

# SPECIFICATION

DEVICE NAME : Power MOSFET

TYPE NAME : 2SK2691-01R

SPEC. NO. :

Fuji Electric Co.,Ltd.

This Specification is subject to change without notice.

	DATE	NAME	APPROVED	Fuji Electric Co.,Ltd.	
DRAWN				DRG. NO.	1/13
CHECKED					

- 1.Scope** This specifies Fuji Power MOSFET 2SK2691-01R
- 2.Construction** N-Channel enhancement mode power MOSFET
- 3.Applications** for Switching
- 4.Outview** TO-3PF Outview See to 5/13 page

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

Description	Symbol	Characteristics	Unit	Remarks
Drain-Source Voltage	V <sub>DS</sub>	60	V	
Continuous Drain Current	I <sub>D</sub>	±70	A	
Pulsed Drain Current	I <sub>DP</sub>	±280	A	
Gate-Source Voltage	V <sub>GS</sub>	±20	V	
Maximum Avalanche Energy	E <sub>AV</sub>	685	mJ	*1
Maximum Power Dissipation	P <sub>D</sub>	100	W	
Operating and Storage	T <sub>ch</sub>	150	°C	
Temperature range	T <sub>stg</sub>	-55 to +150	°C	

\*1 L=0.186mH, V<sub>cc</sub>=24V

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

**Static Ratings**

Description	Symbol	Conditions	min.	typ.	max.	Unit	
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> =1mA V <sub>GS</sub> =0V	60			V	
Gate Threshold Voltage	V <sub>GS(th)</sub>	I <sub>D</sub> =1mA V <sub>DS</sub> =V <sub>GS</sub>	1.0	1.5	2.0	V	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V T <sub>ch</sub> =25°C		10	500	μA	
		V <sub>GS</sub> =0V T <sub>ch</sub> =125°C		0.2	1.0	mA	
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =20V V <sub>DS</sub> =0V		10	100	nA	
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	I <sub>D</sub> =40A	V <sub>GS</sub> =4V		12	17	mΩ
			V <sub>GS</sub> =10V		7.5	10	

### Dynamic Ratings

Description	Symbol	Conditions	min.	typ.	max.	Unit
Forward Transconductance	$g_{fs}$	$I_D=40A$ $V_{DS}=25V$	25	55		S
Input Capacitance	$C_{iss}$	$V_{DS}=25V$		3500	5250	pF
Output Capacitance	$C_{oss}$	$V_{GS}=0V$		1250	1870	
Reverse Transfer Capacitance	$C_{rss}$	$f=1MHz$		360	540	
Turn-On Time	$t_{d(on)}$	$V_{ce}=30V$		15	23	ns
	$t_r$	$V_{GS}=10V$		75	120	
Turn-Off Time	$t_{d(off)}$	$I_D=75A$		190	285	
	$t_f$	$R_{GS}=10\Omega$		110	165	

### Reverse Diode

Description	Symbol	Conditions	min.	typ.	max.	Unit
Avalanche Capability	$I_{AV}$	$L=100\mu H$ $T_{ch}=25^\circ C$ See Fig.1 and Fig.2	70			A
Diode Forward On-Voltage	$V_{SD}$	$I_F=160A$ $V_{GS}=0V$ $T_{ch}=25^\circ C$		1.15	1.65	V
Reverse Recovery Time	$t_{rr}$	$I_F=80A$		75	120	ns
Reverse Recovery Charge	$Q_{rr}$	$-di/dt=100A/\mu s$ $T_{ch}=25^\circ C$		0.17		$\mu c$

### 7. Thermal Resistance

Description	Symbol	min.	typ.	max.	Unit
Channel to Case	$R_{th(ch-c)}$			1.25	$^\circ C/W$
Channel to Ambient	$R_{th(ch-a)}$			30.0	$^\circ C/W$

Fig.1 Test Circuit

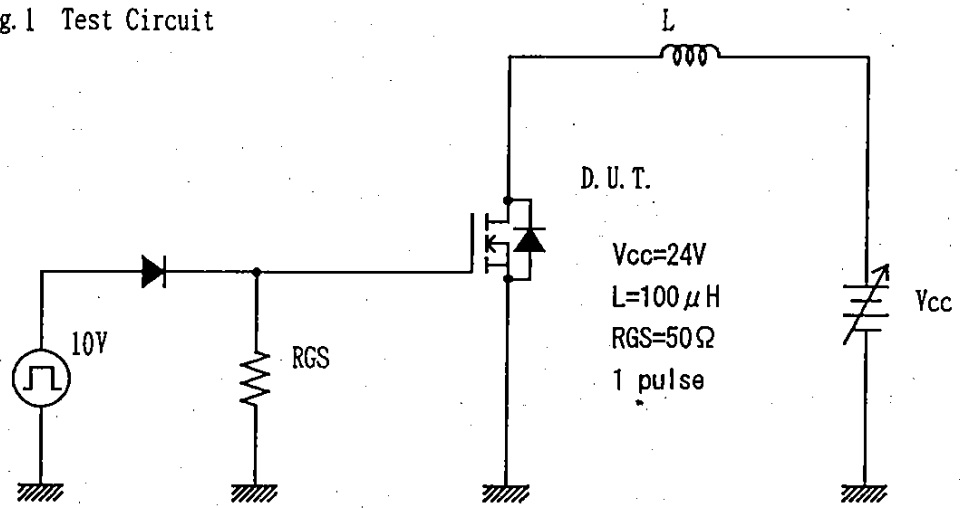
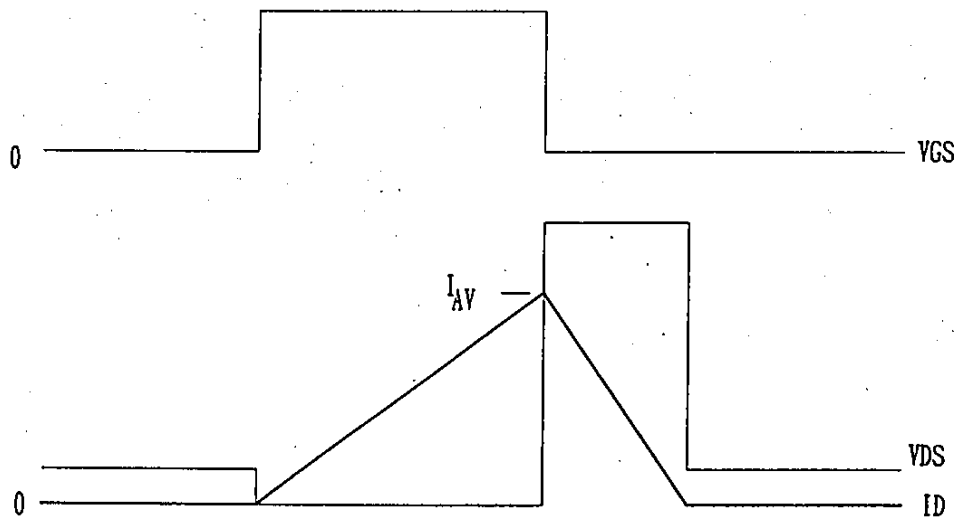
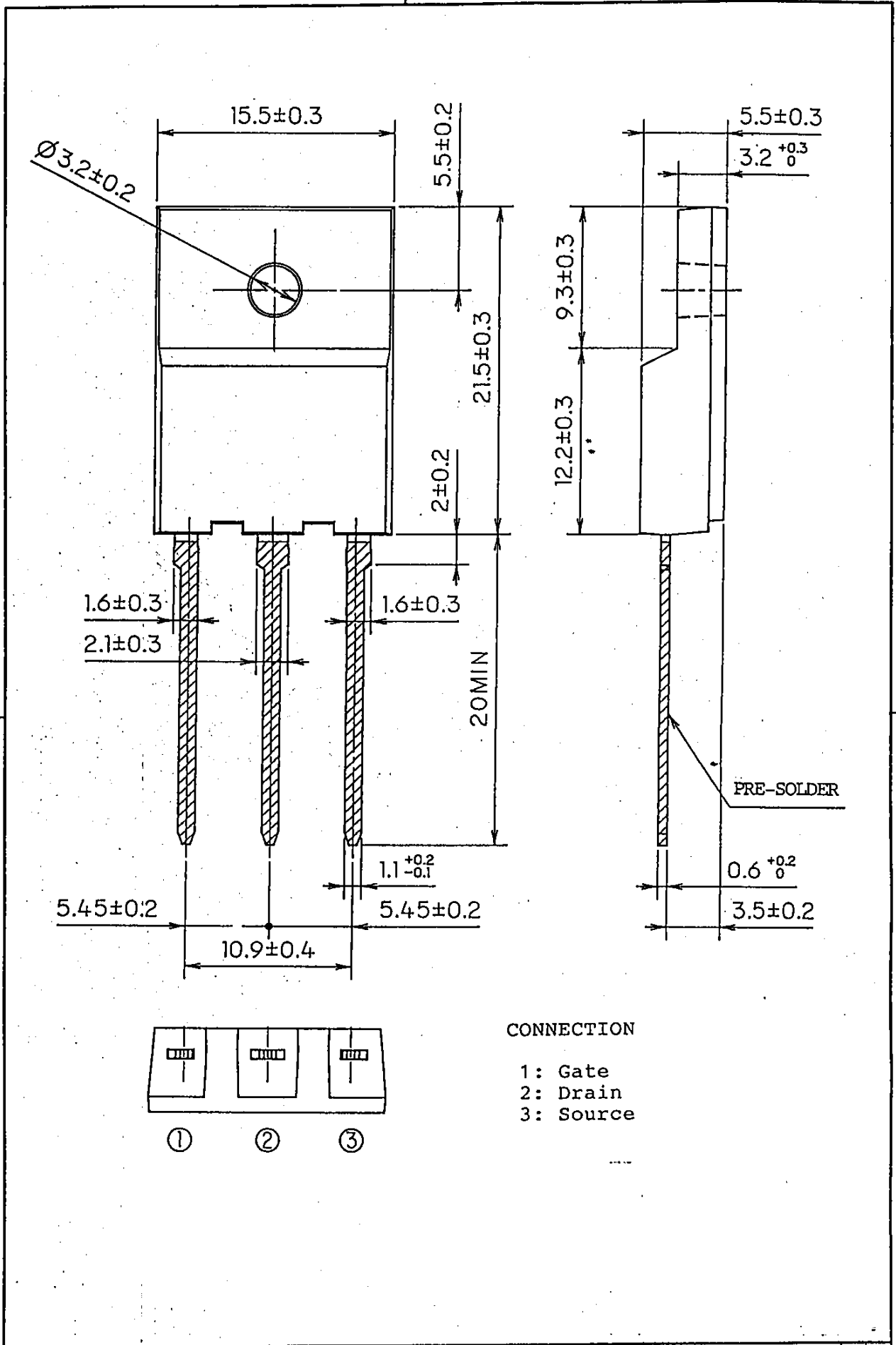
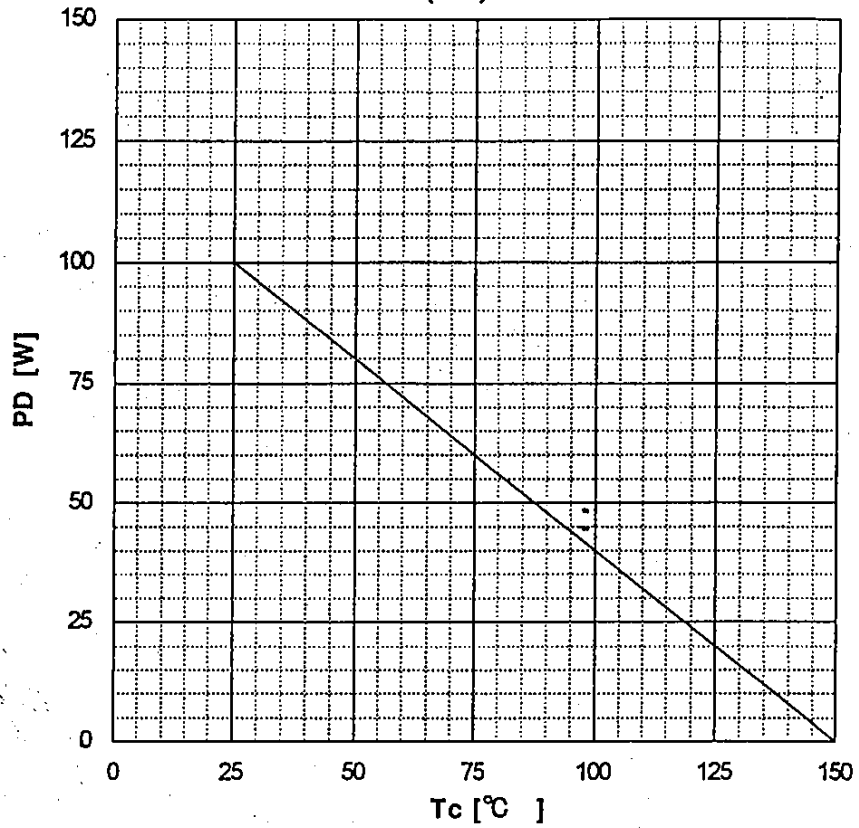


Fig.2 Operating waveforms

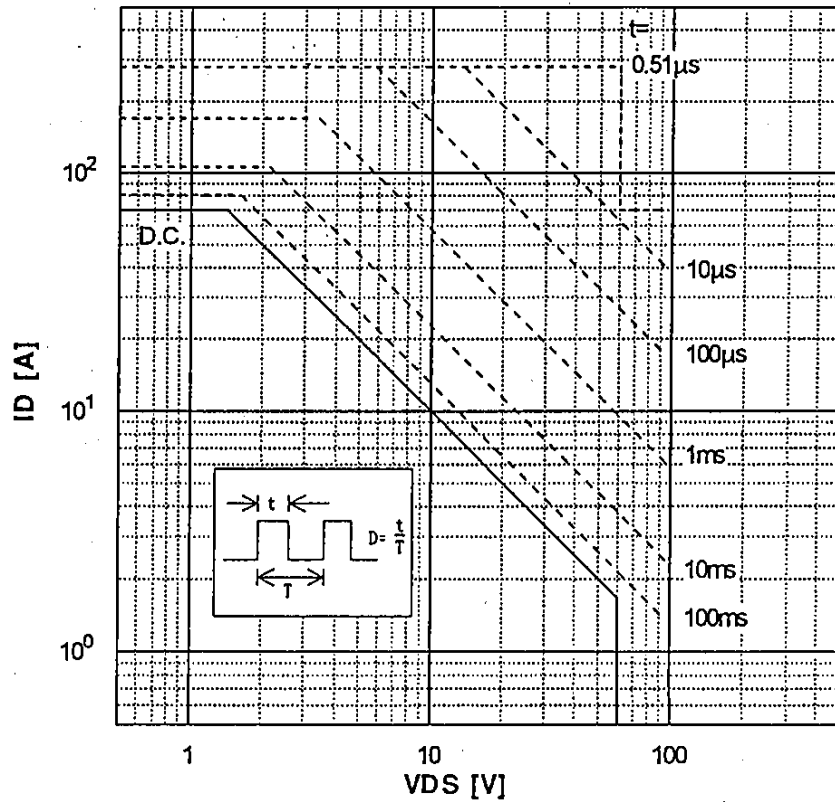





**Power Dissipation**  
 $PD=f(T_c)$

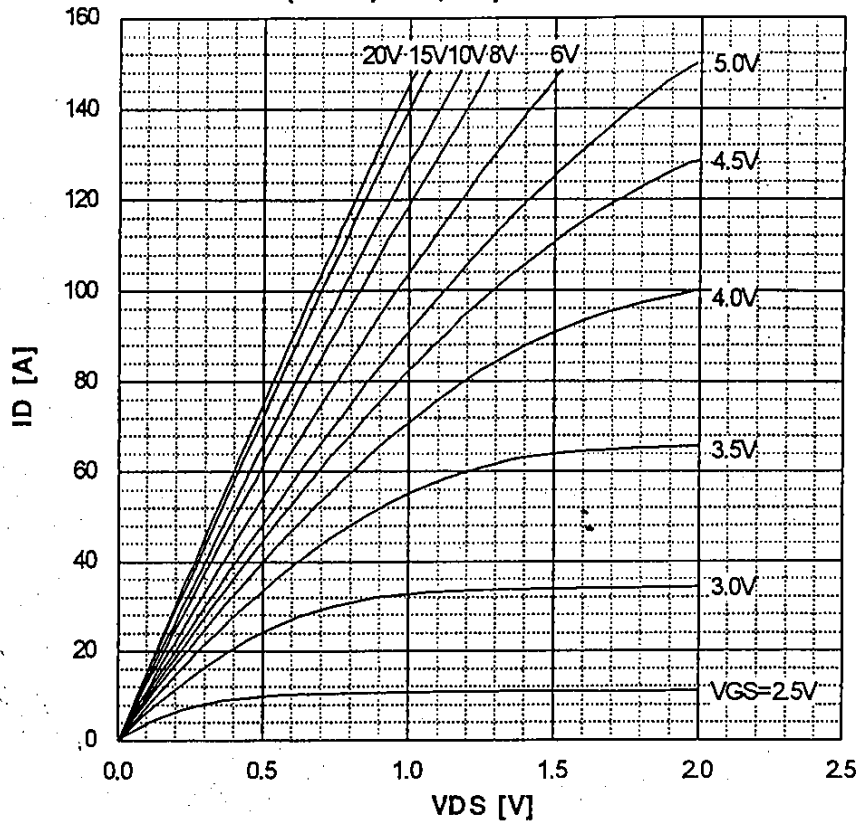


**Safe operating area**  
 $ID=f(V_{DS}):D=0.01, T_c=25^\circ C$



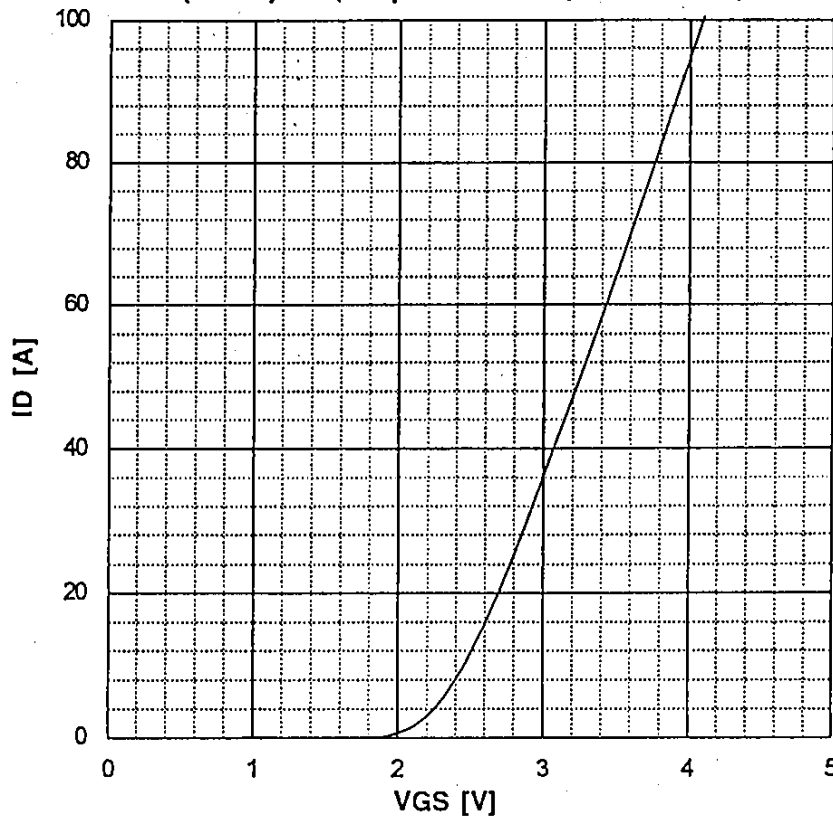
### Typical Output Characteristics

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



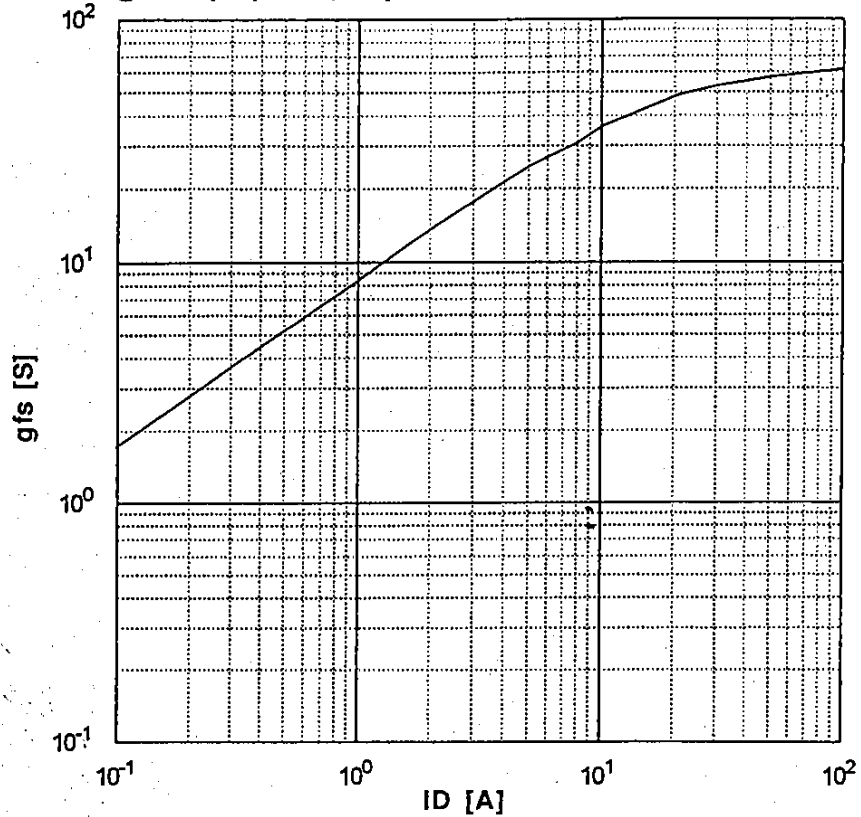
### Typical Transfer Characteristic

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



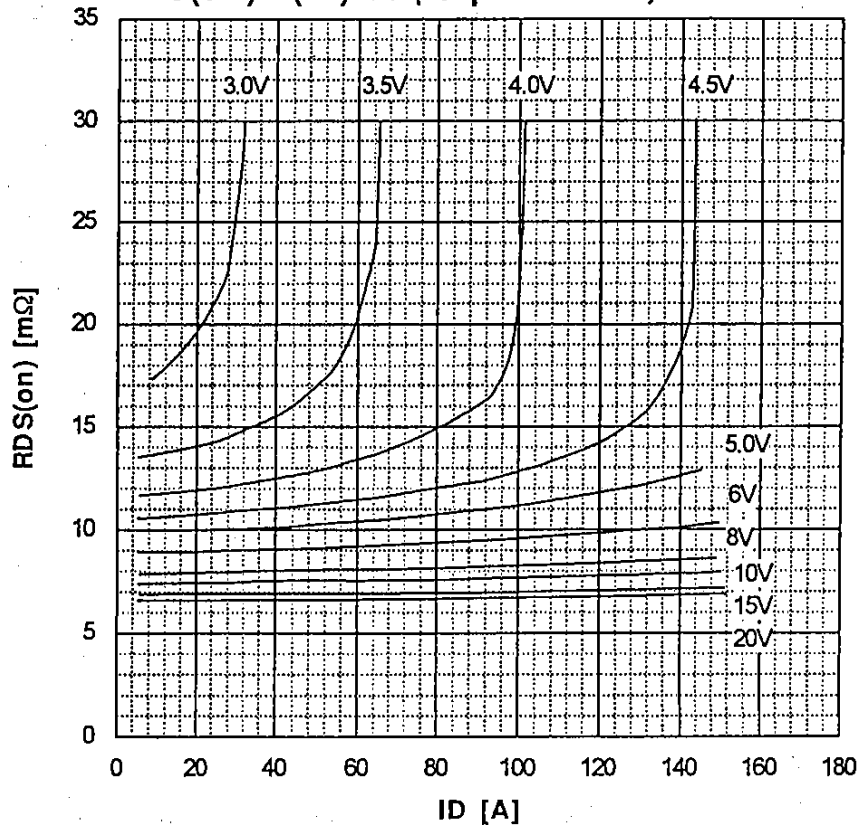
### Typical Transconductance

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

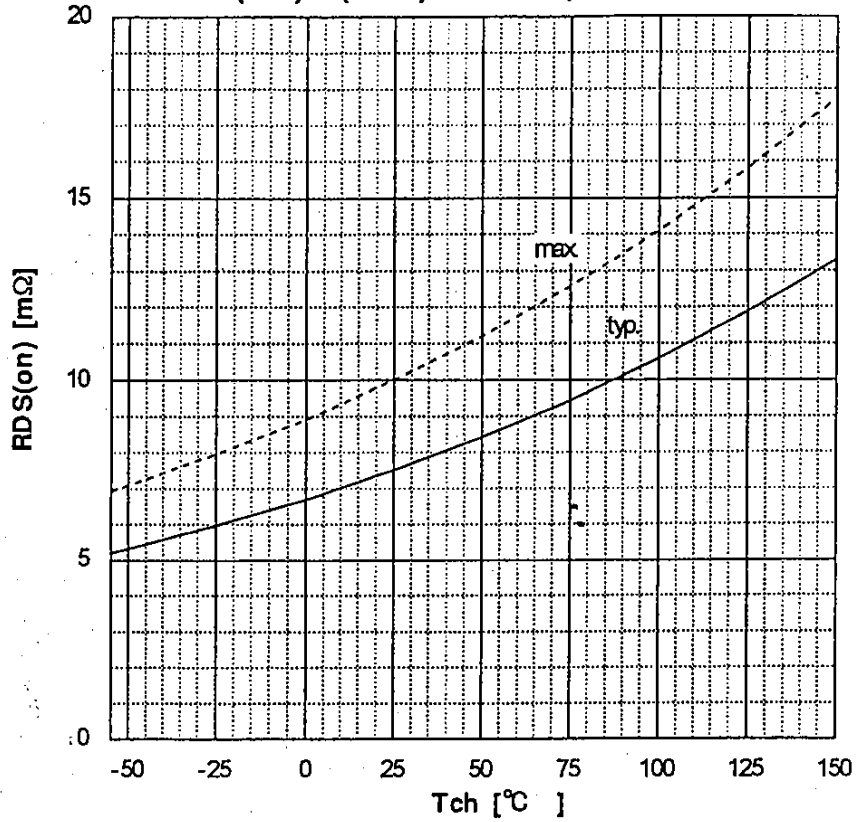


### Typical Drain-Source on-State Resistance

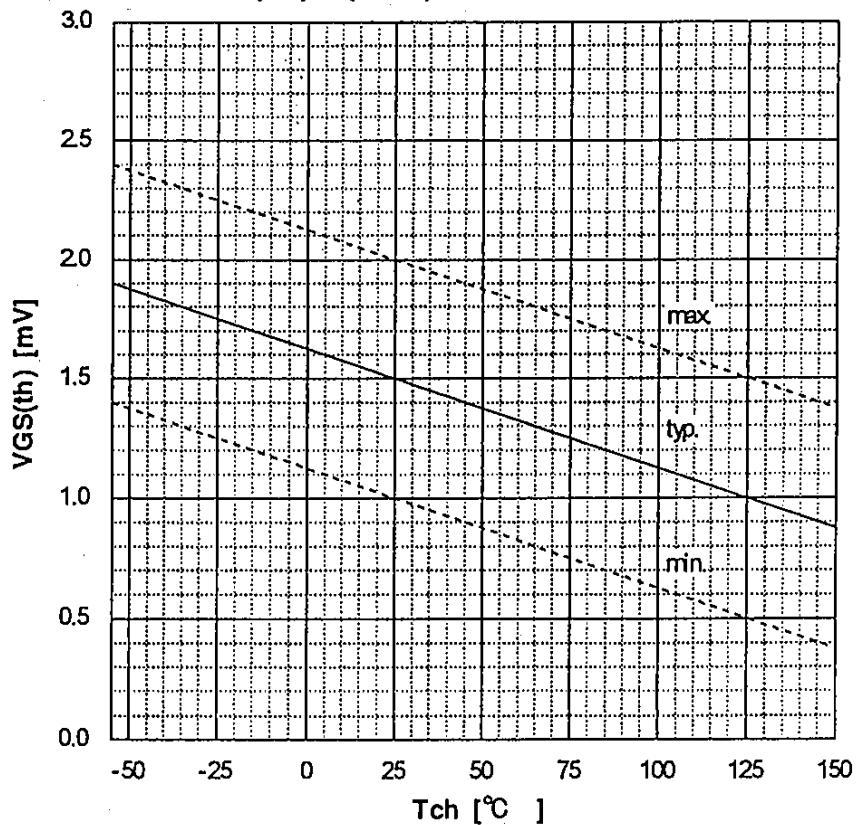
$R_{DS(on)}=f(I_D)$ : 80  $\mu$ s pulse test,  $T_{ch}=25^\circ C$



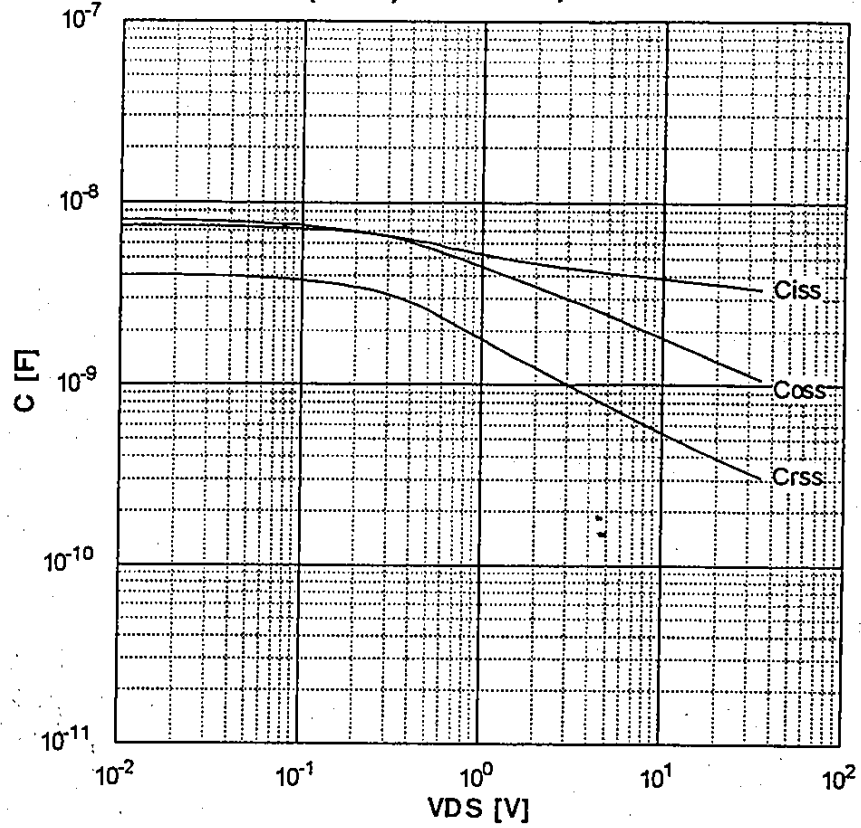

**Drain-Source On-state Resistance**  
 $R_{DS(on)} = f(T_{ch}) : I_D = 40A, V_{GS} = 10V$



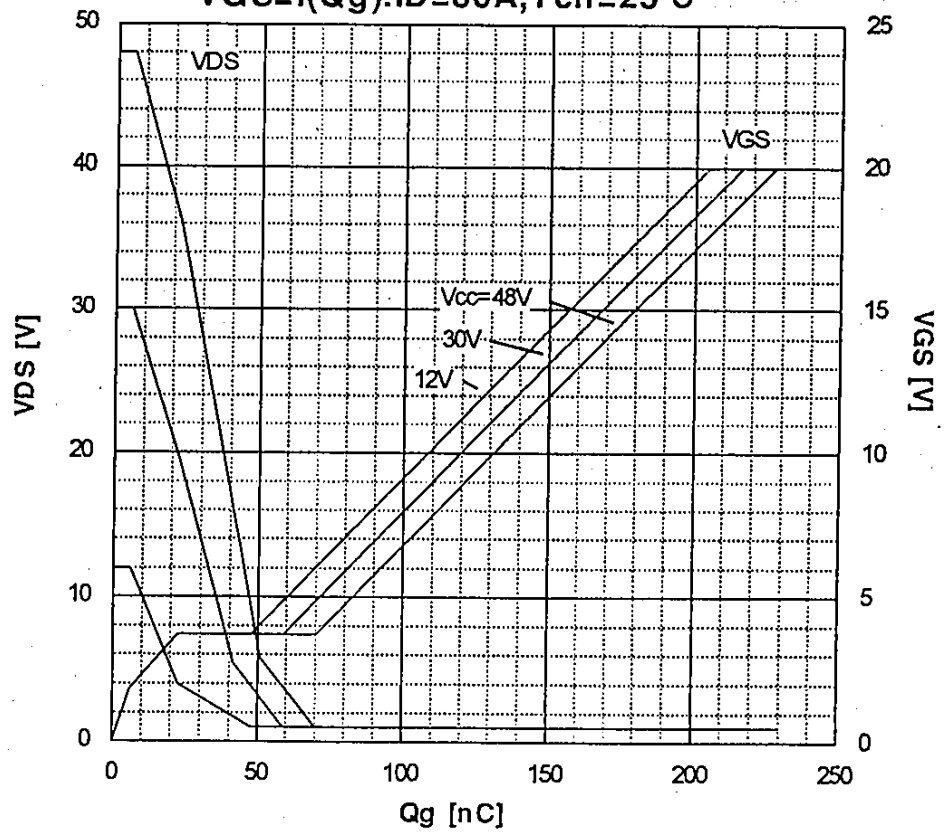
**Gate Threshold Voltage vs. T<sub>ch</sub>**  
 $V_{GS(th)} = f(T_{ch}) : V_{DS} = V_{GS}, I_D = 1mA$



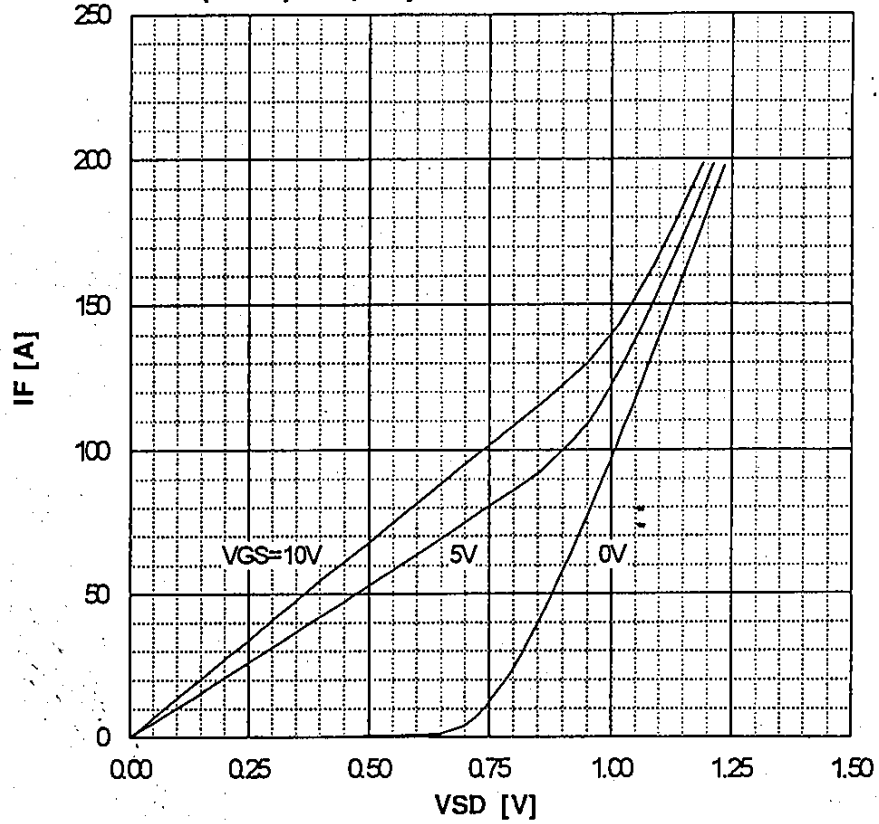
**Typical Capacitance**  
 $C=f(V_{DS}):V_{GS}=0V, f=1MHz$



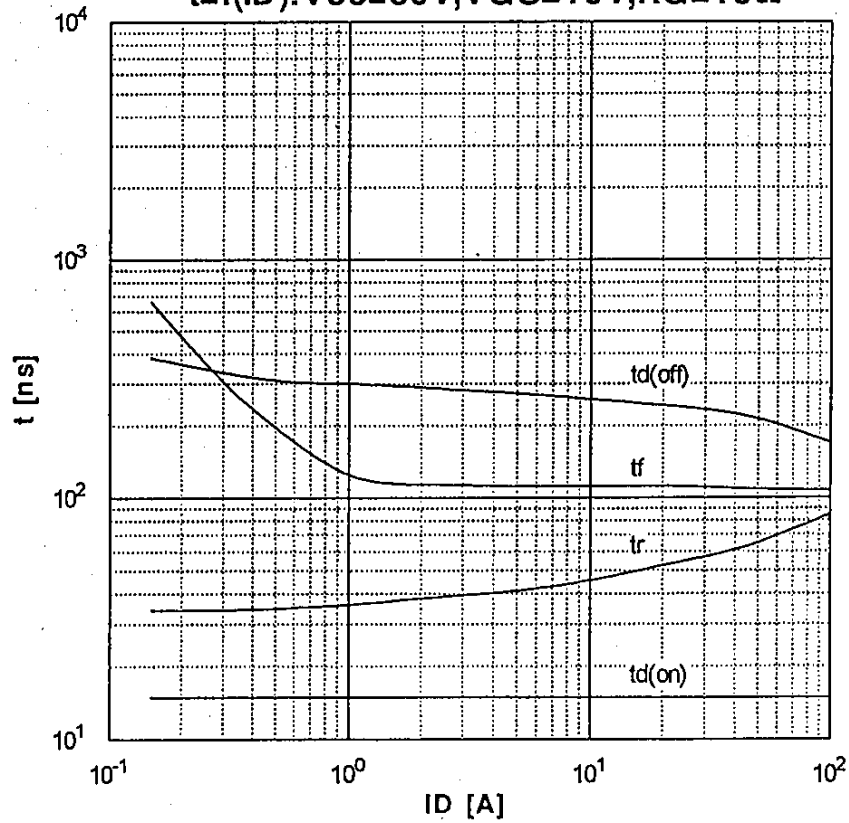
**Typical Gate Charge Characteristics**  
 $V_{GS}=f(Q_g):I_D=80A, T_{ch}=25^\circ C$



**Typical Forward Characteristics of Reverse Diode**  
 $I_F = f(V_{SD})$ : 80  $\mu$ s pulse test,  $T_{ch} = 25^\circ\text{C}$

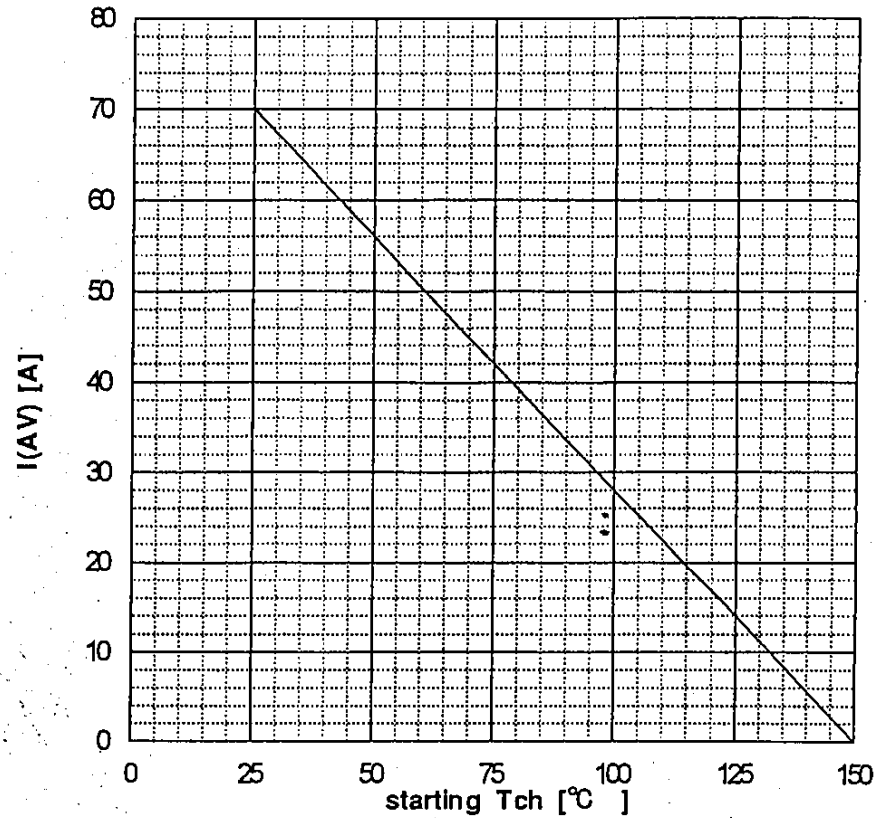


**Typical Switching Characteristics vs. ID**  
 $t = f(I_D)$ :  $V_{CC} = 30\text{V}$ ,  $V_{GS} = 10\text{V}$ ,  $R_G = 10\Omega$



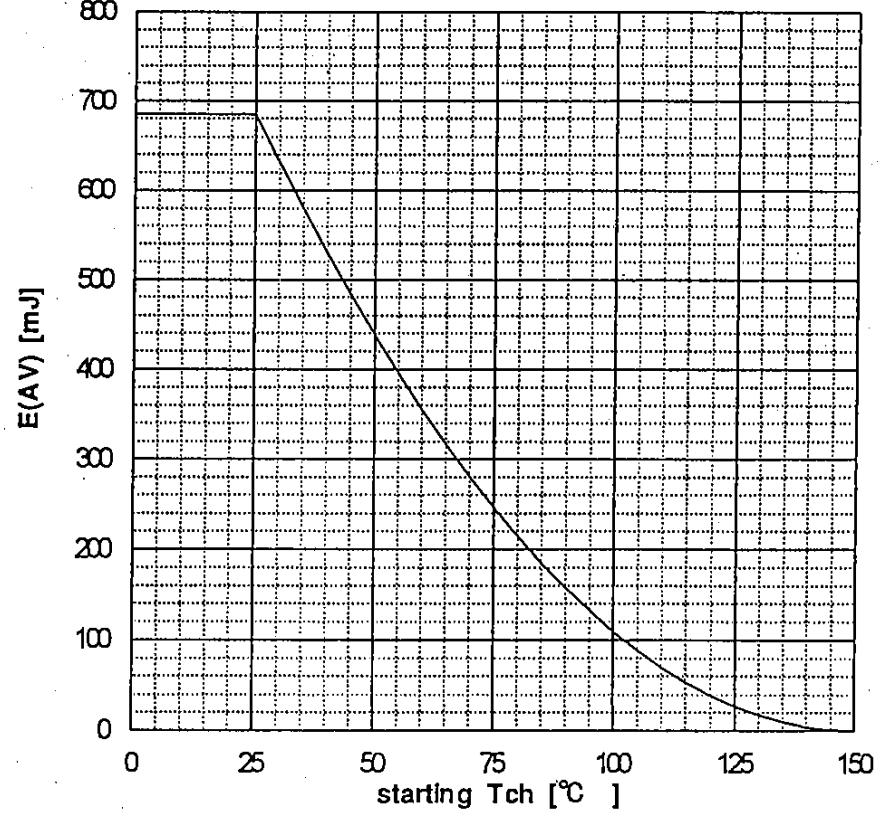
Maximum Avalanche Current vs. starting Tch

$I(AV)=f(\text{starting Tch})$



Maximum Avalanche Energy vs. starting Tch

$E(AV)=f(\text{starting Tch}):V_{CC}=24V, I(AV) \leq 70A$



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

