



SEMITRANS® 3

Trench IGBT Module

SKM 600GB126D

SKM 600GAL126D

Features

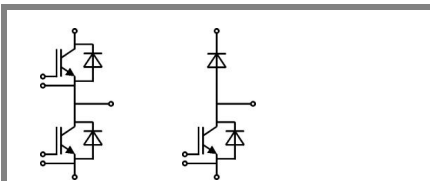
- Trench = Trenchgate technology
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$

Typical Applications*

- AC inverter drives
- UPS
- Electronic welders

Remarks

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



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Absolute Maximum Ratings		$T_c = 25\text{ °C}$, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT				
V_{CES}	$T_j = 25\text{ °C}$	1200	V	
I_C	$T_j = 150\text{ °C}$	$T_c = 25\text{ °C}$	660	A
		$T_c = 80\text{ °C}$	460	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	800	A	
V_{GES}		± 20	V	
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ °C}$ $V_{CES} < 1200\text{ V}$	10	μs	
Inverse Diode				
I_F	$T_j = 150\text{ °C}$	$T_c = 25\text{ °C}$	490	A
		$T_c = 80\text{ °C}$	340	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	800	A	
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150\text{ °C}$	2880	A
Freewheeling Diode				
I_F	$T_j = 150\text{ °C}$	$T_c = 25\text{ °C}$	490	A
		$T_c = 80\text{ °C}$	340	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	800	A	
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150\text{ °C}$	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		$T_c = 25\text{ °C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 16\text{ mA}$	5	5,8	6,5	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 25\text{ °C}$	0,2	0,6	mA
		$T_j = 125\text{ °C}$			mA
V_{CE0}		$T_j = 25\text{ °C}$	1	1,2	V
		$T_j = 125\text{ °C}$	0,9	1,1	V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}$	1,8	2,4	$m\Omega$
		$T_j = 125\text{ °C}$	2,8	3,4	$m\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 400\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}_{chiplev.}$	1,7	2,15	V
		$T_j = 125\text{ °C}_{chiplev.}$	2	2,45	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	32		nF
C_{oes}			11		nF
C_{res}			2,2		nF
Q_G	$V_{GE} = -8\text{ V} - +20\text{ V}$		3600		nC
R_{Gint}	$T_j = \text{ °C}$		1,88		Ω
$t_{d(on)}$	$R_{Gon} = 2\text{ }\Omega$	$V_{CC} = 600\text{ V}$ $I_C = 400\text{ A}$	290		ns
t_r			60		ns
E_{on}			39		mJ
$t_{d(off)}$	$R_{Goff} = 2\text{ }\Omega$	$T_j = 125\text{ °C}$ $V_{GE} = \pm 15\text{ V}$	670		ns
t_f			80		ns
E_{off}			64		mJ
$R_{th(j-c)}$	per IGBT			0,055	K/W



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Typical Applications*

- AC inverter drives
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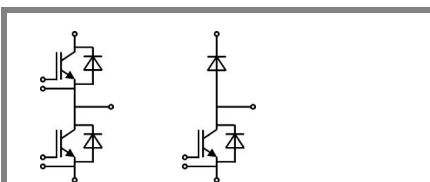
Remarks

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

Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
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}	$I_F = 400\text{ A}$	$T_j = 125\text{ °C}$	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}	$I_F = 400\text{ A}$	$T_j = 125\text{ °C}$	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

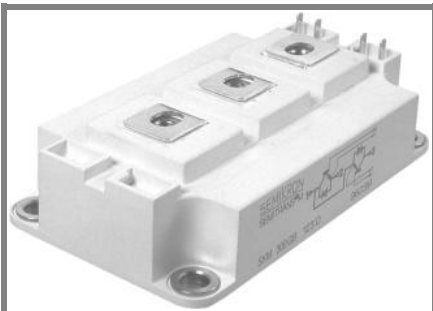
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.



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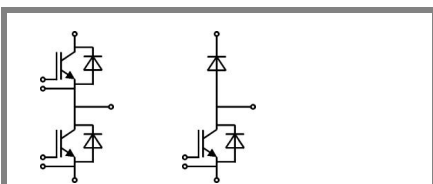
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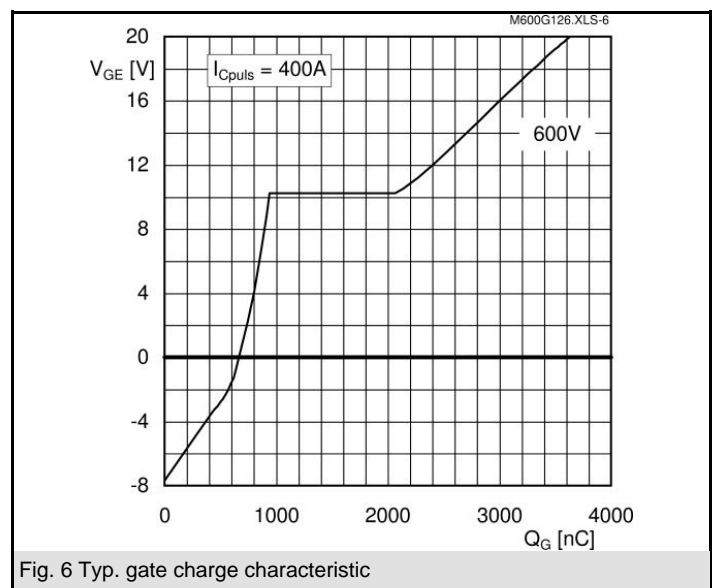
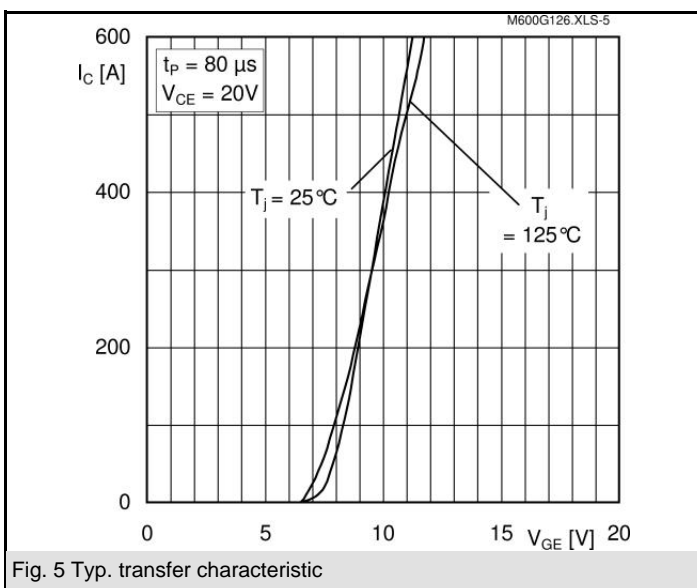
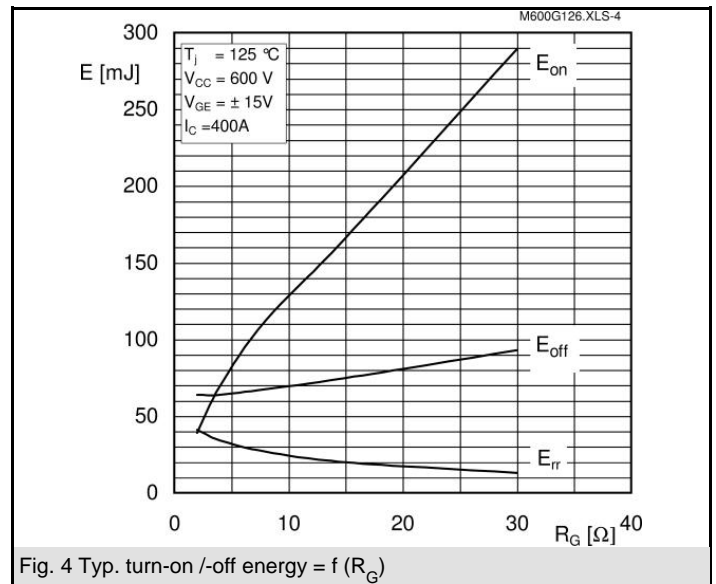
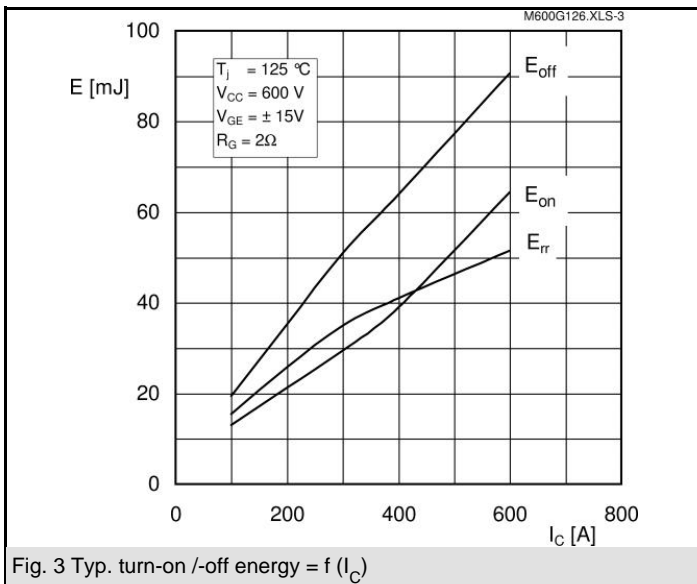
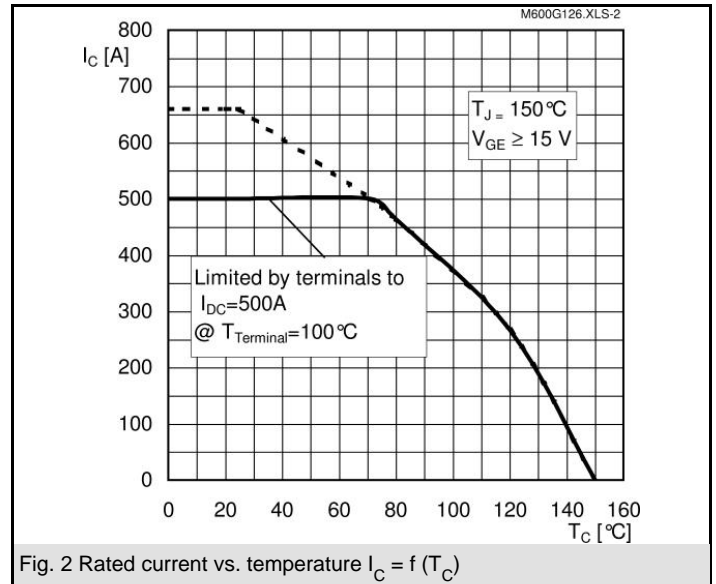
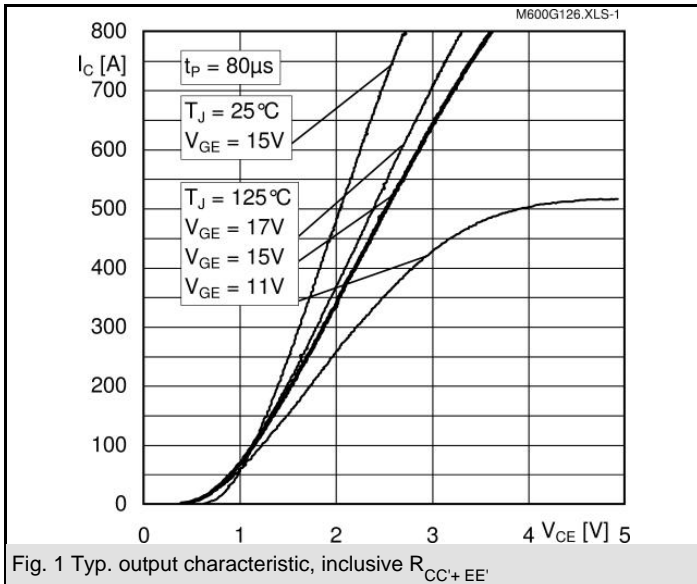
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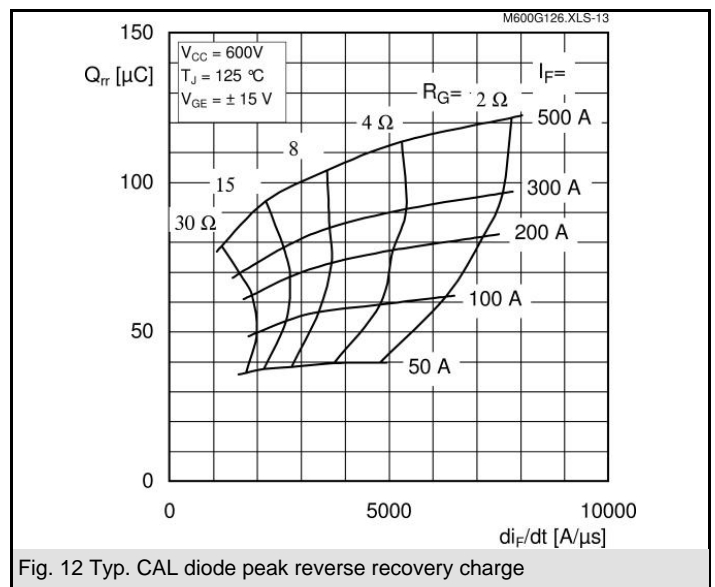
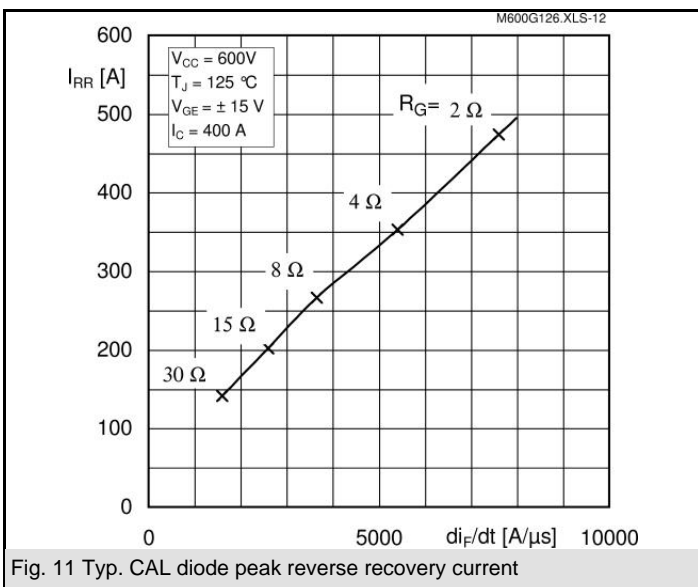
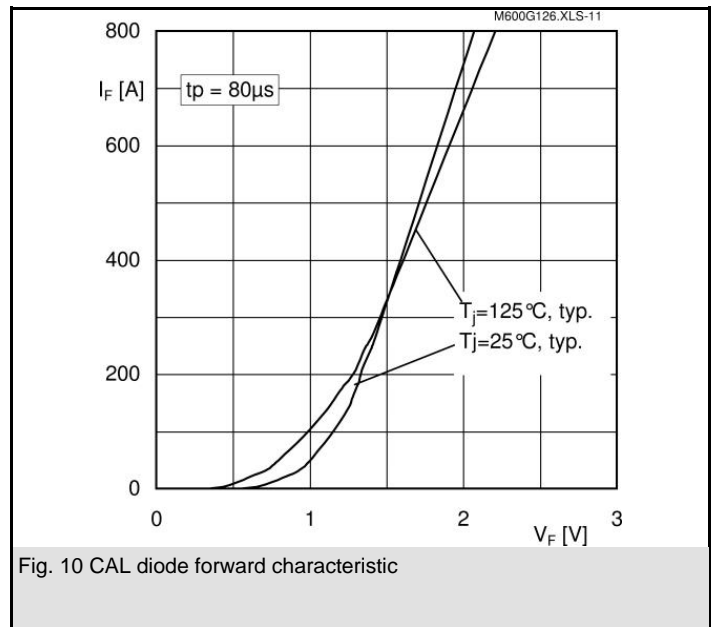
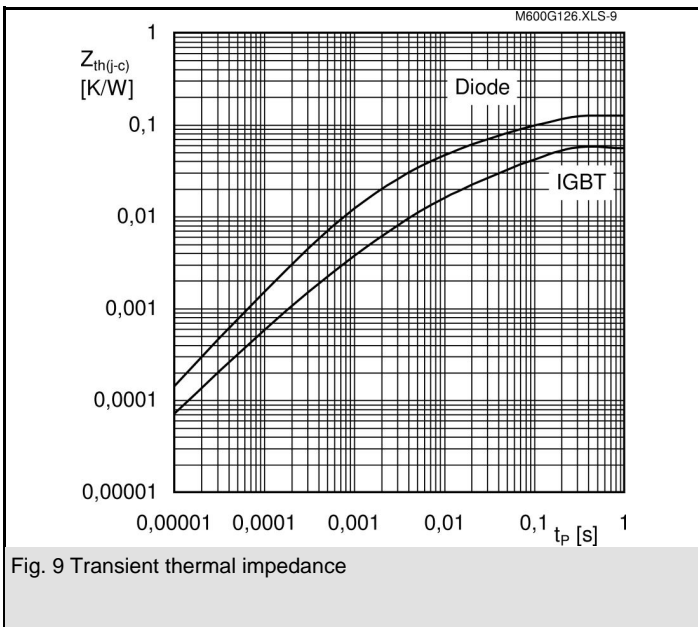
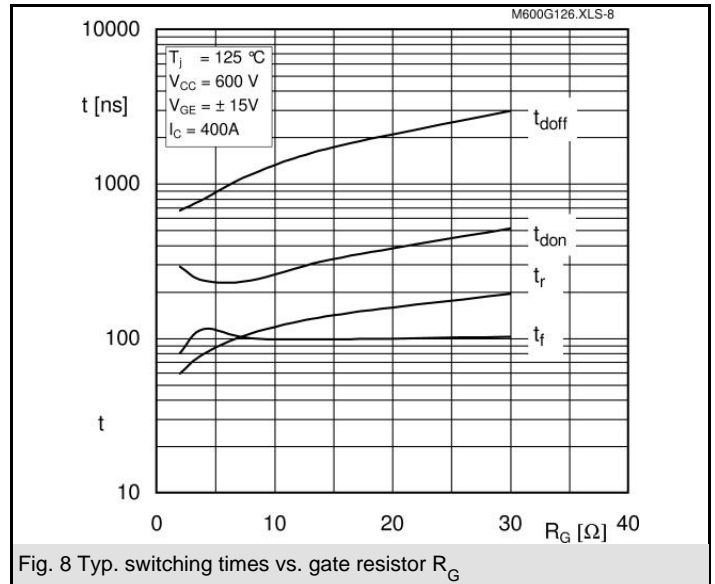
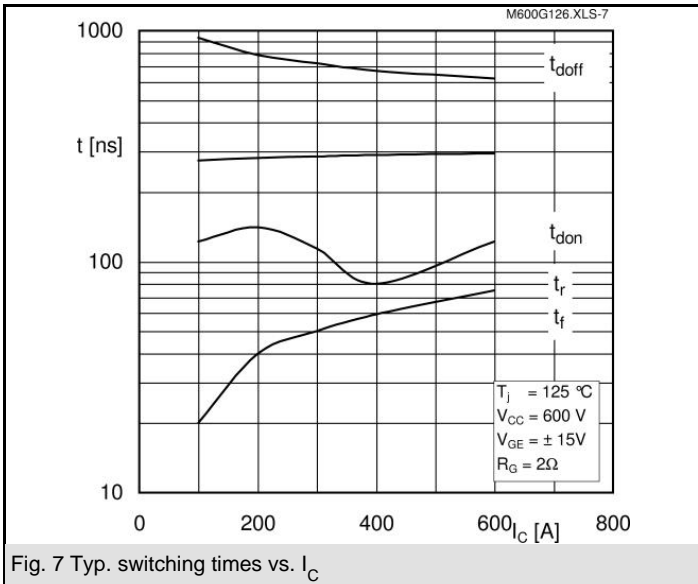
Z_{th}		Conditions	Values	Units
$Z_{th(j-c)I}$				
R_f		$i = 1$	38	mk/W
R_f		$i = 2$	13	mk/W
R_f		$i = 3$	3,4	mk/W
R_f		$i = 4$	0,6	mk/W
τ_{u_i}		$i = 1$	0,0836	s
τ_{u_i}		$i = 2$	0,009	s
τ_{u_i}		$i = 3$	0,0024	s
τ_{u_i}		$i = 4$	0,0002	s
$Z_{th(j-c)D}$				
R_f		$i = 1$	75	mk/W
R_f		$i = 2$	39	mk/W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



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Case D 56



GB Case D 56



GAL Case D 57