

N-CHANNEL SILICON POWER MOS-FET

Features

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

Applications

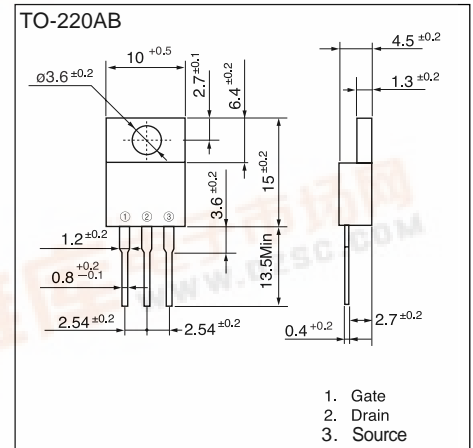
- Switching regulators
- UPS (Uninterruptible Power Supply)
- DC-DC converters

Maximum ratings and characteristic Absolute maximum ratings

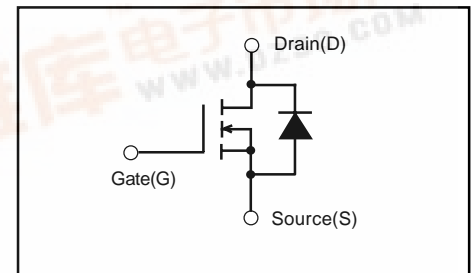
(Tc=25°C unless otherwise specified)

Item	Symbol	Rating	Unit
Drain-source voltage	V _{DS}	30	V
Continuous drain current	I _D	±50	A
Pulsed drain current	I _{D(puls)}	±200	A
Gate-source voltage	V _{GS}	±16	V
Maximum Avalanche Energy	E _{AV*1}	1735	mJ
Max. power dissipation	P _D	80	W
Operating and storage temperature range	T _{ch} T _{stg}	+150 -55 to +150	°C

*1 L=0.925mH, V_{cc}=12V



Equivalent circuit schematic



Electrical characteristics (Tc =25°C unless otherwise specified)

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	V _{(BR)DSS}	I _D =1mA V _{GS} =0V	30			V
Gate threshold voltage	V _{GS(th)}	I _D =1mA V _{DS} =V _{GS}	1.0	1.5	2.0	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =30V V _{GS} =0V	T _{ch} =25°C	10	500	μA
			T _{ch} =125°C	0.2	1.0	mA
Gate-source leakage current	I _{GSS}	V _{GS} =±16V V _{DS} =0V		10	100	nA
Drain-source on-state resistance	R _{DS(on)}	I _D =50A V _{GS} =4V		8.0	10.5	mΩ
		I _D =50A V _{GS} =10V		5.3	6.8	
Forward transconductance	g _{fs}	I _D =50A V _{DS} =25V	35	70		S
Input capacitance	C _{iss}	V _{DS} =25V		3900	5850	pF
Output capacitance	C _{oss}	V _{GS} =0V		2000	3000	
Reverse transfer capacitance	C _{rss}	f=1MHz		850	1280	
Turn-on time t _{on}	t _{d(on)}	V _{CC} =15V I _D =100A		17	30	ns
	t _r	V _{GS} =10V		70	110	
Turn-off time t _{off}	t _{d(off)}	R _{GS} =10Ω		250	380	
	t _f			180	270	
Avalanche capability	I _{AV}	L=100μH T _{ch} =25°C	50			A
Diode forward on-voltage	V _{SD}	I _F =50A V _{GS} =0V T _{ch} =25°C		1.0	1.5	V
Reverse recovery time	t _{rr}	I _F =50A V _{GS} =0V		65		ns
Reverse recovery charge	Q _{rr}	-di/dt=100A/μs T _{ch} =25°C		0.12		μC

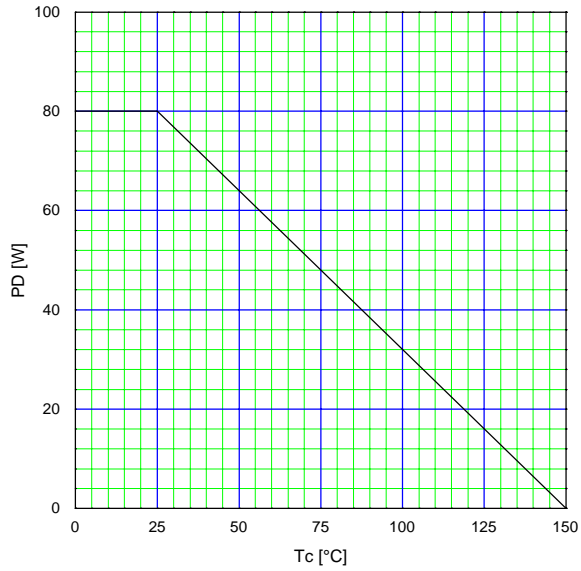
Thermal characteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	R _{th(ch-c)}	channel to case			1.56	°C/W
	R _{th(ch-a)}	channel to ambient			75.0	°C/W

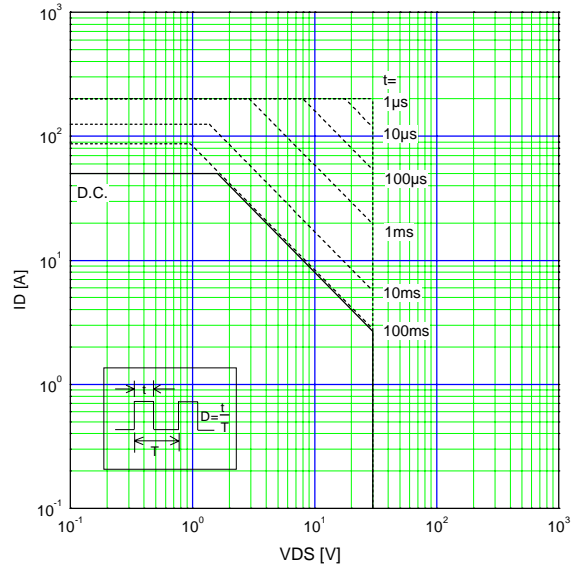


Characteristics

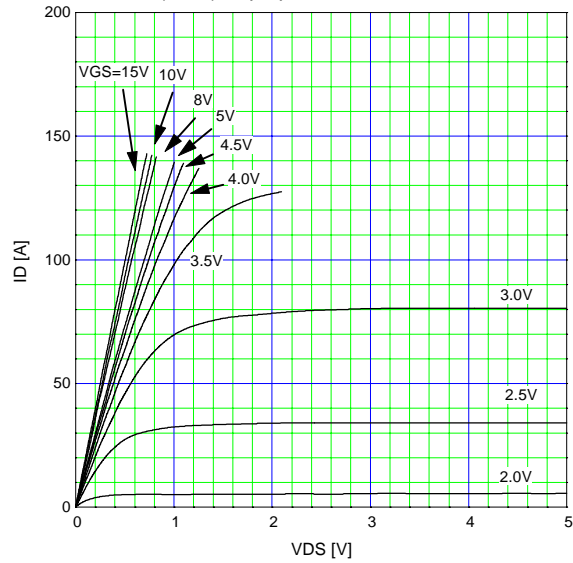
Power Dissipation
 $PD=f(T_c)$



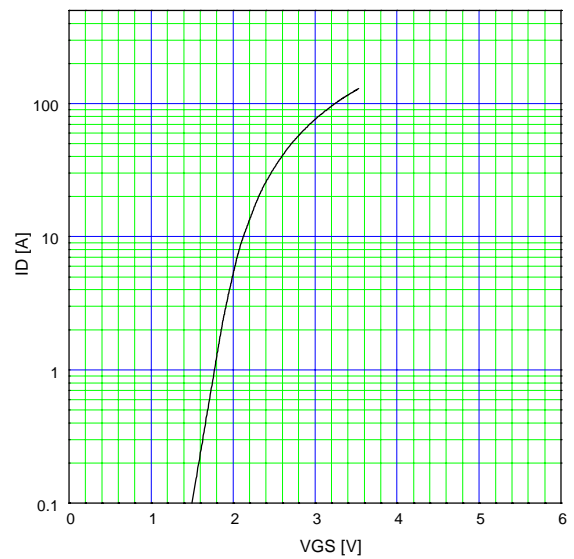
Safe operating area
 $ID=f(V_{DS}): D=0.01, T_c=25^\circ C$



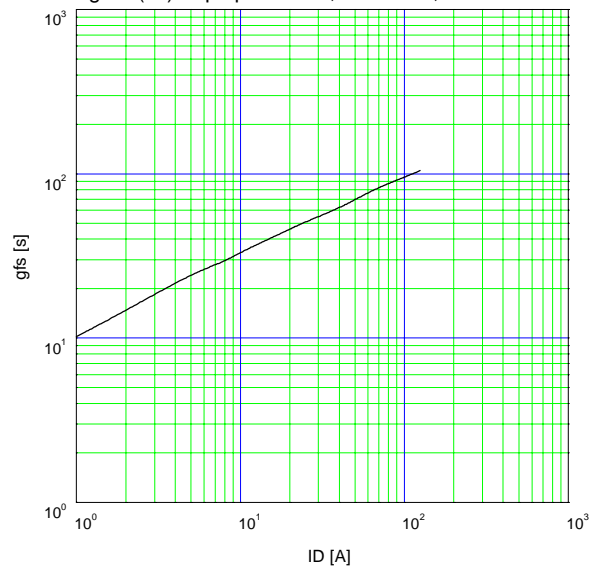
Typical output characteristics
 $ID=f(V_{DS}): 80\mu s$ pulse test, $T_c=25^\circ C$



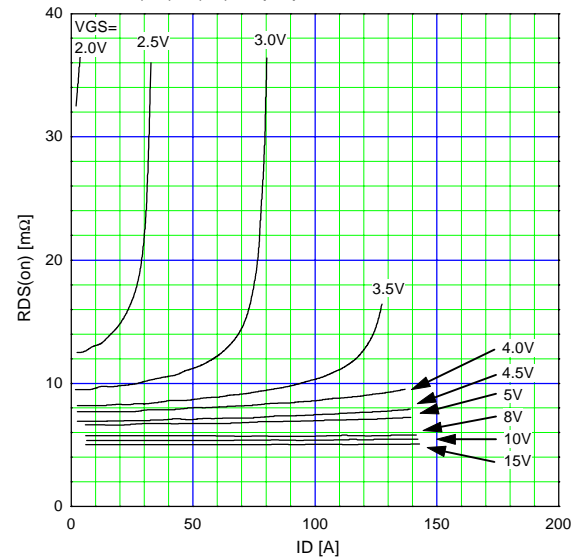
Typical transfer characteristics
 $ID=f(V_{GS}): 80\mu s$ pulse test, $V_{DS}=25V, T_{ch}=25^\circ C$

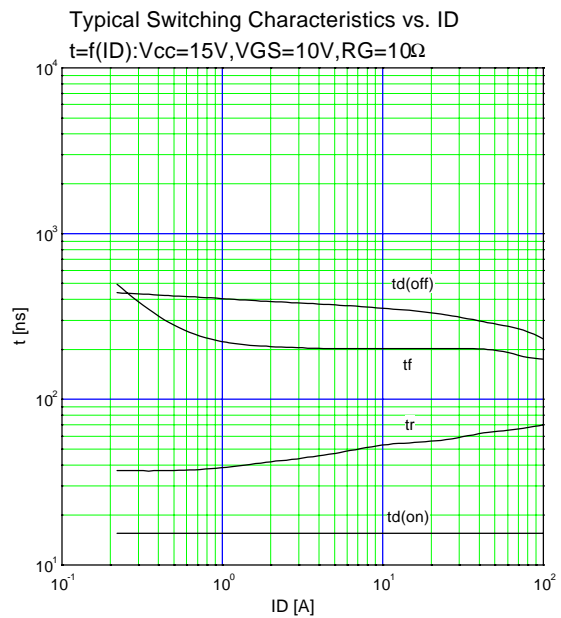
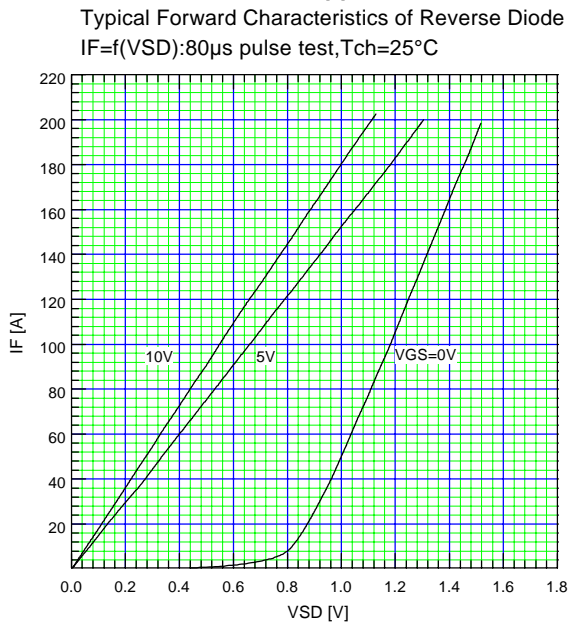
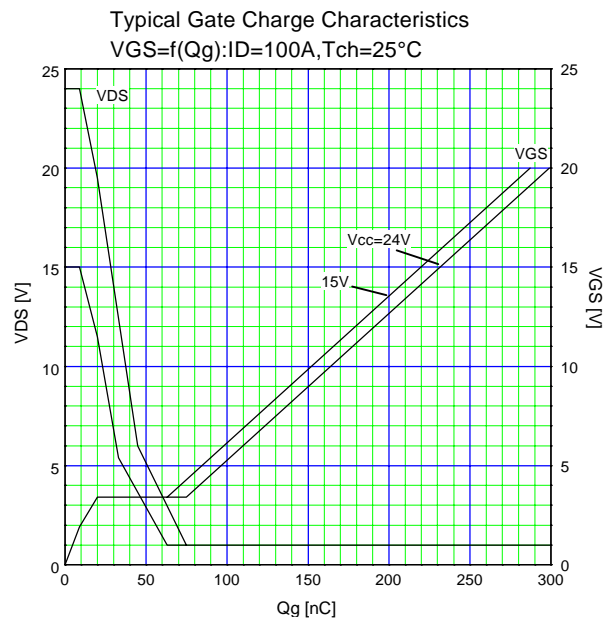
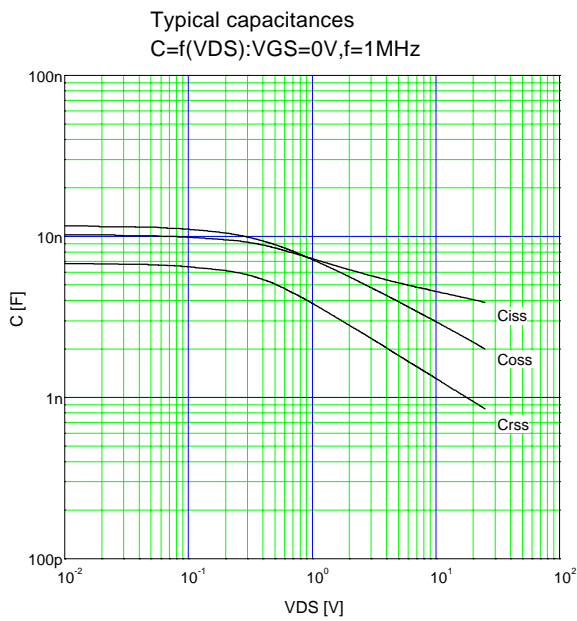
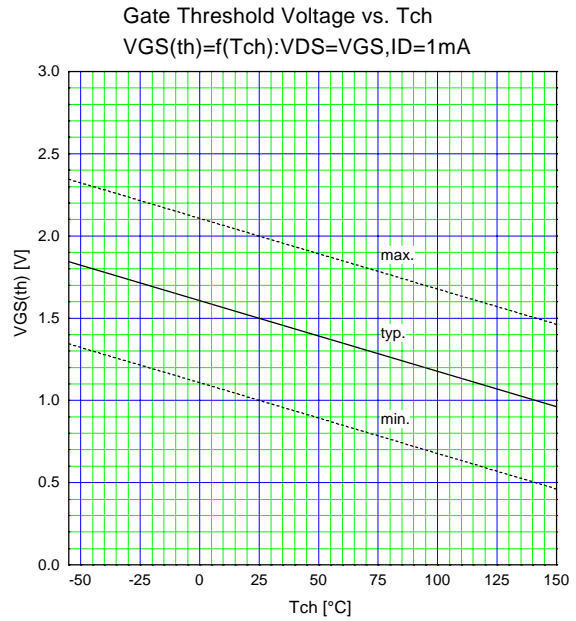
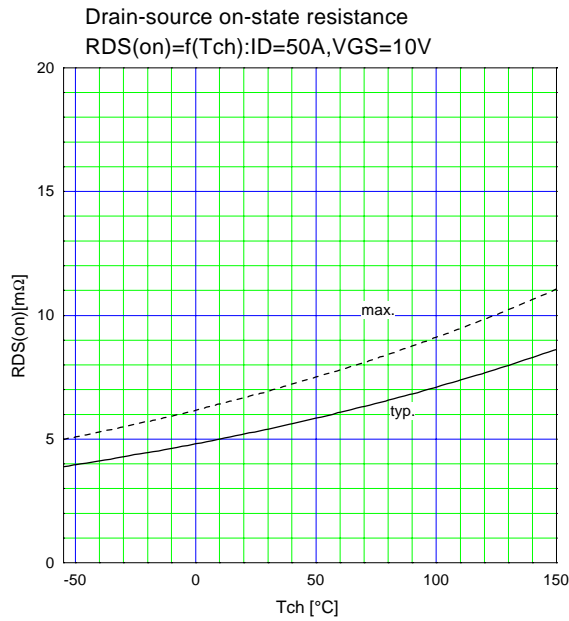


Typical forward transconductance
 $g_{fs}=f(I_D): 80\mu s$ pulse test, $V_{DS}=25V, T_{ch}=25^\circ C$

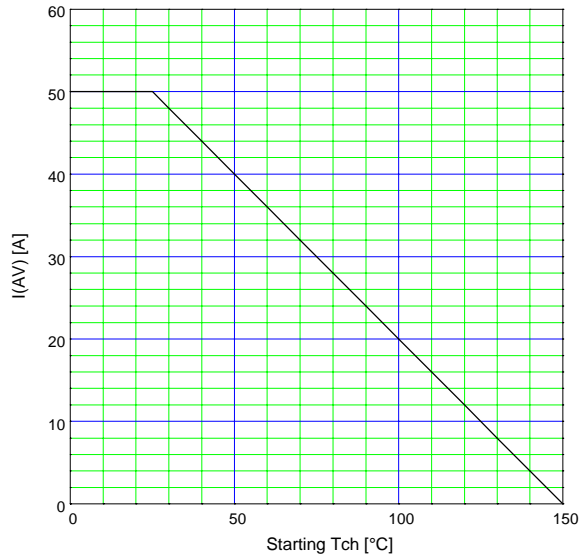


Typical Drain-Source on-State Resistance
 $R_{DS(on)}=f(I_D): 80\mu s$ pulse test, $T_{ch}=25^\circ C$

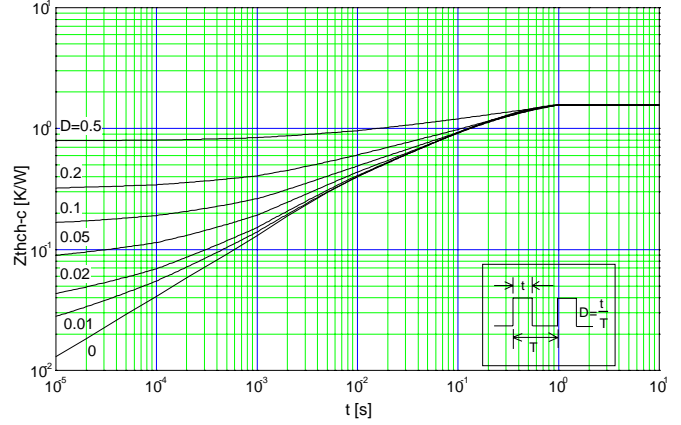




Maximum Avalanche Current vs. starting Tch
 $I(AV)=f(\text{starting Tch})$



Transient thermal impedance
 $Z_{thch}=f(t)$ parameter: $D=t/T$



Maximum Avalanche energy vs. starting Tch
 $E_{as}=f(\text{starting Tch}): V_{cc}=12V, I(AV) < 50A$

