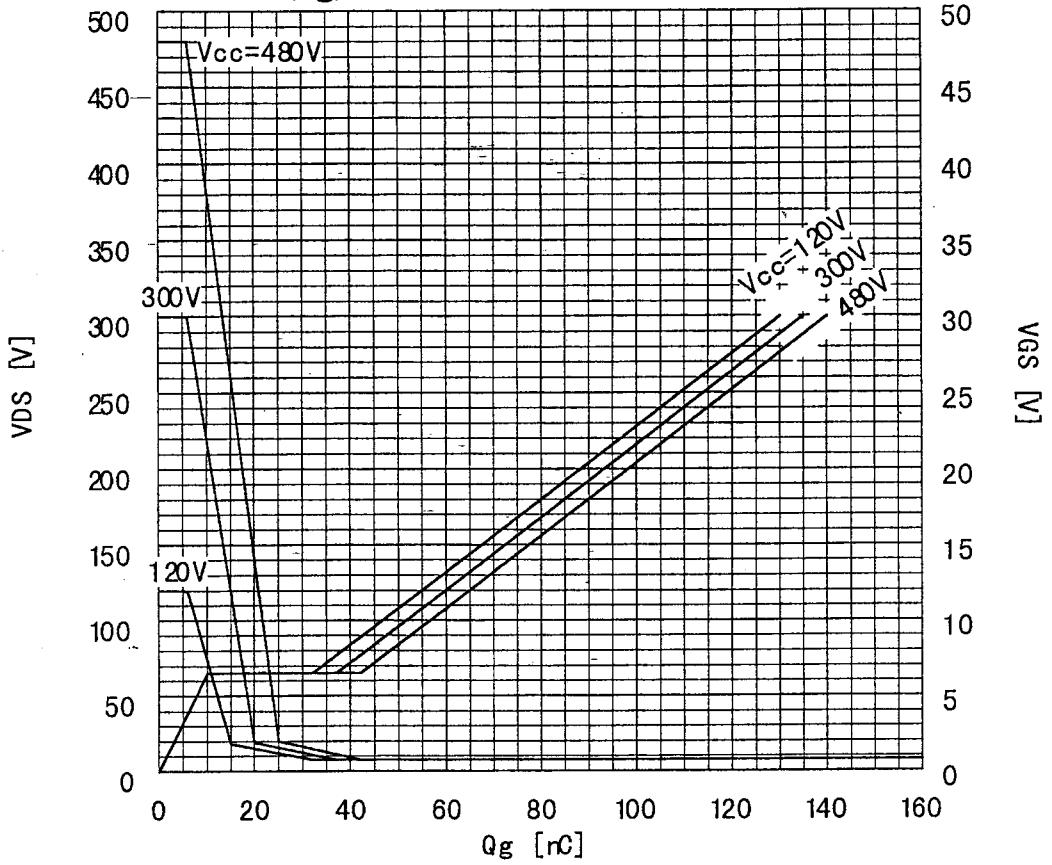
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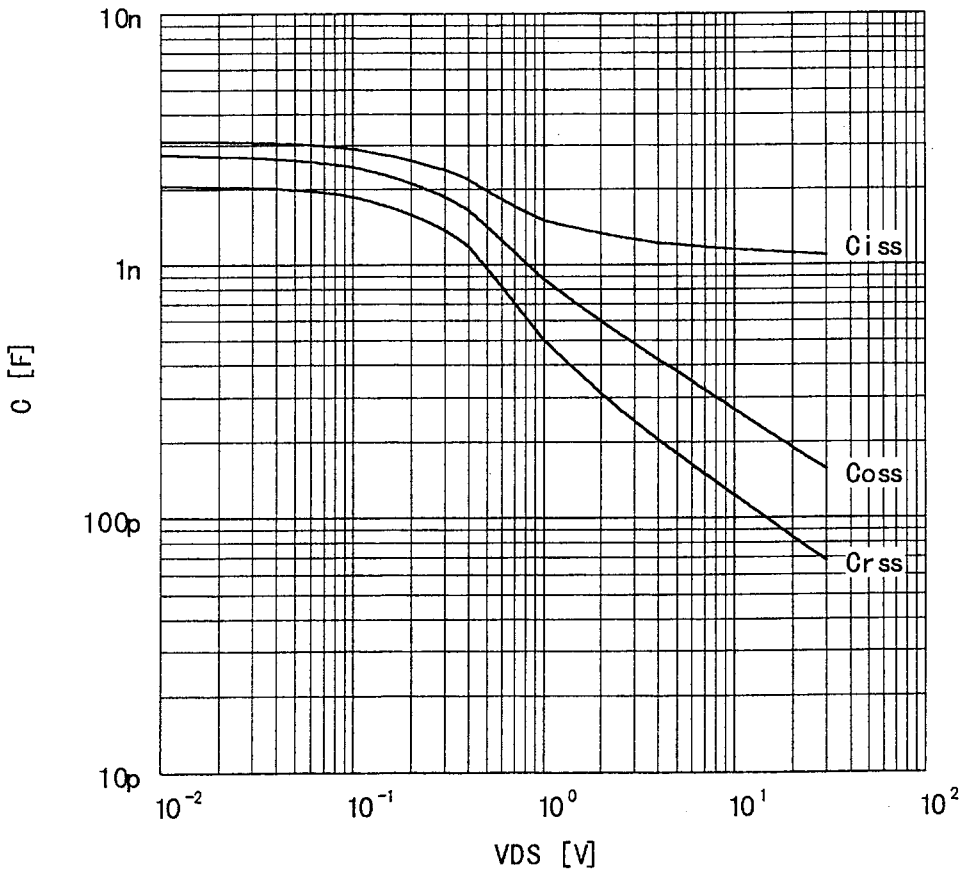
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Typical gate charge characteristic
 $V_{GS} = f(Q_g) : I_D = 10A, T_c = 25^\circ C$

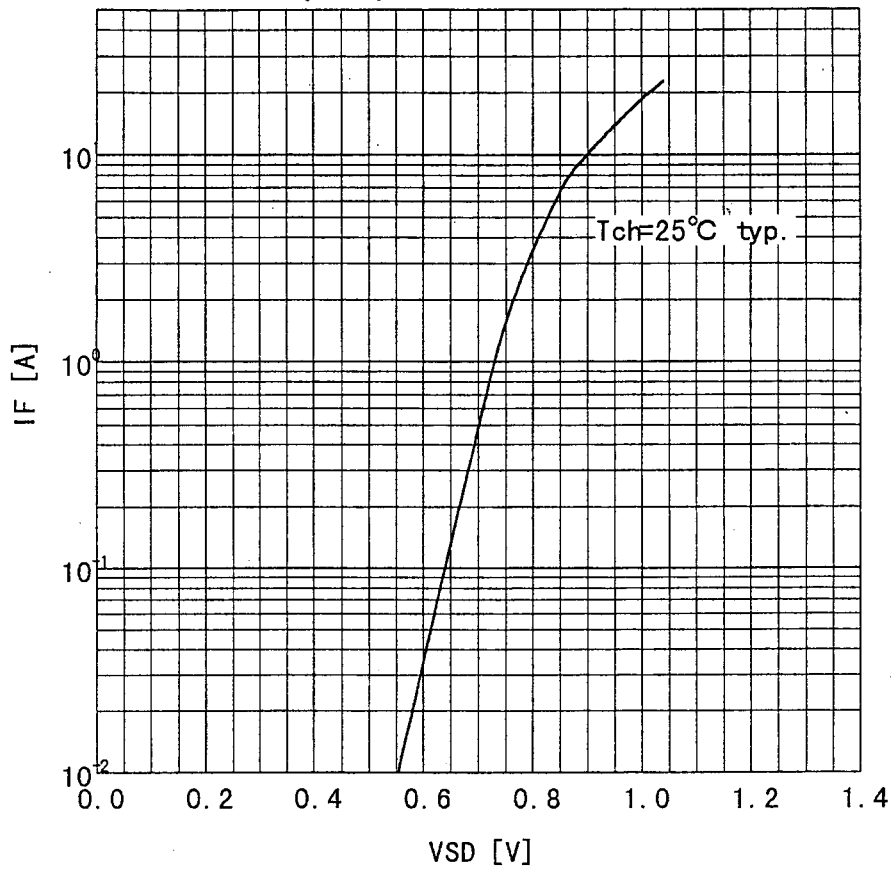


Typical capacitances

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

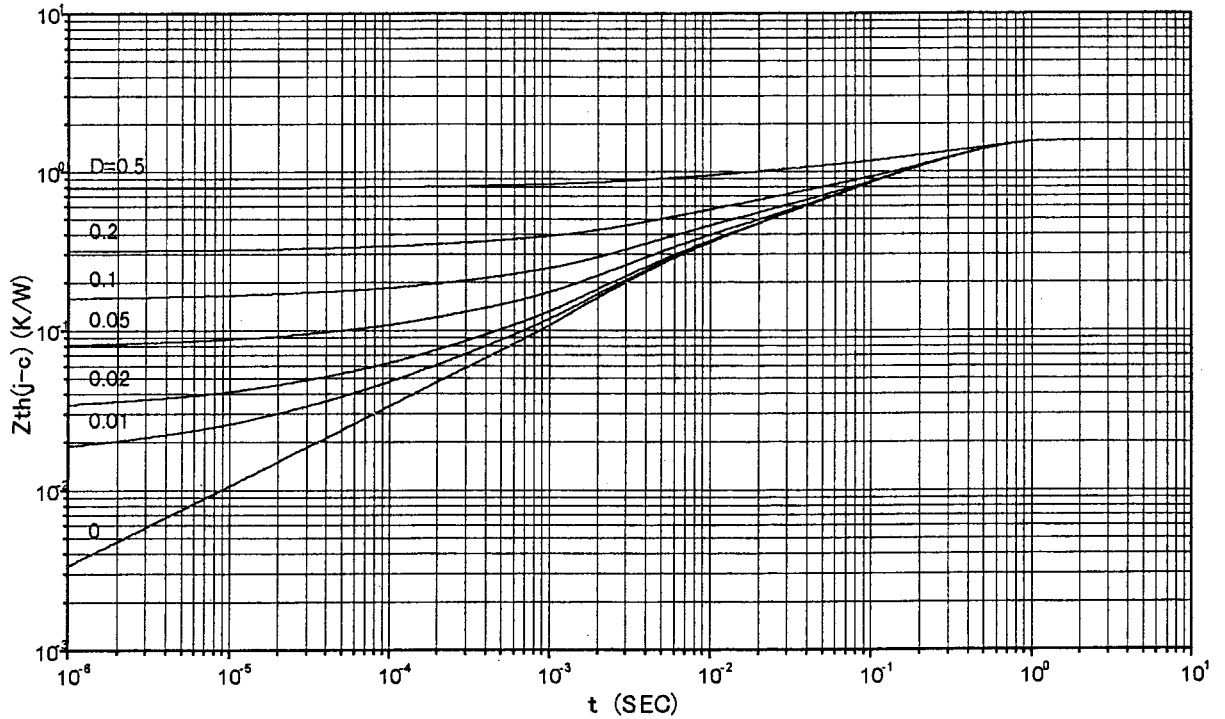


Forward characteristic of reverse of diode
 $I_F=f(V_{SD}): 80\mu s$ pulses test, $V_{GS}=0V$



TO-3PF/80W Transient Thermal Impedance

$Z_{th(ch-c)}=f(t) : D=t/T$



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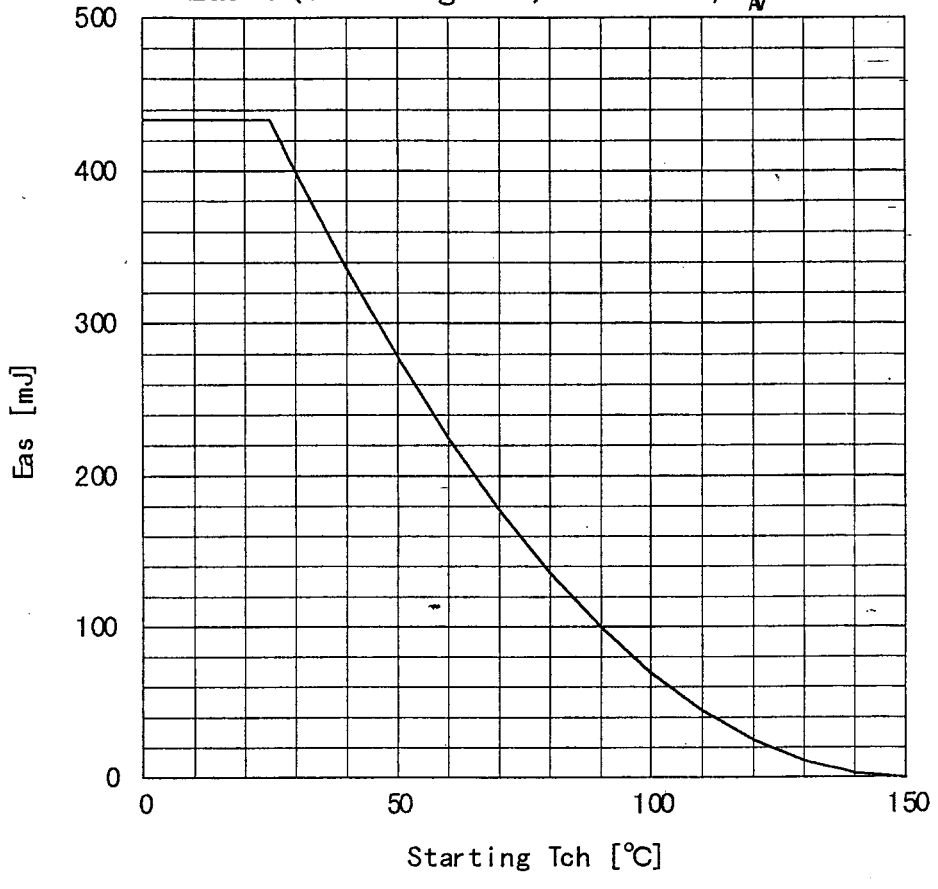
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Avalanche energy derating
 $E_{as} = f(\text{starting } T_{ch}) : V_{CC} = 60V, I_A = 10A$



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