



SEMITRANS® 4

Ultra Fast IGBT Modules

SKM 600GA125D

Features

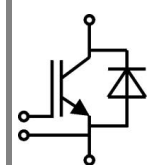
- NPT-IGBT with positive temperature coefficient of V_{CEsat}
- Short circuit self limiting to $6 \times I_C$
- Corresponds to standards: IEC 60721-3-3 (humidity) class 3K3/IEC 68T.1 climate 40/125/56

Typical Applications*

- Resonant inverters upto 100 kHz
- Inductive heating
- Electronic welders at $f_{SW} > 20$ kHz

Remarks

- $I_{DC} \leq 500A$ limited by terminals
- Take care of over-voltage caused by stray inductances.



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Absolute Maximum Ratings			T _c = 25 °C, unless otherwise specified	
Symbol	Conditions		Values	Units
IGBT				
V _{CES}	T _j = 25 °C		1200	V
I _C	T _j = 150 °C	T _{case} = 25 °C	580	A
		T _{case} = 80 °C	400	A
I _{CRM}	I _{CRM} =2xI _{Cnom}		800	A
V _{GES}			± 20	V
t _{psc}	V _{CC} = 600 V; V _{GE} ≤ 20 V; T _j = 125 °C V _{CES} < 1200 V		10	µs
Inverse Diode				
I _F	T _j = 150 °C	T _{case} = 25 °C	500	A
		T _{case} = 80 °C	350	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		800	A
I _{FSM}	t _p = 10 ms; sin.	T _j = 150 °C	3600	A
Module				
I _{t(RMS)}			500	A
T _{vj}			- 40 ... + 150 (125)	°C
T _{stg}			125	°C
V _{isol}	AC, 1 min.		4000	V

Characteristics			T _c = 25 °C, unless otherwise specified			
Symbol	Conditions		min.	typ.	max.	Units
IGBT						
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 16 mA		4,5	5,5	6,5	V
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES} T _j = 25 °C			0,15	0,45	mA
V _{CE0}	T _j = 25 °C			1,5	1,75	V
	T _j = 125 °C			1,7		V
r _{CE}	V _{GE} = 15 V T _j = 25°C			4,5	5,3	mΩ
	T _j = 125°C			6		mΩ
V _{CE(sat)}	I _{Cnom} = 400 A, V _{GE} = 15 V T _j = 25°C _{chiplev.}			3,3	3,85	V
	T _j = 125°C _{chiplev.}			4		V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V f = 1 MHz		36			nF
C _{oes}			3,8			nF
C _{res}			3,5			nF
Q _G	V _{GE} = -8V - +20V		4400			nC
R _{Gint}	T _j = °C		1,25			Ω
t _{d(on)}	R _{Gon} = 2,5 Ω	V _{CC} = 600V I _C = 400A	80			ns
t _r			70			ns
E _{on}	R _{Goff} = 2,5 Ω	T _j = 125 °C V _{GE} = ± 15V	30			mJ
t _{d(off)}			570			ns
t _f			60			ns
E _{off}						mJ
R _{th(j-c)}	per IGBT		0,041			K/W



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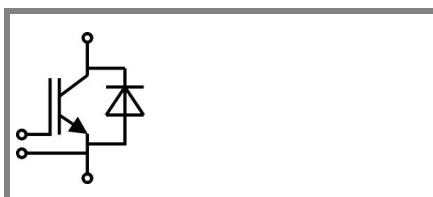
Remarks

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Characteristics						
Symbol	Conditions		min.	typ.	max.	Units
Inverse Diode						
$V_F = V_{EC}$	$I_{Fnom} = 400\text{ A}; V_{GE} = 0\text{ V}$	$T_j = 25\text{ }^{\circ}\text{C}_{chiplev.}$		2	2,5	V
		$T_j = 125\text{ }^{\circ}\text{C}_{chiplev.}$		1,8		V
V_{F0}		$T_j = 25\text{ }^{\circ}\text{C}$		1,1	1,2	V
		$T_j = 125\text{ }^{\circ}\text{C}$				V
r_F		$T_j = 25\text{ }^{\circ}\text{C}$		2,3	3,3	mΩ
		$T_j = 125\text{ }^{\circ}\text{C}$				mΩ
I_{RRM}	$I_F = 400\text{ A}$	$T_j = 125\text{ }^{\circ}\text{C}$		460		A
Q_{rr}				65		μC
E_{rr}	$V_{GE} = 0\text{ V}; V_{CC} = 600\text{ V}$					mJ
$R_{th(j-c)D}$	per diode				0,09	K/W
Module						
L_{CE}				15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = \text{ }^{\circ}\text{C}$		0,18		mΩ
$R_{th(c-s)}$	per module				0,038	K/W
M_s	to heat sink			3	5	Nm
M_t	to terminals			2,5 (1,1)	5 (2)	Nm
w					330	g

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

* 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 staff.



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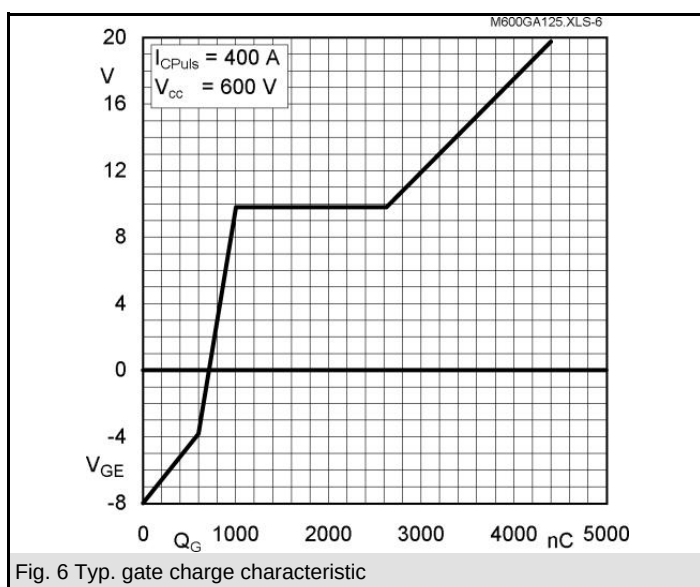
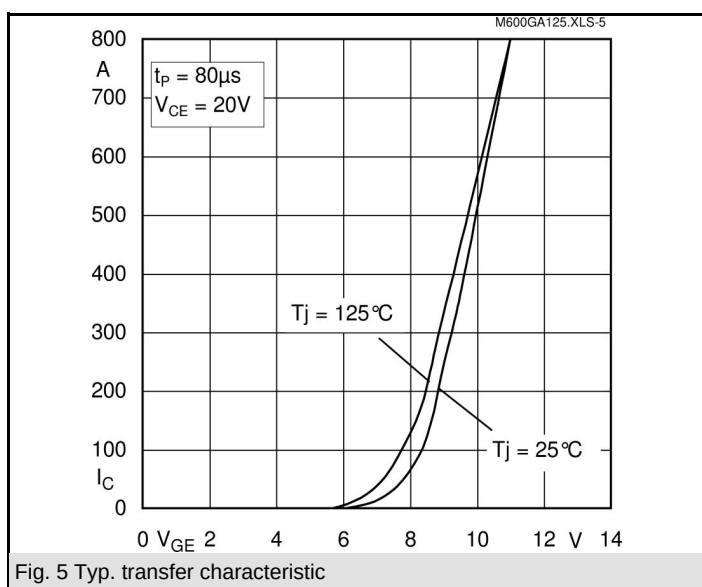
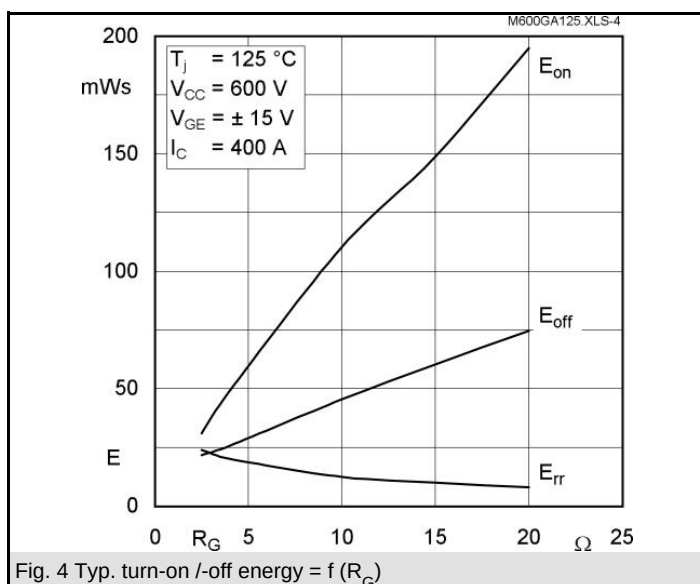
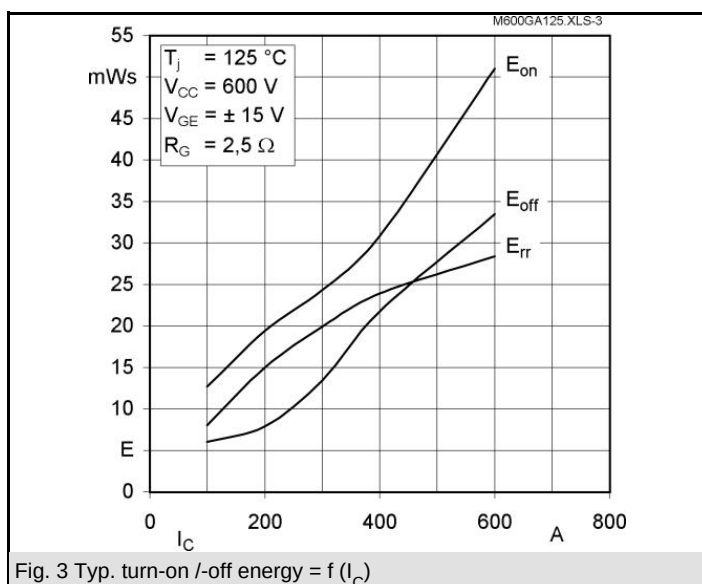
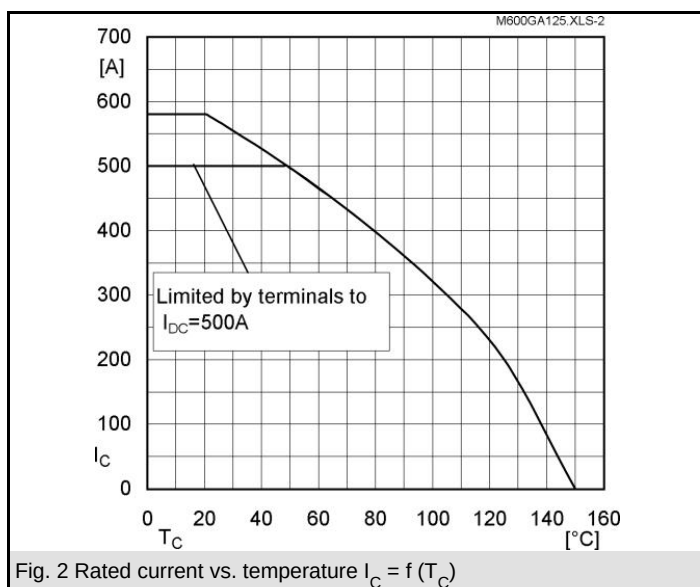
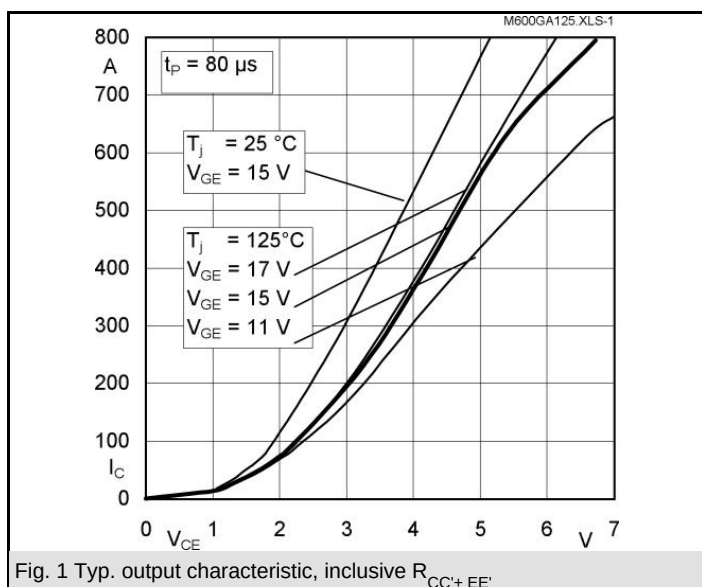
Remarks

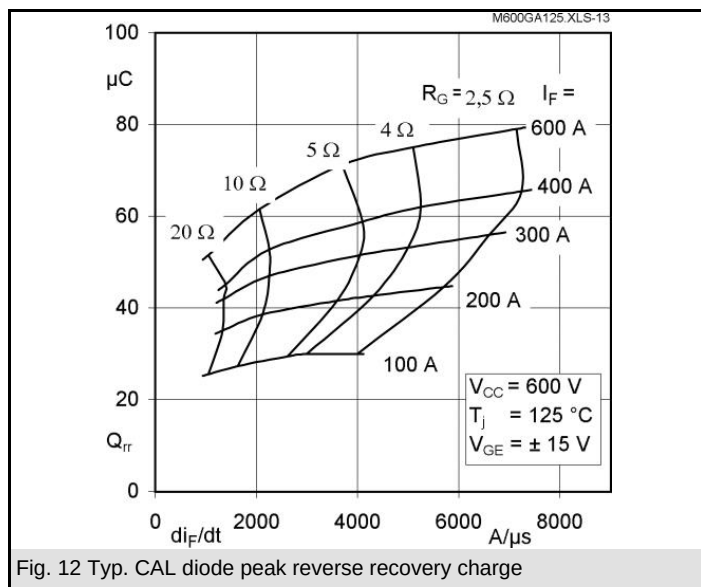
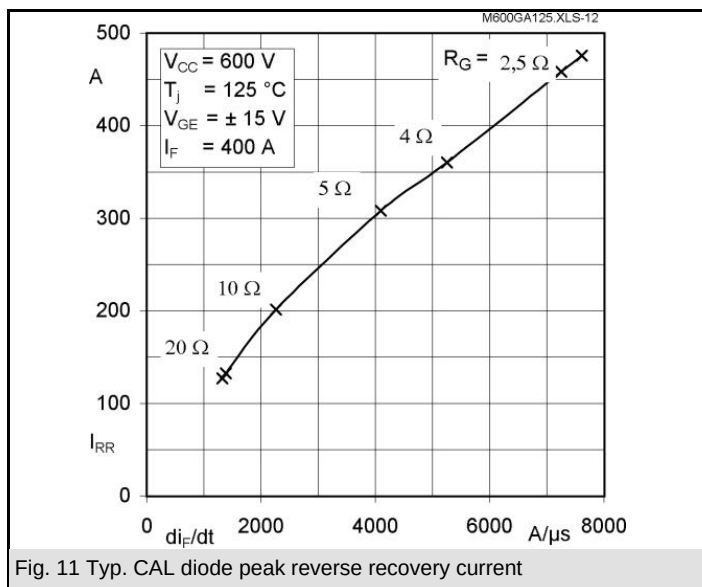
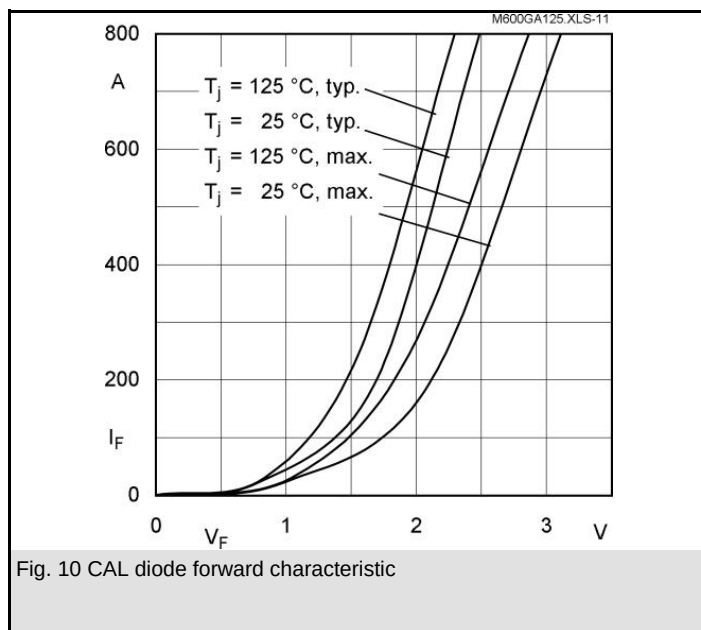
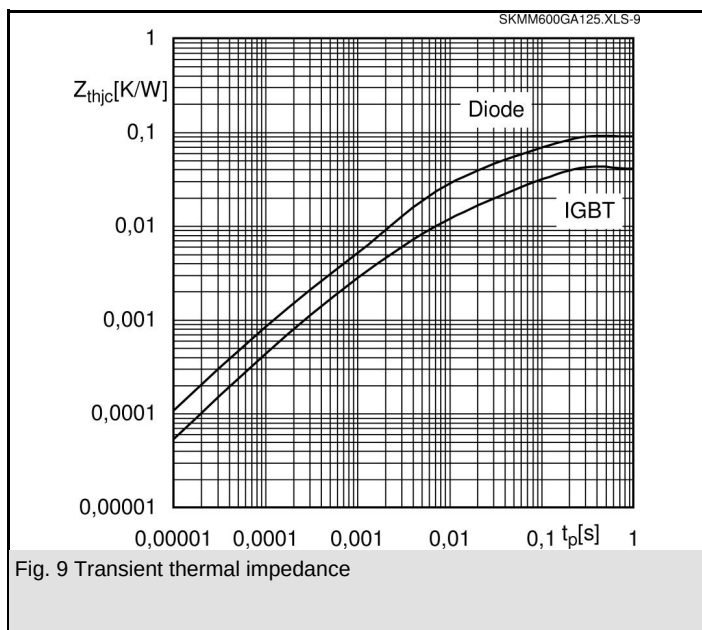
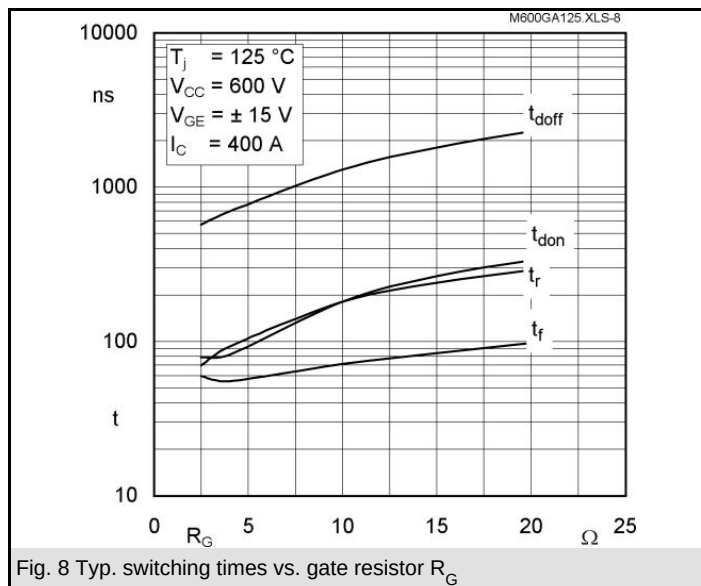
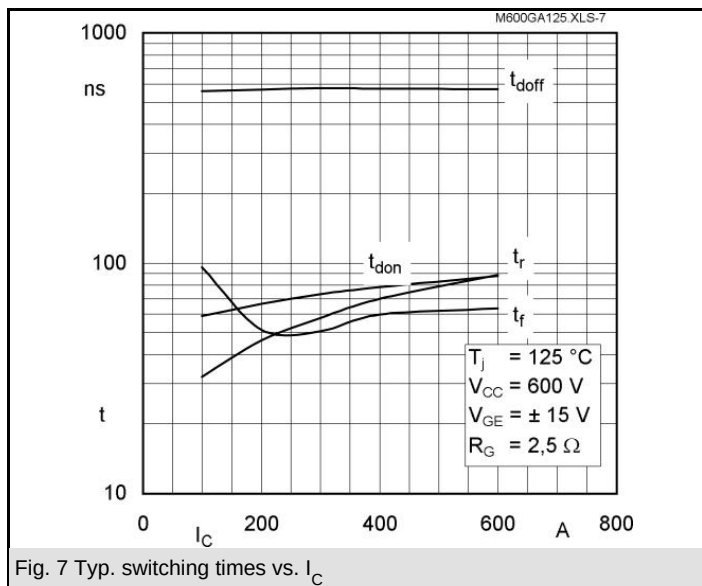
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Z_{th}			
Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	29	mk/W
R_i	$i = 2$	9	mk/W
R_i	$i = 3$	2,6	mk/W
R_i	$i = 4$	0,4	mk/W
τ_{ui}	$i = 1$	0,1043	s
τ_{ui}	$i = 2$	0,009	s
τ_{ui}	$i = 3$	0,001	s
τ_{ui}	$i = 4$	0,0002	s
$Z_{th(j-c)D}$			
R_i	$i = 1$	62	mk/W
R_i	$i = 2$	23	mk/W
R_i	$i = 3$	4,2	mk/W
R_i	$i = 4$	0,8	mk/W
τ_{ui}	$i = 1$	0,0566	s
τ_{ui}	$i = 2$	0,0166	s
τ_{ui}	$i = 3$	0,0015	s
τ_{ui}	$i = 4$	0,0002	s



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