

SKM 150GB123D



SEMITRANS® 3

IGBT Modules

SKM 150GB123D

SKM 150GAL123D

Features

- MOS input (voltage controlled)
- N channel, Homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to $6 \times I_{Cnom}$
- Latch-up free
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding
- Large clearance (12 mm) and creepage distances (20 mm)

Typical Applications

- AC inverter drives
- UPS



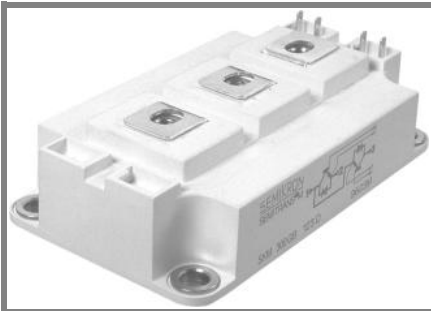
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Absolute Maximum Ratings		$T_c = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1200		V
I_C	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	150	A
		$T_{case} = 80^\circ\text{C}$	110	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	200		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	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	150	A
		$T_{case} = 80^\circ\text{C}$	100	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	200		A
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150^\circ\text{C}$	1100	A
Freewheeling Diode				
I_F	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	200	A
		$T_{case} = 80^\circ\text{C}$	135	A
I_{FRM}		300		A
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150^\circ\text{C}$	1440	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.	2500		V

Characteristics		$T_c = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 4\text{ mA}$	4,5	5,5	6,5	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 25^\circ\text{C}$	0,1	0,3	mA
		$T_j = 125^\circ\text{C}$			mA
V_{CE0}		$T_j = 25^\circ\text{C}$	1,4	1,6	V
		$T_j = 125^\circ\text{C}$	1,6	1,8	V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	11	14	$\text{m}\Omega$
		$T_j = 125^\circ\text{C}$	15	19	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 100\text{ A}, V_{GE} = 15\text{ V}$	$T_j = ^\circ\text{C}_{chiplever.}$	2,5	3	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	6,5	8,5	nF
C_{oes}			1	1,5	nF
C_{res}			0,5	0,6	nF
Q_G	$V_{GE} = -8\text{ V} - +20\text{ V}$		1000		nC
R_{Gint}	$T_j = ^\circ\text{C}$		2,5		Ω
$t_{d(on)}$	$R_{Gon} = 6,8\ \Omega$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 100\text{ A}$	160	320	ns
t_r			80	160	ns
E_{on}	$R_{Goff} = 6,8\ \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$	13		mJ
$t_{d(off)}$			400	520	ns
t_f			70	100	ns
E_{off}			11		mJ
$R_{th(j-c)}$	per IGBT			0,15	K/W

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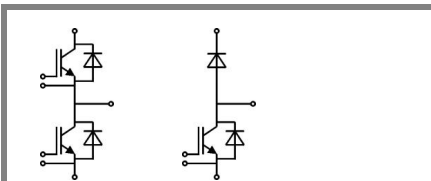
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Characteristics

Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 100 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	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
		$T_j = 125 \text{ }^\circ\text{C}$			V
r_F		$T_j = 25 \text{ }^\circ\text{C}$	9	13	mΩ
		$T_j = 125 \text{ }^\circ\text{C}$			mΩ
I_{RRM}	$I_{Fnom} = 100 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	50		A
Q_{rr}	$di/dt = 1000 \text{ A}/\mu\text{s}$		5		μC
E_{rr}	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
$R_{th(j-c)D}$	per diode			0,3	K/W
Freewheeling Diode					
$V_F = V_{EC}$	$I_{Fnom} = 150 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	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
		$T_j = 125 \text{ }^\circ\text{C}$			V
r_F		$T_j = 25 \text{ }^\circ\text{C}$	6	8,7	V
		$T_j = 125 \text{ }^\circ\text{C}$			V
I_{RRM}	$I_{Fnom} = 100 \text{ A}$	$T_j = 25 \text{ }^\circ\text{C}$	40		A
Q_{rr}			5		μC
E_{rr}	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
$R_{th(j-c)FD}$	per diode			0,25	K/W
Module					
L_{CE}			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$	0,35		mΩ
		$T_{case} = 125 \text{ }^\circ\text{C}$	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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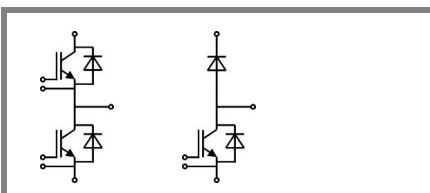
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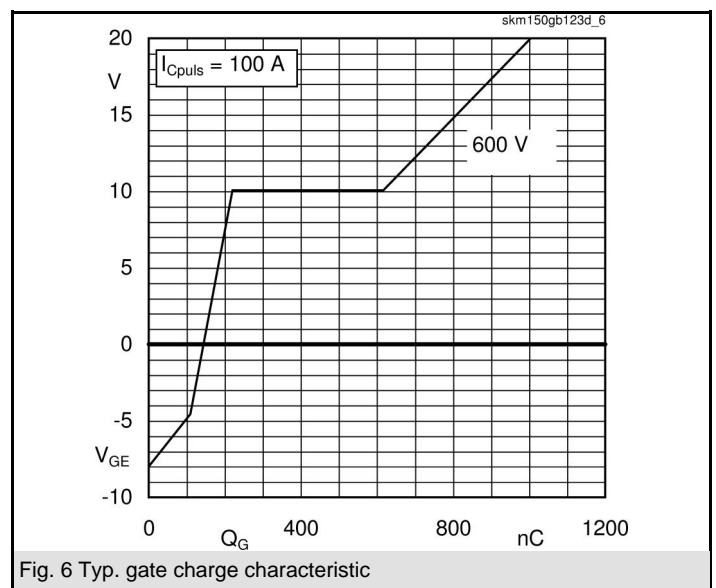
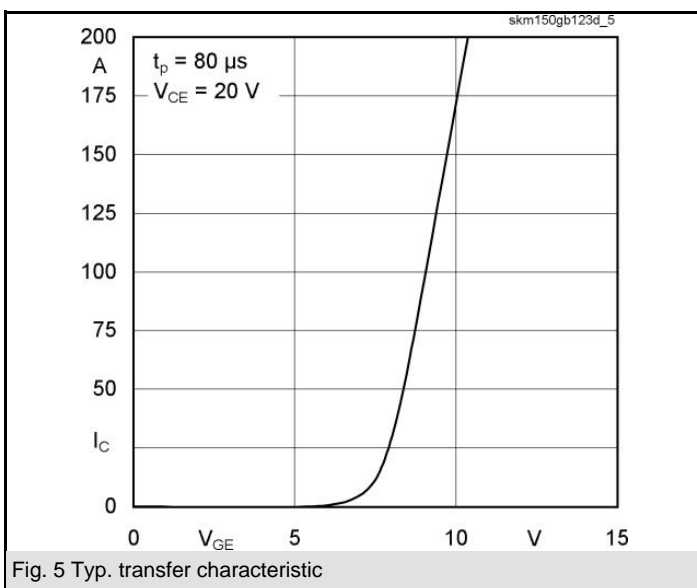
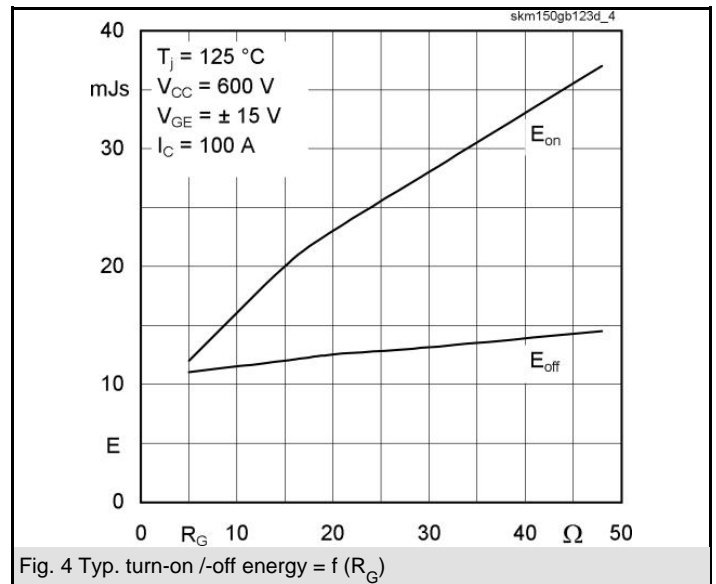
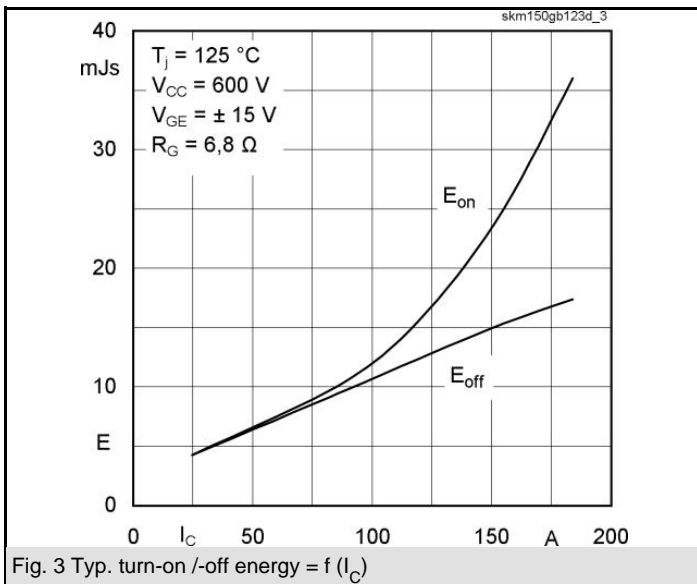
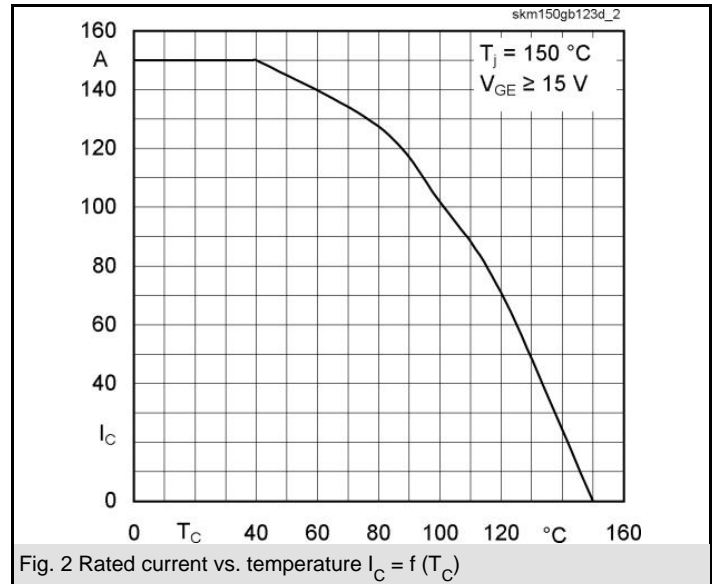
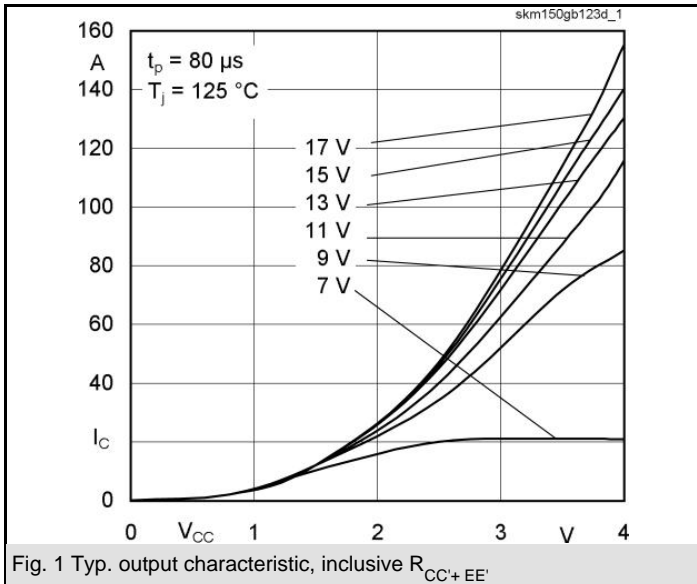
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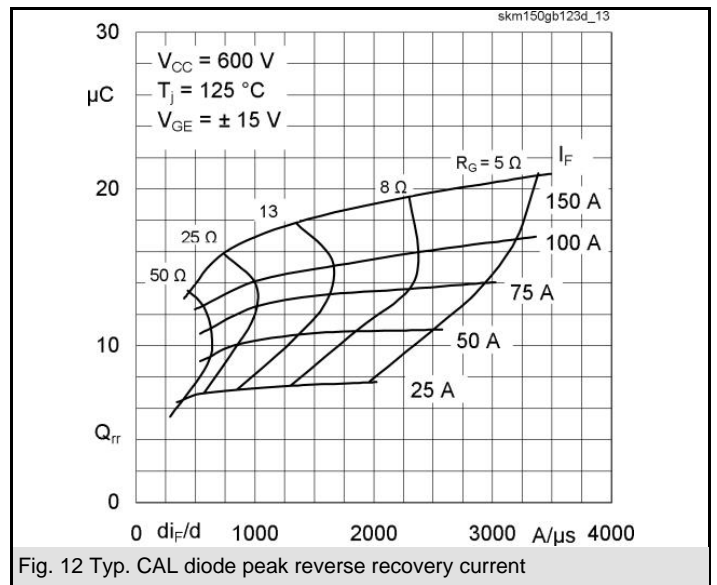
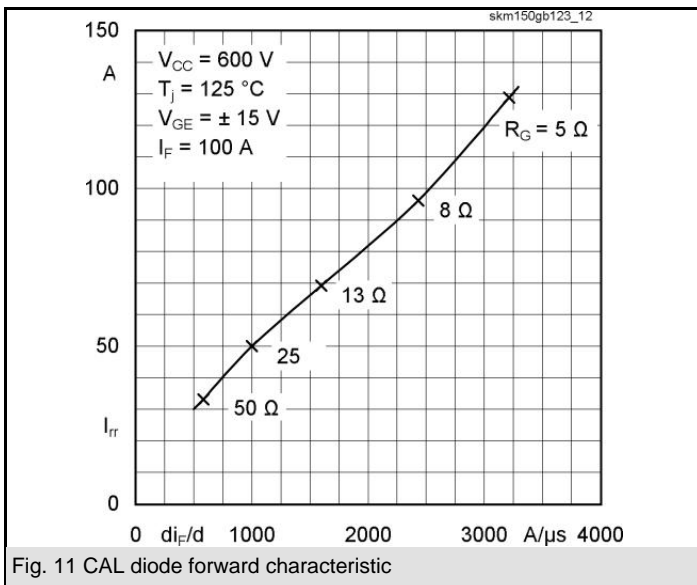
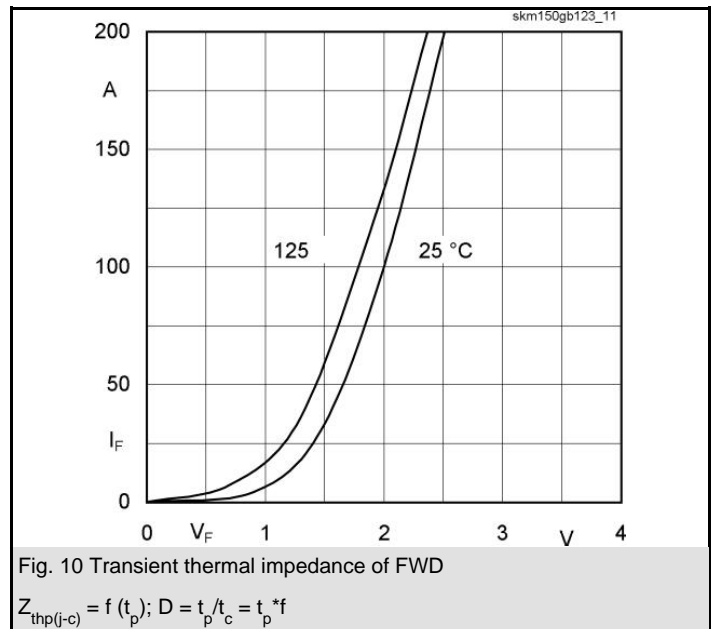
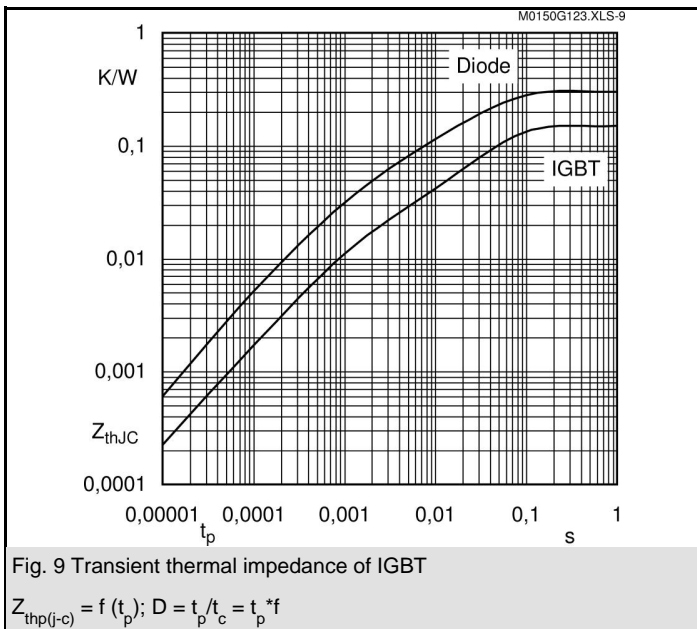
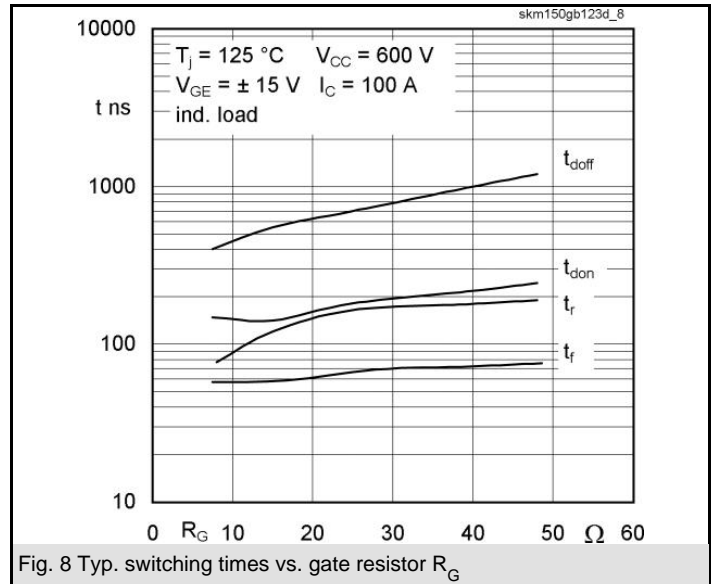
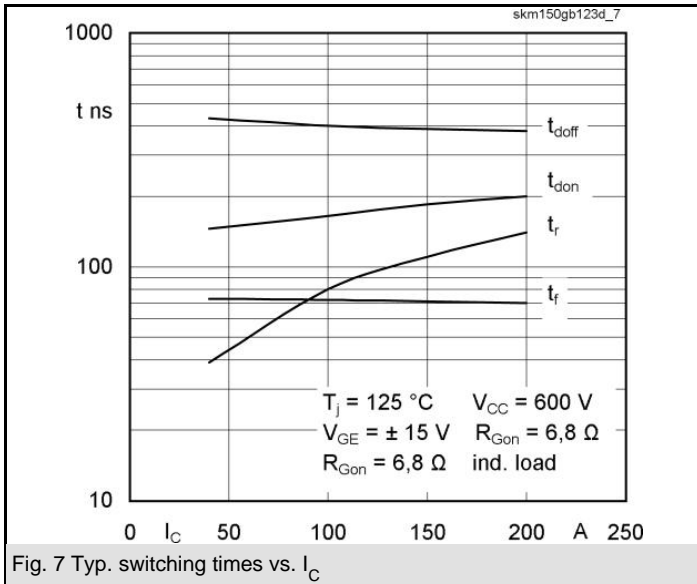
Z_{th}		Conditions	Values	Units
$Z_{th(j-c)I}$				
$R_{\theta j-c}$	$i = 1$		105	mk/W
$R_{\theta j-c}$	$i = 2$		35	mk/W
$R_{\theta j-c}$	$i = 3$		8	mk/W
$R_{\theta j-c}$	$i = 4$		2	mk/W
$\tau_{th j-c}$	$i = 1$		0,03	s
$\tau_{th j-c}$	$i = 2$		0,03	s
$\tau_{th j-c}$	$i = 3$		0,0014	s
$\tau_{th j-c}$	$i = 4$		0,0001	s
$Z_{th(j-c)D}$				
$R_{\theta j-cD}$	$i = 1$		210	mk/W
$R_{\theta j-cD}$	$i = 2$		70	mk/W
$R_{\theta j-cD}$	$i = 3$		16	mk/W
$R_{\theta j-cD}$	$i = 4$		4	mk/W
$\tau_{th j-cD}$	$i = 1$		0,0623	s
$\tau_{th j-cD}$	$i = 2$		0,0083	s
$\tau_{th j-cD}$	$i = 3$		0,003	s
$\tau_{th j-cD}$	$i = 4$		0,0002	s



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UL Recognized

CASED56

File no. E63 532



Case D 56



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Case D 56



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Case D 57 (→ D 56)