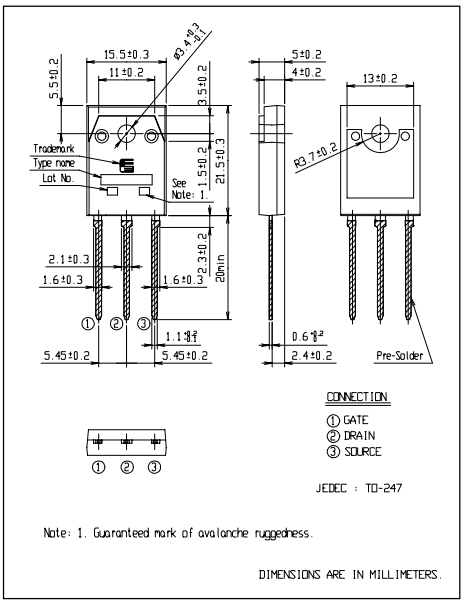
N-CHANNEL SILICON POWER MOS-FET

■ 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



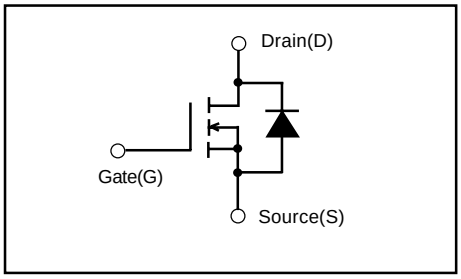
■ Maximum ratings and characteristic Absolute maximum ratings

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

Item	Symbol	Rating	Unit
Drain-source voltage	V_{DS}	400	V
Continuous drain current	I_D	±23	A
Pulsed drain current	$I_{D(puls)}$	±92	A
Gate-source voltage	V_{GS}	±30	V
Repetitive or non-repetitive	I_{AR} *2	23	A
Maximum Avalanche Energy	E_{AV} *1	545	mJ
Max. power dissipation	P_D	295	W
Operating and storage	T_{ch}	+150	℃
temperature range	T_{stg}	-55 to +150	

*1 L=1.89mH, Vcc=40V *2 Tch≦150°C

■ Equivalent circuit schematic



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

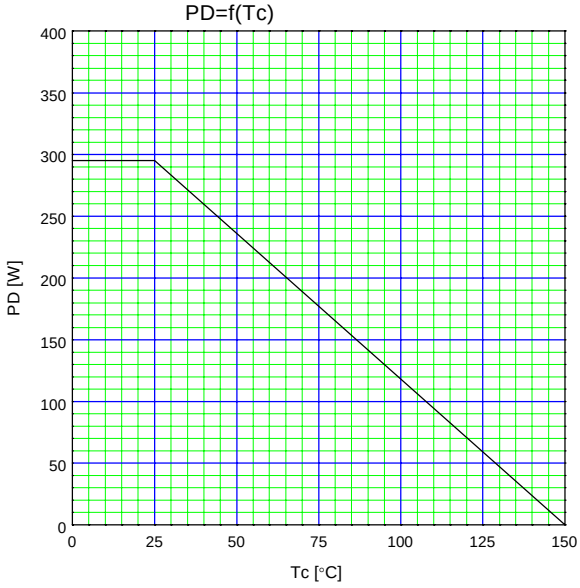
Item	Symbol	Test Conditions		Min.	Typ.	Max.	Units
Drain-source breakdown voltaget	$V_{(BR)DSS}$	I_D=1mA V_{GS}=0V		400			V
Gate threshold voltage	$V_{GS(th)}$	I_D=1mA V_{DS}=V_{GS}		2.5	3.0	3.5	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=400V	T_{ch}=25°C		10	500	μA
		V_{GS}=0V	T_{ch}=125°C		0.2	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=11.5A V_{GS}=10V			0.16	0.2	Ω
Forward transcondutance	g_{fs}	I_D=11.5A V_{DS}=25V		8.5	17		S
Input capacitance	C_{iss}	V_{DS}=25V			2650	3975	pF
Output capacitance	C_{oss}	V_{GS}=0V			500	750	
Reverse transfer capacitance	C_{rss}	f=1MHz			230	345	
Turn-on time t_{on}	$t_{d(on)}$	V_{CC}=300V I_D=23A			22	35	ns
	t_r	V_{GS}=10V			105	160	
Turn-off time t_{off}	$t_{d(off)}$	R_{GS}=10Ω			225	340	
	t_f				120	180	
Total gate charge	Q_G	Vcc=200V			137	210	nC
Gate-Source charge	Q_{GS}	I_D=23A			36	55	
Gete-Drain charge	Q_{GD}	V_{GS}=10V			48	75	
Avalanche capability	I_{AV}	L=1.89mH T_{ch}=25°C		23			A
Diode forward on-voltage	V_{SD}	I_F=2xI_{DR} V_{GS}=0V T_{ch}=25°C			1.15	1.73	V
Reverse recovery time	t_{rr}	I_F=I_{DR} V_{GS}=0V			450		ns
Reverse recovery charge	Q_{rr}	-di/dt=100A/μs T_{ch}=25°C			8.6		μC

● **Thermalcharacteristics**

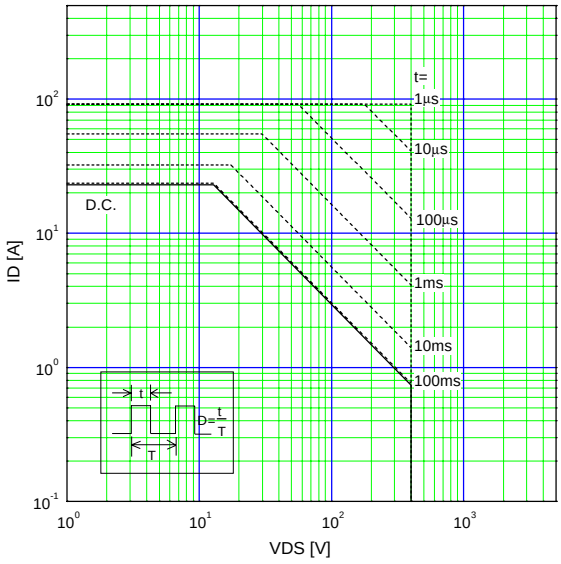
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-c)}$	channel to case			0.424	°C/W
	$R_{th(ch-a)}$	channel to ambient			50.0	°C/W

Characteristics

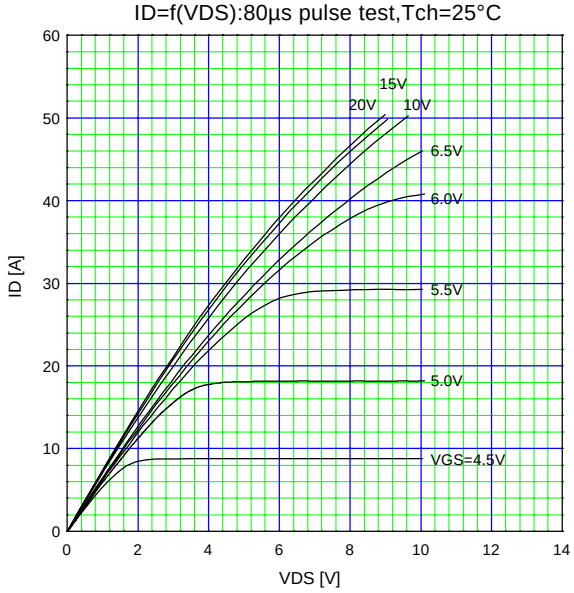
Allowable Power Dissipation
PD=f(Tc)



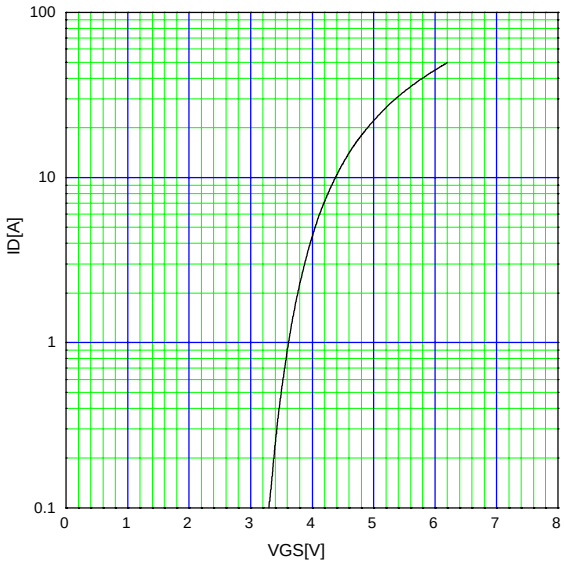
Safe operating area
ID=f(VDS):Single Pulse,Tc=25°C



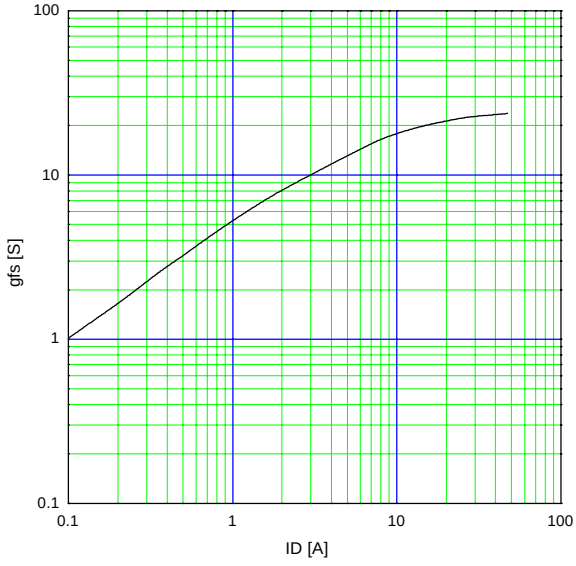
Typical Output Characteristics
ID=f(VDS):80µs pulse test,Tch=25°C



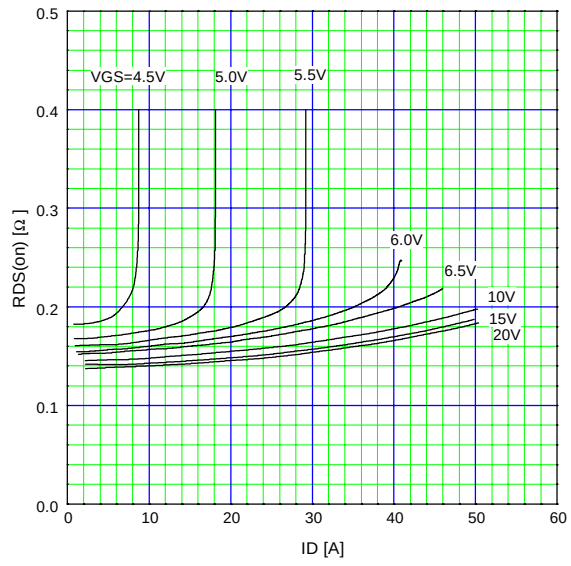
Typical Transfer Characteristic
ID=f(VGS):80µs pulse test,VDS=25V,Tch=25°C



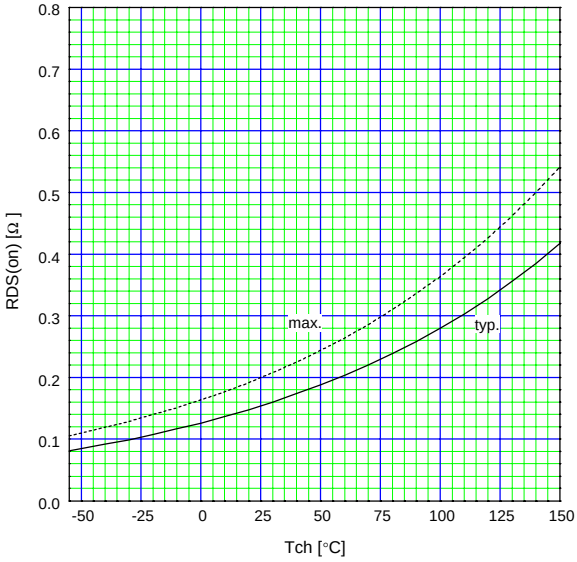
Typical Transconductance
gfs=f(ID):80µs pulse test,VDS=25V,Tch=25°C



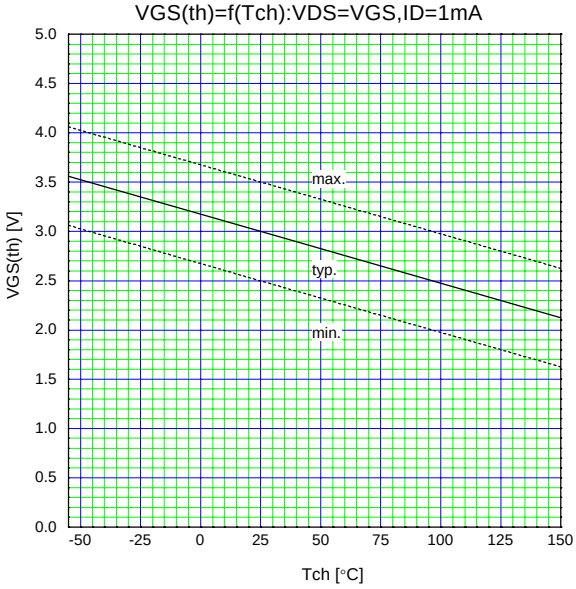
Typical Drain-Source on-state Resistance
RDS(on)=f(ID):80µs pulse test,Tch=25°C



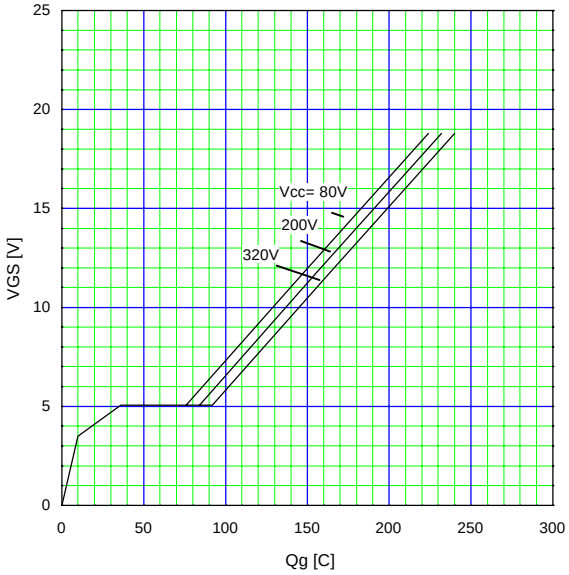
Drain-Source On-state Resistance
RDS(on)=f(Tch):ID=11.5A,VGS=10V



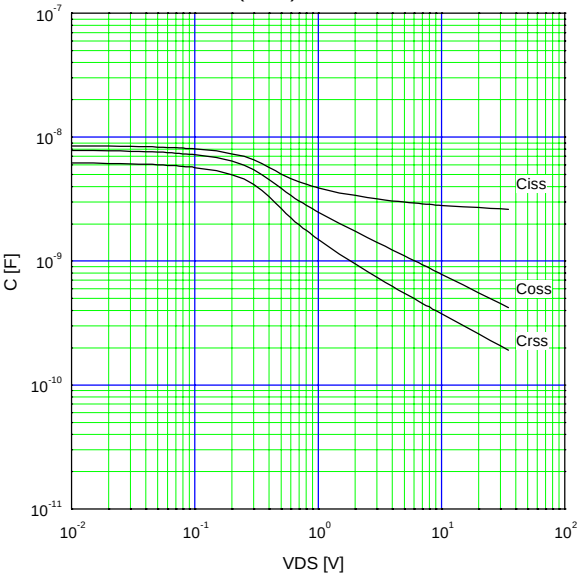
Gate Threshold Voltage vs. Tch
VGS(th)=f(Tch):VDS=VGS,ID=1mA



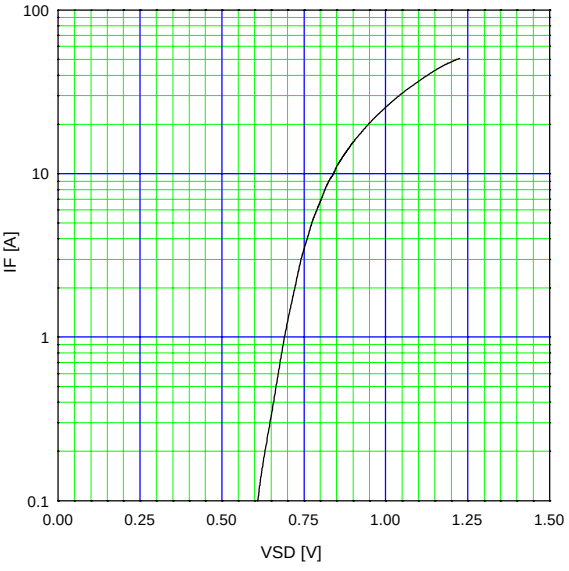
Typical Gate Charge Characteristics
VGS=f(Qg):ID=23A,Tch=25°C



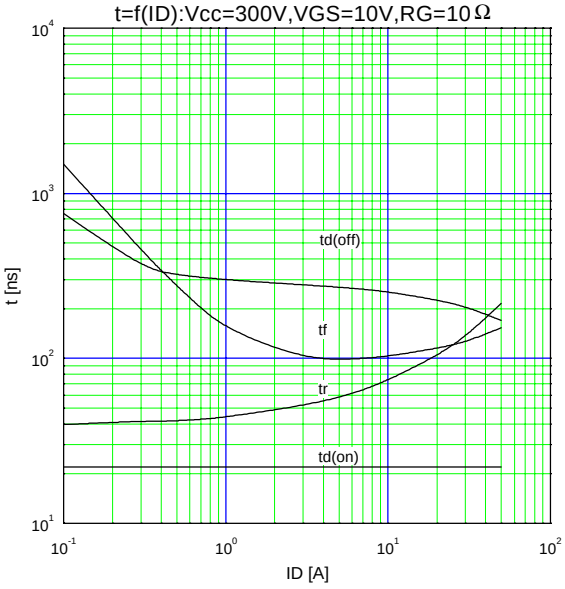
Typical Capacitance
C=f(VDS):VGS=0V,f=1MHz



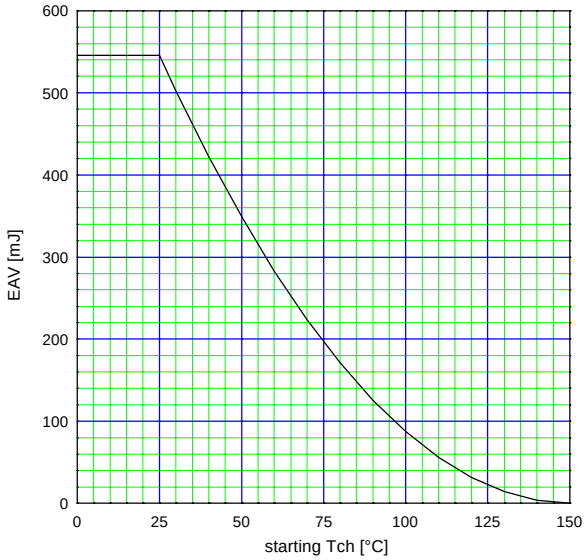
Typical Forward Characteristics of Reverse Diode
IF=f(VSD):80μs pulse test,Tch=25°C



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=40V,I(AV)<=23A



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