



SEMITRANS® 20

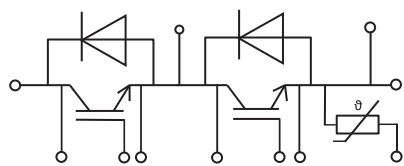
SKM450GB33F

Features

- 3.3 kV F-IGBT
- 450A half bridge
- Low V_{CE} , E_{off} and R_{th}
- High power density
- Low inductance module design
- T-sensor
- Easy paralleling and easy power scaling
- For flexible and compact medium voltage inverters

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}	T _j = 25 °C		3300	V
I _C	T _j = 150 °C	T _c = 25 °C	760	A
		T _c = 80 °C	542	A
I _{Cnom}			450	A
I _{CRM}	I _{CRM} = 2xI _{Cnom}		900	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 2200 V, L _s = 40 nH, R _{Gon} = 6.8 Ω, R _{Goff} = 68 Ω, V _{GE} ± 15, T _j = 150 °C, V _{CES} ≤ 3300		10	μs
T _j	Operation		-50 ... 150	°C
Inverse diode				
I _F	T _j = 150 °C	T _c = 25 °C	674	A
		T _c = 80 °C	476	A
I _{Fnom}			450	A
I _{FRM}	I _{FRM} = 2xI _{Fnom}		900	A
I _{FSM}	t _p = 10 ms, sin 180°,		t.b.d.	A
T _j	Operation		-50 ... 150	°C
Module				
I _{t(RMS)}			1000	A
T _{stg}			-55 ... 150	°C
V _{isol}	AC sinus 50 Hz, t = 1 min		6000	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
V _{CE(sat)}	I _C = 450 A	T _j = 25 °C	1.75	2.07	2.37	V
	V _{GE} = 15 V chipelevel	T _j = 150 °C	2.43	2.86	3.26	V
V _{GE(th)}	V _{CE} = 10V, I _C = 450 mA, T _j = 25 °C		5.5	6.5	7.5	V
I _{CES}	V _{GE} = 0 V	T _j = 25 °C			0.3	mA
	V _{CE} = 3300 V	T _j = 150 °C		15	50	mA
C _{ies}	V _{GE} = 0 V, V _{CE} = 10 V, f = 0.1 MHz, T _{vj} = 25 °C			24.0		nF
Q _G	V _{GE} = -15V ... 15V			1296		nC
R _{Gint}	T _j = 25 °C			6.2		Ω
t _{d(on)}	V _{CC} = 1800 V	T _j = 150 °C		326		ns
t _r	I _C = 450 A	T _j = 150 °C		118		ns
E _{on}	V _{GE} = +15/-15 V	T _j = 150 °C		601		mJ
t _{d(off)}	R _{G on} = 6.8 Ω	T _j = 150 °C		1180		ns
t _f	R _{G off} = 12 Ω	T _j = 150 °C		291		ns
E _{off}	di/dt _{on} = 3500 A/μs di/dt _{off} = 3400 A/μs du/dt = 1250 V/μs L _s = 35 nH	T _j = 150 °C		601		mJ
R _{th(j-c)}	per IGBT				0.035	K/W



GB



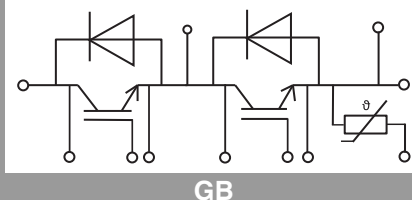
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
V _F	I _F = 450 A		1.75	2.05	2.34	V
	V _{GE} = 0 V chiplevel	T _j = 150 °C	1.93	2.25	2.57	V
I _{RRM}	I _F = 450 A	T _j = 150 °C		493		A
Q _{rr}	di/dt _{off} = 3600 A/μs	T _j = 150 °C		442		μC
E _{rr}	V _{GE} = ±15 V	T _j = 150 °C		542		mJ
t _{rr}	V _{CC} = 1800 V	T _j = 150 °C		1.49		μs
R _{th(j-c)}	L _s = 35 nH	T _j = 150 °C			0.055	K/W
	per diode					
Module						
L _{CE}	Between C ₁ (main) and E ₂ (main)			9		nH
R _{CC'+EE'}	measured per switch, R _{C AUX C'} + R _{E AUX E'}	T _C = 25 °C		t.b.d.		mΩ
		T _C = 125 °C		0.44		mΩ
R _{th(c-s)}	per switch			0.02		K/W
M _s	to heat sink M6			5.5	6	Nm
M _t		to terminals M3		0.6	0.8	Nm
		to terminals M8		14.4	15	Nm
Temperature Sensor						
R ₂₅	T _c = 25°C			5 ± 5%		kΩ
B _{25/50}				3375		K



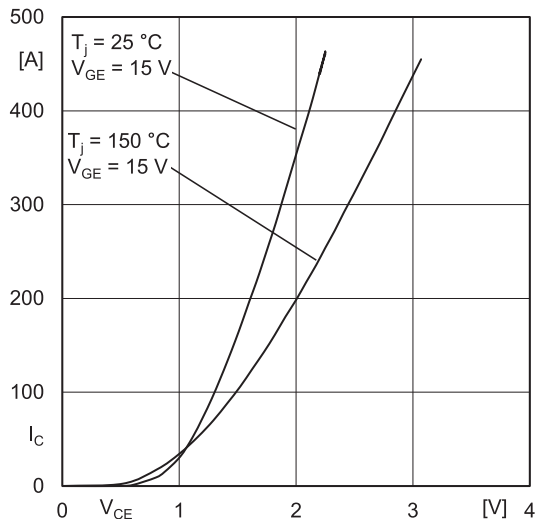


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

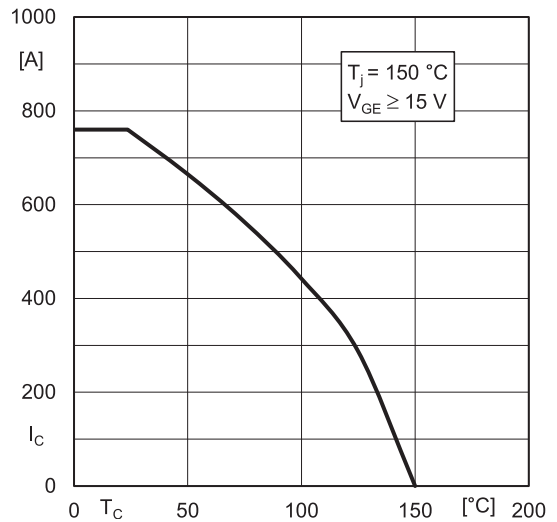


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

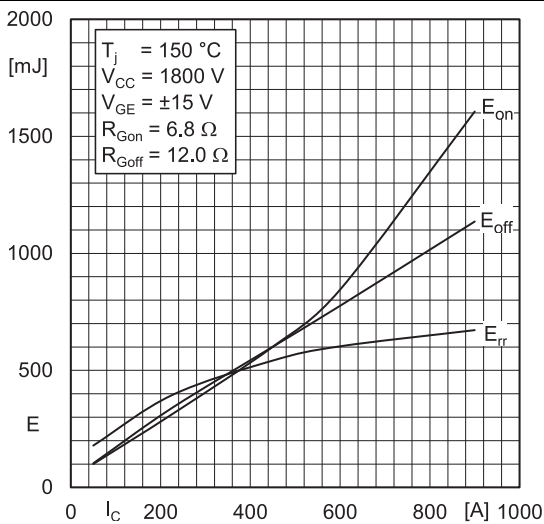


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

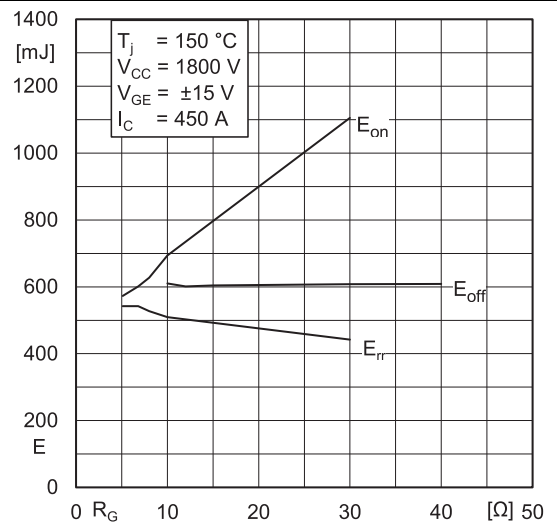


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

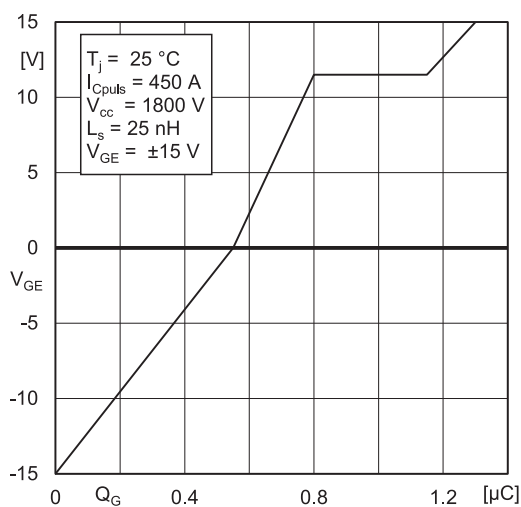


Fig. 6: Typ. gate charge characteristic

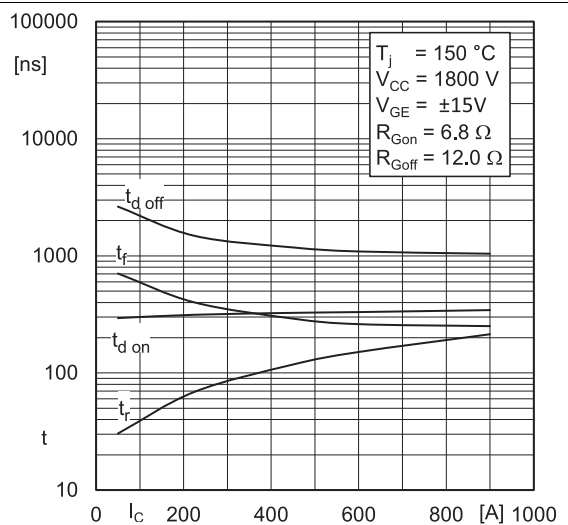
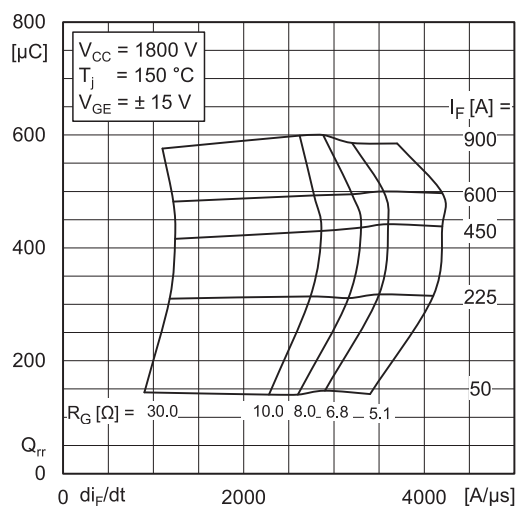
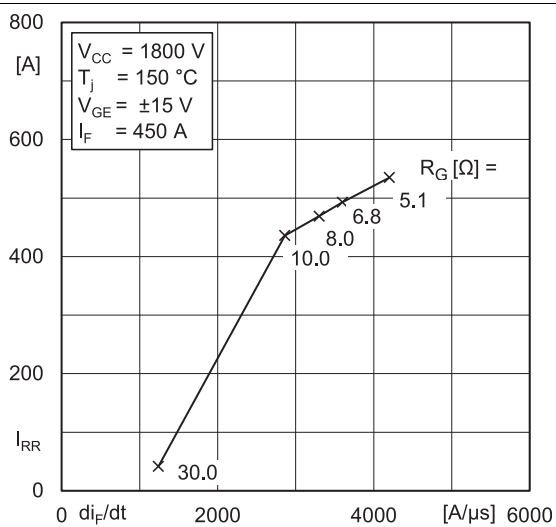
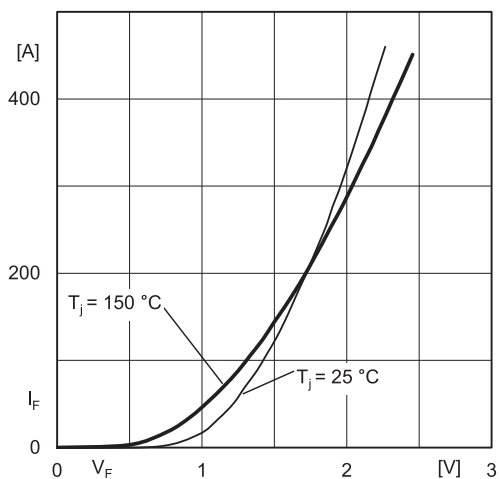
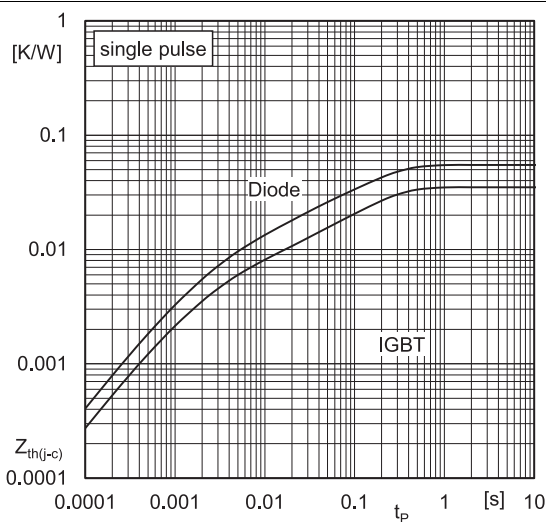
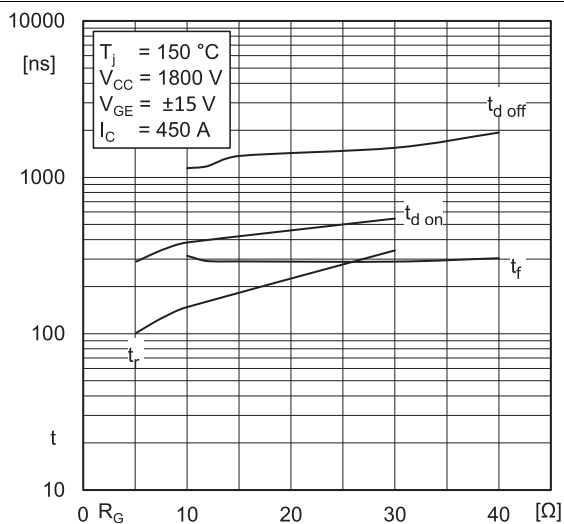


Fig. 7: Typ. switching times = $f(I_C)$





This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, chapter IX.

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