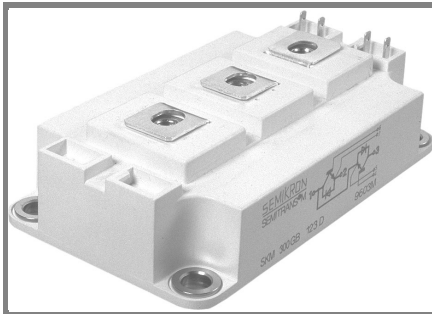


# SKM 400GB125D



**SEMITRANS™ 3**

## Ultra Fast IGBT Modules

SKM 400GB125D

SKM 400GAL125D

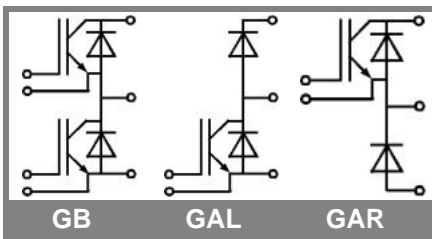
SKM 400GAR125D

### Features

- N channel, homogeneous Si
- Low inductance case
- Short tail current with low temperature dependence
- High short circuit capability, self limiting to  $6 \times I_{Cnom}$
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DBC Direct Copper Bonding Technology
- Large clearance (13 mm) and creepage distances (20 mm)

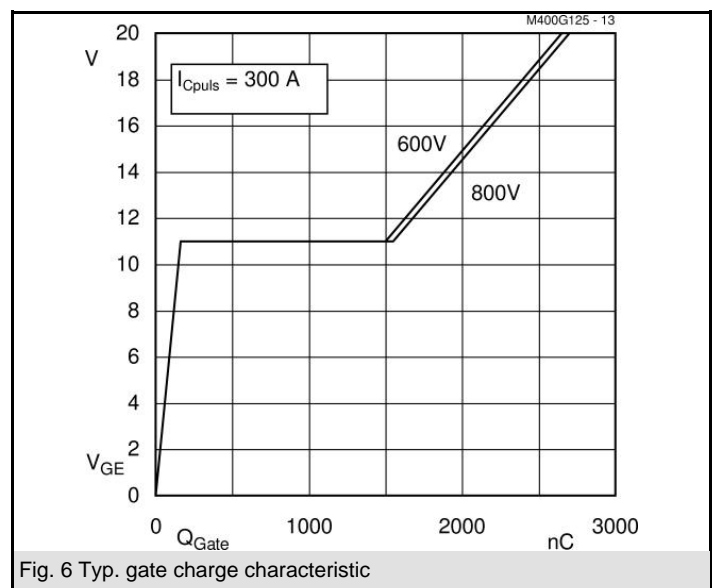
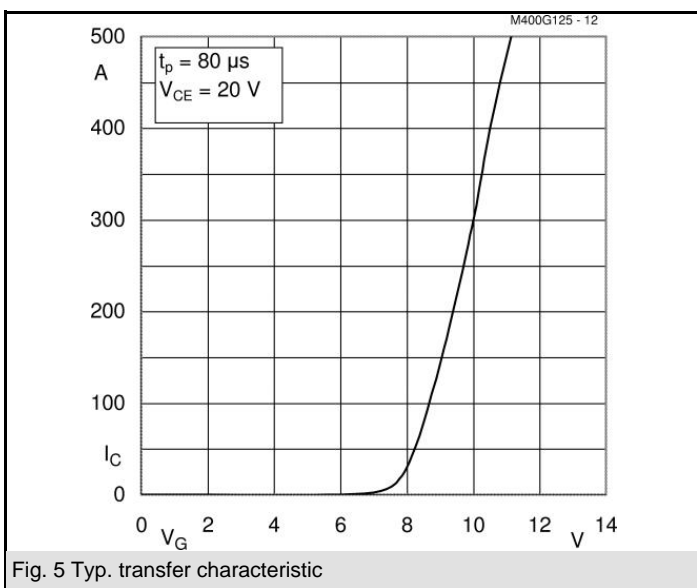
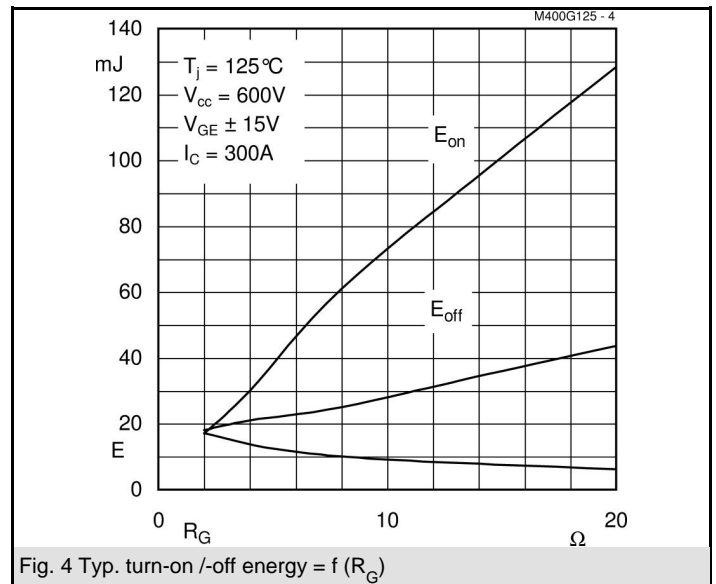
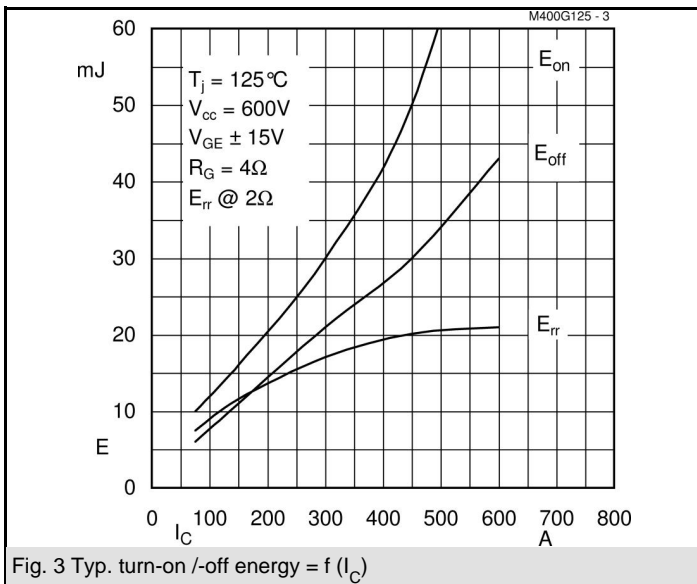
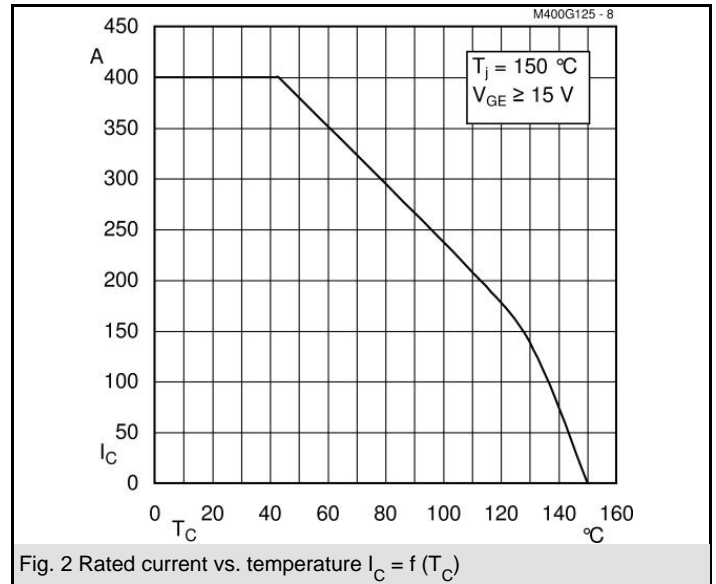
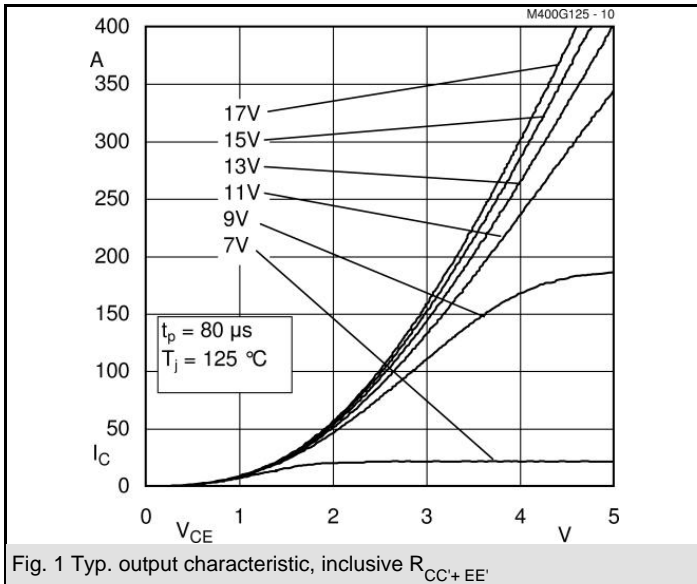
### Typical Applications

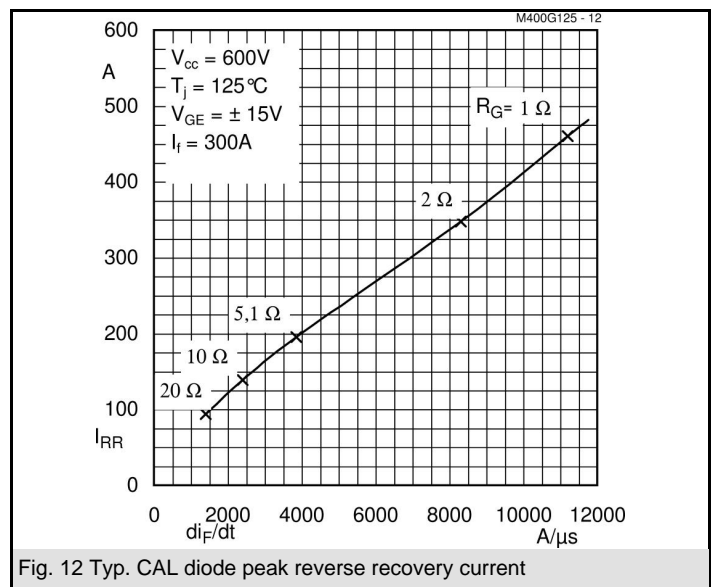
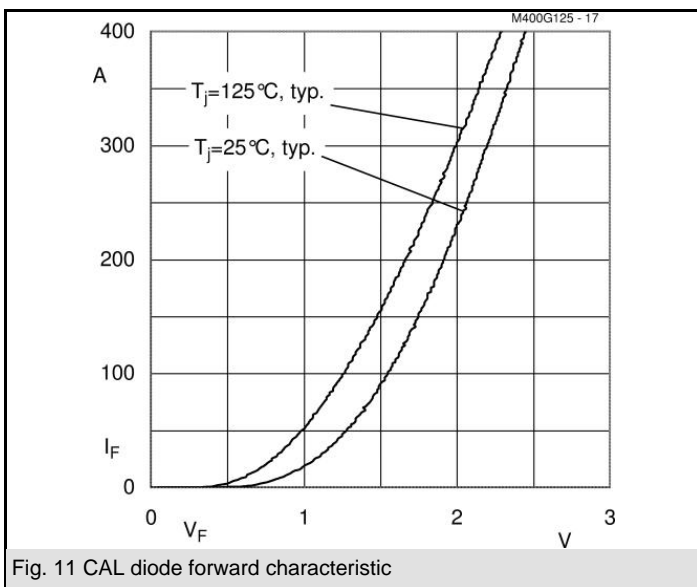
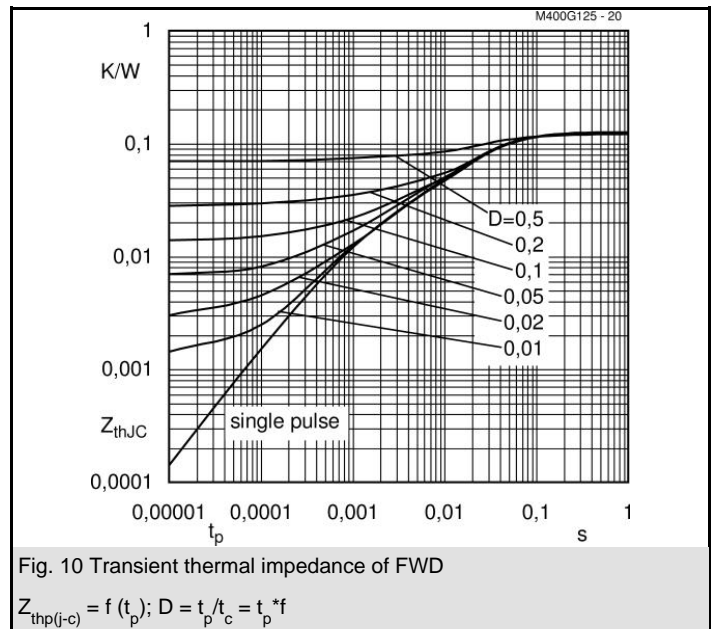
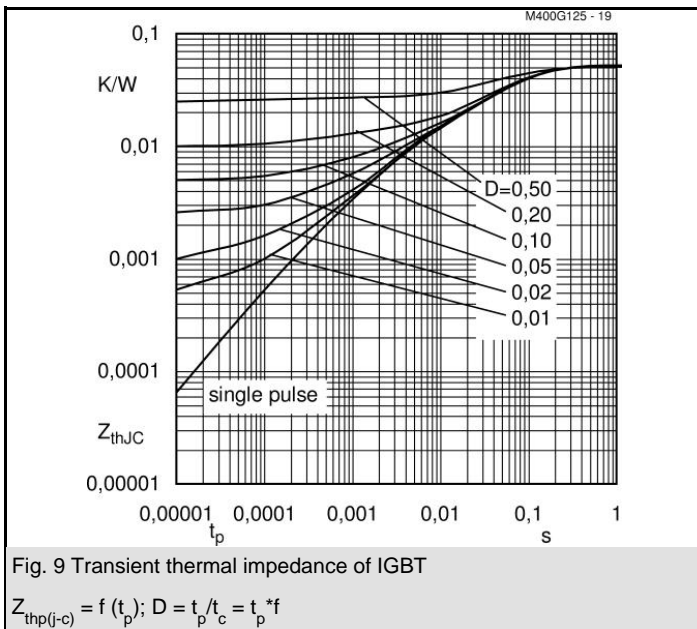
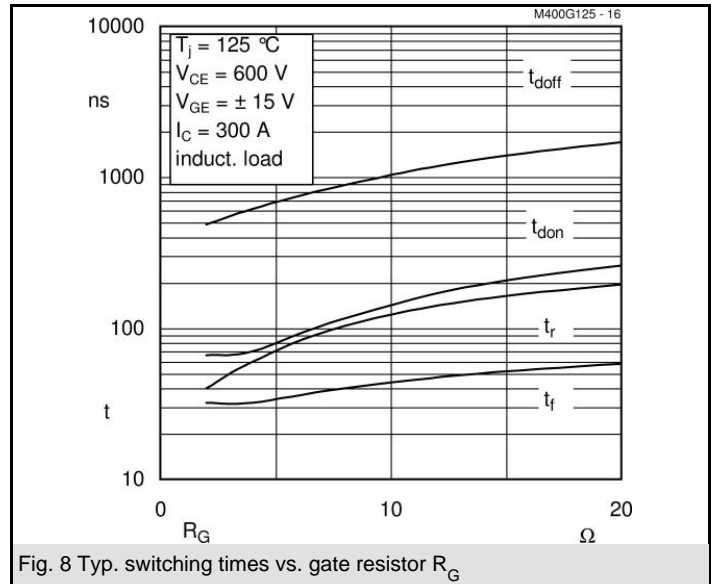
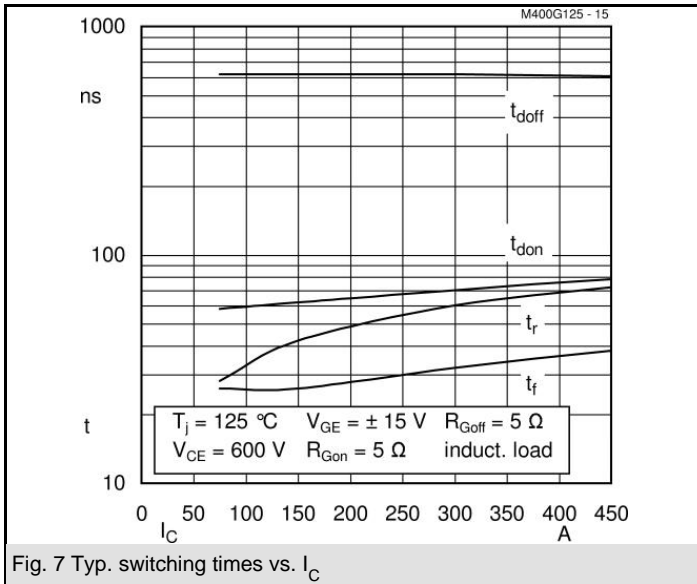
- Switched mode power supplies at  $f_{sw} > 20\text{kHz}$
- Resonant inverters up to 100 kHz
- Inductive heating
- Electronic welders at  $f_{sw} > 20\text{ kHz}$



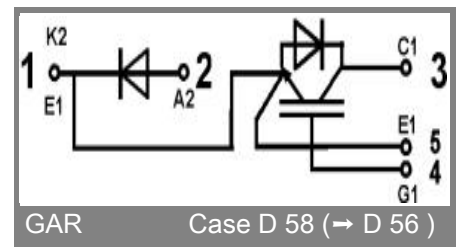
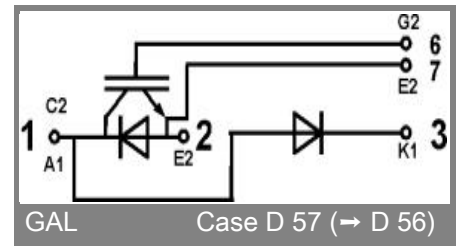
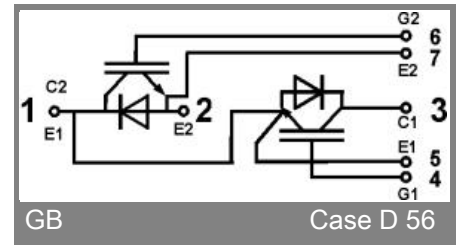
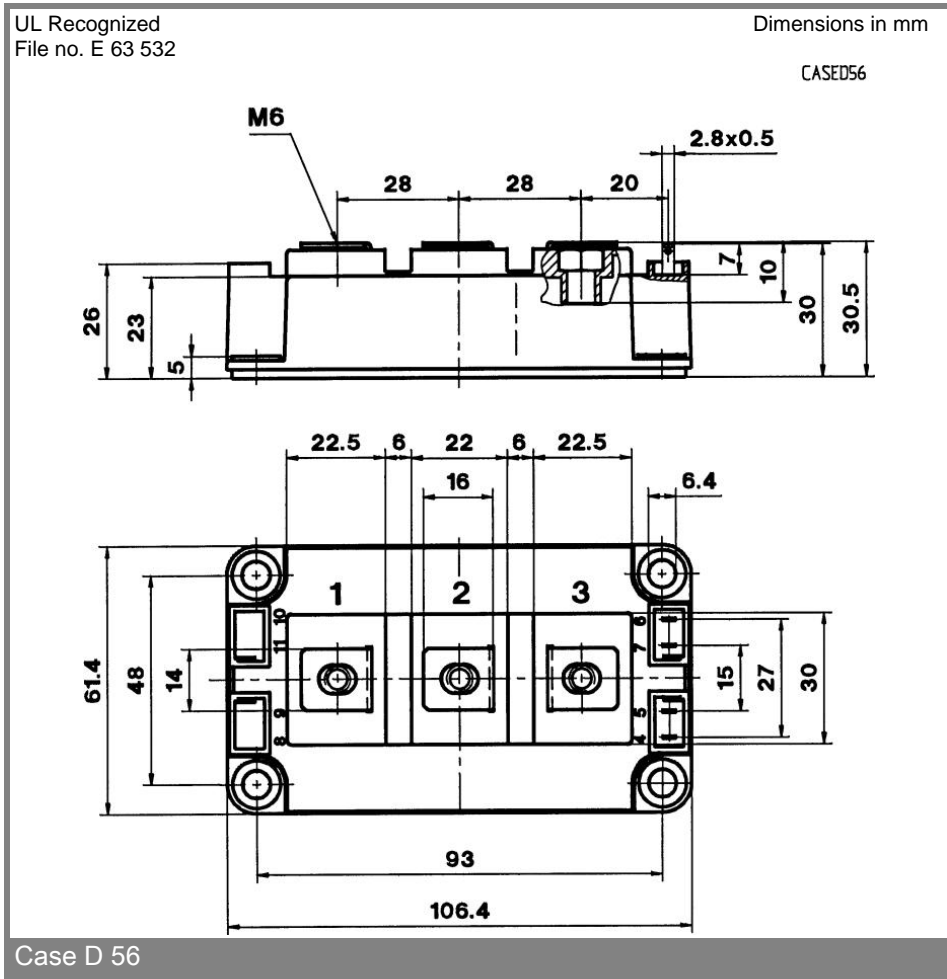
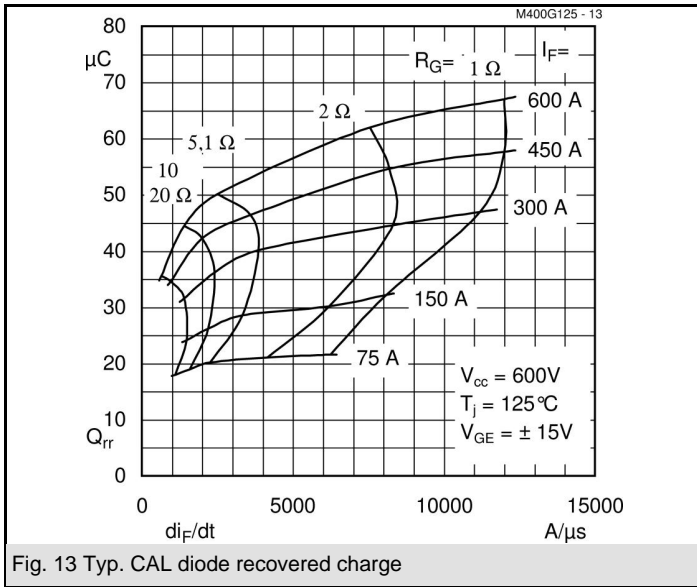
Absolute Maximum Ratings		$T_c = 25\text{ °C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT</b>			
$V_{CES}$		1200	V
$I_C$	$T_c = 25\text{ (80) °C}$	400 (300)	A
$I_{CRM}$	$t_p = 1\text{ ms}$	600	A
$V_{GES}$		$\pm 20$	V
$T_{vj}$ ( $T_{stg}$ )	$T_{OPERATION} \leq T_{stg}$	- 40 ... + 150 (125)	°C
$V_{isol}$	AC, 1 min.	4000	V
<b>Inverse diode</b>			
$I_F$	$T_c = 25\text{ (80) °C}$	390 (260)	A
$I_{FRM}$	$t_p = 1\text{ ms}$	600	A
$I_{FSM}$	$t_p = 10\text{ ms}$ ; sin.; $T_j = 150\text{ °C}$	2900	A
<b>Freewheeling diode</b>			
$I_F$	$T_c = 25\text{ (80) °C}$	390 (260)	A
$I_{FRM}$	$t_p = 1\text{ ms}$	600	A
$I_{FSM}$	$t_p = 10\text{ ms}$ ; sin.; $T_j = 150\text{ °C}$	2900	A

Characteristics		$T_c = 25\text{ °C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}$ , $I_C = 12\text{ mA}$	4,5	5,5	6,5	V
$I_{CES}$	$V_{GE} = 0$ , $V_{CE} = V_{CES}$ , $T_j = 25\text{ (125) °C}$		0,15	0,45	mA
$V_{CE(TO)}$	$T_j = 25\text{ (125) °C}$		1,4 (1,7)		V
$r_{CE}$	$V_{GE} = 15\text{ V}$ , $T_j = 25\text{ (125) °C}$				mΩ
$V_{CE(sat)}$	$I_{Cnom} = 300\text{ A}$ , $V_{GE} = 15\text{ V}$ , chip level		3,3	3,85	V
$C_{ies}$	under following conditions		22	30	nF
$C_{oes}$	$V_{GE} = 0$ , $V_{CE} = 25\text{ V}$ , $f = 1\text{ MHz}$		3,3	4	nF
$C_{res}$			1,2	1,6	nF
$L_{CE}$				20	nH
$R_{CC'+EE'}$	res., terminal-chip $T_c = 25\text{ (125) °C}$		0,35 (0,5)		mΩ
$t_{d(on)}$	$V_{CC} = 600\text{ V}$ , $I_{Cnom} = 300\text{ A}$		70		ns
$t_r$	$R_{Gon} = R_{Goff} = 2\text{ Ω}$ , $T_j = 125\text{ °C}$		50		ns
$t_{d(off)}$	$V_{GE} = \pm 15\text{ V}$		500		ns
$t_f$			32		ns
$E_{on} (E_{off})$			17 (18)		mJ
<b>Inverse diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 300\text{ A}$ ; $V_{GE} = 0\text{ V}$ ; $T_j = 25\text{ (125) °C}$		2 (1,8)	2,5	V
$V_{(TO)}$	$T_j = 25\text{ (125) °C}$		1,1	1,2	V
$r_T$	$T_j = 25\text{ (125) °C}$		3	3,3	mΩ
$I_{RRM}$	$I_{Fnom} = 300\text{ A}$ ; $T_j = 125\text{ ( ) °C}$		350		A
$Q_{rr}$	$di/dt = 8300\text{ A/μs}$		45		μC
$E_{rr}$	$V_{GE} = 0\text{ V}$		17		mJ
<b>FWD</b>					
$V_F = V_{EC}$	$I_F = 300\text{ A}$ ; $V_{GE} = 0\text{ V}$ , $T_j = 25\text{ (125) °C}$		2 (1,8)	2,5	V
$V_{(TO)}$	$T_j = 25\text{ (125) °C}$		1,1	1,2	V
$r_T$	$T_j = 25\text{ (125) °C}$		3	3,3	mΩ
$I_{RRM}$	$I_F = 300\text{ A}$ ; $T_j = 125\text{ ( ) °C}$		350		A
$Q_{rr}$	$di/dt = 8300\text{ A/μs}$		45		μC
$E_{rr}$	$V_{GE} = 0\text{ V}$		17		mJ
<b>Thermal characteristics</b>					
$R_{th(j-c)}$	per IGBT			0,05	K/W
$R_{th(j-c)D}$	per Inverse Diode			0,125	K/W
$R_{th(j-c)FD}$	per FWD			0,125	K/W
$R_{th(c-s)}$	per module			0,038	K/W
<b>Mechanical data</b>					
$M_s$	to heatsink M6	3		5	Nm
$M_t$	to terminals M6	2,5		5	Nm
w				325	g





# SKM 400GB125D



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

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.