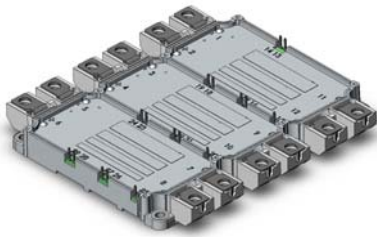


SEMiX353GD126HDc



SEMiX® 33c

Trench IGBT Modules

SEMiX353GD126HDc

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Features

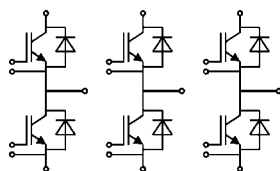
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability
- UL recognised file no. E63532

Typical Applications*

- AC inverter drives
- UPS
- Electronic Welding

Remarks

- Case temperatur limited to $T_C=125^\circ\text{C}$ max.
- Not for new design

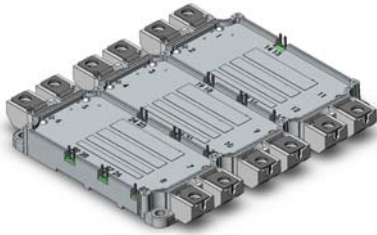


GD

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}			1200	V
I _C	T _j = 150 °C	T _c = 25 °C	364	A
		T _c = 80 °C	256	A
I _{Cnom}			225	A
I _{CRM}	I _{CRM} = 2xI _{Cnom}		450	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 600 V V _{GE} ≤ 20 V V _{CES} ≤ 1200 V	T _j = 125 °C	10	µs
T _j			-40 ... 150	°C
Inverse diode				
I _F	T _j = 150 °C	T _c = 25 °C	329	A
		T _c = 80 °C	228	A
I _{Fnom}			225	A
I _{FRM}	I _{FRM} = 2xI _{Fnom}		450	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		1700	A
T _j			-40 ... 150	°C
Module				
I _{t(RMS)}			600	A
T _{stg}			-40 ... 125	°C
V _{isol}	AC sinus 50Hz, t = 1 min		4000	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
V _{CE(sat)}	I _C = 225 A	T _J = 25 °C		1.7	2.1	V
	V _{GE} = 15 V chipelevel	T _J = 125 °C		2	2.45	V
V _{CE0}		T _J = 25 °C		1	1.2	V
		T _J = 125 °C		0.9	1.1	V
r _{CE}	V _{GE} = 15 V	T _J = 25 °C		3.1	4.0	mΩ
		T _J = 125 °C		4.9	6.0	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 9 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V	T _J = 25 °C		0.1	0.3	mA
	V _{CE} = 1200 V	T _J = 125 °C				mA
C _{ies}	V _{CE} = 25 V	f = 1 MHz		16.0		nF
C _{oes}	V _{GE} = 0 V	f = 1 MHz		0.84		nF
C _{res}		f = 1 MHz		0.73		nF
Q _G	V _{GE} = - 8 V...+ 15 V			1800		nC
R _{Gint}	T _J = 25 °C			3.33		Ω
t _{d(on)}	V _{CC} = 600 V	T _J = 125 °C		265		ns
t _r	I _C = 225 A	T _J = 125 °C		55		ns
E _{on}	R _{G on} = 2 Ω	T _J = 125 °C		26.5		mJ
t _{d(off)}	R _{G off} = 2 Ω	T _J = 125 °C		585		ns
t _f		T _J = 125 °C		120		ns
E _{off}		T _J = 125 °C		32.5		mJ
R _{th(j-c)}	per IGBT				0.1	K/W

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Typical Applications*

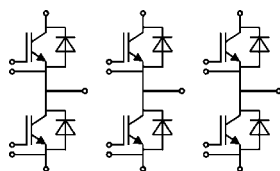
- AC inverter drives
- UPS
- Electronic Welding

Remarks

- Case temperatur limited to $T_C=125^{\circ}\text{C}$ max.
- Not for new design

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Inverse diode					
$V_F = V_{EC}$	$I_F = 225\text{ A}$ $V_{GE} = 0\text{ V}$ chip		$T_j = 25^{\circ}\text{C}$ $T_j = 125^{\circ}\text{C}$	1.6 1.80 1.6 1.8	V
V_{F0}		$T_j = 25^{\circ}\text{C}$ $T_j = 125^{\circ}\text{C}$	0.9 0.7	1 0.8	V
r_F		$T_j = 25^{\circ}\text{C}$ $T_j = 125^{\circ}\text{C}$	2.2 3.1	2.7 3.6	m Ω
I_{RRM}	$I_F = 225\text{ A}$ $di/dt_{off} = 5600\text{ A}/\mu\text{s}$	$T_j = 125^{\circ}\text{C}$	330		A
Q_{rr}	$V_{GE} = -15\text{ V}$	$T_j = 125^{\circ}\text{C}$	69		μC
E_{rr}	$V_{CC} = 600\text{ V}$	$T_j = 125^{\circ}\text{C}$	29		mJ
$R_{th(j-c)}$	per diode			0.17	K/W
Module					
L_{CE}			20		nH
$R_{CC'+EE'}$	res., terminal-chip	$T_C = 25^{\circ}\text{C}$ $T_C = 125^{\circ}\text{C}$	0.7 1		m Ω
$R_{th(c-s)}$	per module		0.014		K/W
M_s	to heat sink (M5)		3	5	Nm
M_t		to terminals (M6)	2.5	5	Nm
w				900	g
Temperatur Sensor					
R_{100}	$T_C=100^{\circ}\text{C}$ ($R_{25}=5\text{ k}\Omega$)		493 $\pm$ 5%		Ω
$B_{100/125}$	$R_{(T)}=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$; $T[\text{K}]$;		3550 $\pm 2\%$		K



GD

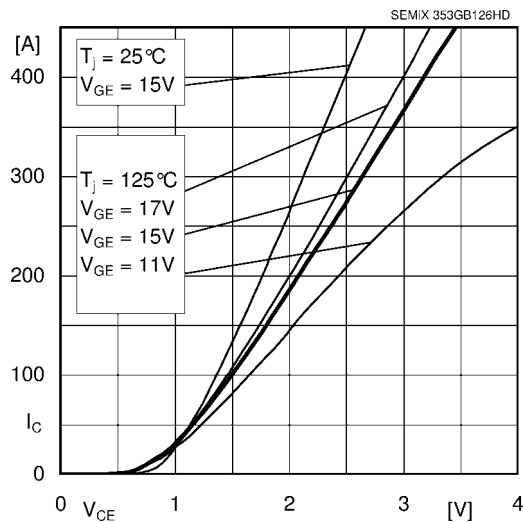


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

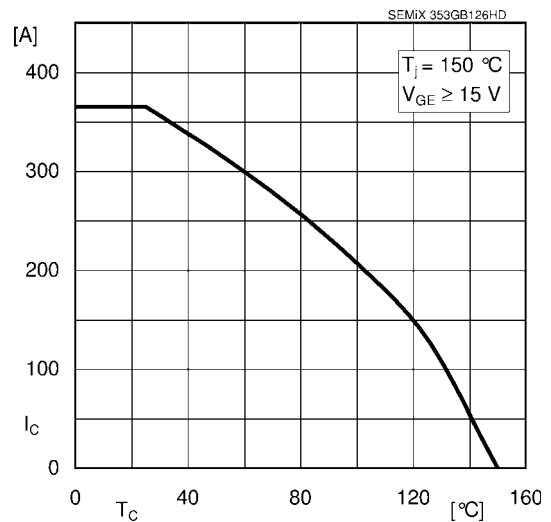


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

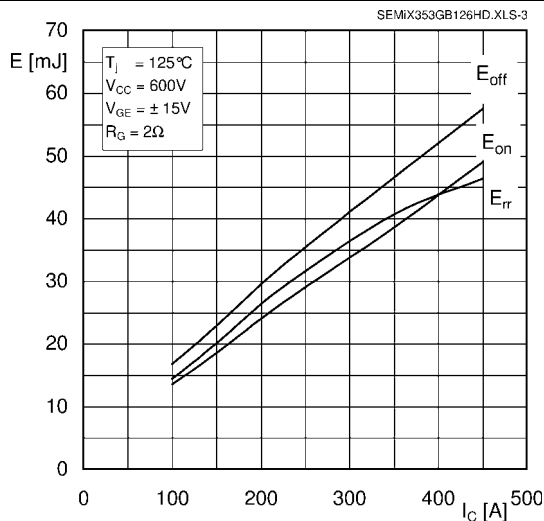


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

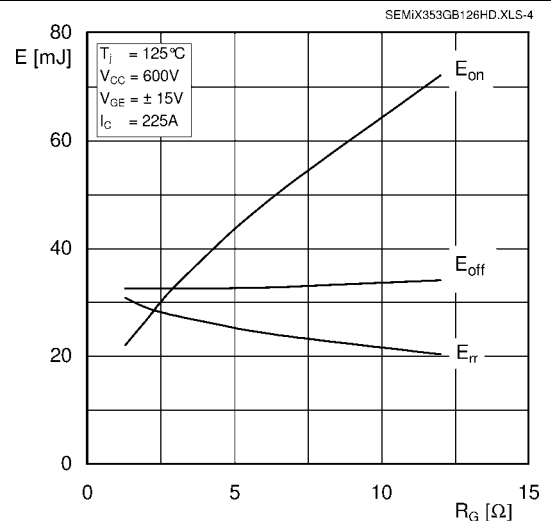


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

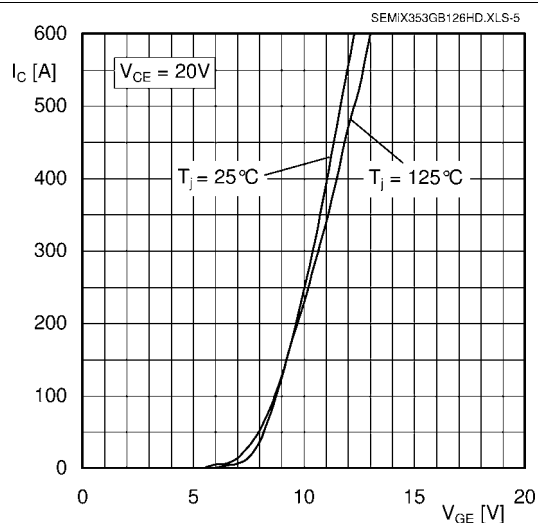


Fig. 5: Typ. transfer characteristic

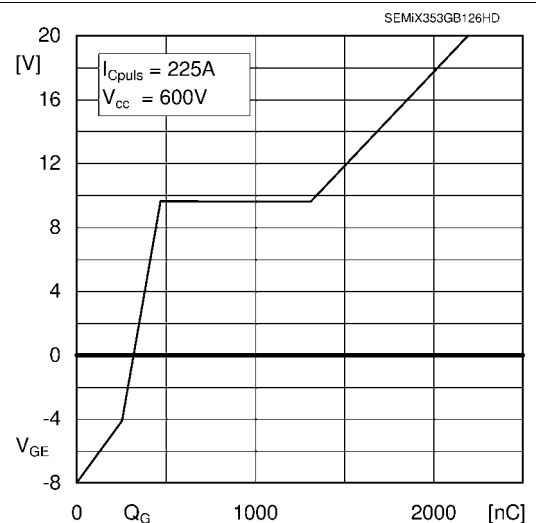


Fig. 6: Typ. gate charge characteristic

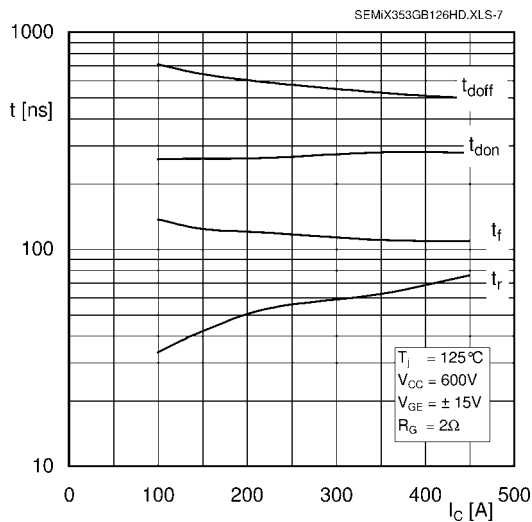


Fig. 7: Typ. switching times vs. I_C

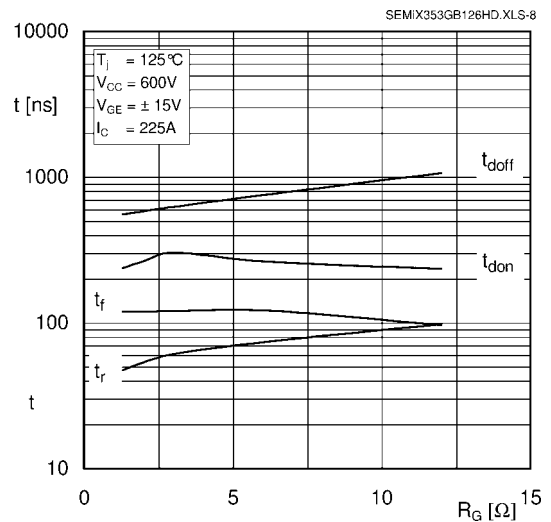


Fig. 8: Typ. switching times vs. gate resistor R_G

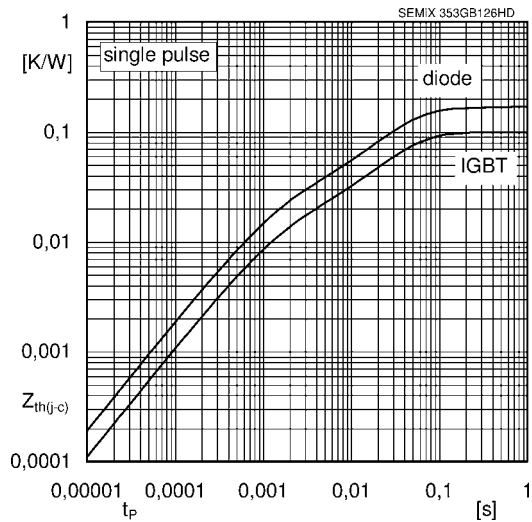


Fig. 9: Typ. transient thermal impedance

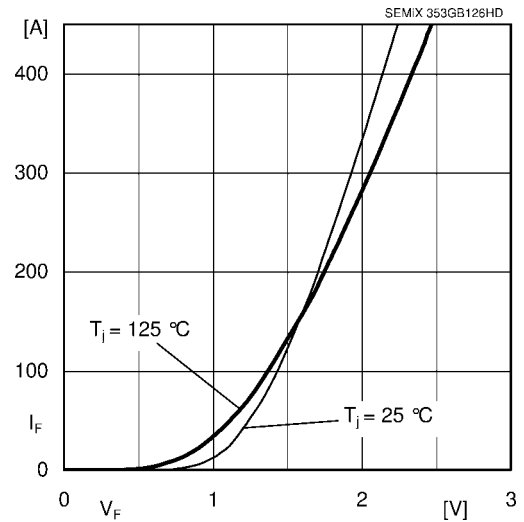


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

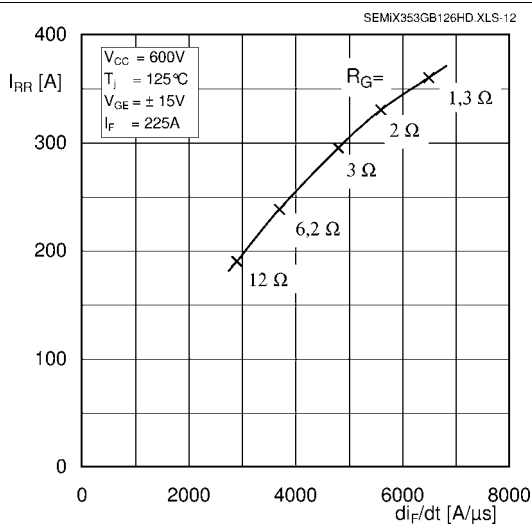


Fig. 11: Typ. CAL diode peak reverse recovery current

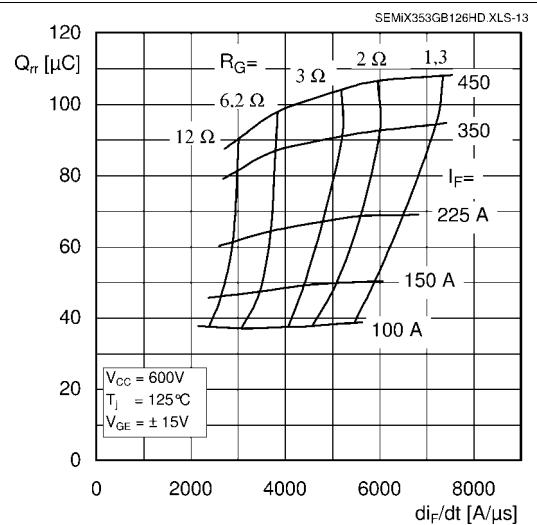
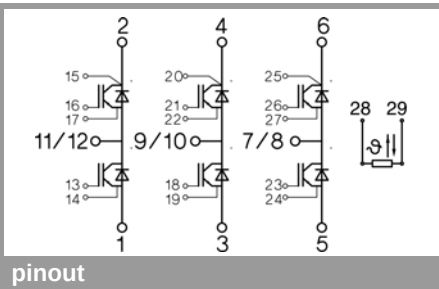
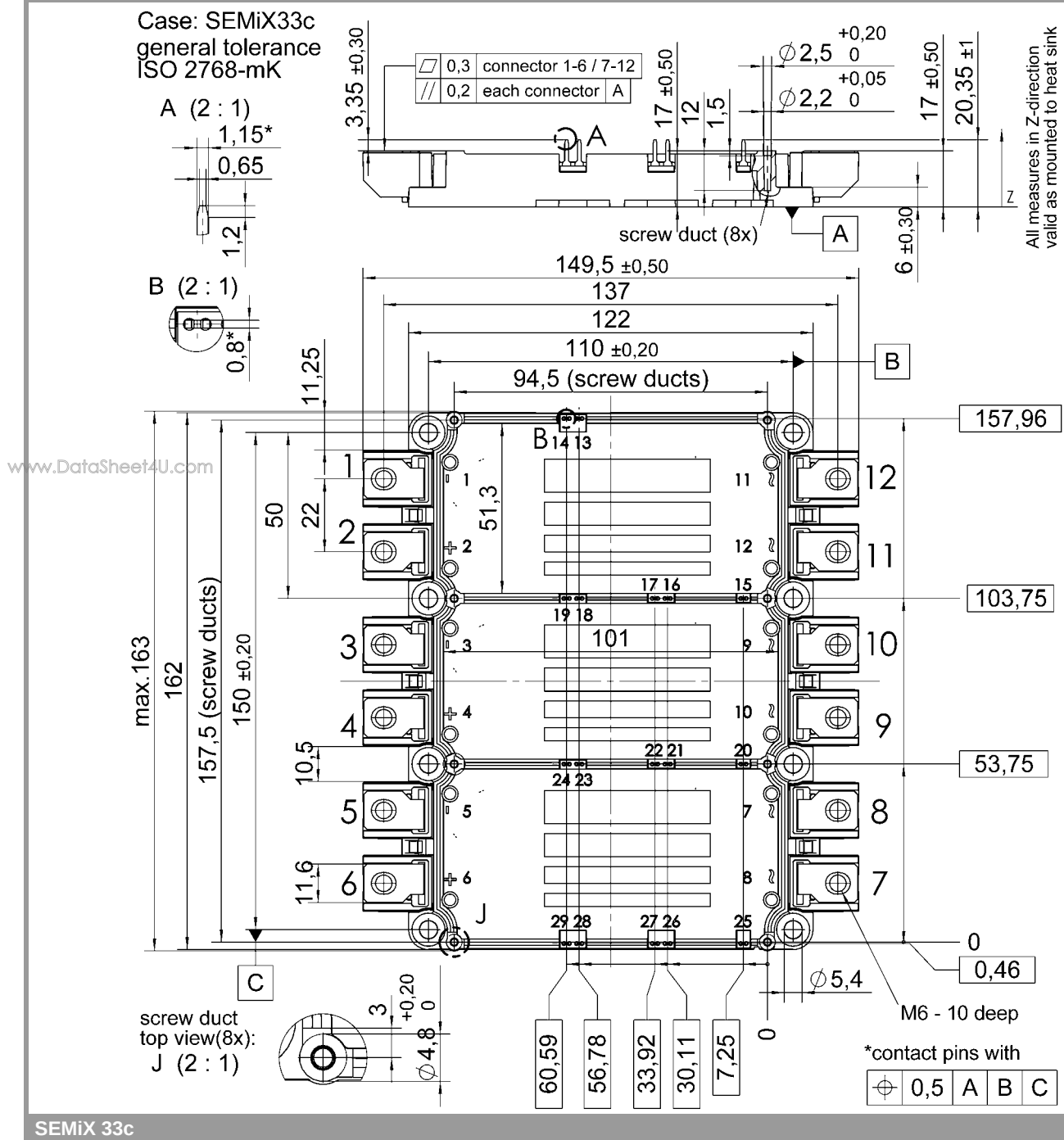


Fig. 12: Typ. CAL diode recovery charge

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* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.