SKM 300GB125D



Ultra Fast IGBT Module

SKM 300GB125D

Preliminary Data

Features

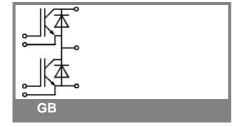
- N channel, homogeneous Silicon structure (NPT - Non punch-through IGBT)
- · Low inductance case
- Short tail current with low temperature dependence
- High short circuit capability, self limiting
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology
- Large clearance (10 mm) and creepage distances (20 mm)

Typical Applications

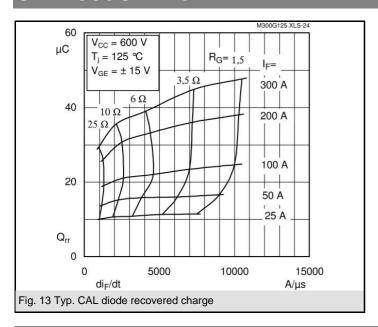
- Switched mode power supplies at f_{sw} > 20 kHz
- Resonant inverters up to 100 kHz
- Silent AC motor speed control (elevators)
- Inductive heating
- Silent UPS Uninterruptable power supplies at f_{sw} > 20 kHz
- Electronic (also portable) welders at f_{sw} > 20 kHz

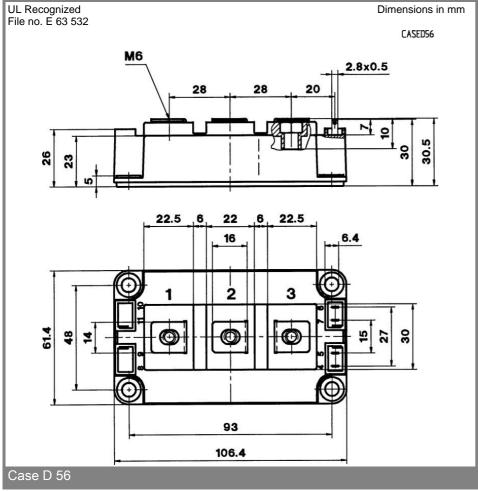
Absolute Maximum Ratings $T_c = 25$ °C, unless otherwise specified									
Symbol	Conditions	Values	Units						
IGBT									
V_{CES}		1200	V						
V _{CES}	T _c = 25 (80) °C	300 (210)	Α						
I _{CRM}	t _p = 1 ms	400	Α						
V_{GES}	·	± 20	V						
T_{vj} , (T_{stg})	$T_{OPERATION} \leq T_{stg}$	- 40 + 150 (125)	°C						
V _{isol}	AC, 1 min.	4000	V						
Inverse diode									
I _F	$T_c = 25 (80) ^{\circ}C$	260 (180)	Α						
I _{FRM}	t _p = 1 ms	400	Α						
I _{FSM}	$t_p = 10 \text{ ms; sin.; } T_j = 150 \text{ °C}$	2200	Α						

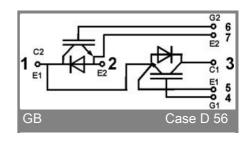
$ \begin{array}{ c c c c } \textbf{IGBT} \\ \hline V_{GE(th)} & V_{GE} = V_{CE}, \ I_{C} = 8 \ \text{mA} \\ \hline V_{CE(TC)} & V_{GE} = 0, \ V_{CE} = V_{CES}, \ T_{j} = 25 \ (125) \ ^{\circ}\text{C} \\ \hline V_{CE(TC)} & T_{j} = 25 \ (125) \ ^{\circ}\text{C} \\ \hline V_{CE(TC)} & V_{GE} = 15 \ \text{V}, \ T_{j} = 25 \ (125) \ ^{\circ}\text{C} \\ \hline V_{CE(att)} & I_{Comm} = 200 \ \text{A}, \ V_{GE} = 15 \ \text{V}, \text{chip level} \\ \hline V_{CE(att)} & I_{Comm} = 200 \ \text{A}, \ V_{GE} = 15 \ \text{V}, \text{chip level} \\ \hline V_{CE(att)} & I_{Comm} = 200 \ \text{A}, \ V_{GE} = 15 \ \text{V}, \text{chip level} \\ \hline C_{ies} & Under following conditions \\ \hline C_{oes} & V_{GE} = 0, \ V_{CE} = 25 \ \text{V}, \text{f} = 1 \ \text{MHz} \\ \hline C_{ces} & I_{Comm} = 200 \ \text{A}, \ V_{CE} = 25 \ \text{V}, \text{f} = 1 \ \text{MHz} \\ \hline C_{res} & I_{COM} & I_{COM} \\ \hline C_{res} & I_{COM} & I_{COM} \\ \hline C_{res} & I_{COM} & I_{COM} \\ \hline C_{Ces} & I_{COM} & I_{COM} \\ \hline C_{res} & I_{COM} & I_{COM} \\ \hline C_{COM} $	Characteristics		T _c = 25 °C, unless otherwise specified						
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Symbol	Conditions	min.	typ.	max.	Units			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	IGBT		•			1			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	V _{GF(th)}	$V_{GF} = V_{CF}$, $I_{C} = 8 \text{ mA}$	4,5	5,5	6,5	V			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				0,1	0,3	mA			
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				1,5 (1,7)	1,75	V			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	` '	V _{GE} = 15 V, T _j = 25 (125) °C		9 (11,5)	10,5	$m\Omega$			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	V _{CE(sat)}	I_{Cnom} = 200 A, V_{GE} = 15 V, chip level		3,3 (4)	3,85	V			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	C _{ies}	under following conditions		18	24	nF			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	C _{oes}	$V_{GE} = 0, V_{CE} = 25 V, f = 1 MHz$		2,5	3,2	nF			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	C _{res}			1	•	nF			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	L _{CE}				20	nH			
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	R _{CC'+EE'}	res., terminal-chip T _c = 25 (125) °C		0,35 (0,5)		mΩ			
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	t _{d(on)}	V _{CC} = 600 V, I _{Cnom} = 200 A		130		ns			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				40		ns			
$ \begin{array}{ c c c c } \hline \textbf{E}_{on} \left(\textbf{E}_{off} \right) & \textbf{16} \left(11 \right) & \textbf{mJ} \\ \hline \textbf{Inverse diode} \\ \hline V_F = V_{EC} & I_{Fnom} = 200 \text{ A}; V_{GE} = 0 \text{ V}; T_j = 25 \left(125 \right) & 2 \left(1,8 \right) & 2,5 & V \\ \hline V_{(TO)} & T_j = 125 \left(\right) ^{\circ} \text{C} & 1,1 & 1,2 & V \\ \hline r_T & T_j = 125 \left(\right) ^{\circ} \text{C} & 3 & 5,5 & m\Omega \\ \hline I_{RRM} & I_{Fnom} = 200 \text{ A}; T_j = 125 \left(\right) ^{\circ} \text{C} & 340 & A \\ \hline Q_{rr} & \text{d}i/\text{d}t = 8000 \text{ A}/\mu\text{s} & 46 & \mu\text{C} \\ \hline E_{rr} & V_{GE} = 0 \text{ V} & 13,6 & mJ \\ \hline \hline \textbf{Thermal characteristics} \\ \hline R_{th(j-c)} & \text{per IGBT} & 0,075 & K/W \\ \hline R_{th(j-c)D} & \text{per Inverse Diode} & 0,18 & K/W \\ \hline R_{th(c-s)} & \text{per module} & 0,038 & K/W \\ \hline \textbf{Mechanical data} \\ \hline M_s & \text{to heatsink M6} & 3 & 5 & Nm \\ M_t & \text{to terminals M6} & 2,5 & 5 & Nm \\ \hline \end{array} $	t _{d(off)}	$V_{GE} = \pm 15 \text{ V}$				ns			
$ \begin{array}{ c c c c c } \hline \textbf{Inverse diode} \\ V_F = V_{EC} & _{F_{DOM}} = 200 \text{ A; } V_{GE} = 0 \text{ V; } T_j = 25 \text{ (125)} \\ \hline V_{(TO)} & T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline r_T & T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{F_{DOM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\ \hline Q_{rr} & _{G_{COM}} = 200 \text{ A; } T_j = 125 \text{ () } ^{\circ}\text{C} \\$	t _f			30		ns			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$E_{on} \left(E_{off} \right)$			16 (11)		mJ			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Inverse diode								
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$V_F = V_{EC}$	I_{Fnom} = 200 A; V_{GE} = 0 V; T_j = 25 (125) °C		2 (1,8)	2,5	V			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	V _(TO)	T _i = 125 () °C		1,1	1,2	V			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				3	5,5	$m\Omega$			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	I _{RRM}			340		Α			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Q_{rr}	di/dt = 8000 A/µs		46		μC			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	E _{rr}	V _{GE} = 0 V		13,6		mJ			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Thermal characteristics								
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	R _{th(i-c)}	per IGBT			0,075	K/W			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		per Inverse Diode			0,18	K/W			
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		per module			0,038	K/W			
M _t to terminals M6 2,5 5 Nm									
M _t to terminals M6 2,5 5 Nm	M_s	to heatsink M6	3		5	Nm			
		to terminals M6	2,5		5	Nm			
	-				325	g			



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

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