

# SKM 200GB128D



**SEMITRANS® 3**

## SPT IGBT Module

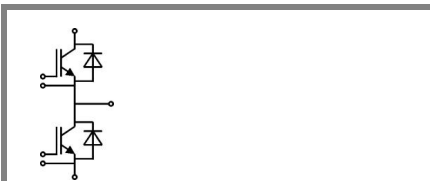
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### Features

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

### Typical Applications

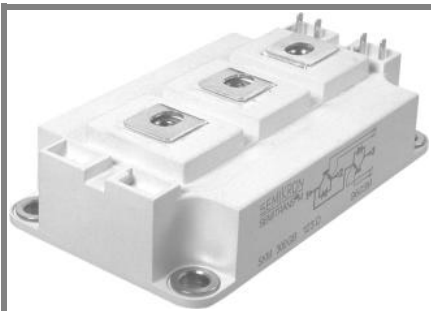
- AC inverter drives
- UPS
- Electronic welders  $f_{sw}$  up to 20kHz



**GB**

Absolute Maximum Ratings		$T_C = 25\text{ }^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	Values			Units
<b>IGBT</b>					
$V_{CES}$	$T_j = 150\text{ }^\circ\text{C}$	1200			V
$I_C$	$T_j = 150\text{ }^\circ\text{C}$	$T_C = 25\text{ }^\circ\text{C}$	300		A
		$T_C = 80\text{ }^\circ\text{C}$	220		A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	300			A
$V_{GES}$		$\pm 20$			V
$t_{psc}$	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ }^\circ\text{C}$ $V_{CES} < 1200\text{ V}$	10			$\mu\text{s}$
<b>Inverse Diode</b>					
$I_F$	$T_j = 150\text{ }^\circ\text{C}$	$T_{case} = 25\text{ }^\circ\text{C}$	190		A
		$T_{case} = 80\text{ }^\circ\text{C}$	130		A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	300			A
$I_{FSM}$	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150\text{ }^\circ\text{C}$	1440		A
<b>Module</b>					
$I_{t(RMS)}$		500			A
$T_{vj}$		- 40... + 150			$^\circ\text{C}$
$T_{stg}$		- 40... + 125			$^\circ\text{C}$
$V_{isol}$	AC, 1 min.	4000			V

Characteristics		$T_C = 25\text{ }^\circ\text{C}$ , unless otherwise specified				
Symbol	Conditions	min.	typ.	max.	Units	
<b>IGBT</b>						
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 6\text{ mA}$	4,5	5,5	6,45	V	
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$		0,2	0,6	mA	
$V_{CE0}$		$T_j = 25\text{ }^\circ\text{C}$	1		1,15	V
		$T_j = 125\text{ }^\circ\text{C}$	0,9		1,05	V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ }^\circ\text{C}$	6		8	m $\Omega$
		$T_j = 125\text{ }^\circ\text{C}$	8		10	m $\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 150\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25\text{ }^\circ\text{C}_{chiplev.}$	1,9		2,35	V
		$T_j = 125\text{ }^\circ\text{C}_{chiplev.}$	2,1		2,55	V
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	13		nF	
$C_{oes}$			2		nF	
$C_{res}$			2		nF	
$Q_G$	$V_{GE} = -8\text{V} - +20\text{V}$	1700			nC	
$R_{Gint}$	$T_j = 25\text{ }^\circ\text{C}$	2,5			$\Omega$	
$t_{d(on)}$	$R_{Gon} = 7\text{ }^\circ\Omega$ $di/dt = 4800\text{ A}/\mu\text{s}$	$V_{CC} = 600\text{V}$ $I_{Cnom} = 150\text{A}$	125		ns	
$t_r$			50		ns	
$E_{on}$			18		mJ	
$t_{d(off)}$	$R_{Goff} = 7\text{ }^\circ\Omega$	$T_j = 125\text{ }^\circ\text{C}$ $V_{GE} = \pm 15\text{V}$ $L_s = 20\text{ nH}$	620		ns	
$t_f$			55		ns	
$E_{off}$			15		mJ	
$R_{th(j-c)}$	per IGBT	0,095			K/W	



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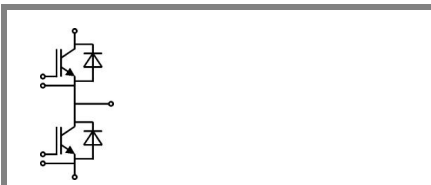
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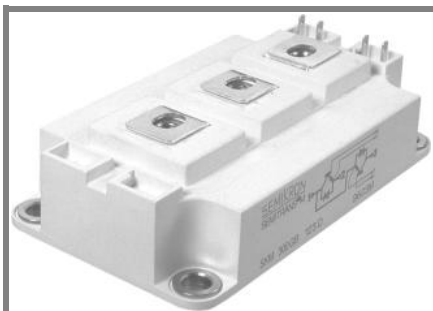
**GB**

Characteristics				min.	typ.	max.	Units
Symbol	Conditions						
<b>Inverse Diode</b>							
$V_F = V_{EC}$	$I_{Fnom} = 150 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$		2	2,5		V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		1,8			V
$V_{F0}$		$T_j = 25 \text{ }^\circ\text{C}$		1,1	1,2		V
$r_F$		$T_j = 25 \text{ }^\circ\text{C}$		6	7,8		m $\Omega$
$I_{RRM}$	$I_{Fnom} = 150 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$		190			A
$Q_{rr}$	$di/dt = 4800 \text{ A}/\mu\text{s}$			24			$\mu\text{C}$
$E_{rr}$	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$			8			mJ
$R_{th(j-c)D}$	per diode					0,25	K/W
<b>Module</b>							
$L_{CE}$				15	20		nH
$R_{CC+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$		0,35			m $\Omega$
		$T_{case} = 125 \text{ }^\circ\text{C}$		0,5			m $\Omega$
$R_{th(c-s)}$	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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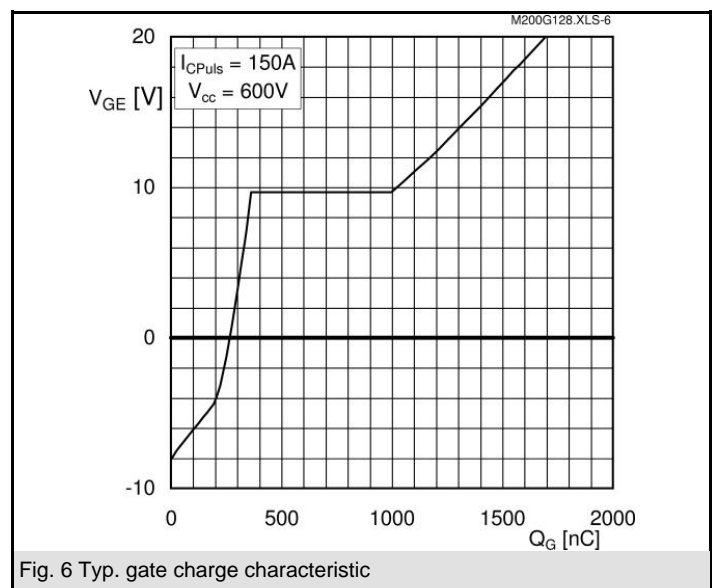
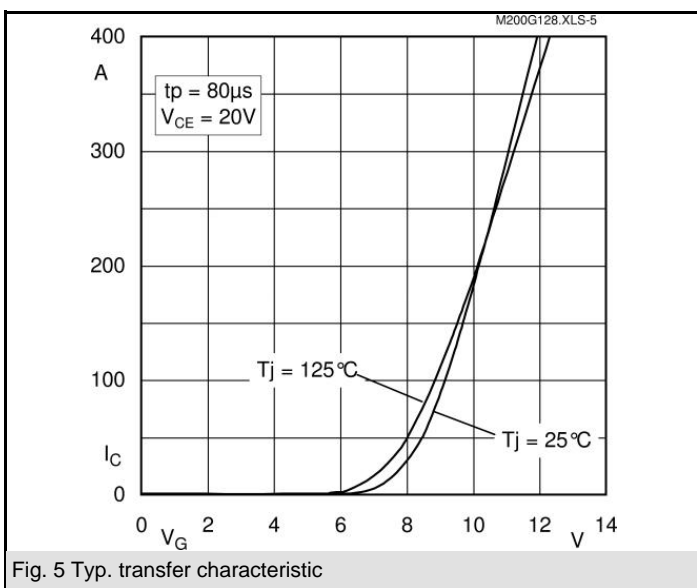
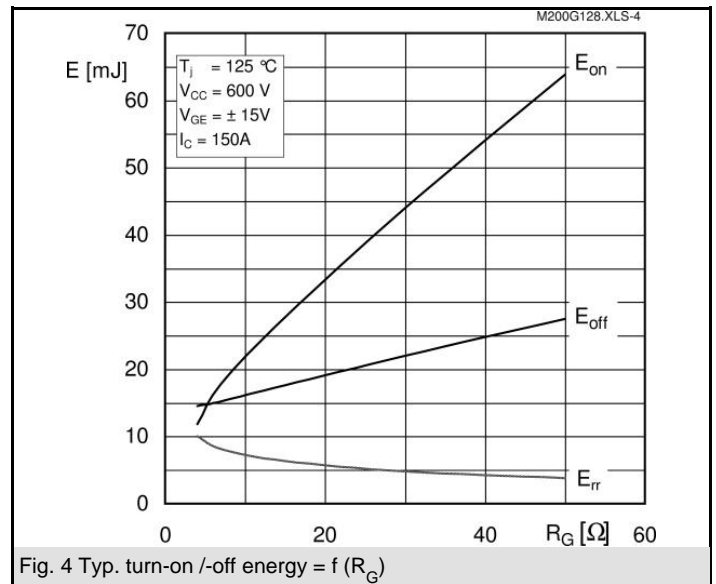
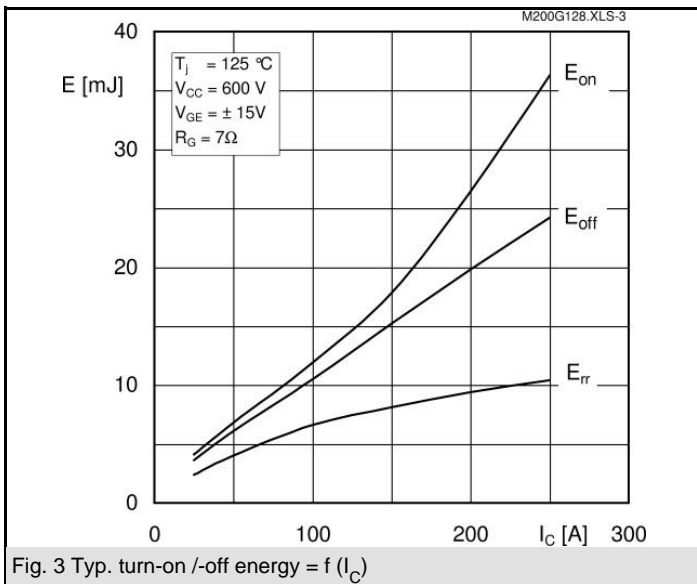
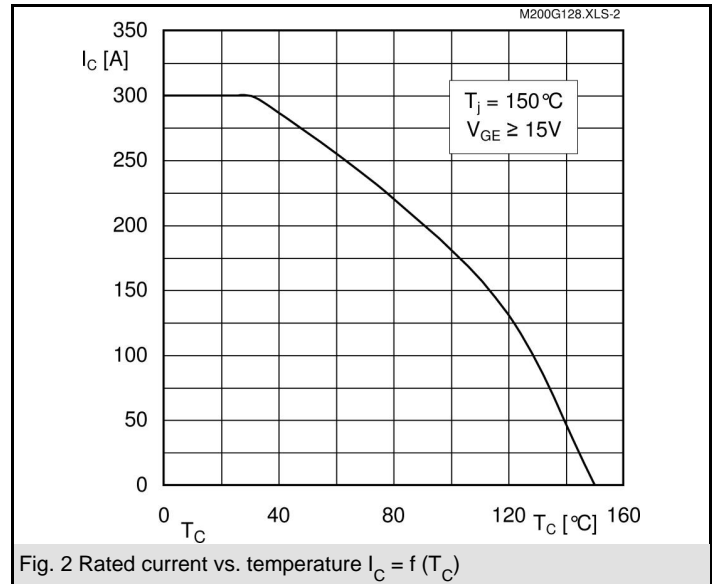
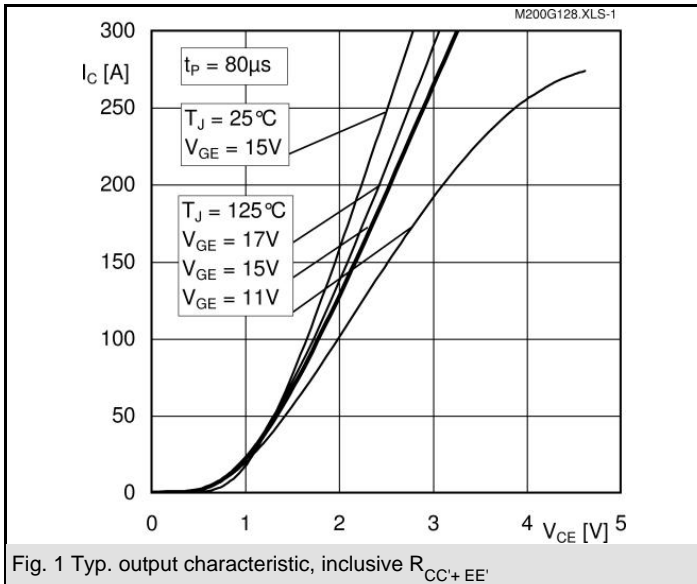
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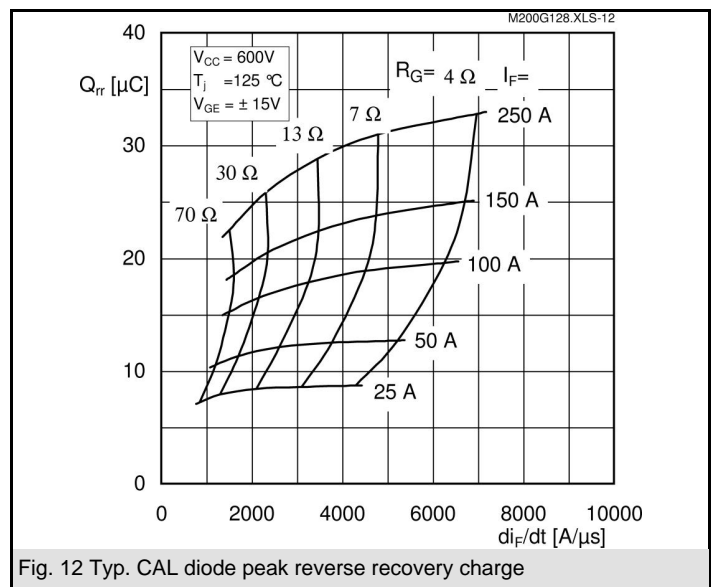
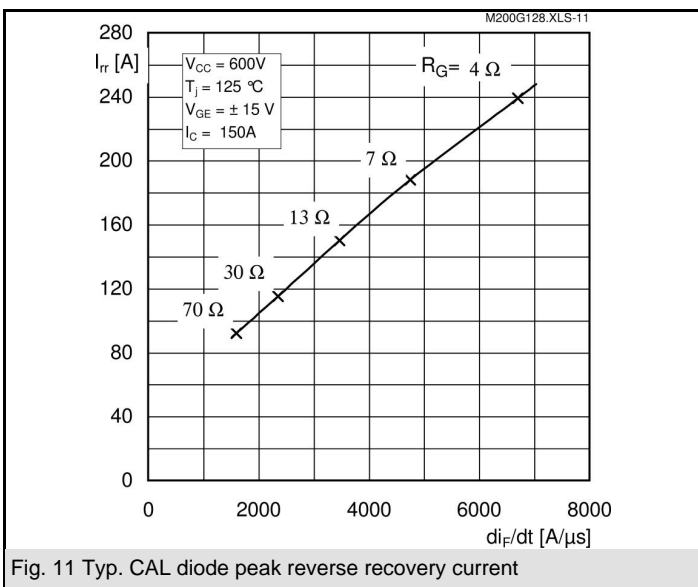
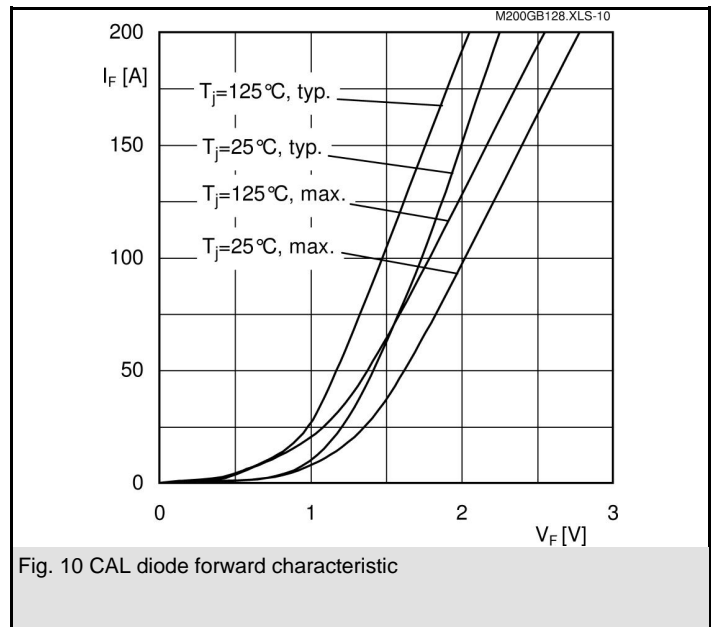
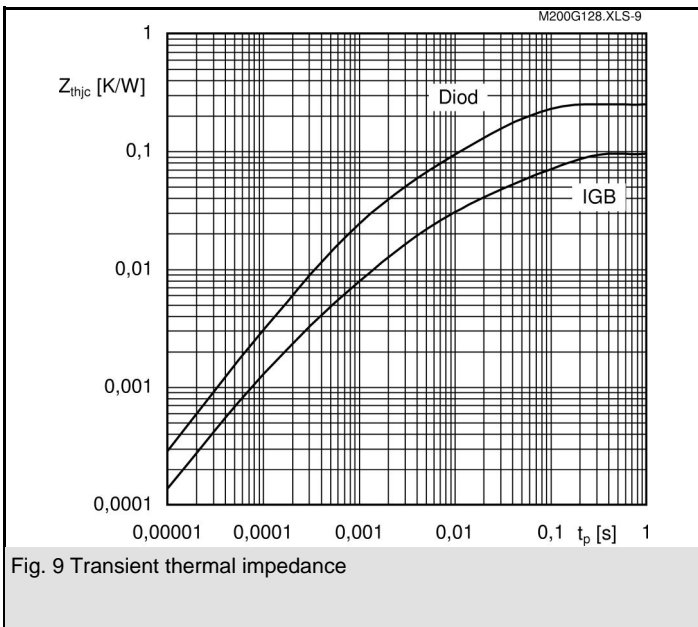
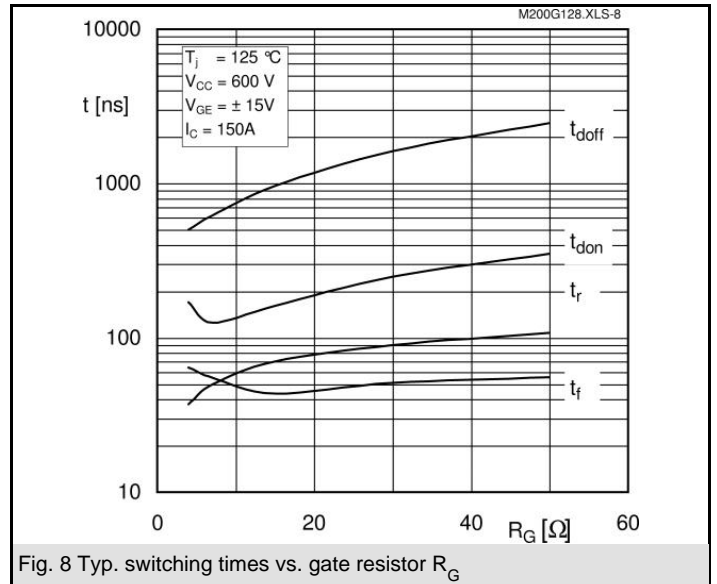
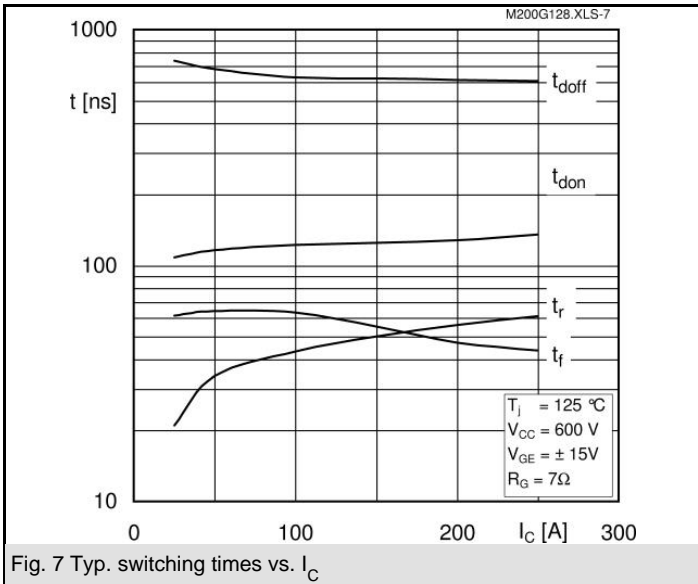
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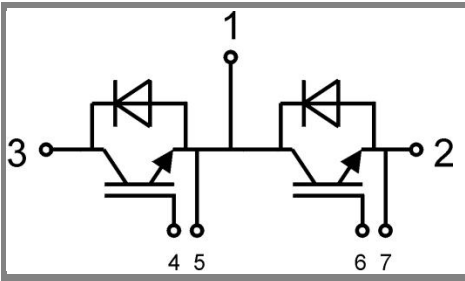
$Z_{th}$		Conditions	Values	Units
<b>Symbol</b>				
$Z_{th(j-c)I}$				
$R_{\theta j-c}$	$i = 1$		65	mk/W
$R_{\theta j-c}$	$i = 2$		22	mk/W
$R_{\theta j-c}$	$i = 3$		6,8	mk/W
$R_{\theta j-c}$	$i = 4$		1,2	mk/W
$\tau_{th(j-c)I}$	$i = 1$		0,0744	s
$\tau_{th(j-c)I}$	$i = 2$		0,0078	s
$\tau_{th(j-c)I}$	$i = 3$		0,0016	s
$\tau_{th(j-c)I}$	$i = 4$		0,0002	s
<b>Symbol</b>				
$Z_{th(j-c)D}$				
$R_{\theta j-c}$	$i = 1$		155	mk/W
$R_{\theta j-c}$	$i = 2$		71	mk/W
$R_{\theta j-c}$	$i = 3$		21	mk/W
$R_{\theta j-c}$	$i = 4$		3	mk/W
$\tau_{th(j-c)D}$	$i = 1$		0,0716	s
$\tau_{th(j-c)D}$	$i = 2$		0,0056	s
$\tau_{th(j-c)D}$	$i = 3$		0,0042	s
$\tau_{th(j-c)D}$	$i = 4$		0,0002	s







Case D 56



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Case D 56