

SKM 400GA128D



SEMITRANS® 4

SPT IGBT Modules

SKM 400GA128D

Features

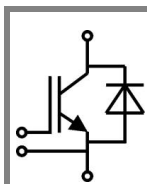
- SPT = Soft-Punch-Through technology
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$

Typical Applications

- AC inverter drives
- UPS
- Electronic welders at f_{sw} up to 20 kHz

Remarks

- $I_{DC} \leq 500 \text{ A}$ for $T_{Terminal} = 100 \text{ }^\circ\text{C}$



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Absolute Maximum Ratings		$T_c = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1200	V	
I_C	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	565	A
		$T_c = 80^\circ\text{C}$	400	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	600	A	
V_{GES}		± 20	V	
t_{psc}	$V_{CC} = 600 \text{ V}; V_{GE} \leq 20 \text{ V}; T_j = 125^\circ\text{C}$ $V_{CES} < 1200 \text{ V}$	10	μs	
Inverse Diode				
I_F	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	390	A
		$T_{case} = 80^\circ\text{C}$	260	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	600	A	
I_{FSM}	$t_p = 10 \text{ ms}; \text{sin.}$	$T_j = 150^\circ\text{C}$	2900	A
Module				
$I_{t(RMS)}$		500	A	
T_{vj}		- 40... + 150	$^\circ\text{C}$	
T_{stg}		- 40... + 125	$^\circ\text{C}$	
V_{isol}	AC, 1 min.	4000	V	

Characteristics		$T_c = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}; I_C = 12 \text{ mA}$	4,5	5,5	6,45	V
I_{CES}	$V_{GE} = 0 \text{ V}, V_{CE} = V_{CES}$		$T_j = 25^\circ\text{C}$ 0,2	0,6	mA
V_{CE0}		$T_j = 25^\circ\text{C}$	1	1,15	V
		$T_j = 125^\circ\text{C}$	0,9	1,05	V
r_{CE}	$V_{GE} = 15 \text{ V}$	$T_j = 25^\circ\text{C}$	3	4	m Ω
		$T_j = 125^\circ\text{C}$	4	5	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 300 \text{ A}, V_{GE} = 15 \text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,9	2,35	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	2,1	2,55	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0 \text{ V}$	$f = 1 \text{ MHz}$	26		nF
C_{oes}			3		nF
C_{res}			3		nF
Q_G	$V_{GE} = -8\text{V} - +20\text{V}$		3500		nC
R_{Gint}	$T_j = ^\circ\text{C}$		1,25		Ω
$t_{d(on)}$	$R_{Gon} = 5 \Omega$	$V_{CC} = 600\text{V}$ $I_{Cnom} = 300\text{A}$	120		ns
t_r			70		ns
E_{on}			31		mJ
$t_{d(off)}$	$R_{Goff} = 5 \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{V}$	800		ns
t_f			75		ns
E_{off}			33		mJ
$R_{th(j-c)}$	per IGBT			0,055	K/W

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Characteristics

Symbol	Conditions	min.	typ.	max.	Units	
Inverse Diode						
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$		$T_j = 25 \text{ °C}_{chiplev.}$	2	2,5	V
			$T_j = 125 \text{ °C}_{chiplev.}$	1,8		V
V_{F0}			$T_j = 25 \text{ °C}$	1,1	1,2	V
r_F			$T_j = 25 \text{ °C}$	3	4,3	mΩ
I_{RRM}	$I_{Fnom} = 300 \text{ A}$ $di/dt = 5200 \text{ A}/\mu\text{s}$		$T_j = 125 \text{ °C}$	345		A
Q_{rr}				48		μC
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$			20		mJ
$R_{th(j-c)D}$	per diode			0,125		K/W
Module						
L_{CE}				15	20	nH
$R_{CC'+EE'}$	res., terminal-chip		$T_{case} = 25 \text{ °C}$	0,18		mΩ
			$T_{case} = 125 \text{ °C}$	0,22		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 (M4)			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.

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

