SKM 400GB125D

SEMITRANS® 3

Ultra Fast IGBT Modules

SKM 400GB125D

SKM 400GAL125D

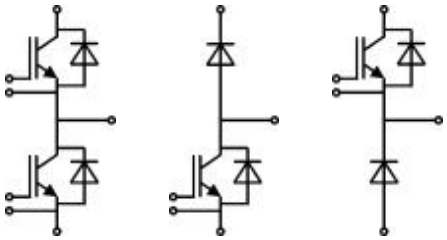
SKM 400GAR125D

Features

- Low inductance case
- Short tail current with low temperature dependence
- High short circuit capability, self limiting to 6 x 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} >20kHz
- Resonant inverters up to 100 kHz
- Inductive heating
- Electronic welders at f_{sw} > 20 kHz



GB GAL GAR

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	400	A
		T_{case} = 80 °C	300	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		600	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 600 V; V_{GE} ≤ 20 V; V_{CES} < 1200 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	390	A
		T_{case} = 80 °C	260	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		600	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	2880	A
Freewheeling Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	390	A
		T_{case} = 80 °C	260	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		600	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	2880	A
Module				
$I_{t(RMS)}$			500	A
T_{vj}			- 40...+ 150	°C
T_{stg}			- 40...+ 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 = 12 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		1,4		V
		T_j = 125 °C		1,7		V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		6,3		mΩ
		T_j = 125°C		7,6		mΩ
$V_{CE(sat)}$	I_{Cnom} = 300 A, V_{GE} = 15 V	T_j = 25°C$_{chiplev.}$		3,3	3,85	V
		T_j = 125°C$_{chiplev.}$		4	4,55	V
C_{ies}				22	30	nF
C_{oes}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		3,3	4	nF
C_{res}				1,2	1,6	nF
Q_G	V_{GE} = 0V - +20V			2650		nC
R_{Gint}	T_j = °C			1,25		Ω
$t_{d(on)}$				70		ns
t_r	R_{Gon} = 2 Ω	V_{CC} = 600V		50		ns
E_{on}		I_C= 300A		17		mJ
$t_{d(off)}$	R_{Goff} = 2 Ω	T_j = 125 °C		500		ns
t_f		V_{GE} = ±15V		32		ns
E_{off}				18		mJ
$R_{th(j-c)}$	per IGBT				0,05	K/W

Characteristics

Symbol	Conditions		min.	typ.	max.	Units
Inverse Diode						
V_F = V_{EC}	I_{Fnom} = 300 A; V_{GE} = 0 V	T_j = 25 °C$_{chiplev.}$		2	2,5	V
		T_j = 125 °C$_{chiplev.}$		1,8		V

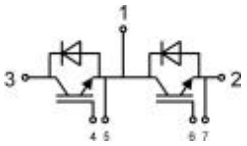
V_{F0}		T_j = 25 °C T_j = 125 °C	1,1	1,2	V V
r_F		T_j = 25 °C T_j = 125 °C	3	4,3	mΩ mΩ
I_{RRM} Q_{rr} E_{rr}	I_F = 300 A di/dt = 8300 A/µs V_{GE} = 0 V; V_{CC} = 600 V	T_j = 125 °C	350 45 16		A µC mJ
$R_{th(j-c)D}$	per diode			0,125	K/W
Freewheeling Diode					
$V_F = V_{EC}$	I_{Fnom} = 300 A; V_{GE} = 0 V	T_j = 25 °C$_{chiplev.}$ T_j = 125 °C$_{chiplev.}$	2 1,8	2,5	V V
V_{F0}		T_j = 25 °C T_j = 125 °C	1,1	1,2	V V
r_F		T_j = 25 °C T_j = 125 °C	3	4,3	V V
I_{RRM} Q_{rr} E_{rr}	I_F = 300 A di/dt = 8300 A/µs V_{GE} = 0 V; V_{CC} = 600 V	T_j = 125 °C	350 45 16		A µC mJ
$R_{th(j-c)FD}$	per diode			0,125	K/W
Module					
L_{CE}			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	T_{case} = 25 °C T_{case} = 125 °C	0,35 0,5		mΩ mΩ
$R_{th(c-s)}$	per module			0,038	K/W
M_s	to heat sink M6		3	5	Nm
M_t	to terminals M6		2,5	5	Nm
w				325	g

Z_{th}

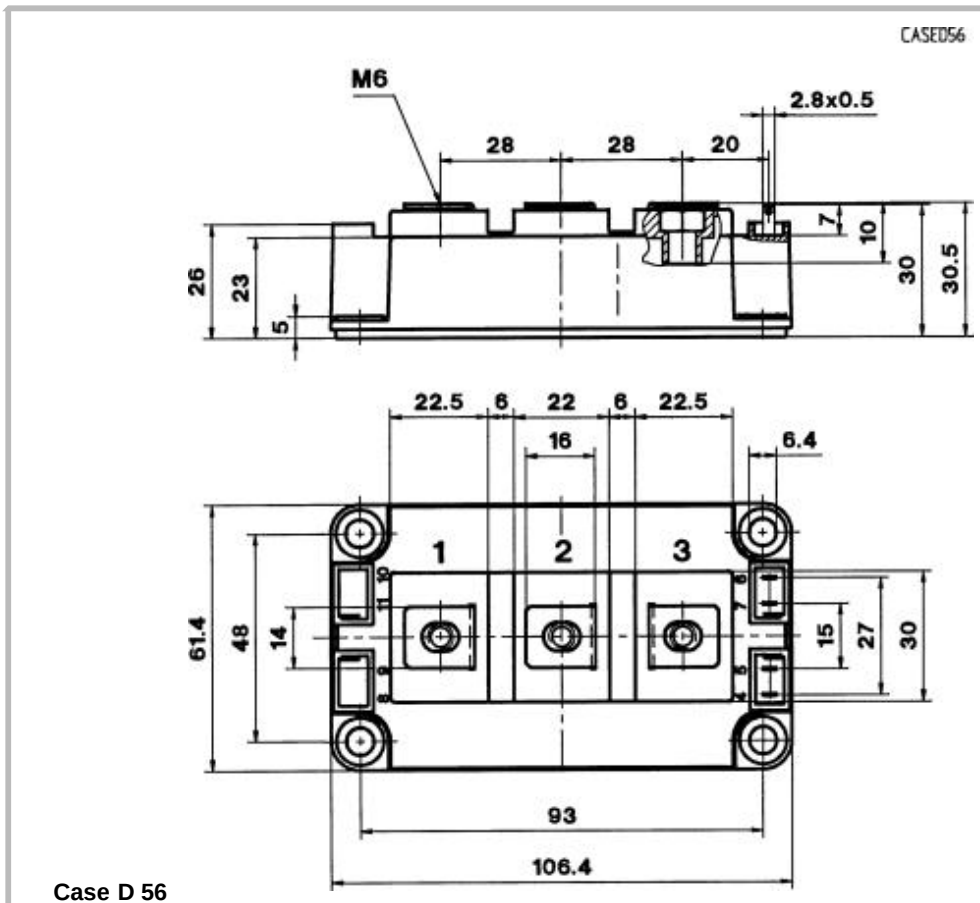
Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	36	mk/W
R_i	i = 2	10,5	mk/W
R_i	i = 3	3	mk/W
R_i	i = 4	0,5	mk/W
tau_i	i = 1	0,0744	s
tau_i	i = 2	0,0078	s
tau_i	i = 3	0,0016	s
tau_i	i = 4	0,0002	s
$Z_{th(j-c)D}$			
R_i	i = 1	75	mk/W
R_i	i = 2	38	mk/W
R_i	i = 3	10,6	mk/W
R_i	i = 4	1,4	mk/W
tau_i	i = 1	0,0386	s
tau_i	i = 2	0,0201	s
tau_i	i = 3	0,001	s
tau_i	i = 4	0,003	s

Cases / Circuits

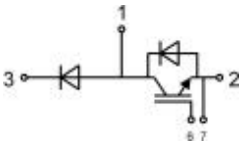
UL Recognized	File 63 532



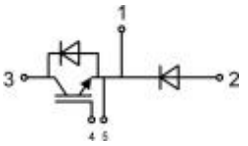
GB **Case D 56**



Case D 56



GAL **Case D 57 (➞ D 56)**



GAR **Case D 58 (➞ D 56)**