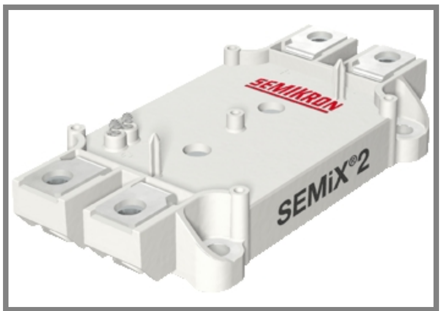
SEMiX 402GB066HDs



SEMiX®2s

Trench IGBT Modules

SEMiX 402GB066HDs

SEMiX 402GAL066HDs

SEMiX 402GAR066HDs

Preliminary Data

Features

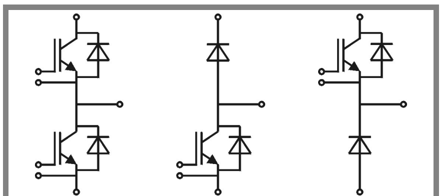
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient

Typical Applications

- Matrix Converter
- Resonant Inverter
- Current Source Inverter

Remarks

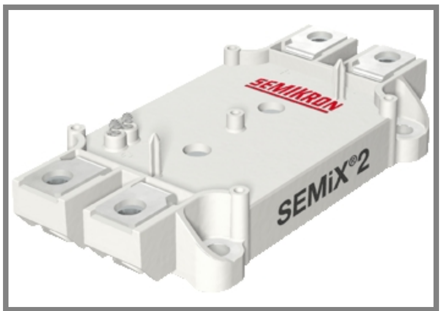
- Case temperatur limited to T_C=125°C max.
- Product reliability results are valid for T_j=150°C
- use of soft RG necessary
- take care of over-voltage caused by stray inductance



GB GAL GAR

Absolute Maximum Ratings	T_{case} = 25°C, unless otherwise specified			
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = 25 °C		600	V
I_C	T_j = 175 °C	T_c = 25 °C	530	A
		T_c = 80 °C	400	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		800	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 360 V; V_{GE} ≤ 15 V; VCES < 600 V	T_j = 150 °C	6	µs
Inverse Diode				
I_F	T_j = 175 °C	T_c = 25 °C	415	A
		T_c = 80 °C	300	A
I_{FRM}	I_{FRM} = 2xI_{Fnom}		800	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 25 °C	1800	A
Module				
$I_{t(RMS)}$			600	A
T_{vj}			- 40 ... + 175	°C
T_{stg}			- 40 ... + 125	°C
V_{isol}	AC, 1 min.		4000	V

Characteristics	T_{case} = 25°C, unless otherwise specified					
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
IGBT						
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 6,4 mA			5,8		V
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}	T_j = 25 °C			0,1	mA
V_{CE0}		T_j = 25 °C		0,9	1	V
		T_j = 150 °C		0,85	0,9	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		1,4	2,25	mΩ
		T_j = 150°C		2,15	3	mΩ
$V_{CE(sat)}$	I_{Cnom} = 400 A, V_{GE} = 15 V	T_j = 25°$C_{chiplev.}$		1,45	1,9	V
		T_j = 150°$C_{chiplev.}$		1,7	2,1	V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		25		nF
C_{oes}				1,5		nF
C_{res}				0,8		nF
Q_G	V_{GE} = -8 ... +15V			3200		nC
$t_{d(on)}$	R_{Gon} = 4,5 Ω	V_{CC} = 300V; I_{Cnom}= 400A; T_j = 150 °C		150		ns
t_r				125		ns
E_{on}				22		mJ
$t_{d(off)}$	R_{Goff} = 4,5 Ω			900		ns
t_f				65		ns
E_{off}				24		mJ
$R_{th(j-c)}$	per IGBT				0,11	K/W



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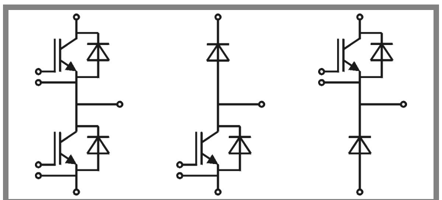


GB GAL GAR

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 400 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		1,4	1,6	V
		T_j = 150 °$C_{chiplev.}$		1,4	1,6	V
V_{F0}		T_j = 25 °C		1	1,1	V
		T_j = 150 °C		0,85	0,95	V
r_F		T_j = 25 °C		1	1,25	mΩ
		T_j = 150 °C		1,4	1,65	mΩ
I_{RRM}	I_{Fnom} = 400 A	T_j = 150 °C		250		A
Q_{rr}	di/dt = 3200 A/µs			47		µC
E_{off}	V_{GE} = -8 V; V_{CC} = 300 V			10		mJ
$R_{th(j-c)D}$	per diode				0,22	K/W
Module						
L_{CE}				18		nH
$R_{CC'+EE'}$	res., terminal-chip	T_{case}= 25 °C		0,7		mΩ
		T_{case}= 125 °C		1,05		mΩ
$R_{th(c-s)}$	per module			0,045		K/W
M_s	to heat sink (M5)		3		5	Nm
M_t	to terminals (M6)		2,5		5	Nm
w				290	250	g
Temperature sensor						
R_{100}	T_c=100°C (R_{25}=5 kΩ)			0,493±5%		kΩ
$B_{100/125}$	R(T)=R_{100}exp[$B_{100/125}$(1/T-1/T_{100})]; T[K]; B			3550±2%		K

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.

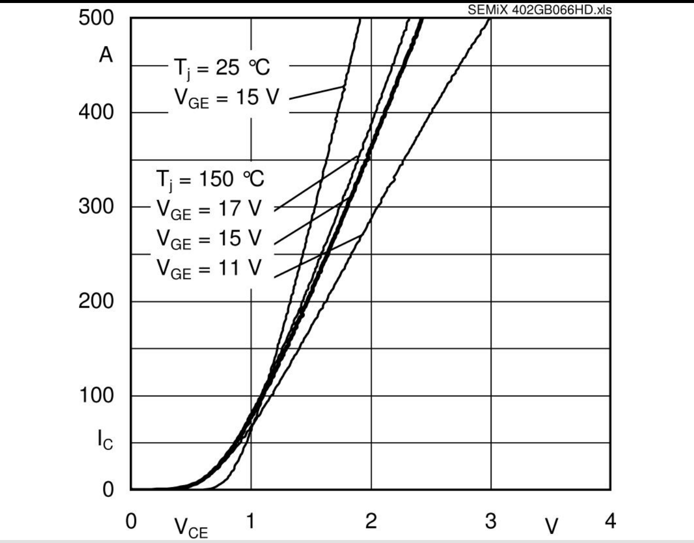


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

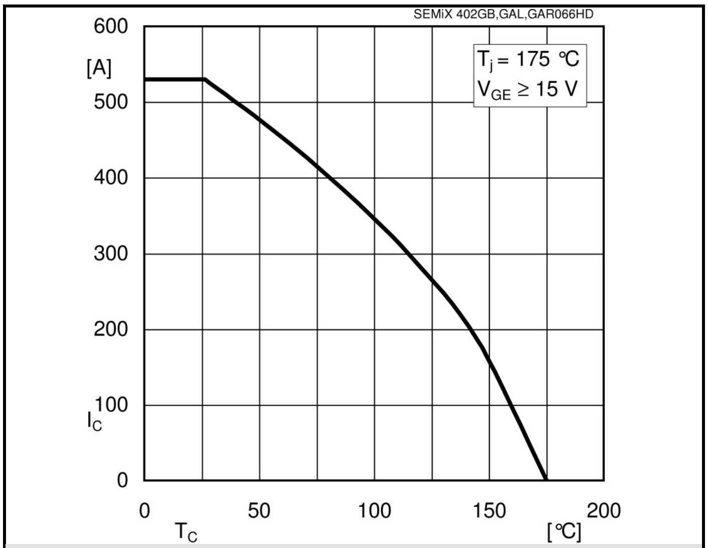


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

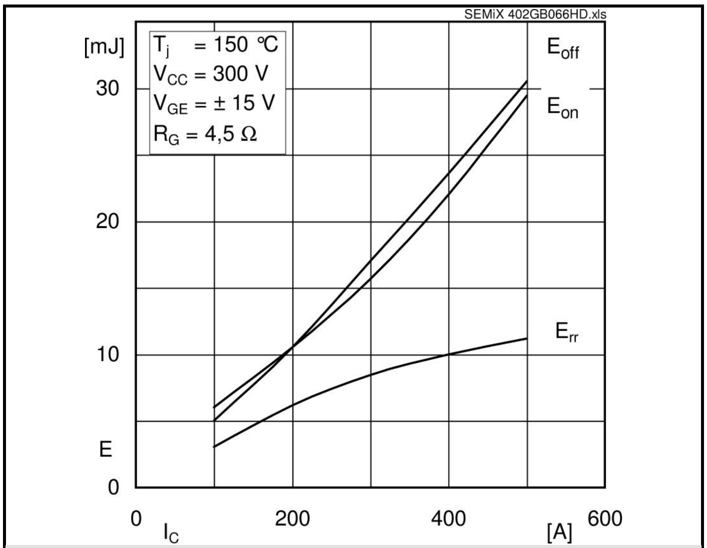


Fig. 3 Typ. turn-on /-off energy = f (I_C)

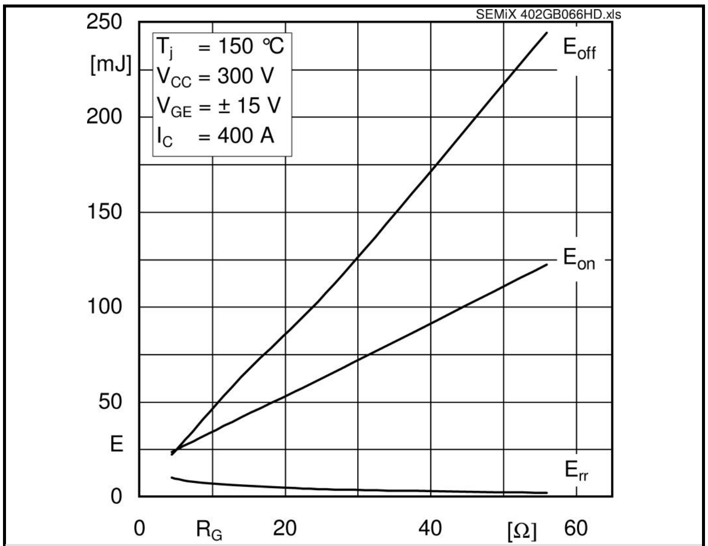


Fig. 4 Typ. turn-on /-off energy = f (R_G)

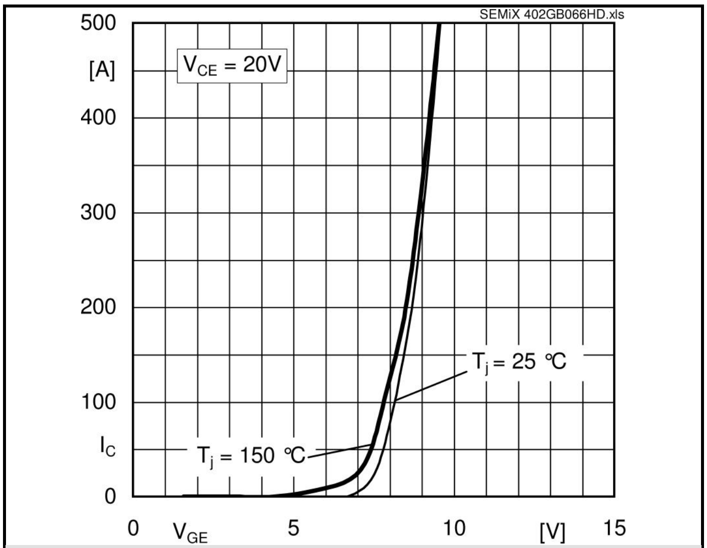


Fig. 5 Typ. transfer characteristic

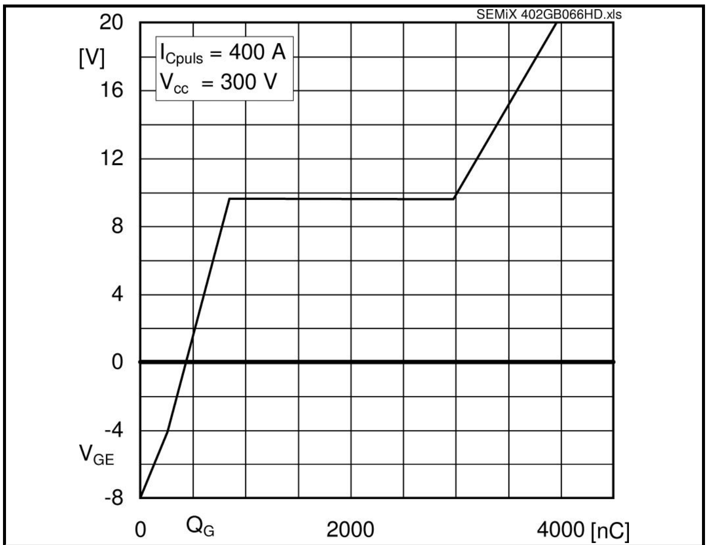


Fig. 6 Typ. gate charge characteristic

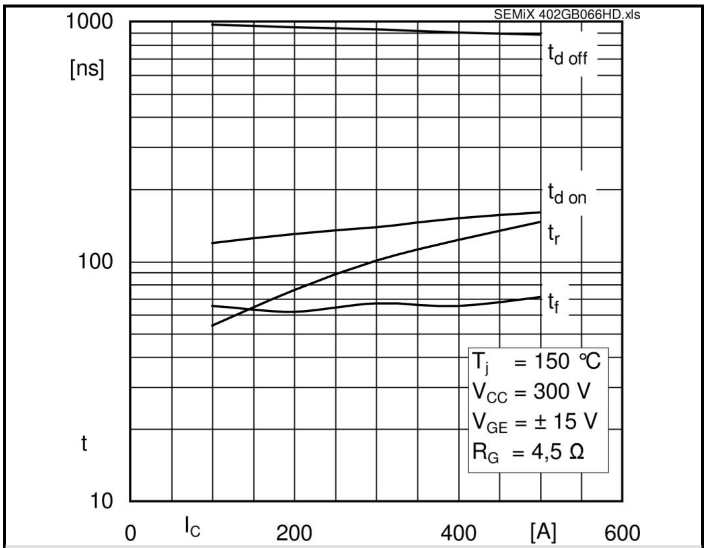


Fig. 7 Typ. switching times vs. I_C

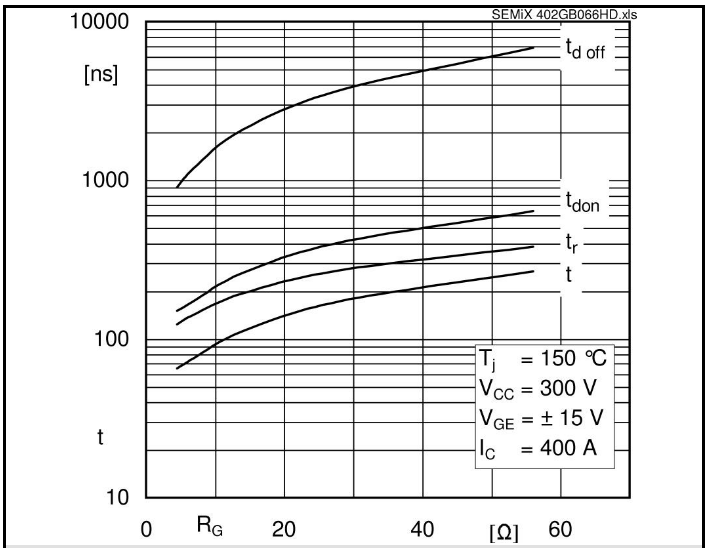


Fig. 8 Typ. switching times vs. gate resistor R_G

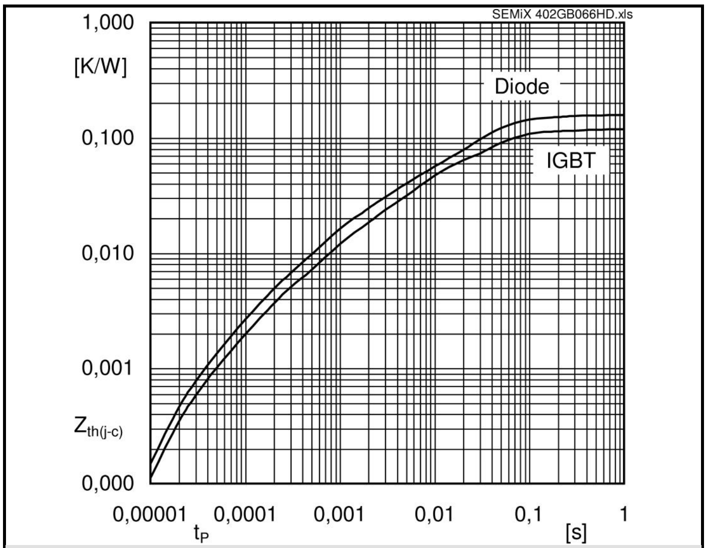


Fig. 9 Typ. transient thermal impedance

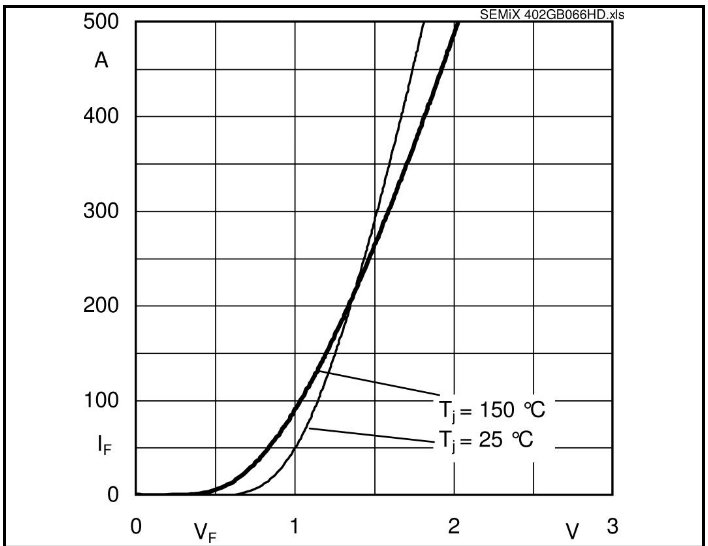


Fig. 10 Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

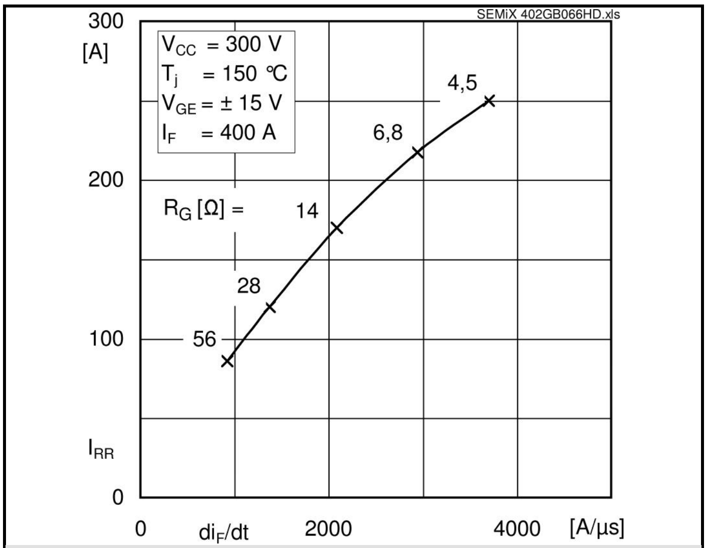


Fig. 11 Typ. CAL diode peak reverse recovery current

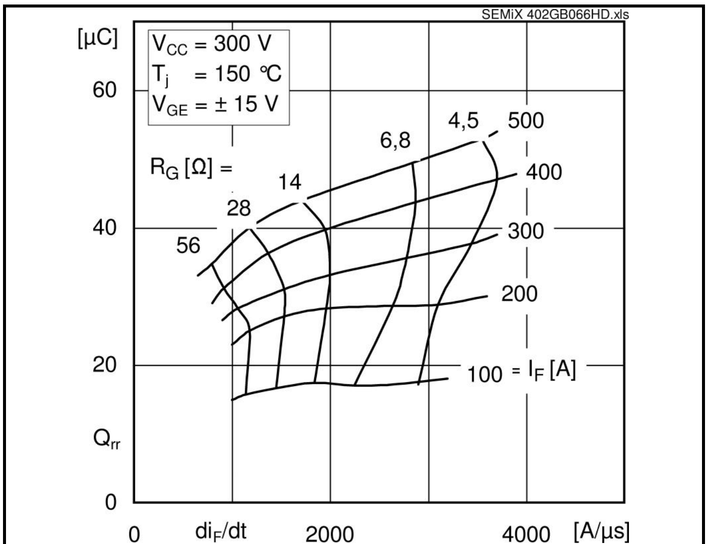
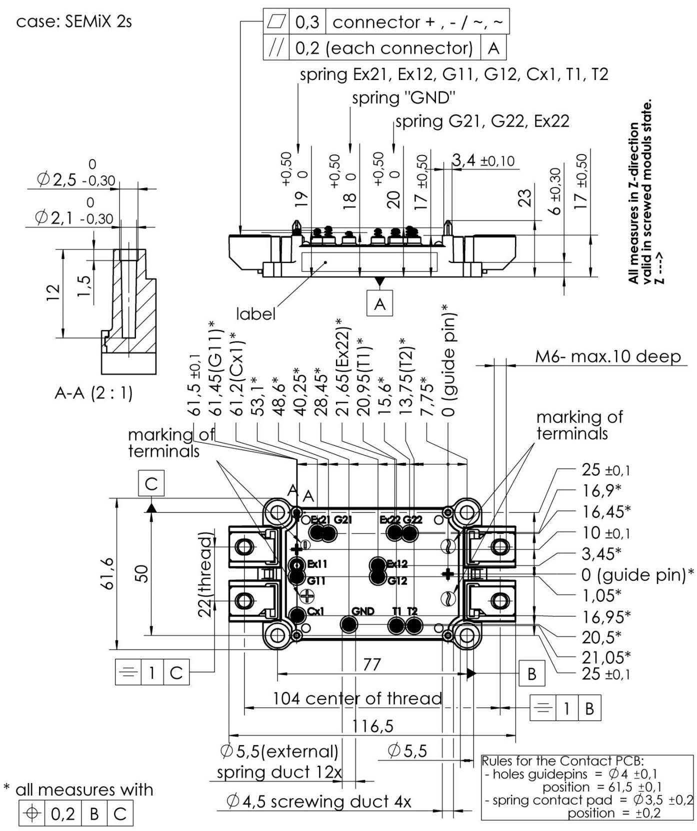


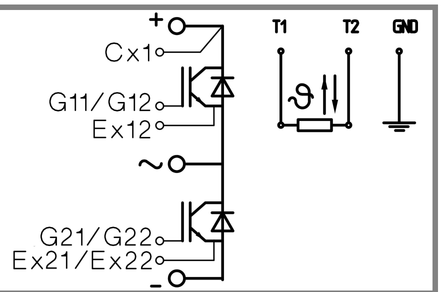
Fig. 12 Typ. CAL diode recovery charge

UL Recognized
File no. E 63 532

Dimensions in mm



Case SEMiX 2s



Pinout GB, GAL, GAR

