2SK3730-01MR FUJI POWER MOSFET

Fuji Electric

N-CHANNEL SILICON POWER MOSFET

Trench Power MOSFET

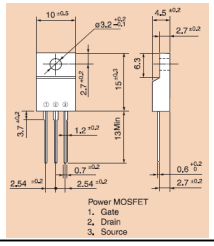
■Features

High speed switching
Low on-resistance
No secondary breakdown
Low driving power
Avalanche-proof

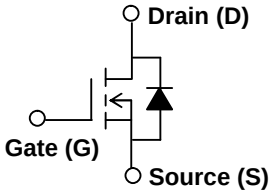
■Applications

Switching regulators
DC-DC converters
General purpose power amplifier

■Outline Drawings [mm]



■Equivalent circuit schematic



■Absolute Maximum Ratings at Tc=25℃(unless otherwise specified)

Description	Symbol	Characteristics	Unit	Remarks
Drain-Source Voltage	V_{DS}	75	V	
	V_{DSX}	40	V	V_{GS}=-20V
Continuous Drain Current	I_D	±70	A	
Pulsed Drain Current	I_{DP}	±280	A	
Gate-Source Voltage	V_{GS}	±20	V	
Non-Repetitive Maximum Avalanche current	I_{AS}	70	A	Note*1
Non-Repetitive Maximum Avalanche Energy	E_{AS}	251	mJ	Note*2
Maximum Power Dissipation	P_D	70	W	
Operating and Storage Temperature range	T_{ch}	150	℃	
	T_{stg}	-55 to +150	℃	

Note*1 : Tch≦150℃,See Fig.1 and Fig.2
Note*2 : Starting Tch=25℃,L=48μH,V_{CC}=48V,RG=50Ω,See Fig.1 and Fig.2
E_{AS} limited by maximum channel temperature and avalanche current.
See to Avalanche Energy graph of page 4

■Electrical Characteristics at Tc=25℃(unless otherwise specified)

Static Ratings

Description	Symbol	Conditions		Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=1mA V_{GS}=0V		75	—	—	V
	BV_{DSX}	I_D=1mA V_{GS}=-20V		40	—	—	V
Gate Threshold Voltage	$V_{GS(th)}$	I_D=10mA V_{DS}= V_{GS}		2.5	3.0	3.5	V
Zero Gate Voltage Drain current	I_{DSS}	V_{DS}= 75V V_{GS}=0V	Tch=25℃	—	1	100	μA
			Tch=125℃	—	10	500	
Gate-Source Leakage current	I_{GSS}	V_{GS}= ±20V V_{DS}= 0V		—	10	100	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	I_D=35A V_{GS}=10V		—	6.4	7.9	mΩ

Dynamic Ratings

Description	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Transconductance	g_{fS}	I_D=35A V_{DS}=10V	10	80	—	S
Input Capacitance	C_{iSS}	V_{DS}=25V V_{GS}=0V f=1MHz	—	7800	—	pF
Output Capacitance	C_{oSS}		—	1050	—	
Reverse Transfer Capacitance	C_{rSS}		—	550	—	
Turn-On Time	$t_{d(on)}$	V_{CC}=38V, V_{GS}=10V I_D=70A, R_G=10Ω See Fig.3 and Fig.4	—	50	—	ns
	t_r		—	140	—	
Turn-Off Time	$t_{d(off)}$		—	150	—	
	t_f		—	170	—	
Total Gate Charge	Q_G	V_{DD}=38V, I_D=70A V_{GS}=10V See Fig.5	—	140	—	nC
Gate-Source Charge	Q_{GS}		—	30	—	
Gate-Drain Charge	Q_{GD}		—	45	—	

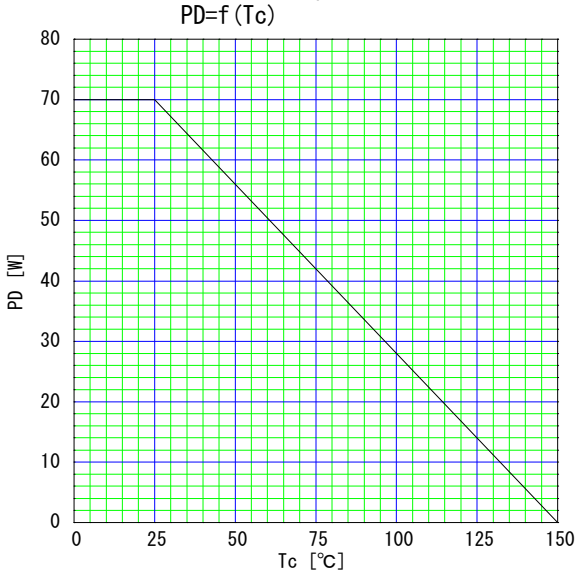
Reverse Ratings

Description	Symbol	Conditions	Min.	Typ.	Max.	Unit
Avalanche Capability	I_{AV}	L=48μH, T_{ch}=25℃ See Fig.1 and Fig.2	70	—	—	A
Diode Forward On- Voltage	V_{SD}	I_F=70A, V_{GS}=0V T_{ch}=25℃	—	1.3	1.65	V
Reverse Recovery Time	t_{rr}	I_F=70A, V_{GS}=0V -di/dt=100A/μs T_{ch}=25℃	—	95	—	ns
Reverse Recovery Charge	Q_{rr}		—	0.3	—	μC

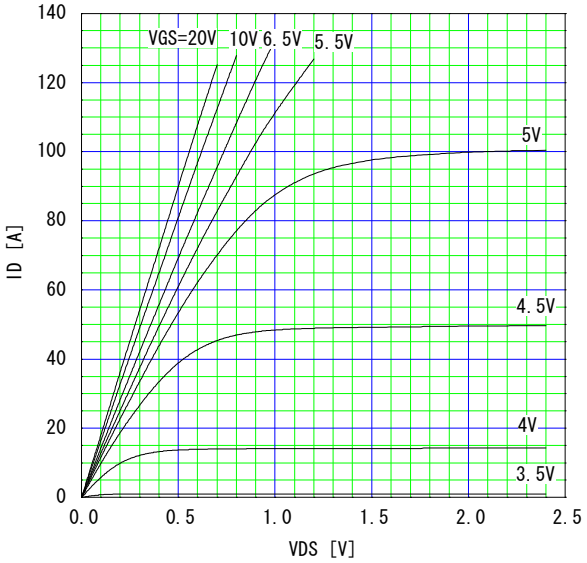
■Thermal Characteristics

Description	Symbol	Min.	Typ.	Max.	Unit
Cannel to Case	$R_{th(ch-c)}$	—	—	1.79	℃/W
Cannel to Ambient	$R_{th(ch-a)}$	—	—	62.5	℃/W

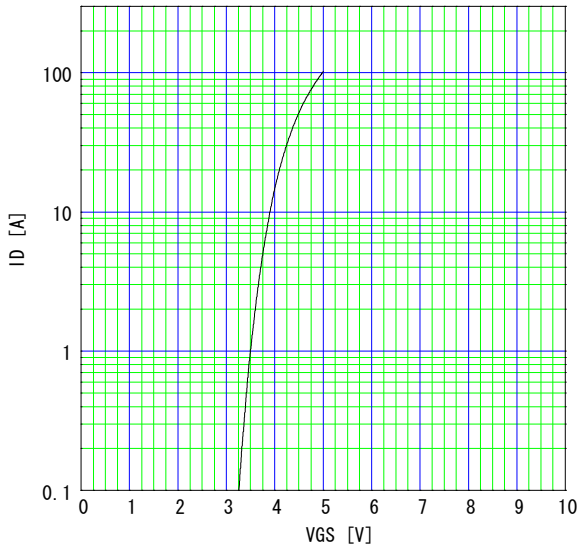
Power Dissipation
PD=f(Tc)



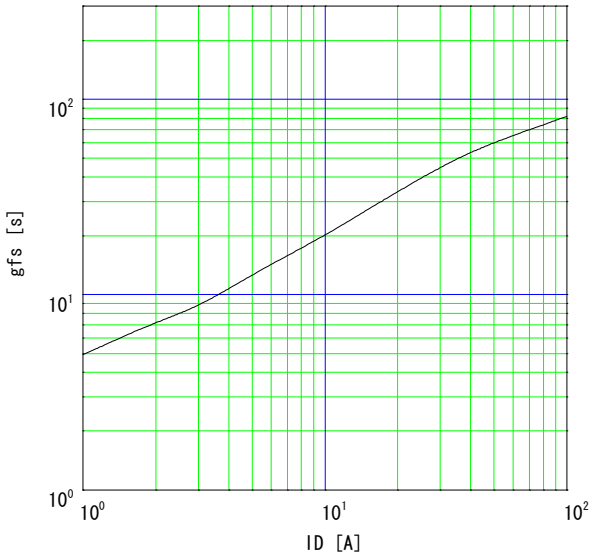
Typical output characteristics
ID=f(VDS):80μs pulse test, Tc=25℃



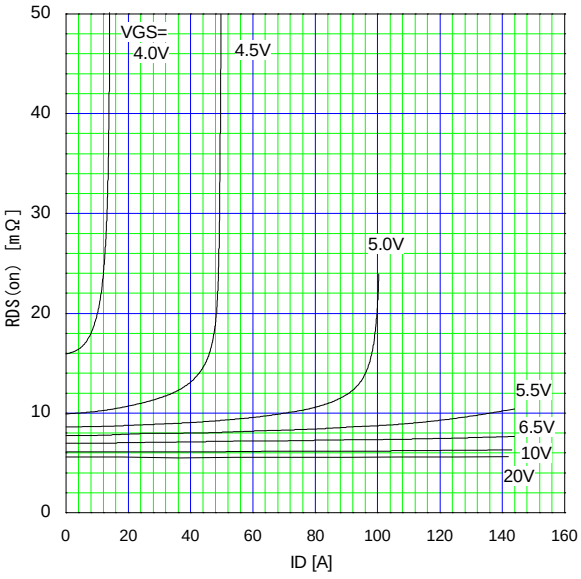
Typical transfer characteristics
ID=f(VGS):80μs pulse test, VDS=10V, Tch=25℃



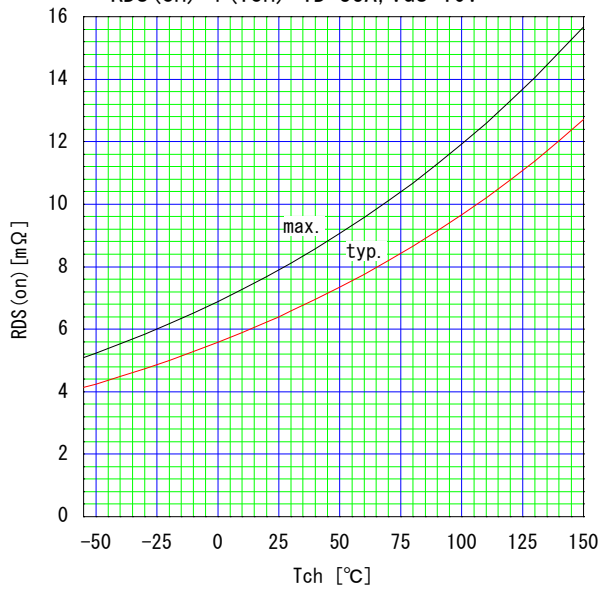
Typical forward transconductance
gfs=f(ID):80μs pulse test, VDS=10V, Tch=25℃



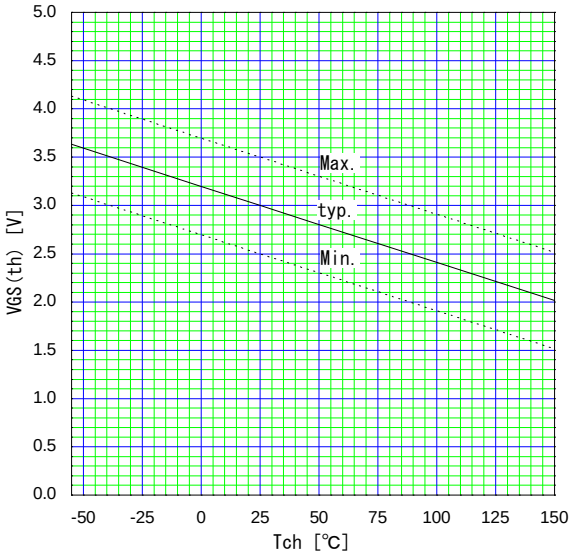
Typical Drain-Source on-State Resistance
RDS(on)=f(ID):80μs pulse test, Tch=25℃



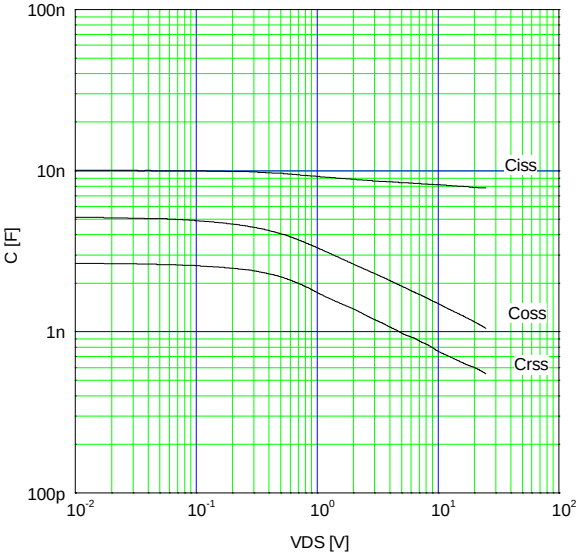
Drain-source on-state resistance
RDS(on)=f(Tch):ID=35A, VGS=10V



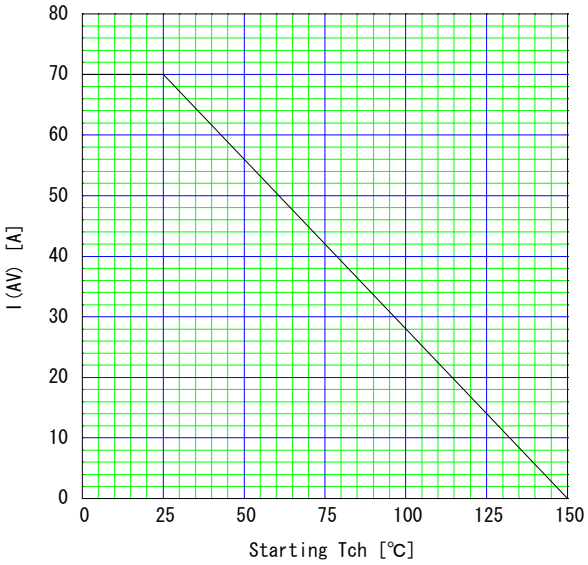
Gate Threshold Voltage vs. Tch
VGS(th)=f(Tch):VDS=VGS, ID=10mA



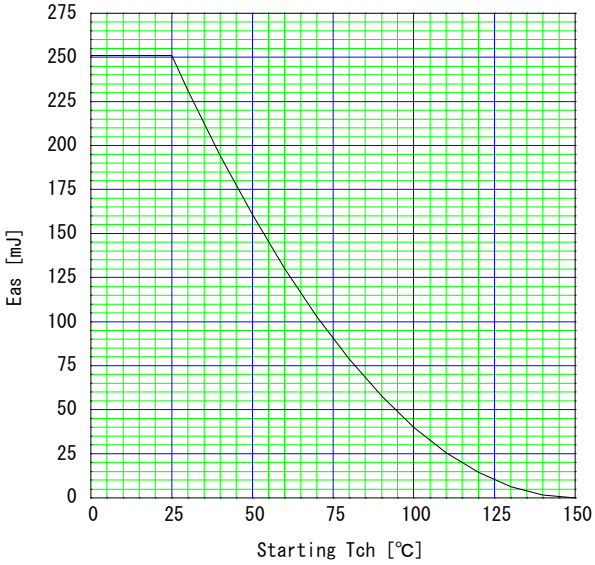
Typical capacitances
C=f(VDS):VGS=0V,f=1MHz



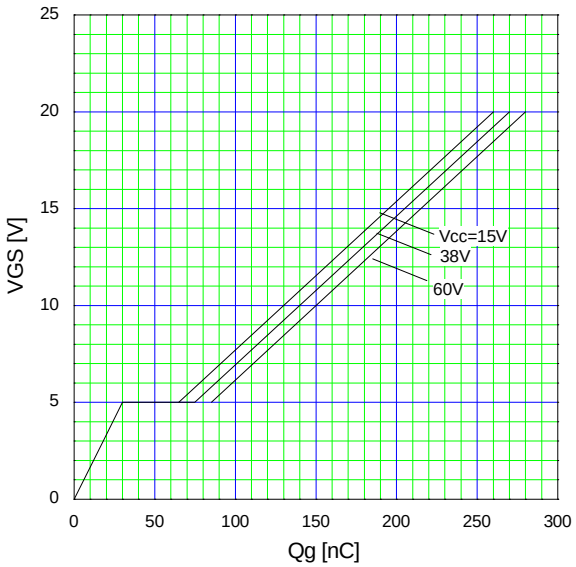
Maximum Avalanche Current vs. starting Tch
I(AV)=f(starting Tch) , single pulse



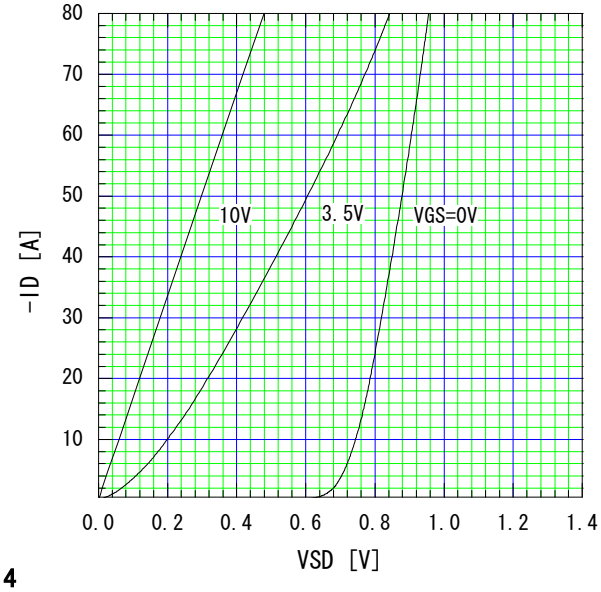
Maximum Avalanche energy vs. starting Tch
Eas=f(starting Tch):Vcc=48V, I_{AV}≦70A , single pulse



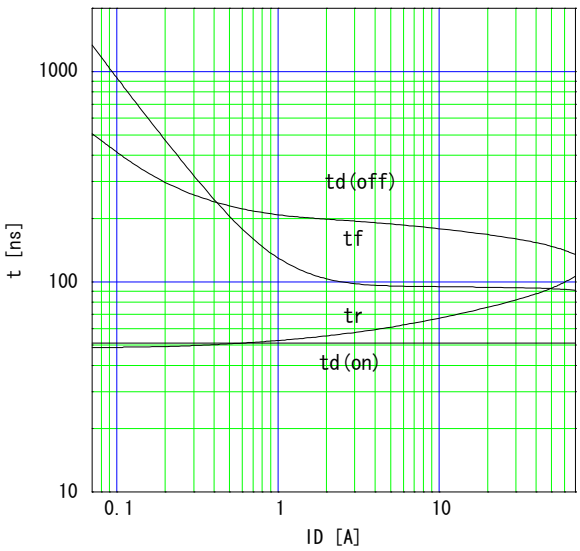
Typical Gate Charge Characteristics
VGS=f(Qg):ID=70A, Tch=25℃



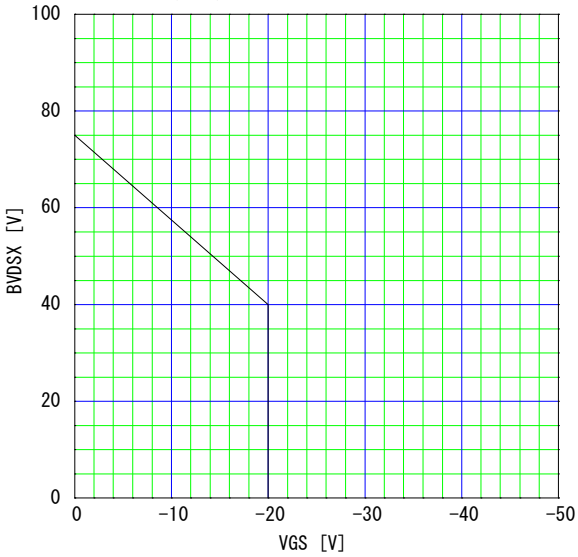
Typical Forward Characteristics of Reverse Diode
-ID=f(VSD):80μs pulse test, Tch=25℃



Typical Switching Characteristics vs. ID
t=f(ID):Vcc=38V, VGS=10V, RG=10Ω



Drain-Sourse Breakdown Voltage vs. Vgs
BVDSX=f(VGS):Tch=25℃



Transient Thermal Impedance
Zth(ch-c)=f(t):D=0

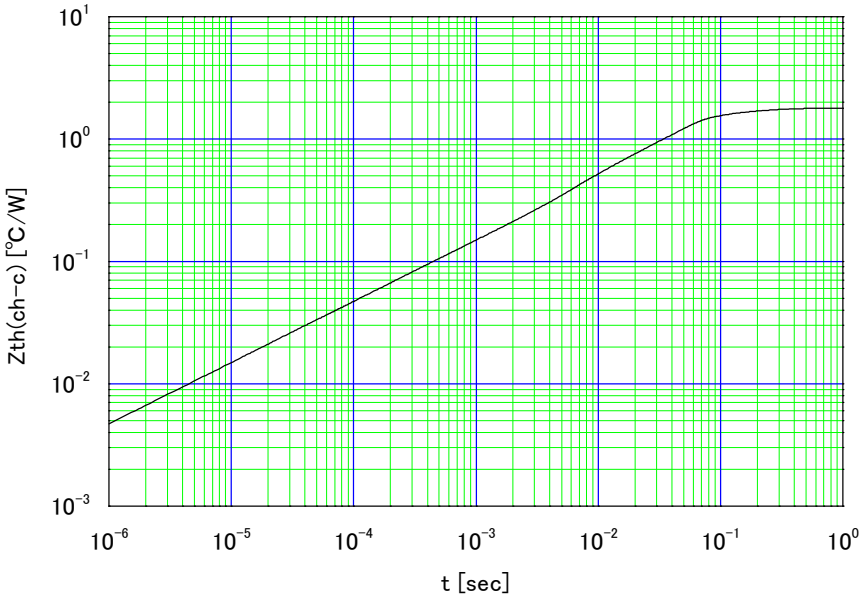


Fig.1 Avalanche Test circuit

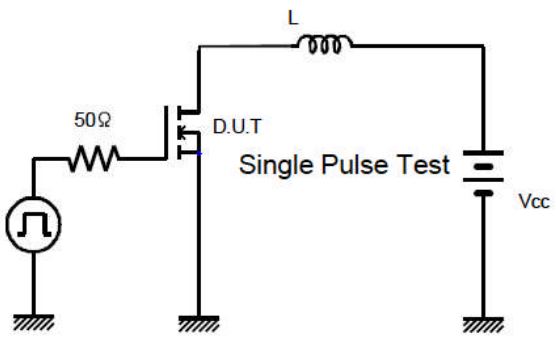


Fig.2 Operating waveforms of Avalanche Test

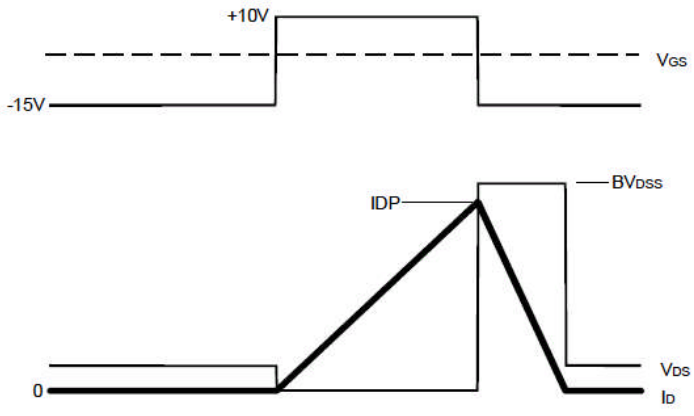


Fig.3 Switching Test circuit

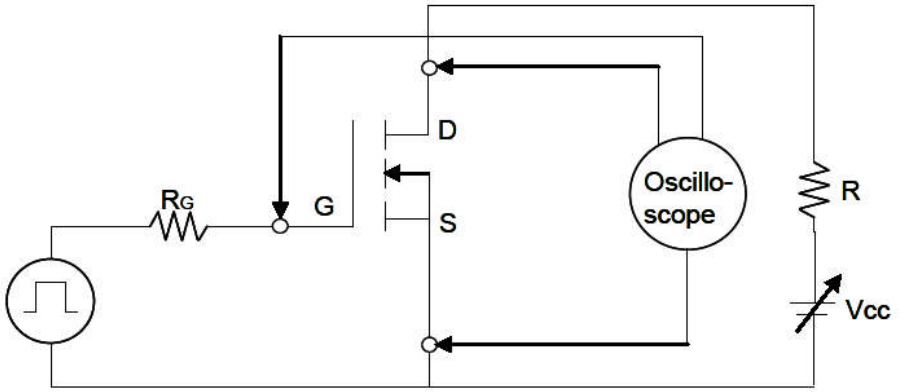


Fig.4 Operating waveform of Switching Test

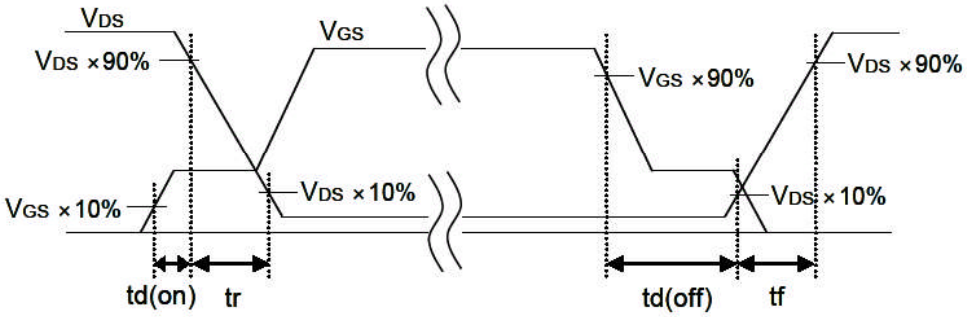


Fig.5 Operating waveform of Gate charge Test

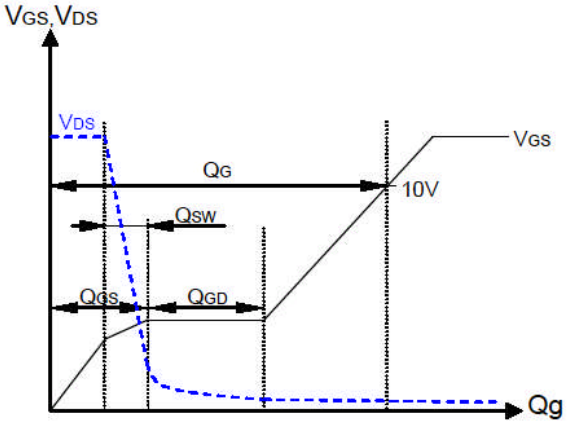


Fig.6 Operating waveform of Body diode Recovery Test