

SKM 300GB125D



SEMITRANS® 3

Ultra Fast IGBT Module

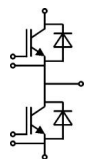
SKM 300GB125D

Features

- NPT - Non punch-through IGBT
- Low inductance case
- Short tail current with low temperature dependence
- High short circuit capability, self limiting
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology
- Large clearance (10 mm) and creepage distances (20 mm)

Typical Applications

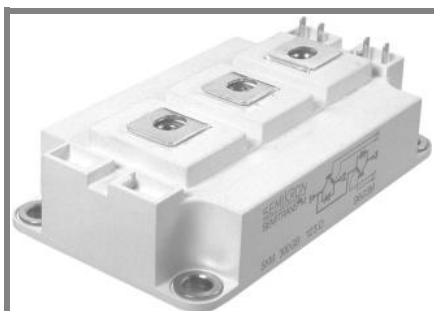
- Switched mode power supplies at $f_{sw} > 20$ kHz
- Resonant inverters up to 100 kHz
- Inductive heating
- UPS Uninterruptable power supplies at $f_{sw} > 20$ kHz
- Electronic welders at $f_{sw} > 20$ kHz



GB

Absolute Maximum Ratings		$T_c = 25\text{ }^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	Values		Units	
IGBT					
V_{CES}	$T_j = 25\text{ }^\circ\text{C}$	1200		V	
I_C	$T_j = 150\text{ }^\circ\text{C}$	$T_{case} = 25\text{ }^\circ\text{C}$	300		A
		$T_{case} = 80\text{ }^\circ\text{C}$	210		A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	400		A	
V_{GES}		± 20		V	
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ }^\circ\text{C}$ $V_{CES} < 1200\text{ V}$	10		μs	
Inverse Diode					
I_F	$T_j = 150\text{ }^\circ\text{C}$	$T_{case} = 25\text{ }^\circ\text{C}$	260		A
		$T_{case} = 80\text{ }^\circ\text{C}$	180		A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	400		A	
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150\text{ }^\circ\text{C}$	1800		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.	4000		V	

Characteristics		$T_c = 25\text{ }^\circ\text{C}$, unless otherwise specified				
Symbol	Conditions	min.	typ.	max.	Units	
IGBT						
$V_{GE(th)}$	$V_{GE} = V_{CE}; I_C = 8\text{ mA}$	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}		$T_j = 25\text{ }^\circ\text{C}$	1,5		1,75	V
		$T_j = 125\text{ }^\circ\text{C}$	1,7			V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ }^\circ\text{C}$	9		10,5	$\text{m}\Omega$
		$T_j = 125\text{ }^\circ\text{C}$	11,5			$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 200\text{ A}; V_{GE} = 15\text{ V}$	$T_j = \text{ }^\circ\text{C}_{chiplev.}$	3,3	3,85	V	
C_{ies}	$V_{CE} = 25; V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	18		24	nF
C_{oes}			2,5		3,2	nF
C_{res}			1		1,3	nF
Q_G	$V_{GE} = 0\text{ V} - +20\text{ V}$		2000		nC	
R_{Gint}	$T_j = \text{ }^\circ\text{C}$		2,5		Ω	
$t_{d(on)}$	$R_{Gon} = 3\text{ }\Omega$	$V_{CC} = 600\text{ V}$ $I_C = 200\text{ A}$	130		ns	
t_r			40		ns	
E_{on}			16		mJ	
$t_{d(off)}$	$R_{Goff} = 3\text{ }\Omega$	$T_j = 125\text{ }^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$	460		ns	
t_f			30		ns	
E_{off}					mJ	
$R_{th(j-c)}$	per IGBT		0,075		K/W	



SEMITRANS® 3

Ultra Fast IGBT Module

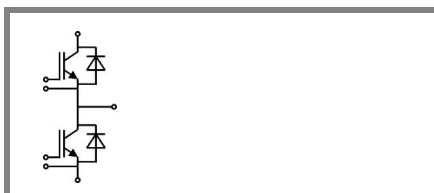
SKM 300GB125D

Features

- NPT - Non punch-through IGBT
- Low inductance case
- Short tail current with low temperature dependence
- High short circuit capability, self limiting
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology
- Large clearance (10 mm) and creepage distances (20 mm)

Typical Applications

- Switched mode power supplies at $f_{sw} > 20$ kHz
- Resonant inverters up to 100 kHz
- Inductive heating
- UPS Uninterruptable power supplies at $f_{sw} > 20$ kHz
- Electronic welders at $f_{sw} > 20$ kHz



GB

Characteristics			min.	typ.	max.	Units
Symbol	Conditions					
Inverse Diode						
$V_F = V_{EC}$	$I_{Fnom} = 200$ 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		4,5	6,5	mΩ
		$T_j = 125$ °C				mΩ
I_{RRM}	$I_F = 200$ A	$T_j = 125$ °C		340		A
Q_{rr}	$di/dt = 8000$ A/μs			46		μC
E_{rr}	$V_{GE} = 0$ V; $V_{CC} = 600$ V					mJ
$R_{th(j-c)D}$	per diode				0,18	K/W
Module						
L_{CE}				15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25$ °C		0,35		mΩ
		$T_{case} = 125$ °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.

SKM 300GB125D



SEMITRANS® 3

Ultra Fast IGBT Module

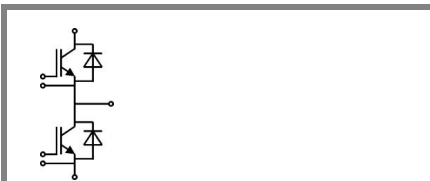
SKM 300GB125D

Features

- NPT - Non punch-through IGBT
- Low inductance case
- Short tail current with low temperature dependence
- High short circuit capability, self limiting
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology
- Large clearance (10 mm) and creepage distances (20 mm)

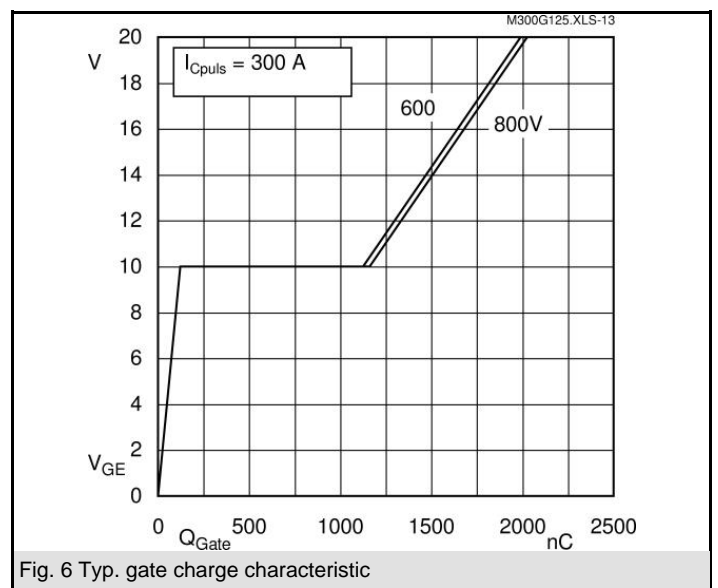
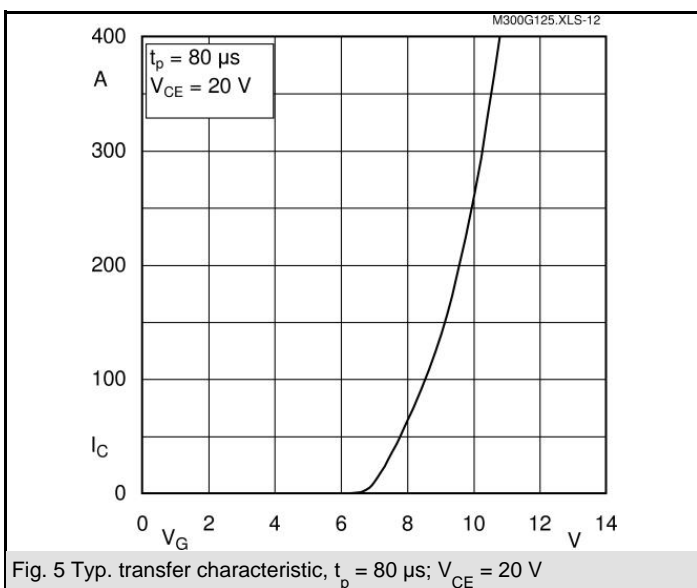
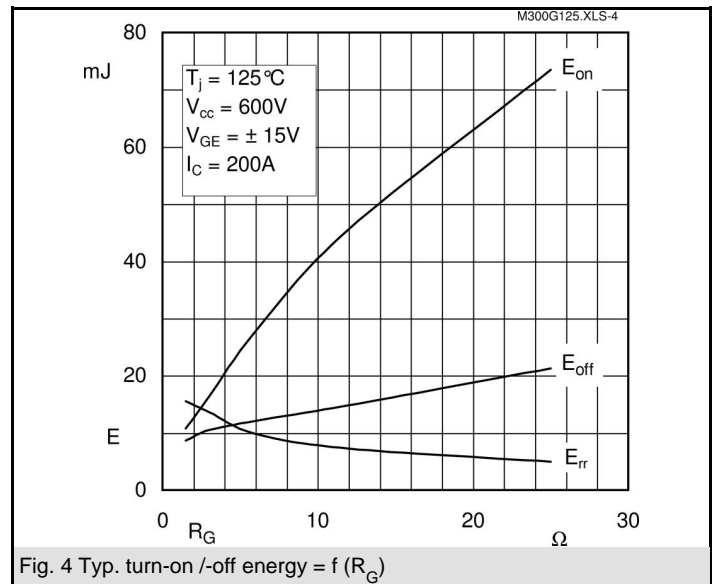
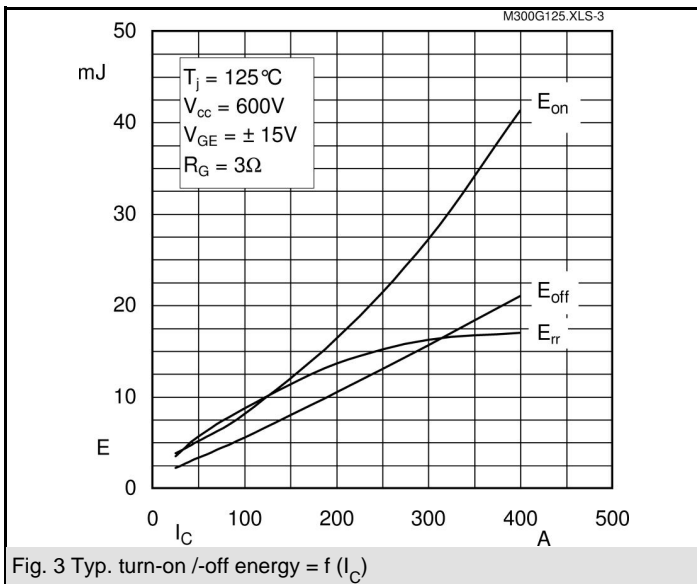
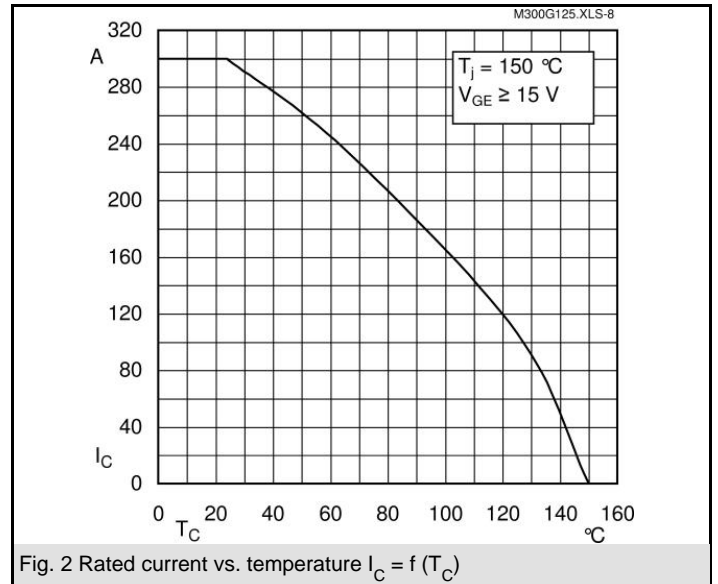
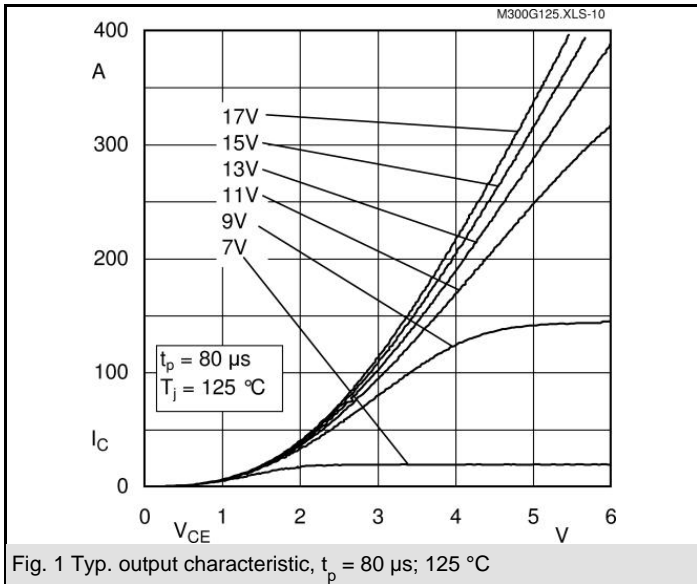
Typical Applications

- Switched mode power supplies at $f_{sw} > 20$ kHz
- Resonant inverters up to 100 kHz
- Inductive heating
- UPS Uninterruptable power supplies at $f_{sw} > 20$ kHz
- Electronic welders at $f_{sw} > 20$ kHz



GB

Z_{th}		Conditions	Values	Units
$Z_{th(j-c)I}$				
$R_{\theta j-c}$	$i = 1$		53	mk/W
$R_{\theta j-c}$	$i = 2$		18,5	mk/W
$R_{\theta j-c}$	$i = 3$		3,1	mk/W
$R_{\theta j-c}$	$i = 4$		4	mk/W
$\tau_{th(j-c)}$	$i = 1$		0,04	s
$\tau_{th(j-c)}$	$i = 2$		0,0189	s
$\tau_{th(j-c)}$	$i = 3$		0,0017	s
$\tau_{th(j-c)}$	$i = 4$		0,003	s
$Z_{th(j-c)D}$				
$R_{\theta j-c}$	$i = 1$		115	mk/W
$R_{\theta j-c}$	$i = 2$		52	mk/W
$R_{\theta j-c}$	$i = 3$		11	mk/W
$R_{\theta j-c}$	$i = 4$		2	mk/W
$\tau_{th(j-c)}$	$i = 1$		0,0366	s
$\tau_{th(j-c)}$	$i = 2$		0,0113	s
$\tau_{th(j-c)}$	$i = 3$		0,003	s
$\tau_{th(j-c)}$	$i = 4$		0,0002	s



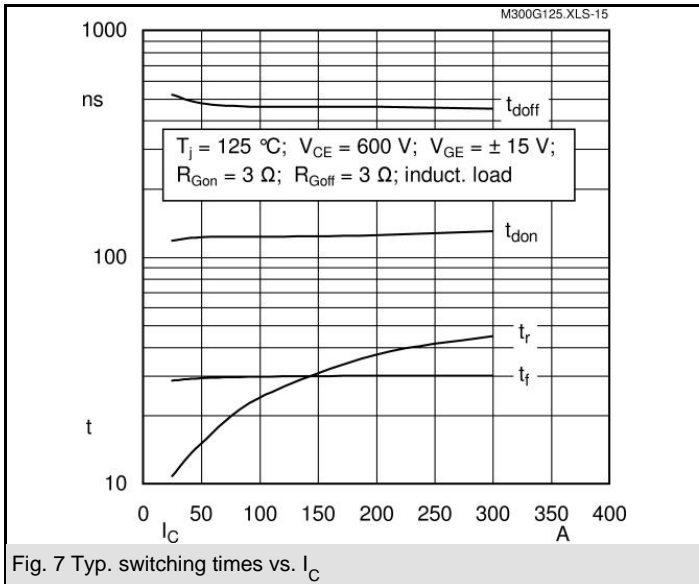


Fig. 7 Typ. switching times vs. I_C

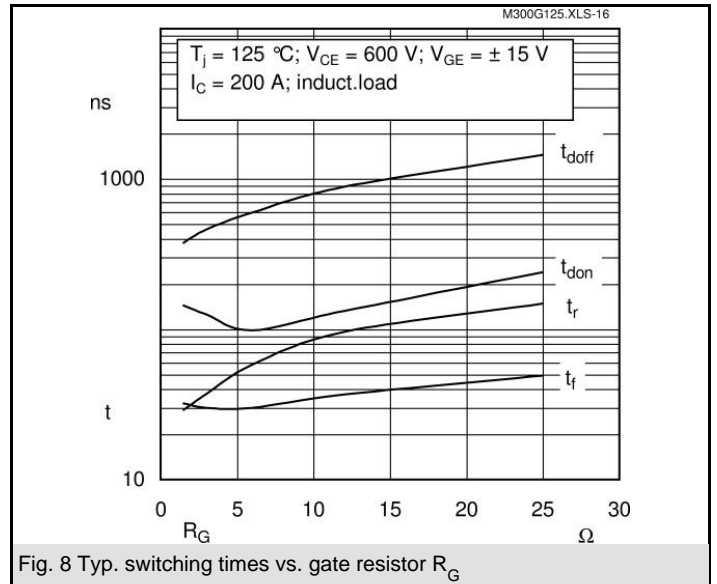


Fig. 8 Typ. switching times vs. gate resistor R_G

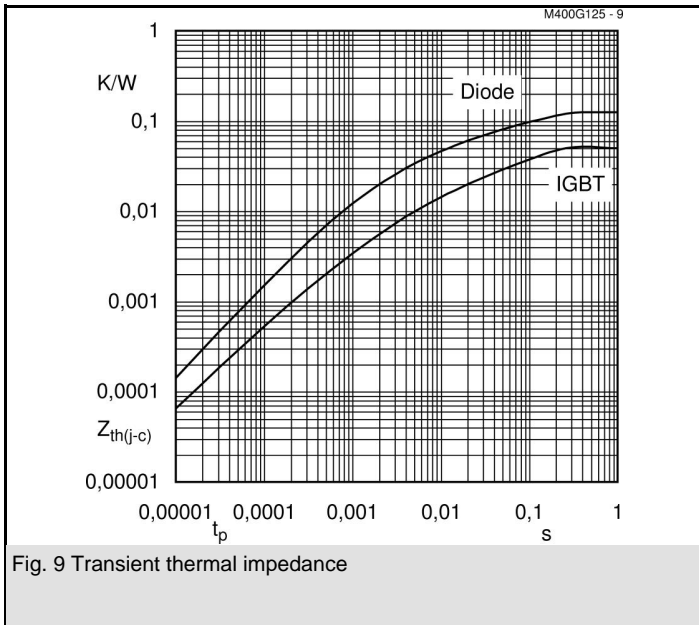


Fig. 9 Transient thermal impedance

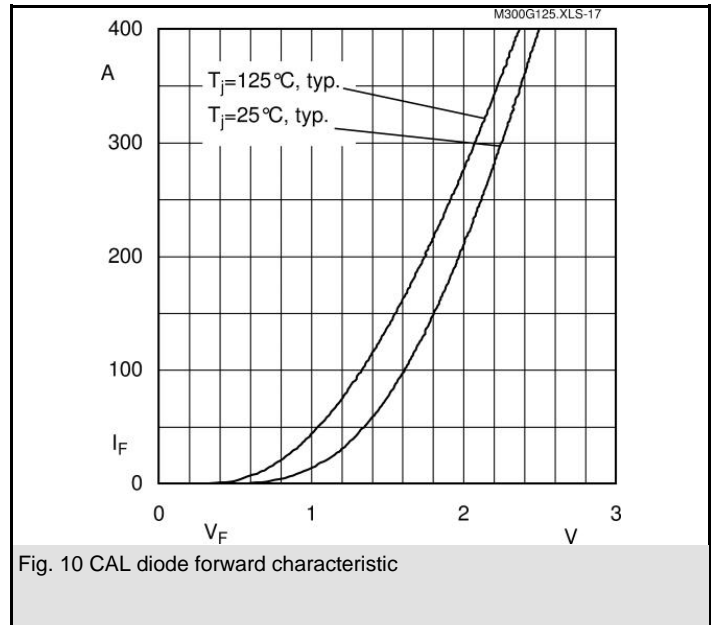


Fig. 10 CAL diode forward characteristic

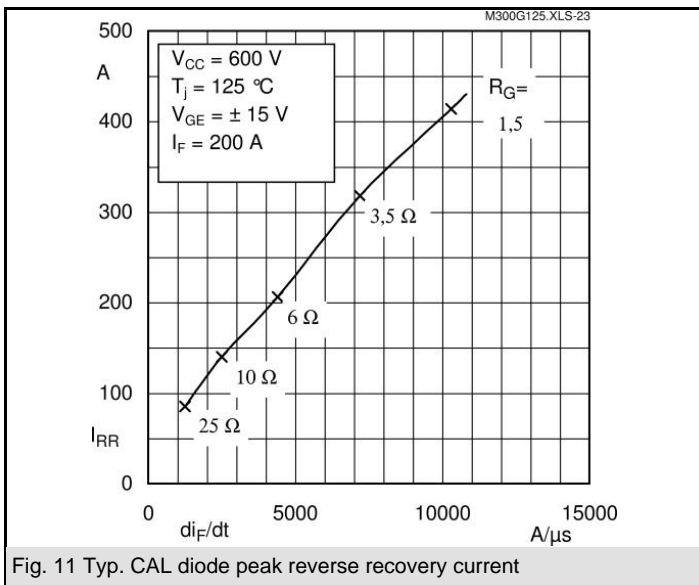


Fig. 11 Typ. CAL diode peak reverse recovery current

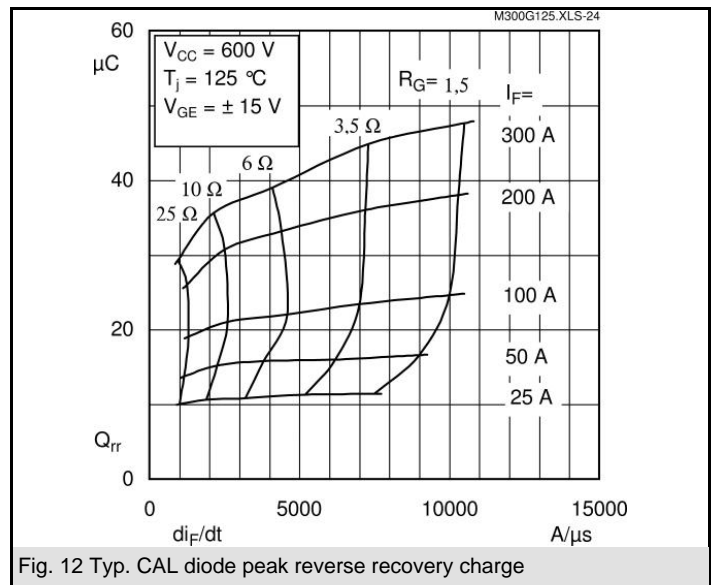


Fig. 12 Typ. CAL diode peak reverse recovery charge

SKM 300GB125D

UL Recognized

CASED56

File 63 532



Case D 56



GB

Case D 56