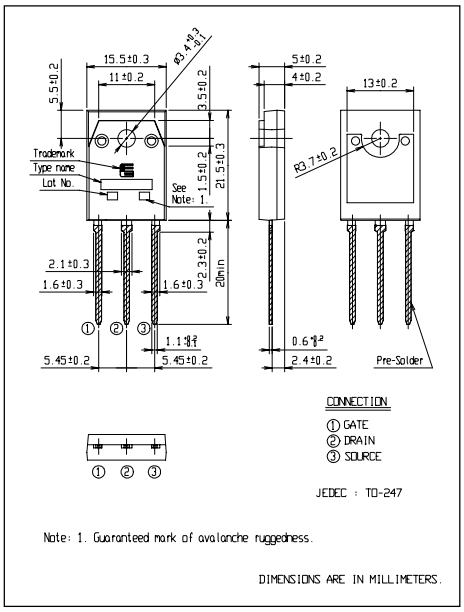
N-CHANNEL SILICON POWER MOS-FET



■ Features

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

■ Applications

Switching regulators
UPS (Uninterruptible Power Supply)
DC-DC converters

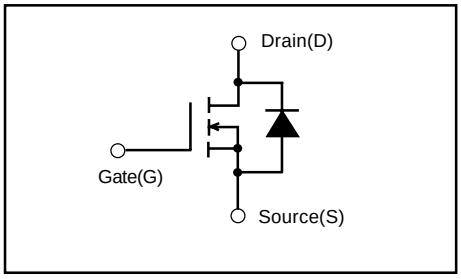
■ Maximum ratings and characteristic Absolute maximum ratings

● **(Tc=25°C unless otherwise specified)**

Item	Symbol	Rating	Unit
Drain-source voltage	V_{DS}	500	V
Continuous drain current	I_D	±20	A
Pulsed drain current	$I_{D(puls)}$	±80	A
Gate-source voltage	V_{GS}	±30	V
Repetitive or non-repetitive	I_{AR} *2	20	A
Maximum Avalanche Energy	E_{AV} *1	775	mJ
Max. power dissipation	P_D	340	W
Operating and storage	T_{ch}	+150	℃
temperature range	T_{stg}	-55 to +150	

*1 L=3.56mH, Vcc=50V *2 Tch≦150°C

■ Equivalent circuit schematic



● **Electrical characteristics (T_C =25°C unless otherwise specified)**

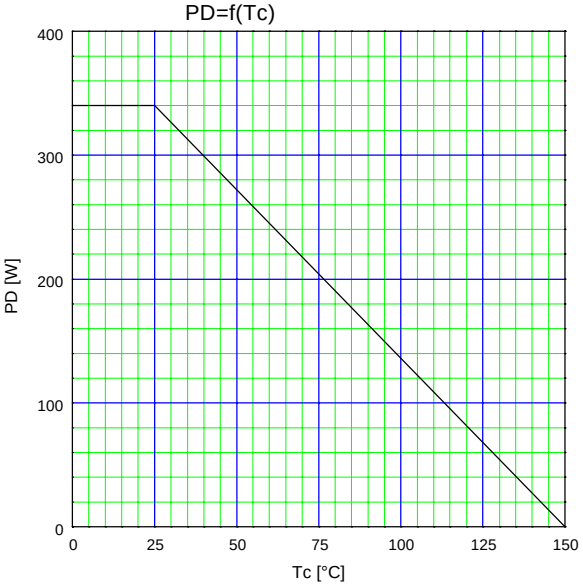
Item	Symbol	Test Conditions		Min.	Typ.	Max.	Units
Drain-source breakdown voltaget	$V_{(BR)DSS}$	I_D=1mA V_{GS}=0V		500			V
Gate threshold voltage	$V_{GS(th)}$	I_D=1mA V_{DS}=V_{GS}		2.5	3.0	3.5	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=500V	T_{ch}=25°C		10	500	μA
		V_{GS}=0V	T_{ch}=125°C		0.2	1.0	mA
Gate-source leakage current	I_{GSS}	V_{GS}=±30V V_{DS}=0V			10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	I_D=10A V_{GS}=10V			0.21	0.27	Ω
Forward transcondutance	g_{fs}	I_D=10A V_{DS}=25V		9	18		S
Input capacitance	C_{iss}	V_{DS}=25V			3350	5025	pF
Output capacitance	C_{oss}	V_{GS}=0V			480	720	
Reverse transfer capacitance	C_{rss}	f=1MHz			200	300	
Turn-on time t_{on}	$t_{d(on)}$	V_{CC}=300V I_D=20A			27	40	ns
	t_r	V_{GS}=10V			100	150	
Turn-off time t_{off}	$t_{d(off)}$	R_{GS}=10 Ω			250	375	
	t_f				100	150	
Total gate charge	Q_G	Vcc=250V			155	235	nC
Gate-Source charge	Q_{GS}	I_D=20A			38	60	
Gete-Drain charge	Q_{GD}	V_{GS}=10V			50	75	
Avalanche capability	I_{AV}	L=3.56 mH T_{ch}=25°C		20			A
Diode forward on-voltage	V_{SD}	I_F=2xI_{DR} V_{GS}=0V T_{ch}=25°C			1.1	1.65	V
Reverse recovery time	t_{rr}	I_F=I_{DR} V_{GS}=0V			600		ns
Reverse recovery charge	Q_{rr}	-di/dt=100A/μs T_{ch}=25°C			11.0		μC

● **Thermalcharacteristics**

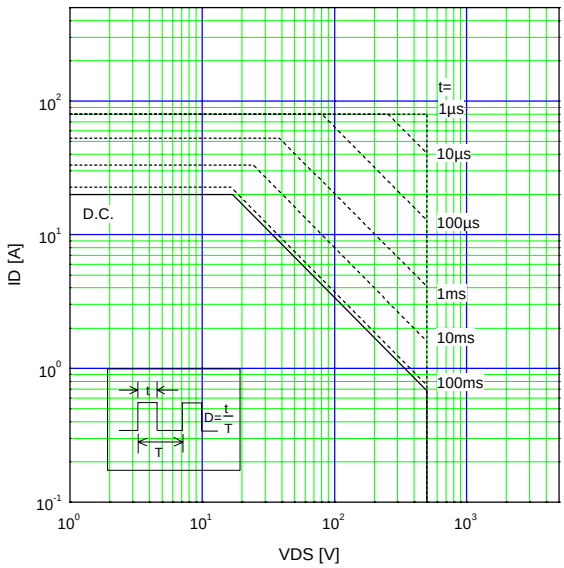
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-c)}$	channel to case			0.368	°C/W
	$R_{th(ch-a)}$	channel to ambient			50.0	°C/W

Characteristics

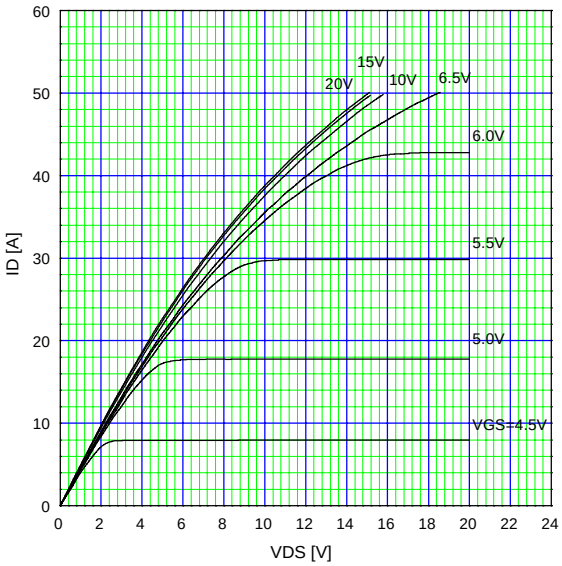
Allowable Power Dissipation
PD=f(Tc)



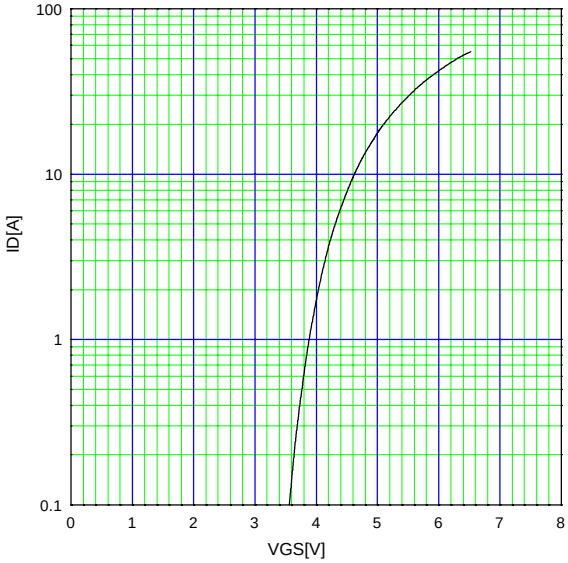
Safe operating area
ID=f(VDS):Single Pulse,Tc=25°C



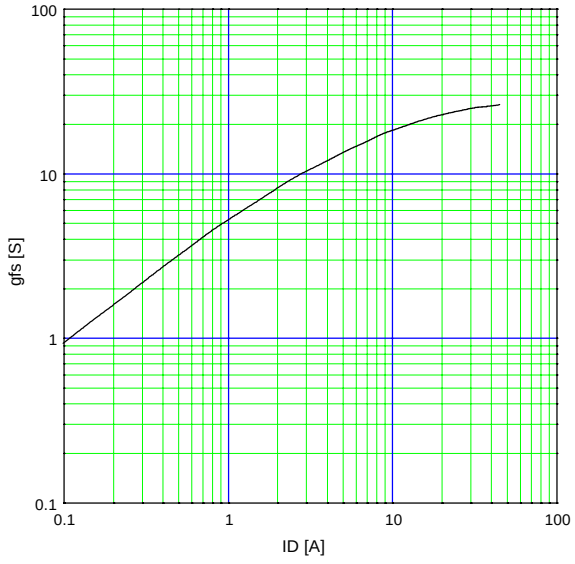
Typical Output Characteristics
ID=f(VDS):80µs pulse test,Tch=25°C



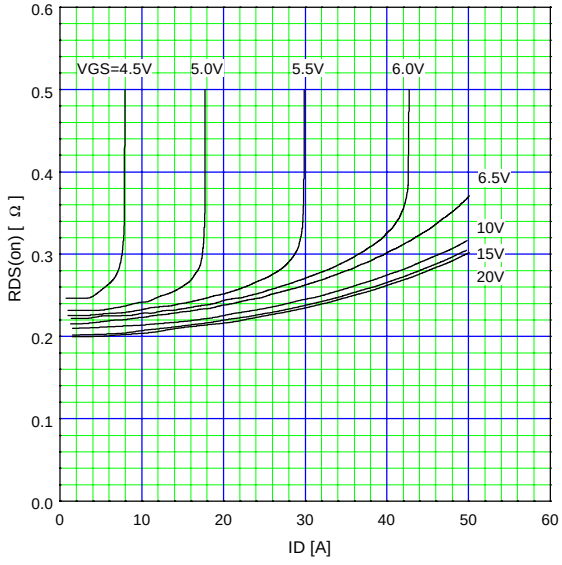
Typical Transfer Characteristic
ID=f(VGS):80µs pulse test,VDS=25V,Tch=25°C



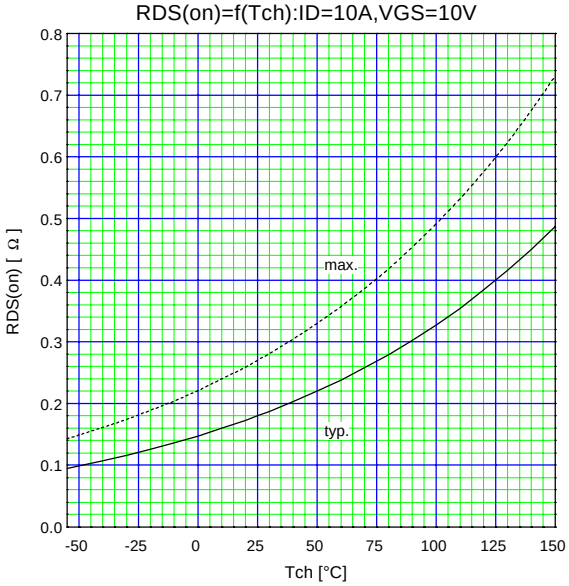
Typical Transconductance
gfs=f(ID):80µs pulse test,VDS=25V,Tch=25°C



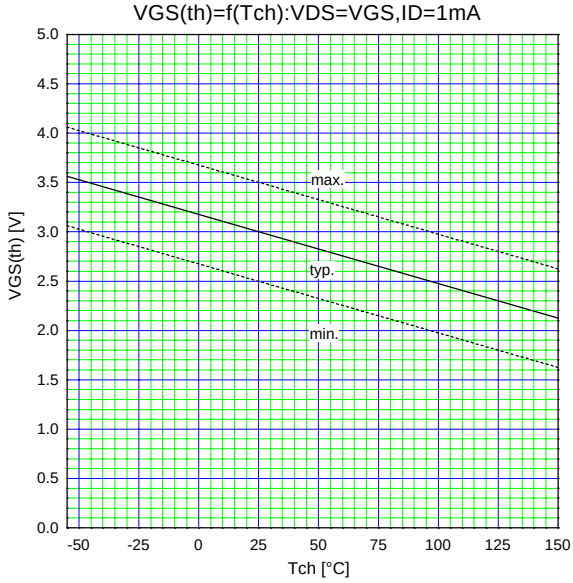
Typical Drain-Source on-state Resistance
RDS(on)=f(ID):80µs pulse test,Tch=25°C



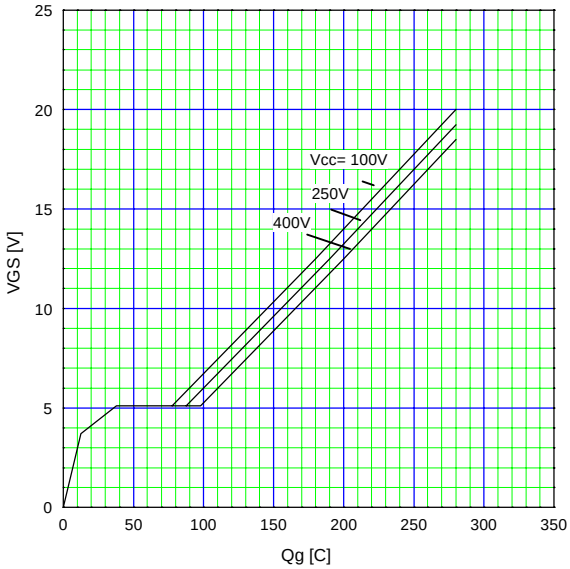
Drain-Source On-state Resistance
RDS(on)=f(Tch):ID=10A,VGS=10V



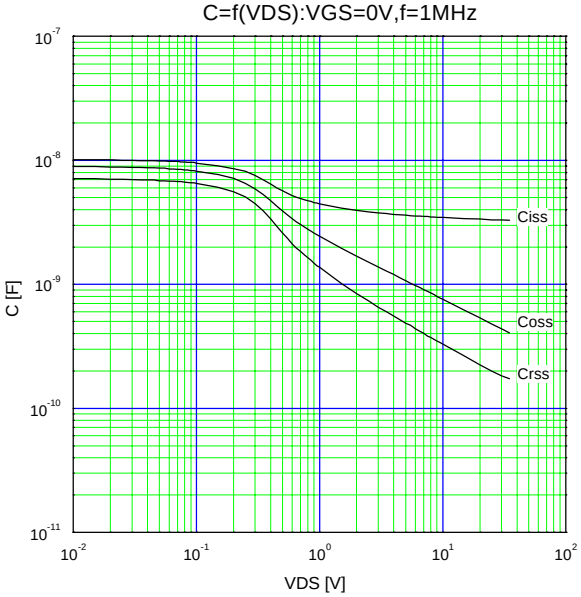
Gate Threshold Voltage vs. Tch
VGS(th)=f(Tch):VDS=VGS,ID=1mA



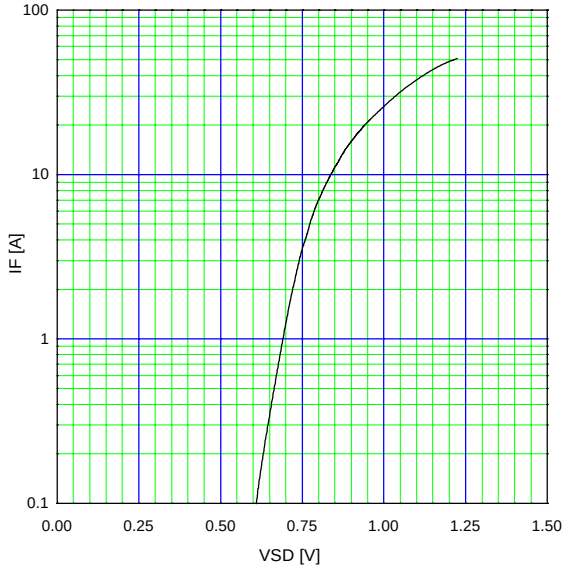
Typical Gate Charge Characteristics
VGS=f(Qg):ID=20A,Tch=25°C



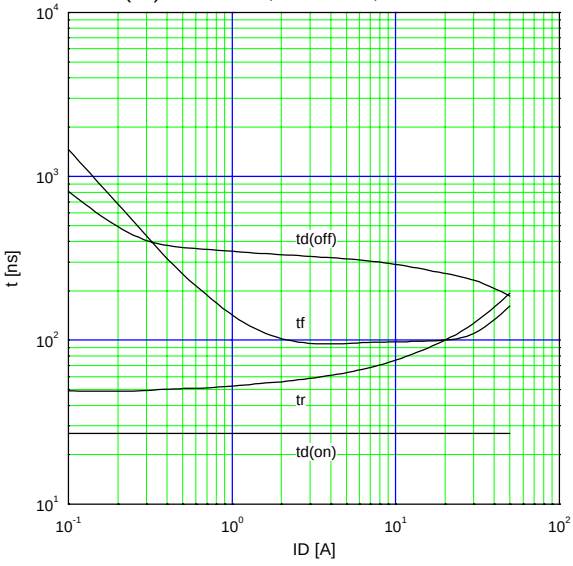
Typical Capacitance
C=f(VDS):VGS=0V,f=1MHz



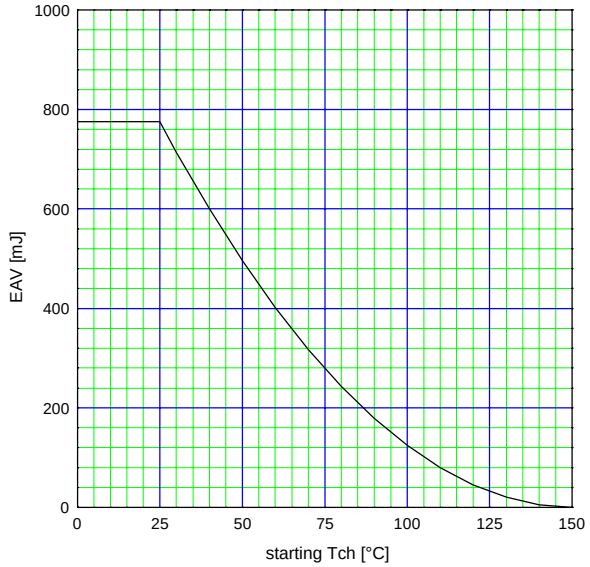
Typical Forward Characteristics of Reverse Diode
IF=f(VSD):80µs pulse test,Tch=25°C



Typical Switching Characteristics vs. ID
t=f(ID):Vcc=300V,VGS=10V,RG=10Ω



Maximum Avalanche Energy vs. starting Tch
E(AV)=f(starting Tch):Vcc=50V,I(AV)<=20A



Transient Thermal impedance
Zth(ch-c)=f(t) parameter:D=t/T