



**SEMITRANS® 3**

## Superfast NPT-IGBT Modules

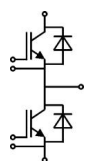
### SKM 200GB063D

#### Features

- N channel, homogeneous Silicon structure (NPT - Non punch-through IGBT)
- Low tail current with low temperature dependence
- High short circuit capability, self limiting if term. G is clamped to E
- Pos. temp.-coeff. of  $V_{CEsat}$
- 50 % less turn off losses
- 30 % less short circuit current
- Very low  $C_{ies}$ ,  $C_{oes}$ ,  $C_{res}$
- Latch-up free
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology without hard mould
- Large clearance (13 mm) and creepage distances (20 mm)

#### Typical Applications

- Switched mode power supplies
- AC inverter servo drives
- UPS uninterruptable power supplies
- Welding inverters



**GB**

Absolute Maximum Ratings		$T_c = 25\text{ }^\circ\text{C}$ , unless otherwise specified		
Symbol	Conditions	Values		Units
<b>IGBT</b>				
$V_{CES}$	$T_j = 25\text{ }^\circ\text{C}$	600		V
$I_C$	$T_j = 150\text{ }^\circ\text{C}$	$T_{case} = 25\text{ }^\circ\text{C}$	260	A
		$T_{case} = 70\text{ }^\circ\text{C}$	200	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	400		A
$V_{GES}$		$\pm 20$		V
$t_{psc}$	$V_{CC} = 300\text{ V}$ ; $V_{GE} \leq 20\text{ V}$ ; $T_j = 125\text{ }^\circ\text{C}$ $V_{CES} < 600\text{ V}$	10		$\mu\text{s}$
<b>Inverse Diode</b>				
$I_F$	$T_j = 150\text{ }^\circ\text{C}$	$T_{case} = 25\text{ }^\circ\text{C}$	200	A
		$T_{case} = 80\text{ }^\circ\text{C}$	135	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	400		A
$I_{FSM}$	$t_p = 10\text{ ms}$ ; sin.	$T_j = 150\text{ }^\circ\text{C}$	1400	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.	2500		V

Characteristics		$T_c = 25\text{ }^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}$ , $I_C = 4\text{ mA}$	4,5	5,5	6,5	V
$I_{CES}$	$V_{GE} = 0\text{ V}$ , $V_{CE} = V_{CES}$		0,1	0,3	mA
$V_{CE0}$		$T_j = 25\text{ }^\circ\text{C}$	1,05		V
		$T_j = 125\text{ }^\circ\text{C}$	1		V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ }^\circ\text{C}$	5,3		m $\Omega$
		$T_j = 125\text{ }^\circ\text{C}$	7		m $\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 200\text{ A}$ , $V_{GE} = 15\text{ V}$	$T_j = 25\text{ }^\circ\text{C}_{chiplev.}$	2,1	2,5	V
		$T_j = 125\text{ }^\circ\text{C}_{chiplev.}$	2,4	2,8	V
$C_{res}$	$V_{CE} = 25$ , $V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	11,2		nF
$C_{oes}$			1,25		nF
$C_{res}$			0,75		nF
$Q_G$	$V_{GE} = 0\text{ V} - +15\text{ V}$		480		nC
$R_{Gint}$	$T_j = \text{ }^\circ\text{C}$		0		$\Omega$
$t_{d(on)}$	$R_{Gon} = 8\text{ }^\circ\Omega$	$V_{CC} = 300\text{ V}$ $I_C = 200\text{ A}$	140		ns
$t_r$			70		ns
$E_{on}$			11		mJ
$t_{d(off)}$	$R_{Goff} = 8\text{ }^\circ\Omega$	$T_j = 125\text{ }^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$	442		ns
$t_f$			45		ns
$E_{off}$			7,5		mJ
$R_{th(j-c)}$	per IGBT			0,14	K/W



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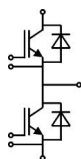
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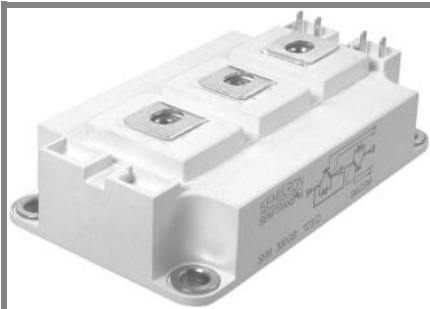
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#### Characteristics

Symbol	Conditions	min.	typ.	max.	Units
<b>Inverse Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 200 \text{ A}; V_{GE} = 0 \text{ V}$		1,55	1,9	V
			1,55		V
$V_{F0}$				0,9	V
$r_F$			4	5,5	mΩ
$I_{RRM}$	$I_F = 200 \text{ A}$		75		A
$Q_{rr}$			12,7		μC
$E_{rr}$	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
$R_{th(j-c)D}$	per diode			0,3	K/W
<b>Module</b>					
$L_{CE}$			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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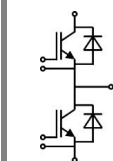
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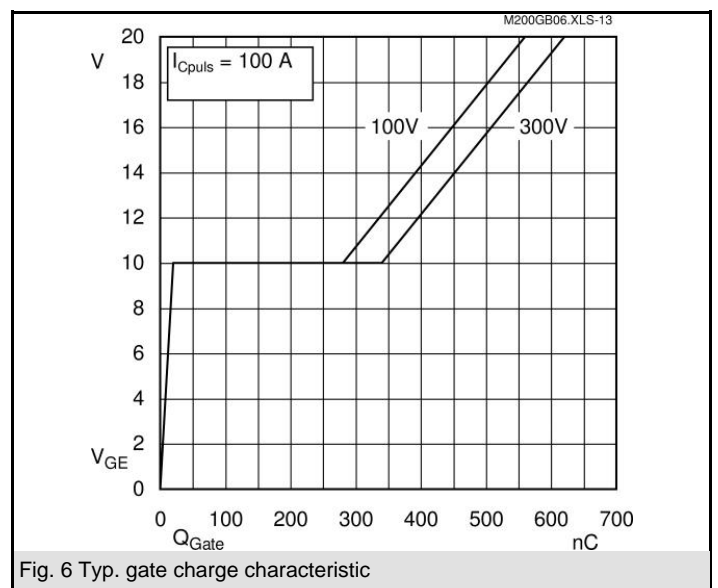
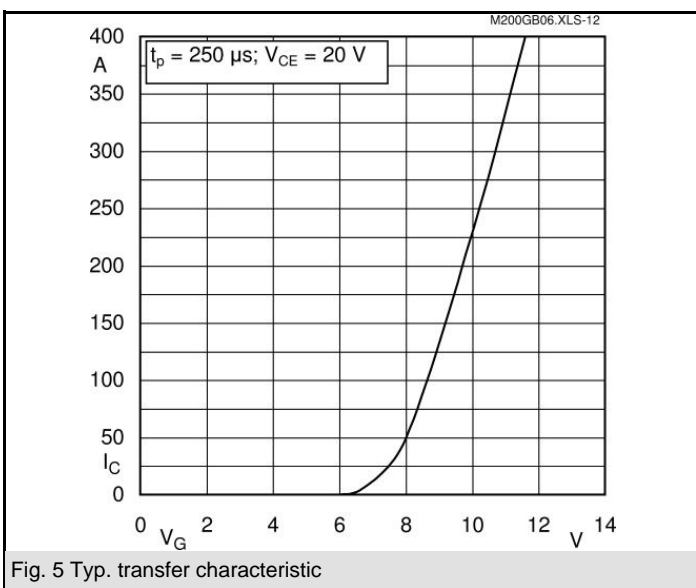
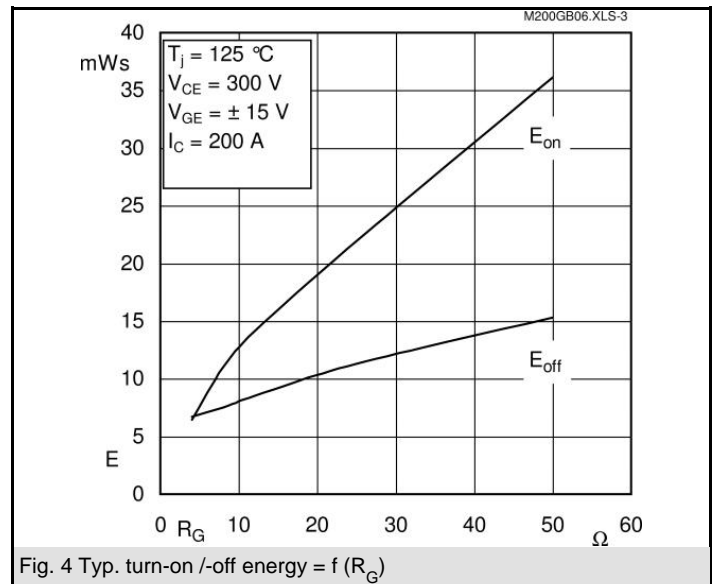
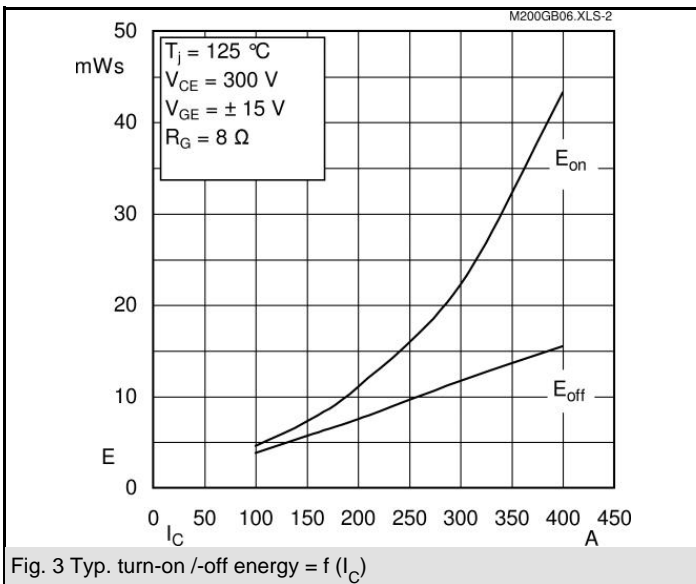
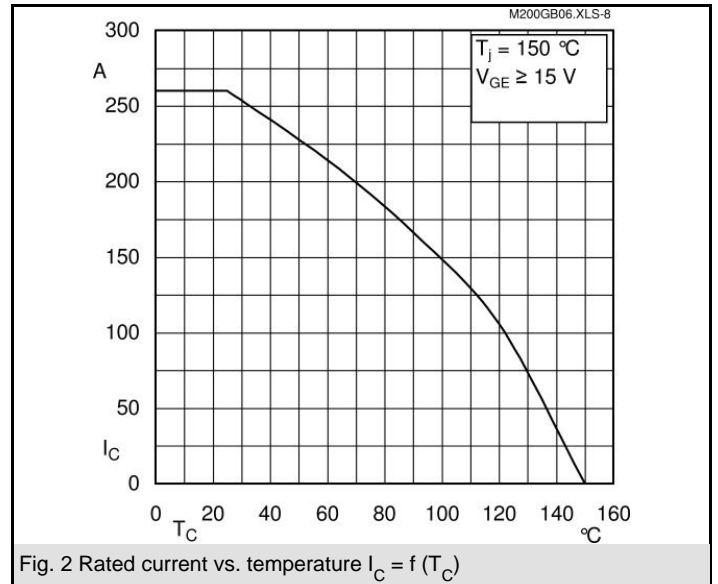
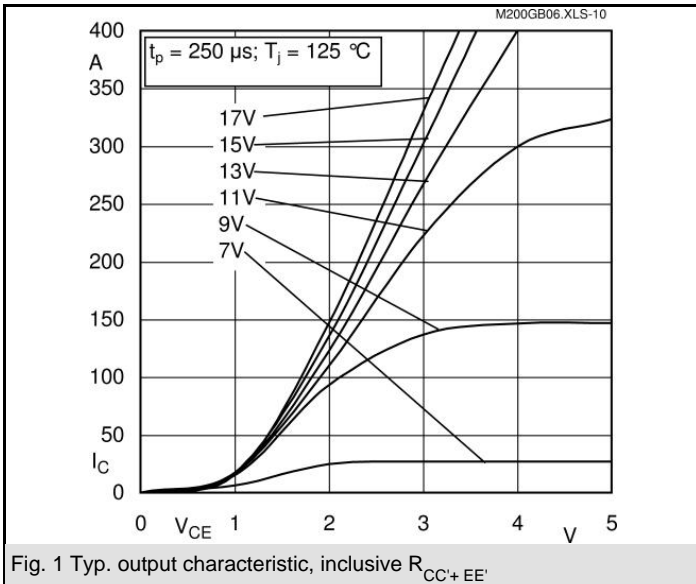
### Typical Applications

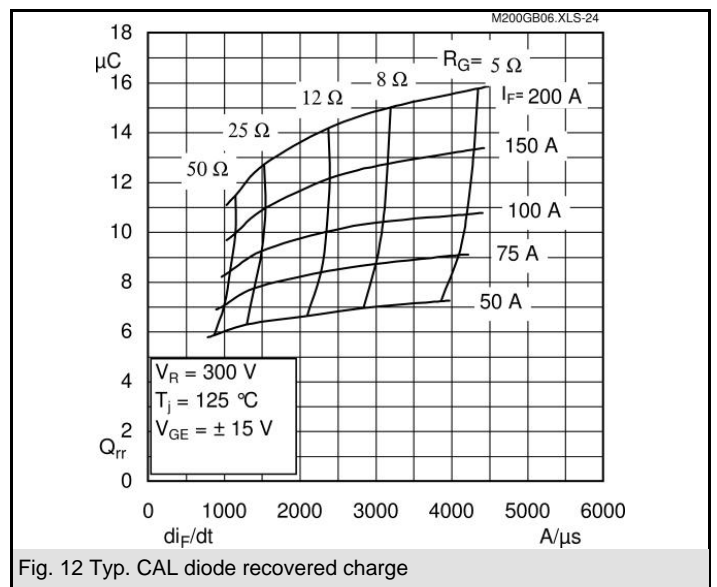
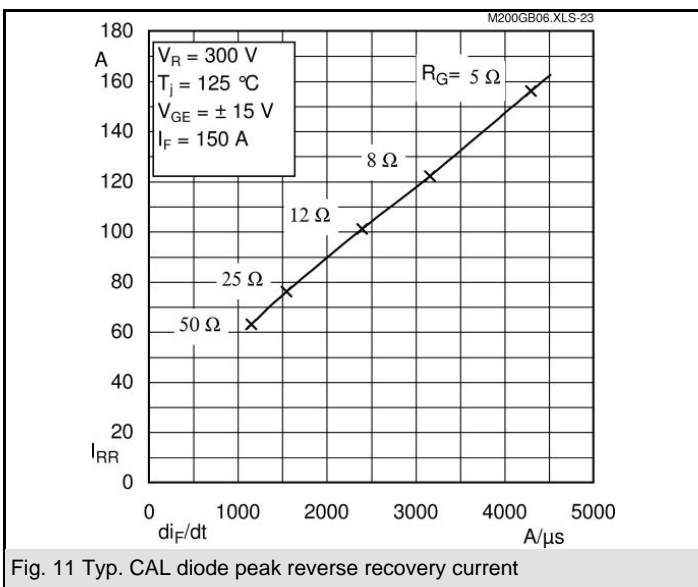
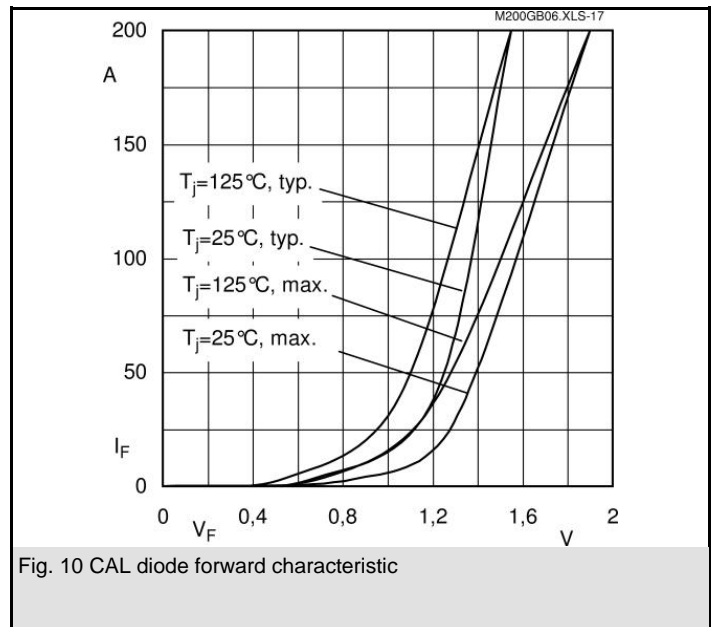
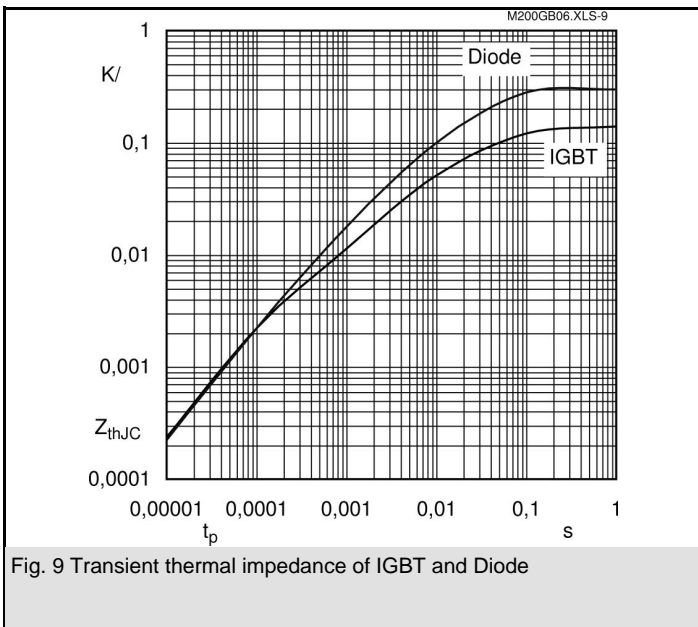
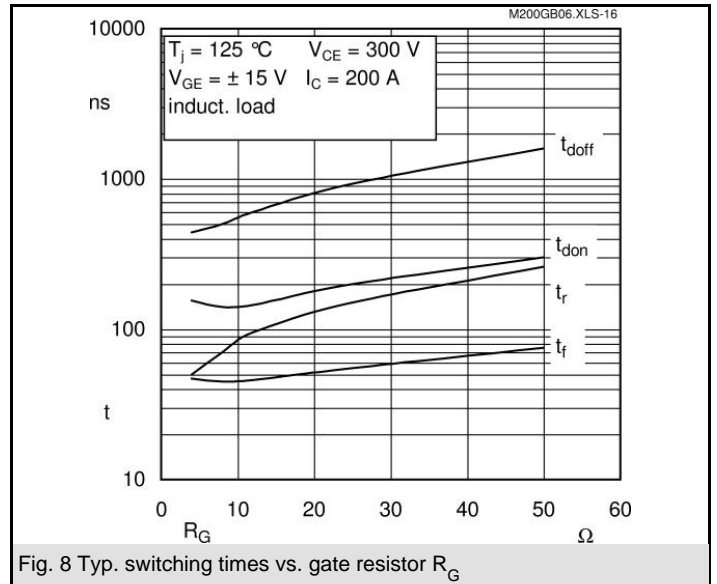
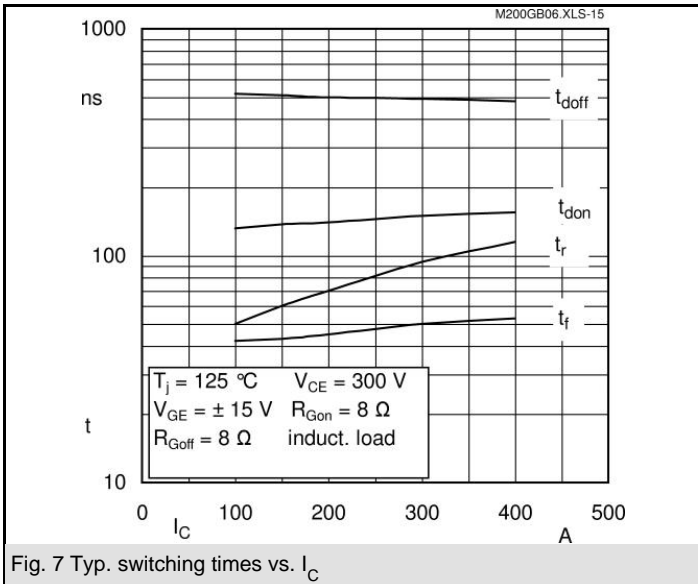
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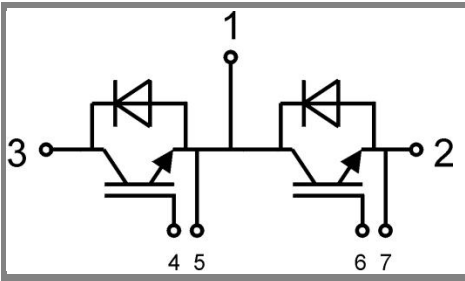
$Z_{th}$ Symbol	Conditions	Values	Units
<b><math>Z_{th(j-c)I}</math></b>			
$R_{\theta j-c1}$	i = 1	90	mk/W
$R_{\theta j-c2}$	i = 2	39	mk/W
$R_{\theta j-c3}$	i = 3	9	mk/W
$R_{\theta j-c4}$	i = 4	2	mk/W
$\tau_{th1}$	i = 1	0,0416	s
$\tau_{th2}$	i = 2	0,0139	s
$\tau_{th3}$	i = 3	0,0021	s
$\tau_{th4}$	i = 4	0,0001	s
<b><math>Z_{th(j-c)D}</math></b>			
$R_{\theta j-c1D}$	i = 1	200	mk/W
$R_{\theta j-c2D}$	i = 2	84	mk/W
$R_{\theta j-c3D}$	i = 3	14	mk/W
$R_{\theta j-c4D}$	i = 4	2	mk/W
$\tau_{th1D}$	i = 1	0,0275	s
$\tau_{th2D}$	i = 2	0,0413	s
$\tau_{th3D}$	i = 3	0,0019	s
$\tau_{th4D}$	i = 4	0,004	s







Case D 56



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Case D 56