



SEMITRANS® 3

Trench IGBT Module

SKM 600GB126D

SKM 600GAL126D

Preliminary Data

Features

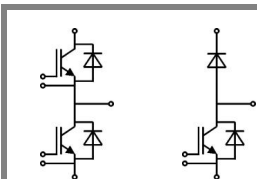
- Trench = Trenchgate technology
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$

Typical Applications

- AC inverter drives
- UPS
- Electronic welders

Remarks

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



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Absolute Maximum Ratings		$T_c = 25^\circ C$, unless otherwise specified			
Symbol	Conditions	Values		Units	
IGBT					
V_{CES}	$T_j = 25^\circ C$	1200		V	
I_C	$T_j = 150^\circ C$	$T_c = 25^\circ C$	660		A
		$T_c = 80^\circ C$	460		A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	800		A	
V_{GES}		± 20		V	
t_{psc}	$V_{CC} = 600 V$; $V_{GE} \leq 20 V$; $T_j = 125^\circ C$ $V_{CES} < 1200 V$	10		μs	
Inverse Diode					
I_F	$T_j = 150^\circ C$	$T_c = 25^\circ C$	490		A
		$T_c = 80^\circ C$	340		A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	800		A	
I_{FSM}	$t_p = 10 ms$; sin.	$T_j = 150^\circ C$	2880		A
Freewheeling Diode					
I_F	$T_j = 150^\circ C$	$T_c = 25^\circ C$	490		A
		$T_c = 80^\circ C$	340		A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	800		A	
I_{FSM}	$t_p = 10 ms$; sin.	$T_j = 150^\circ C$	2880		A
Module					
$I_{t(RMS)}$		500		A	
T_{vj}		- 40 ... + 150		$^\circ C$	
T_{stg}		- 40 ... + 125		$^\circ C$	
V_{isol}	AC, 1 min.	4000		V	

Characteristics		$T_c = 25^\circ C$, unless otherwise specified				
Symbol	Conditions	min.	typ.	max.	Units	
IGBT						
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 16 mA$	5	5,8	6,5	V	
I_{CES}	$V_{GE} = 0 V$, $V_{CE} = V_{CES}$	$T_j = 25^\circ C$	0,2		0,6	mA
		$T_j = 125^\circ C$				mA
V_{CE0}		$T_j = 25^\circ C$	1		1,2	V
		$T_j = 125^\circ C$	0,9		1,1	V
r_{CE}	$V_{GE} = 15 V$	$T_j = 25^\circ C$	1,8		2,4	m Ω
		$T_j = 125^\circ C$	2,8		3,4	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 400 A$, $V_{GE} = 15 V$	$T_j = 25^\circ C_{chiplev.}$	1,7		2,15	V
		$T_j = 125^\circ C_{chiplev.}$	2		2,45	V
C_{ies}	$V_{CE} = 25$, $V_{GE} = 0 V$			32	nF	
C_{oes}				11	nF	
C_{res}				2,2	nF	
Q_G	$V_{GE} = -8V - +20V$			3600	nC	
R_{Gint}	$T_j = ^\circ C$			1,88	Ω	
$t_{d(on)}$	$R_{Gon} = 2 \Omega$	$V_{CC} = 600V$ $I_{Cnom} = 400A$			290	ns
t_r					60	ns
E_{on}					39	mJ
$t_{d(off)}$	$R_{Goff} = 2 \Omega$	$T_j = 125^\circ C$ $V_{GE} = \pm 15V$			670	ns
t_f					80	ns
E_{off}					64	mJ
$R_{th(j-c)}$	per IGBT			0,055	K/W	



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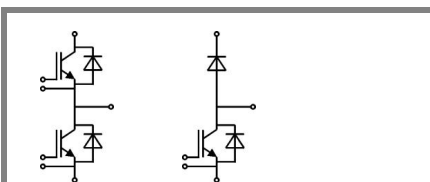
Remarks

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

Characteristics				min.	typ.	max.	Units
Symbol	Conditions						
Inverse diode							
$V_F = V_{EC}$	$I_{Fnom} = 400\text{ A}; V_{GE} = 0\text{ V}$	$T_j = 25\text{ °C}_{chiplev.}$		1,6	1,8		V
		$T_j = 125\text{ °C}_{chiplev.}$		1,6	1,8		V
V_{F0}		$T_j = 25\text{ °C}$		1	1,1		V
		$T_j = 125\text{ °C}$		0,8	0,9		V
r_F		$T_j = 25\text{ °C}$		1,5	1,8		mΩ
		$T_j = 125\text{ °C}$		2	2,3		mΩ
I_{RRM}	$I_{Fnom} = 400\text{ A}$	$T_j = 125\text{ °C}$		475			A
Q_{rr}	$di/dt = 7600\text{ A}/\mu\text{s}$			96			μC
E_{rr}	$V_{GE} = -15\text{ V}; V_{CC} = 600\text{ V}$			41			mJ
$R_{th(j-c)D}$	per diode				0,125		K/W
Freewheeling Diode							
$V_F = V_{EC}$	$I_{Fnom} = 400\text{ A}; V_{GE} = 0\text{ V}$	$T_j = 25\text{ °C}_{chiplev.}$		1,6	1,8		V
		$T_j = 125\text{ °C}_{chiplev.}$		1,6	1,8		V
V_{F0}		$T_j = 25\text{ °C}$		1	1,1		V
		$T_j = 125\text{ °C}$		0,8	0,9		V
r_F		$T_j = 25\text{ °C}$		1,5	1,8		V
		$T_j = 125\text{ °C}$		2	2,3		V
I_{RRM}	$I_{Fnom} = 400\text{ A}$	$T_j = 125\text{ °C}$		475			A
Q_{rr}	$di/dt = 7600\text{ A}/\mu\text{s}$			96			μC
E_{rr}	$V_{GE} = -15\text{ V}; V_{CC} = 600\text{ V}$			41			mJ
$R_{th(j-c)FD}$	per diode				0,125		K/W
Module							
L_{CE}				15	20		nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25\text{ °C}$		0,35			mΩ
		$T_{case} = 125\text{ °C}$		0,5			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

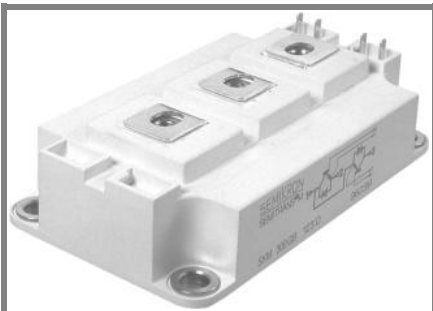
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

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



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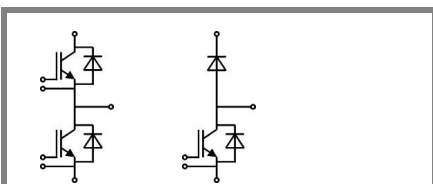
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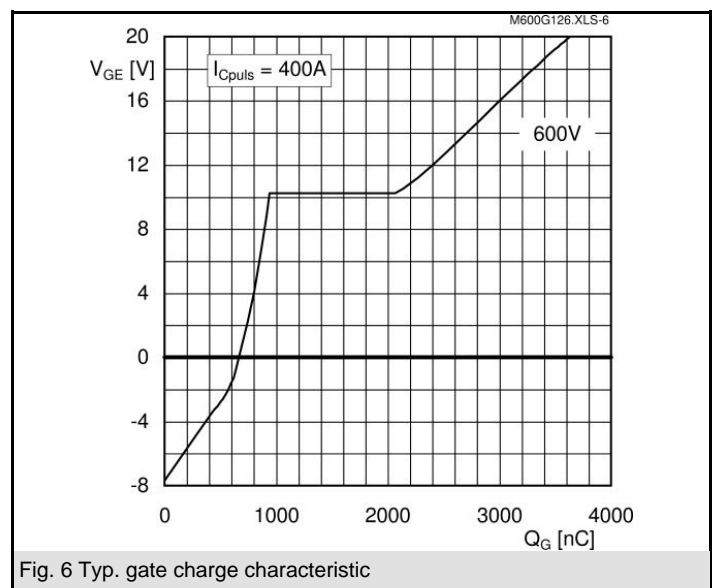
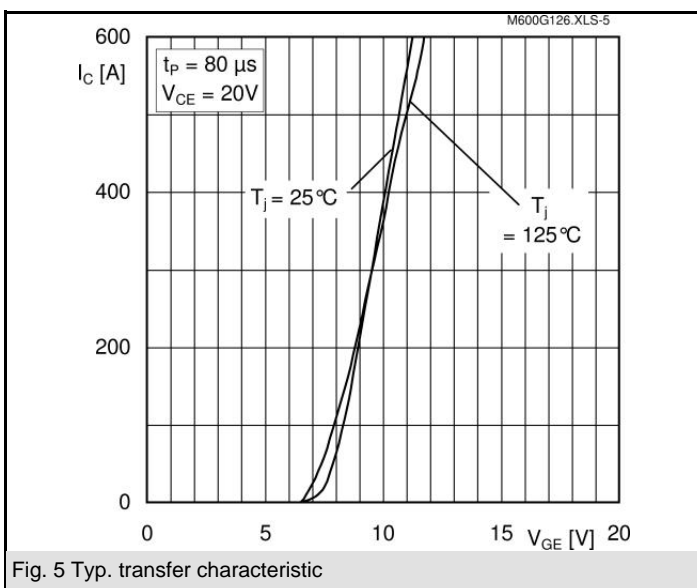
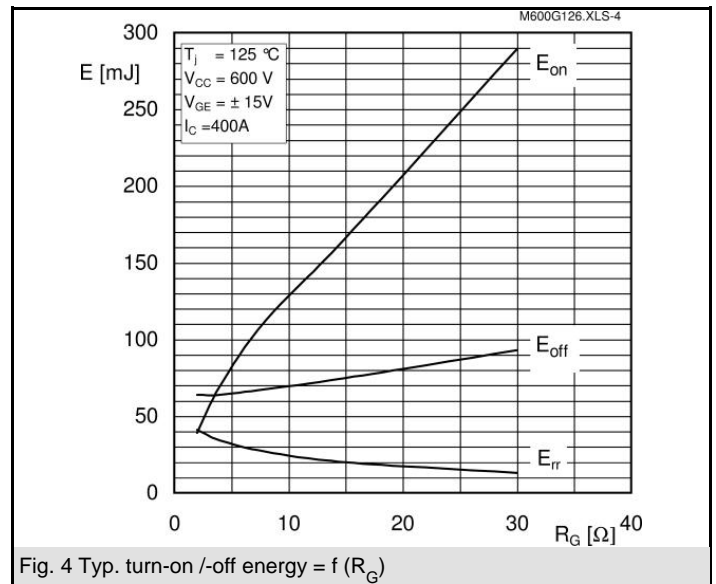
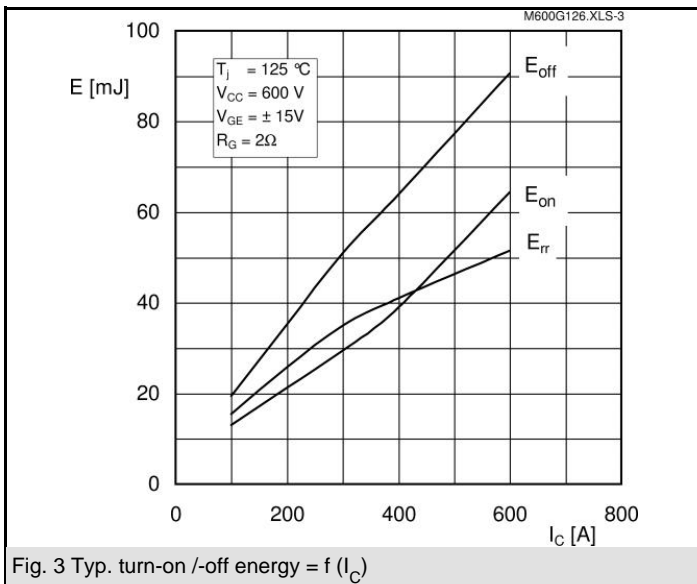
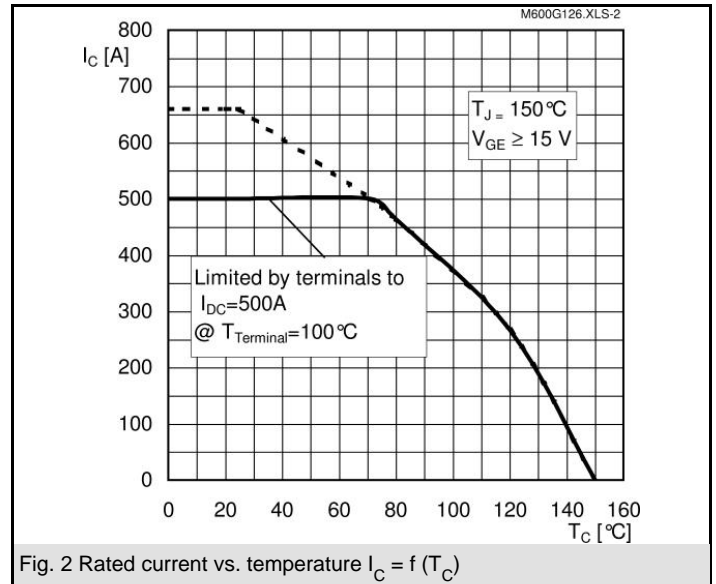
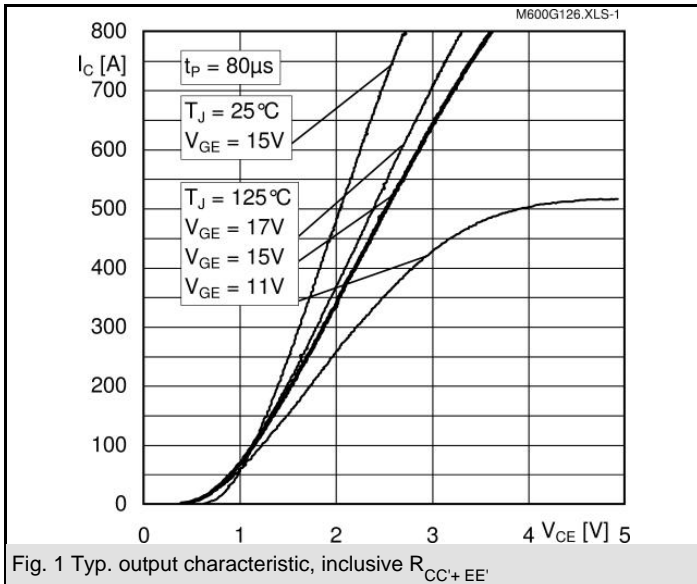
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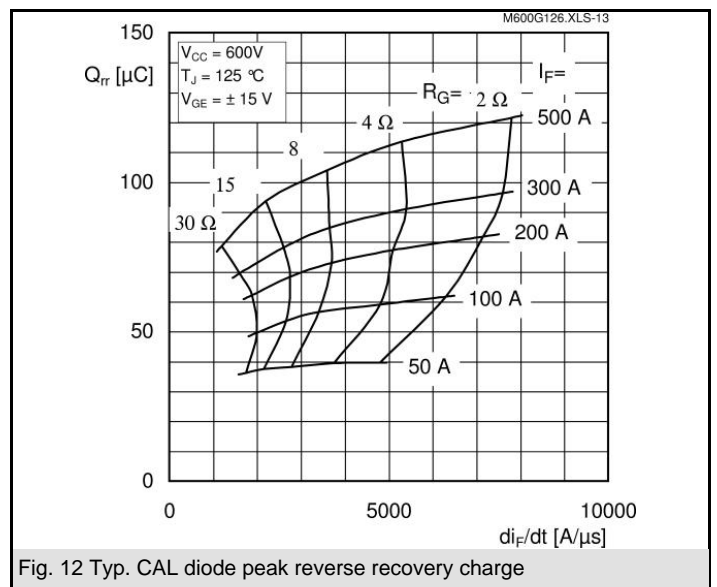
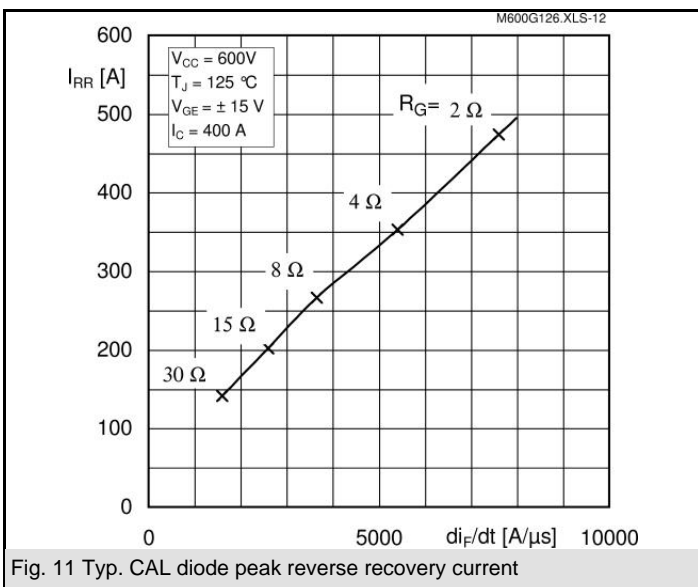
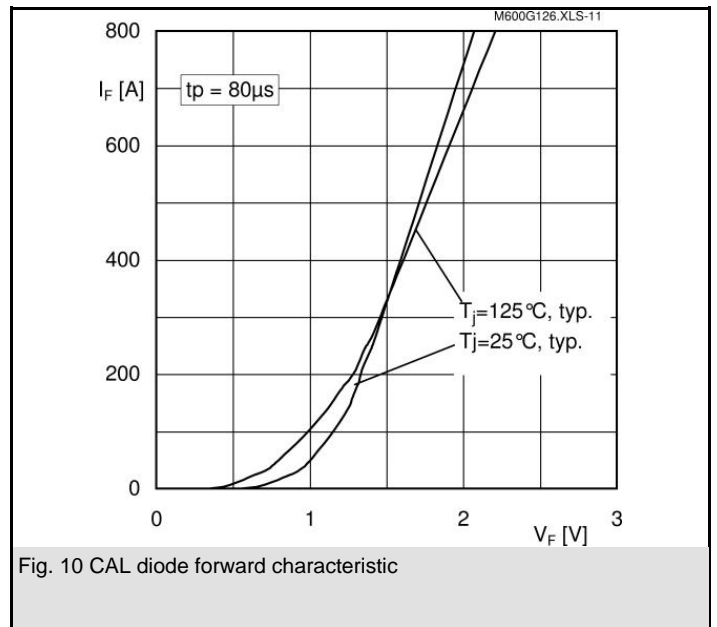
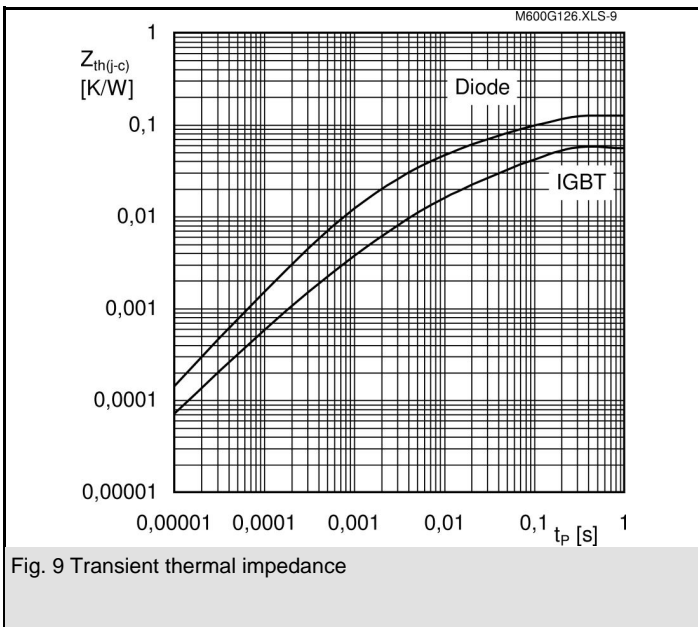
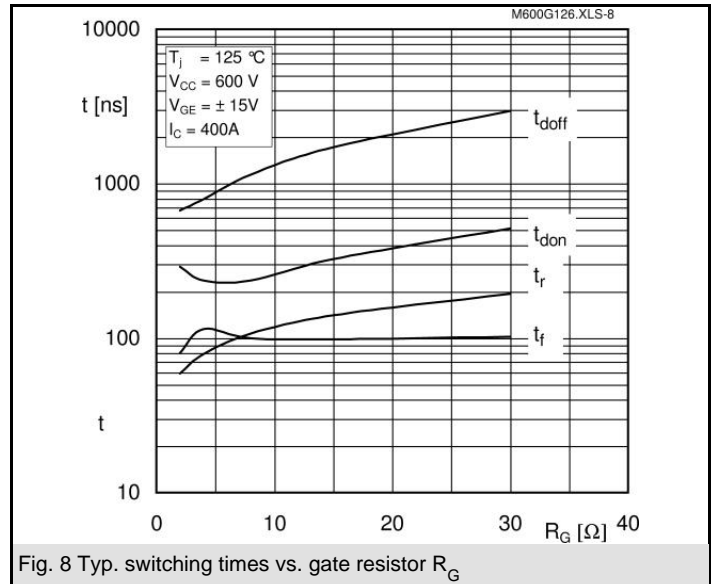
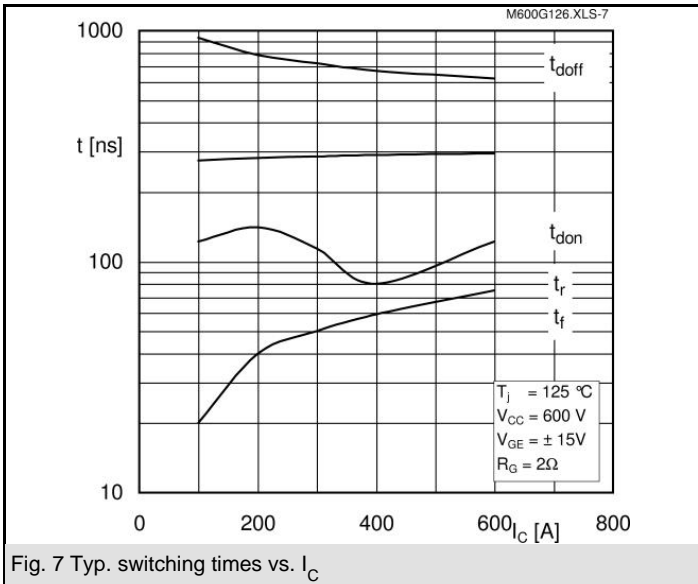
Z_{th}		Conditions	Values	Units
$Z_{th(j-c)I}$				
$R_{\theta j-c}$		$i = 1$	38	mk/W
$R_{\theta j-c}$		$i = 2$	13	mk/W
$R_{\theta j-c}$		$i = 3$	3,4	mk/W
$R_{\theta j-c}$		$i = 4$	0,6	mk/W
$\tau_{\theta j-c}$		$i = 1$	0,0836	s
$\tau_{\theta j-c}$		$i = 2$	0,009	s
$\tau_{\theta j-c}$		$i = 3$	0,0024	s
$\tau_{\theta j-c}$		$i = 4$	0,0002	s
$Z_{th(j-c)D}$				
$R_{\theta j-cD}$		$i = 1$	75	mk/W
$R_{\theta j-cD}$		$i = 2$	39	mk/W
$R_{\theta j-cD}$		$i = 3$	9,5	mk/W
$R_{\theta j-cD}$		$i = 4$	1,5	mk/W
$\tau_{\theta j-cD}$		$i = 1$	0,0327	s
$\tau_{\theta j-cD}$		$i = 2$	0,0101	s
$\tau_{\theta j-cD}$		$i = 3$	0,002	s
$\tau_{\theta j-cD}$		$i = 4$	0,0003	s



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Case D 56



GB Case D 56



GAL Case D 57