

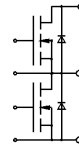
SEMITRANS® M Power MOSFET Modules 120 A, 200 V, 17 mΩ

SKM 120 B 020

Replaces discontinued SKM 224 A



SEMITRANS 2



Features

- N Channel, enhancement mode
- Short internal connections avoid oscillations
- Switching kW in less than 1 μs
- Isolated copper baseplate using Al₂O₃ ceramic Direct Copper Bonding Technology (DCB)
- All electrical connections on top for easy busbaring
- Large clearances and creepage distances
- Material, clearances and creepage distances meet UL-specifications

Typical Applications

- Switched mode power supplies
- DC servo and robot drives
- DC choppers
- UPS equipment
- Plasma cutting
- Not suitable for linear amplification

This is an electrostatic discharge sensitive device (ESDS).
Please observe the international standard IEC 747-1, Chapter IX.

Absolute Maximum Ratings		Values	Units			
Symbol	Conditions ¹⁾					
V _{DS}		200	V			
V _{DGR}	R _{GS} = 20 kΩ	200	V			
I _D	T _{case} = 25 °C	120	A			
	T _{case} = 85 °C	87	A			
I _{DM}		360	A			
V _{GS}		± 20	V			
P _D		500	W			
T _j , T _{stg}		- 55 ... +150	°C			
V _{isol}	AC, 1 min	2 500	V			
humidity	DIN 40 040	Class F				
climate	DIN IEC 68 T.1	55/150/56				
Inverse Diode						
I _F = - I _D		120	A			
I _{FM} = - I _{DM}		360	A			
Characteristics		min.	typ.	max.	Units	
Symbol	Conditions ¹⁾					
V _{(BR)DSS}	V _{GS} = 0, I _D = 0,25 mA	200	-	-	V	
V _{GS(th)}	V _{GS} = V _{DS} , I _D = 1 mA	2,1	3,0	4,0	V	
I _{DSS}	V _{GS} = 0 } T _j = 25 °C	-	50	250	μA	
	V _{GS} = 200 V } T _j = 125 °C	-	300	1000	μA	
I _{GSS}	V _{GS} = 20 V, V _{DS} = 0	-	10	100	nA	
R _{DS(on)}	V _{GS} = 10 V, I _D = 120 A	-	15	17	mΩ	
g _{fs}	V _{DS} = 5 V, I _D = 75 A	60	90	-	S	
C _{CHC}	per MOSFET	-	-	100	pF	
C _{iss}	V _{GS} = 0	-	10,4	16	nF	
C _{oss}	V _{DS} = 25 V	-	2	4,5	nF	
C _{rss}	f = 1 MHz	-	1	1,4	nF	
L _{DS}		-	-	30	nH	
t _{d(on)}	V _{DD} = 100 V	-	120	-	ns	
t _r	I _D = 75 A	-	60	-	ns	
t _{d(off)}	V _{GS} = 10 V	-	240	-	ns	
t _f	R _{GS} = 3,3 Ω	-	40	-	ns	
Inverse Diode						
V _{SD}	I _F = 240 A, V _{GS} = 0	-	1,2	1,5	V	
t _{rr}	T _j = 25 °C ²⁾	-	400	-	ns	
	T _j = 150 °C ²⁾	-	700	-	ns	
Q _{rr}	T _j = 25 °C ²⁾	-	5,0	-	μC	
	T _j = 150 °C ²⁾	-	8	-		
Thermal Characteristics						
R _{thjc}	per MOSFET	-	-	0,25	°C/W	
R _{thch}	per module	-	-	0,05	°C/W	
Mechanical Data						
M ₁	to heatsink	SI Units (M6)	4	-	5	Nm
		US Units	35	-	44	lb.in.
M ₂	for terminals	SI Units (M5)	2,5	-	3,5	Nm
		US Units	22	-	24	lb.in.
a			-	-	5x9,81	m/s ²
w			-	-	250	g
Case	→ page B 5 - 42		D 70			

¹⁾ T_{case} = 25 °C, unless otherwise specified.

²⁾ I_F = - I_D, V_R = 100 V, - di_F/dt = 100 A/μs

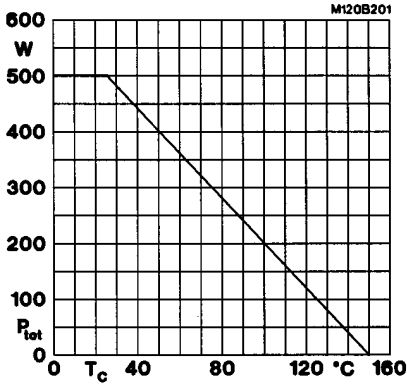


Fig. 1 Rated power dissipation vs. temperature

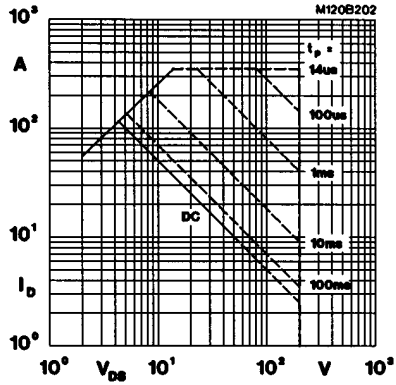


Fig. 2 Maximum safe operating area

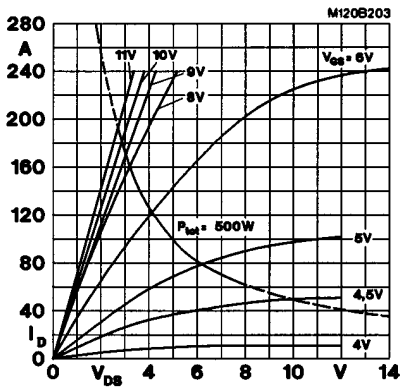


Fig. 3 Output characteristic

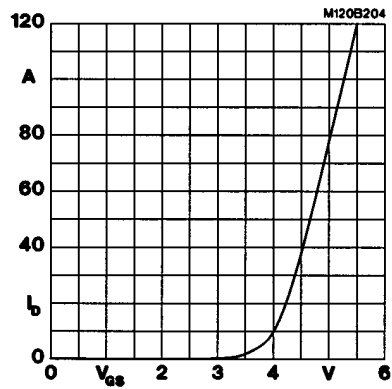


Fig. 4 Transfer characteristic

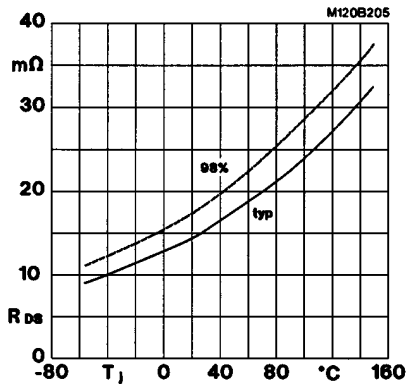


Fig. 5 On-resistance vs. temperature; $I_D = 120$ A; $V_{GS} = 10$ V

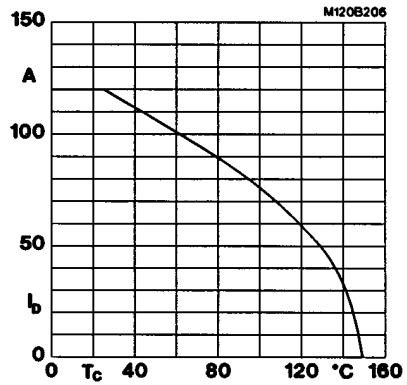


Fig. 6 Rated current vs. temperature; $V_{GS} = 10$ V

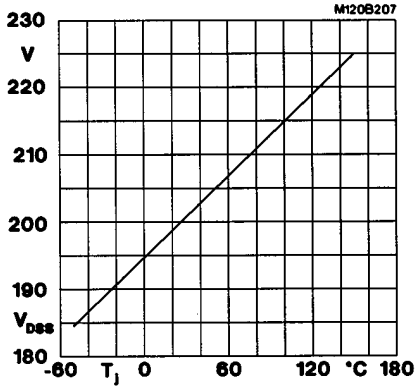


Fig. 7 Breakdown voltage vs. temperature

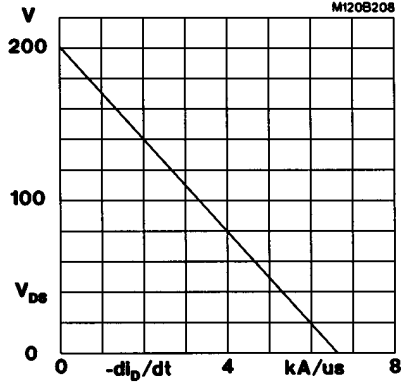


Fig. 8 Drain-source voltage derating

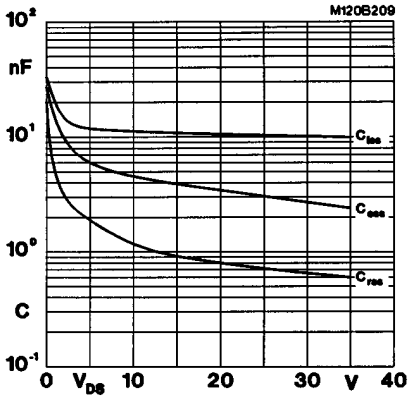


Fig. 9 Capacitances vs. drain-source voltage

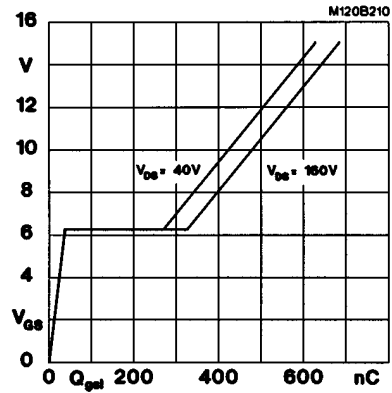


Fig. 10 Gate charge characteristic

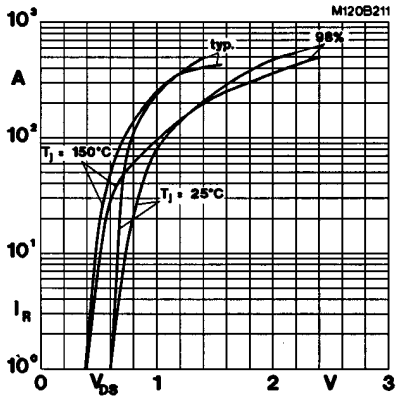


Fig. 11 Diode forward characteristic

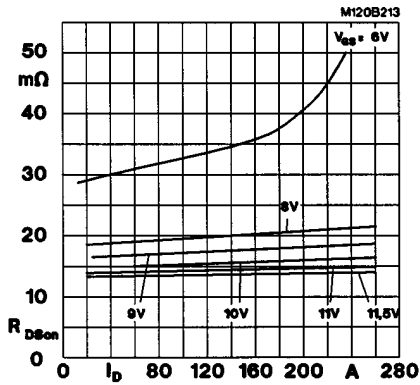


Fig. 13 On-resistance vs. drain current

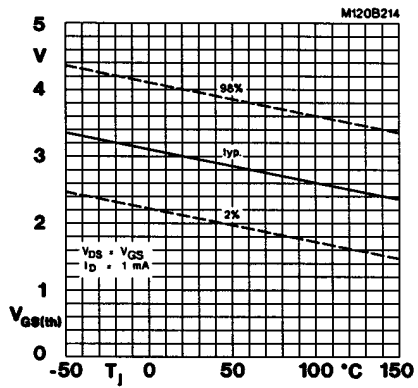


Fig. 14 Gate-source threshold voltage

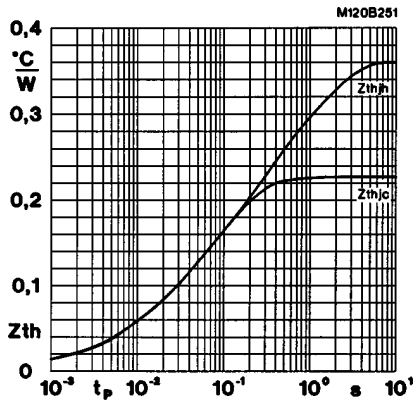


Fig. 51 Transient thermal impedance

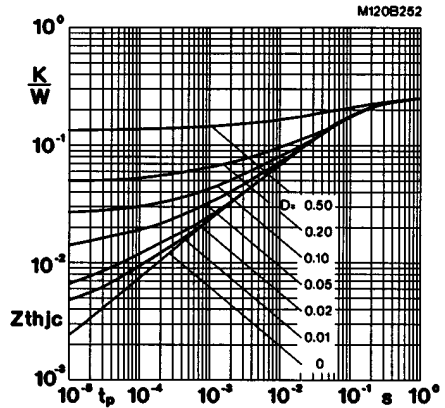


Fig. 52 Thermal impedance under pulse conditions

