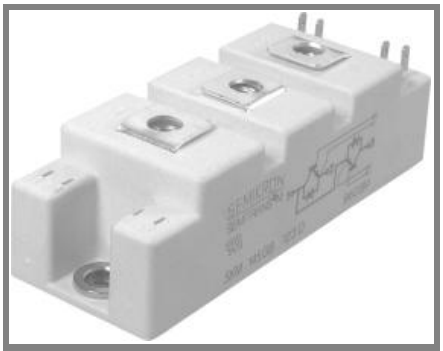
SKM 50GB123D ...



SEMITRANS® 2

IGBT Modules

SKM 50GB123D

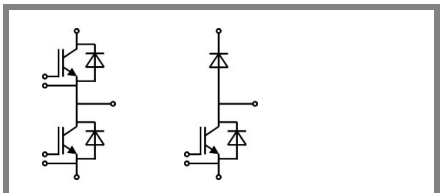
SKM 50GAL123D

Features

- MOS input (voltage controlled)
- Low inductance case
- Low tail current with low temperature dependence
- High short circuit capability, self limiting to $6xI_{CNOM}$
- Fast and soft CAL diodes
- Isolated copper base plate using DCB (Direct Copper Bonding Technology)

Typical Applications

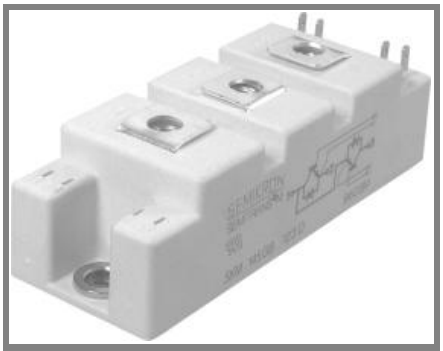
- AC inverter drives
- Power supplies



GB **GAL**

Absolute Maximum Ratings			T_c = 25 °C, unless otherwise specified	
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 150 °C	T_{case} = 25 °C	50	A
		T_{case} = 80 °C	40	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		100	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 600 V; $V_{GE} \leq$ 20 V; V_{CES} < 1200 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	50	A
		T_{case} = 80 °C	40	A
I_{FRM}	I_{FRM} = 2xI_{Fnom}		100	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	550	A
Freewheeling Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	50	A
		T_{case} = 80 °C	40	A
I_{FRM}	IFRM = 2xIFnom		100	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	550	A
Module				
$I_{t(RMS)}$			200	A
T_{vj}			- 40 ...+150	°C
T_{stg}			125	°C
V_{isol}	AC, 1 min.		2500	V

Characteristics			T_c = 25 °C, unless otherwise specified			
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
IGBT						
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 2 mA		4,5	5,5	6,5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}	T_j = 25 °C		0,1	0,3	mA
		T_j = 125 °C				mA
V_{CE0}		T_j = 25 °C		1	1,15	V
		T_j = 125 °C		0,9	1,05	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		30	37	mΩ
		T_j = 125°C		44	53	mΩ
$V_{CE(sat)}$	I_{Cnom} = 50 A, V_{GE} = 15 V	T_j = 25°C$_{chiplev.}$		2,5	3	V
		T_j = 125°C$_{chiplev.}$		3,1	3,7	V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		3,3		nF
C_{oes}				0,5		nF
C_{res}				0,2		nF
Q_G	V_{GE} = -8V - +20V			500		nC
R_{Gint}	T_j = °C			2,5		Ω
$t_{d(on)}$	R_{Gon} = 27 Ω	V_{CC} = 600V		70		ns
t_r		I_{Cnom}= 40A		60		ns
E_{on}		T_j = 125 °C		7		mJ
$t_{d(off)}$	R_{Goff} = 27 Ω			400		ns
t_f				45		ns
E_{off}				4,5		mJ
$R_{th(j-c)}$	per IGBT				0,4	K/W



SEMITRANS® 2

IGBT Modules

SKM 50GB123D

SKM 50GAL123D

Features

- MOS input (voltage controlled)
- Low inductance case
- Low tail current with low temperature dependence
- High short circuit capability, self limiting to $6xI_{CNOM}$
- Fast and soft CAL diodes
- Isolated copper base plate using DCB (Direct Copper Bonding Technology)

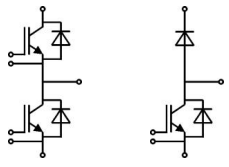
Typical Applications

- AC inverter drives
- Power supplies

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 50 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		2	2,5	V
		T_j = 125 °$C_{chiplev.}$		1,8		V
V_{F0}		T_j = 25 °C		1,1	1,2	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		18	26	mΩ
		T_j = 125 °C			22	mΩ
I_{RRM}	I_{Fnom} = 40 A	T_j = 125 °C		35		A
Q_{rr}	di/dt = 800 A/µs			7		µC
E_{rr}	V_{cc} = 600V			2		mJ
$R_{th(j-c)}$	per diode				0,7	K/W
Freewheeling Diode						
$V_F = V_{EC}$	I_{Fnom} = 50 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		2	2,5	V
		T_j = 125 °$C_{chiplev.}$		1,8		V
V_{F0}		T_j = 25 °C		1,1	1,2	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		18	26	V
		T_j = 125 °C				V
I_{RRM}	I_{Fnom} = 40 A	T_j = 125 °C		35		A
Q_{rr}	di/dt = 800 A/µs			7		µC
E_{rr}	V_{cc} = 600V			2		mJ
$R_{th(j-c)}$	per diode				0,7	K/W
Module						
L_{CE}					30	nH
$R_{CC'+EE'}$	res., terminal-chip	T_{case}= 25 °C		0,75		mΩ
		T_{case}= 125 °C		1		mΩ
$R_{th(c-s)}$	per module				0,05	K/W
M_s	to heat sink M6		3		5	Nm
M_t	to terminals M5		2,5		5	Nm
w					160	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.



GB **GAL**

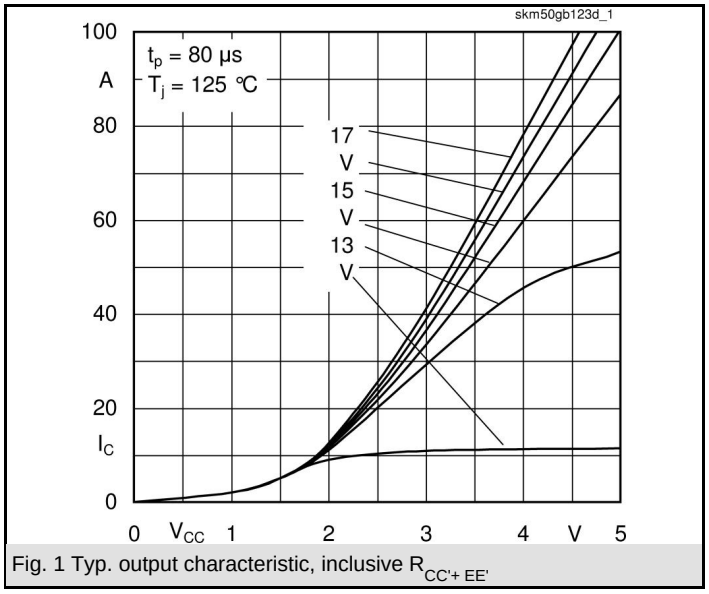


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

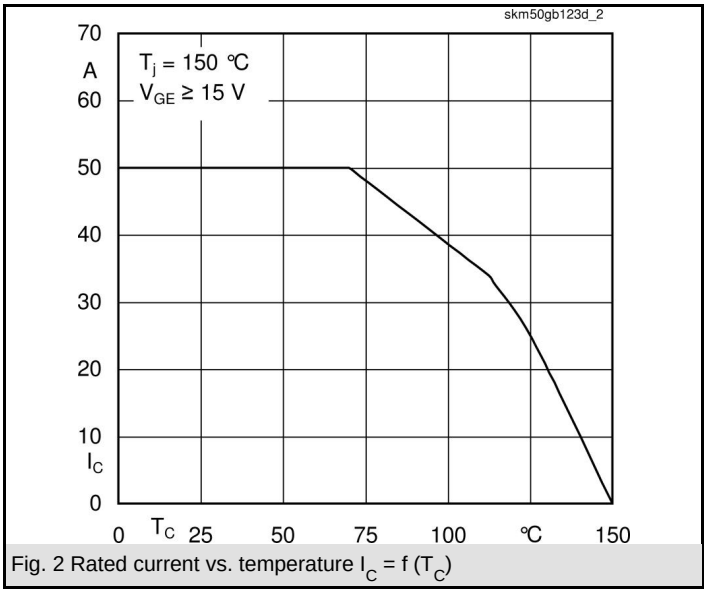


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

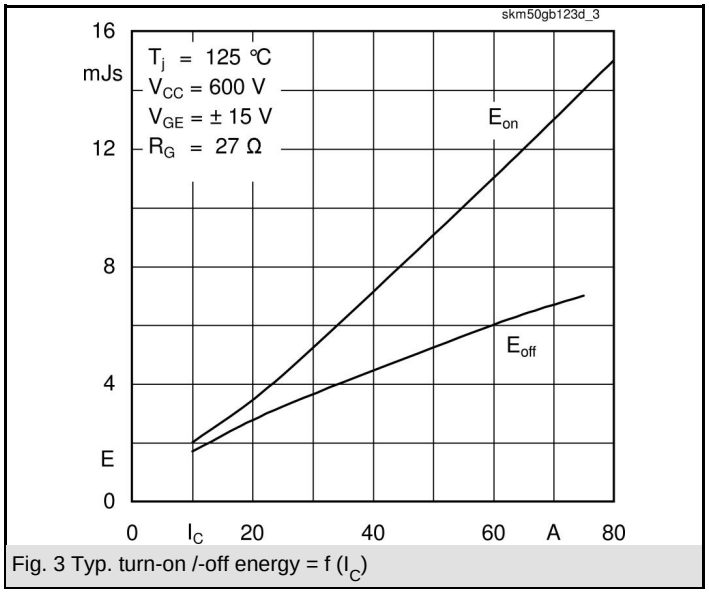


Fig. 3 Typ. turn-on /-off energy = f (I_C)

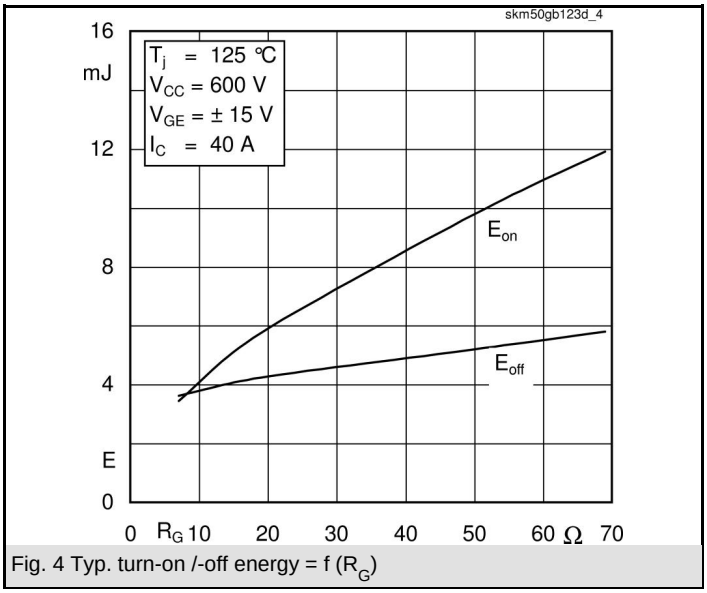


Fig. 4 Typ. turn-on /-off energy = f (R_G)

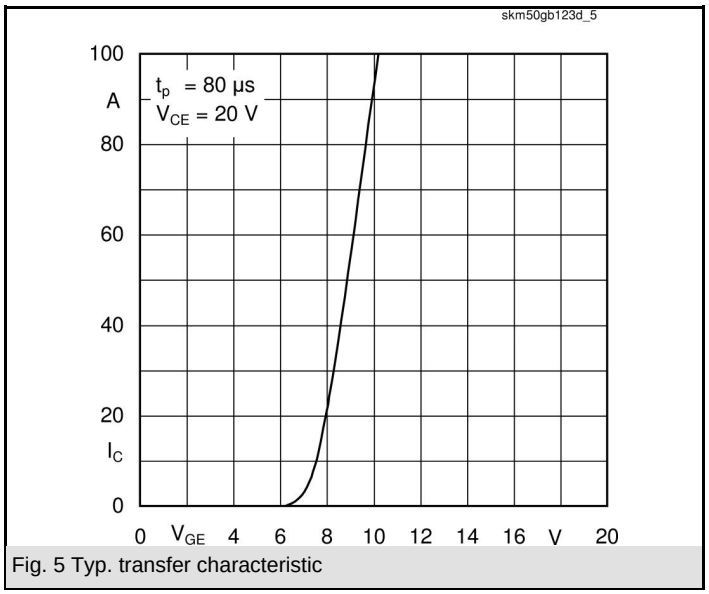


Fig. 5 Typ. transfer characteristic

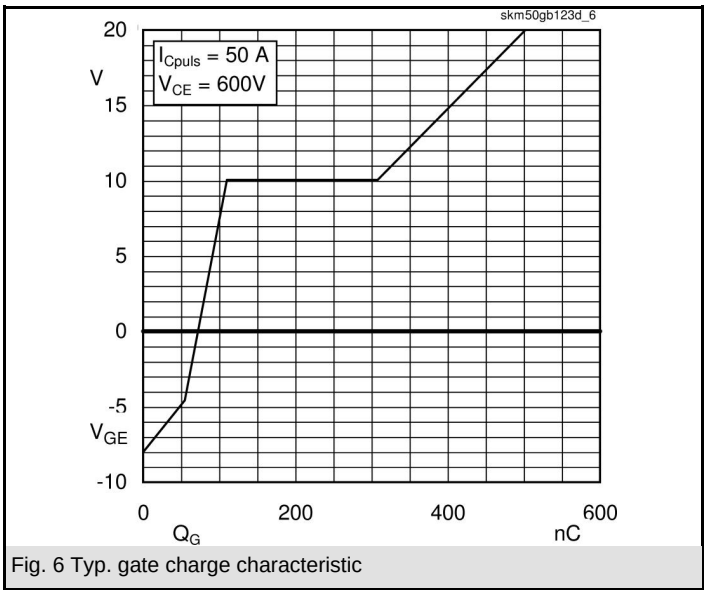


Fig. 6 Typ. gate charge characteristic

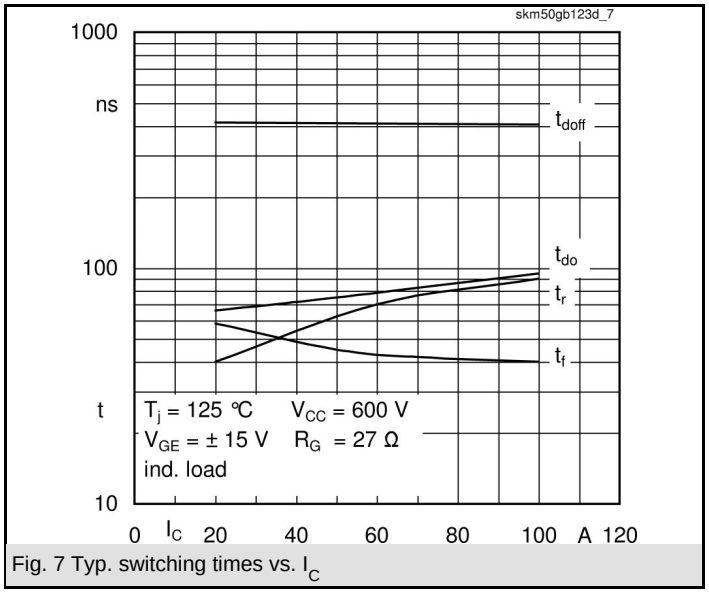


Fig. 7 Typ. switching times vs. I_C

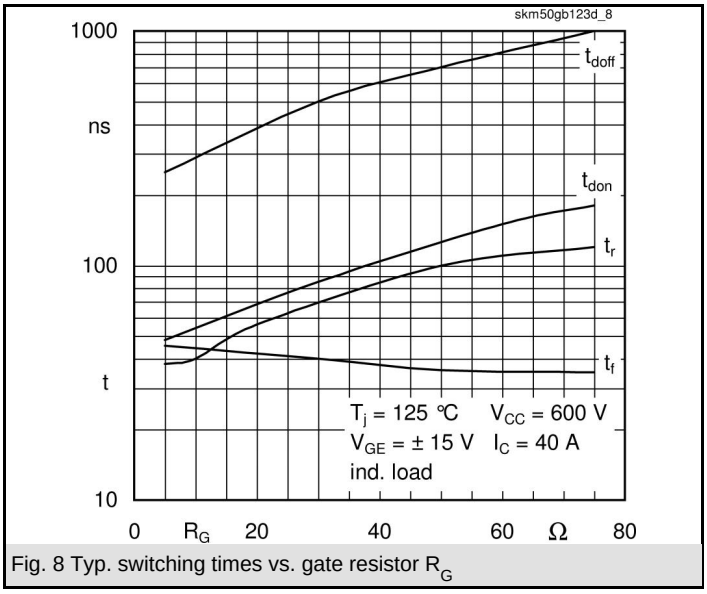


Fig. 8 Typ. switching times vs. gate resistor R_G

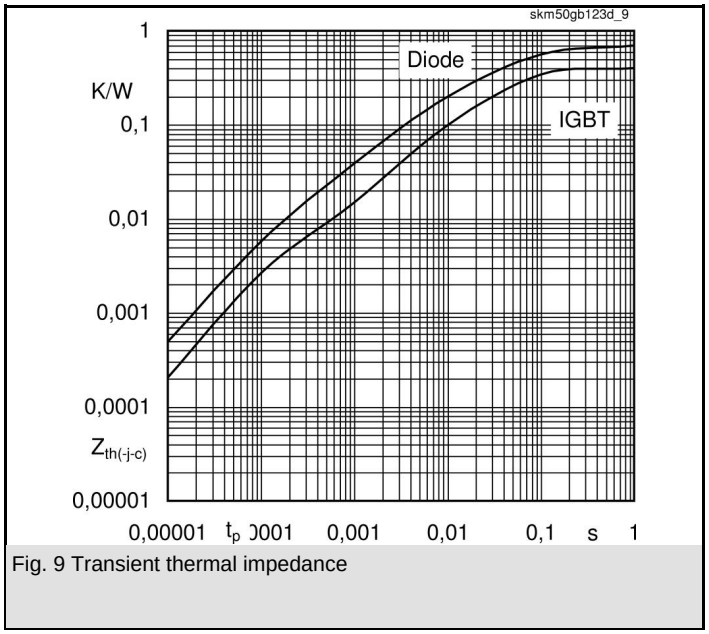


Fig. 9 Transient thermal impedance

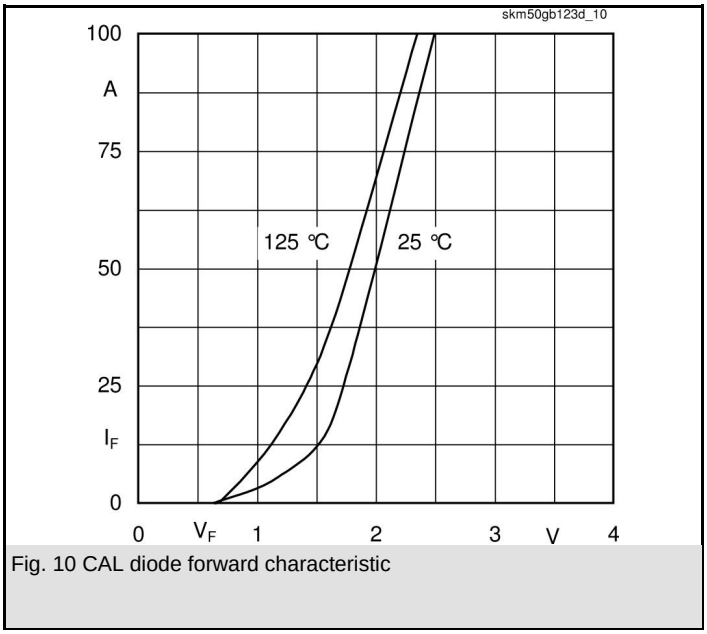


Fig. 10 CAL diode forward characteristic

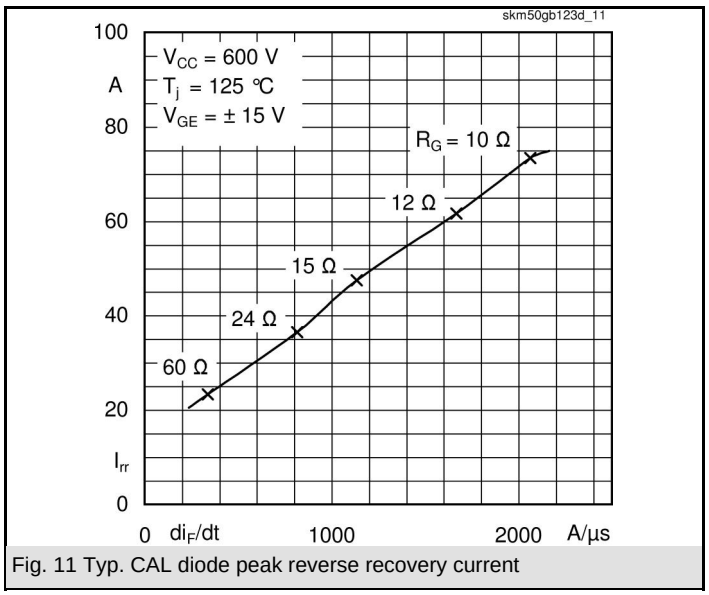


Fig. 11 Typ. CAL diode peak reverse recovery current

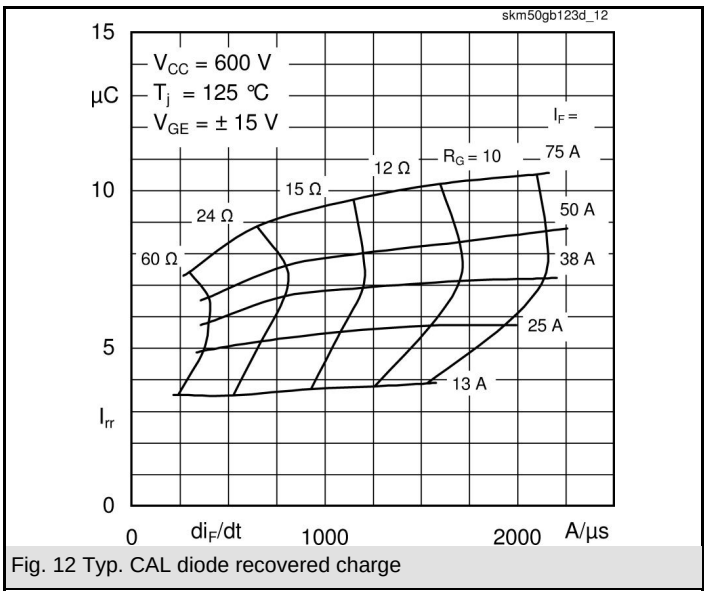


Fig. 12 Typ. CAL diode recovered charge

UL recognized File no. E 63 532

CASED61