

SEMITOP[®]E2

Half-Bridge (Full SiC)

SK200MB120CR03TE2

Features*

- Optimized design for superior thermal performance
- Extremely low inductance design
- Press-Fit contact technology
- 1200V Planar Gen3 SiC MOSFET
- Simple to drive with +15V gate voltage
 Optimized switching stability thanks to module integrated gate resistors
- Integrated NTC temperature sensor
- UL recognized file no. E 63 532

Typical Applications

- Switched Mode Power Supplies
- Energy Storage Systems
- Electric Vehicle charging
- UPS
- Solar

Remarks

- Recommended T_{jop} = -40°C...+150°C
- Recommended turn-off / turn-on gate voltage V_{GS} = -4...0/+15V

Absolute Maximum Ratings

Symbol	Conditions		Values	Unit		
MOSFET						
V _{DSS}	Tj = 25 °C		1200	V		
I _D	HPTP / HP-PCM Tj = 175 °C	T _s = 25 °C	223	А		
		T _s = 70 °C	186	А		
I _{DM}	Pulse width tp limited by Tvjmax		600	А		
V_{GS}	Transient Gate - Source voltage (t<100ns)		-8 19	V		
Tj			-40 175	°C		
Integrated body diode						
I _{FM}	Pulse width t _p limited by T _{vjmax}		600	А		
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 150 °C		896	А		

Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
Module			
I _{t(RMS)}	$\Delta T_{terminal}$ at PCB joint = 30 K, per pin	30	А
T _{stg}	module without TIM	-40 125	°C
Visol	AC, sinusoidal, t = 1 min	2500	V





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	insucs					
Symbol	Conditions		min.	typ.	max.	Unit
MOSFET						
V _{(BR)DSS}	V_{GS} = 0 V, I _D = 0.5 mA, T _j = 25 °C		1200			V
V _{GS(th)}	V _{DS} = V _{GS} , I _D = 58 mA, T _i = 25 °C		1.8	2.5	3.6	V
I _{DSS}	$V_{GS} = 0 V, V_{DS} = 12$	200 V, T _j = 25 °C			0.5	mA
I _{GSS}	$V_{DS} = 0 V, V_{GS} = 15 V, T_j = 25 °C$				400	nA
D	$V_{GS} = 15 V$,	T _j = 25 °C		6.4	8.6	mΩ
RDS(on)	I _D = 207 A, chiplevel	T _j = 150 °C		10		mΩ
Ciss	V _{GS} = 0 V,	f = 0.1 MHz		17000		pF
Coss	V _{DS} = 1000 V,	f = 0.1 MHz		650		pF
Crss	T _j = 25 °C	f = 0.1 MHz		50		pF
Q _G	V_{GS} = -415V, V_{DI}	_D = 800V, I _D = 207 A		590		nC
R _{Gint}	T _j = 25 °C			2.7		Ω
t _{d(on)}	V _{DD} = 600 V	T _j = 150 °C		49		ns
t _{d(off)}	$I_{\rm D} = 200 {\rm A}$	T _j = 150 °C		120		ns
t _r	$V_{GS} = -4/+15 V$	T _j = 150 °C		17		ns
t _f	$di/dt_{off} = 13 \text{ kA/us}$	T _j = 150 °C		29		ns
Eon	di/dt _{on} = 18 kA/µs	T _j = 150 °C		2.47		mJ
E _{off}	dv/dt = 32 kV/ μ s L _s = 5 nH	T _j = 150 °C		2.14		mJ
R _{th(j-s)}	per MOSFET, HPTP / HP-PCM			0.23		K/W
Integrate	d body diode					
V - V	$-I_{\rm D} = 104 \text{ A}$	T _j = 25 °C		4.6		V
$v_F = v_{SD}$	v _{GS} = -4 v chiplevel	T _j = 150 °C		4.3		V
	chiplevel	T _j = 25 °C		3.8		V
$\mathbf{v}_{F0} = \mathbf{v}_{SD0}$		T _j = 150 °C		3.6		V
$r_F = r_{SD}$	chiplevel	T _j = 25 °C		7.7		mΩ
		T _j = 150 °C		6.8		mΩ
t _{rr}	V_{DD} = 600 V -I _D = 200 A V _{GS} = -4 V R _{Gon} =0.6 Ω	T _j = 150 °C		40		μs
Qrr		T _j = 150 °C		5.6		μC
~						
l _m	V _{GS} = -4 V R _{Gon} =0.6 Ω	T _j = 150 °C		281		Α

Characteristics						
Symbol	Conditions	min.	typ.	max.	Unit	
Module						
L _{CE}			6		nH	
Ms	to heatsink	1.6		2.3	Nm	
w	weight		35		g	

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Tempera	ture Sensor				
R ₁₀₀	T _r = 100 °C		493 ± 5%		Ω
B _{100/125}	R _(T) =R ₁₀₀ *exp[B _{100/125} *(1/T-1/T ₁₀₀)], T[K];		3550 (± 2%)		К

















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Fig. 9: Typ. transient thermal impedance







This is an electrostatic discharge sensitive device (ESDS) according to international standard IEC 61340.

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