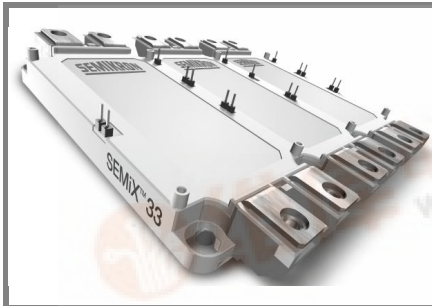


SEMIX 653GD176HDC



SEMIX® 33c

Trench IGBT Modules

SEMIX 653GD176HDC

Preliminary Data

Features

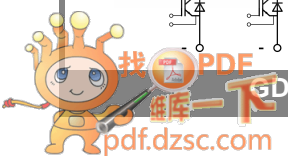
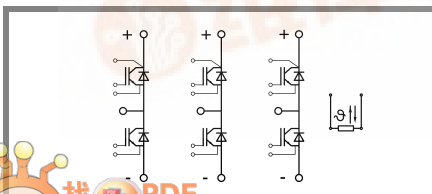
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability

Typical Applications

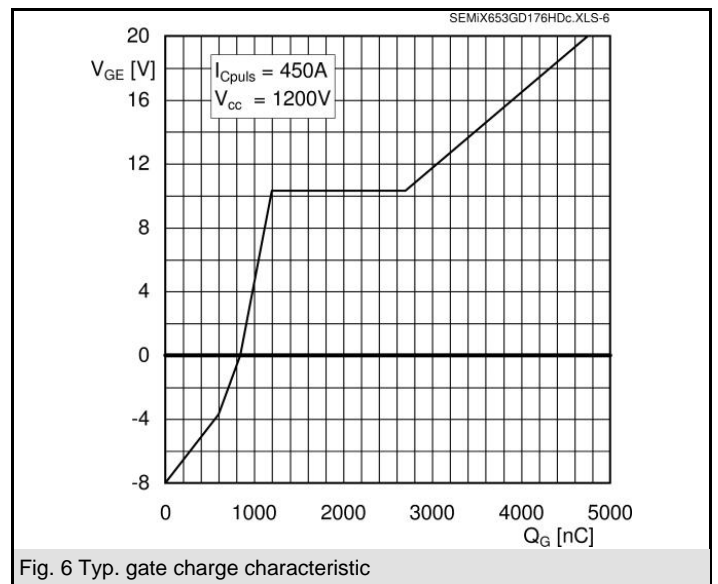
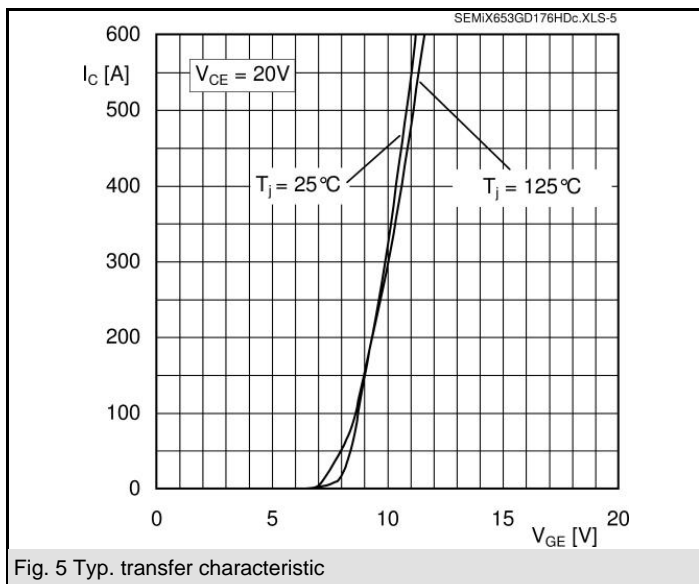
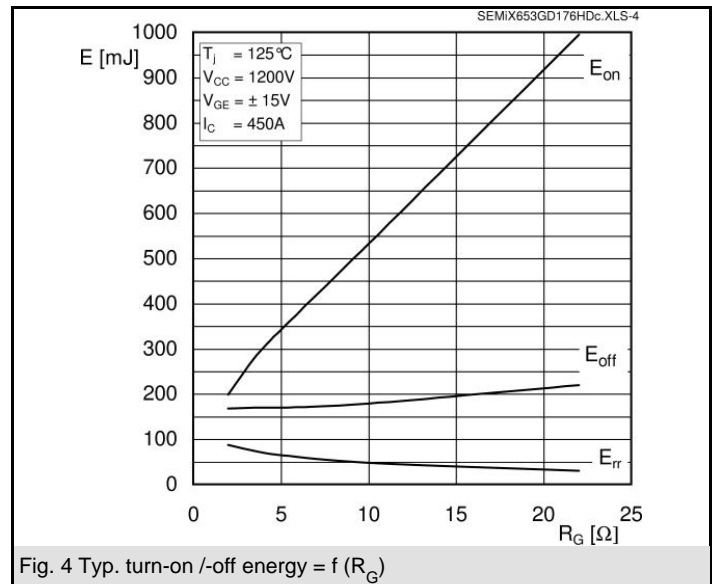
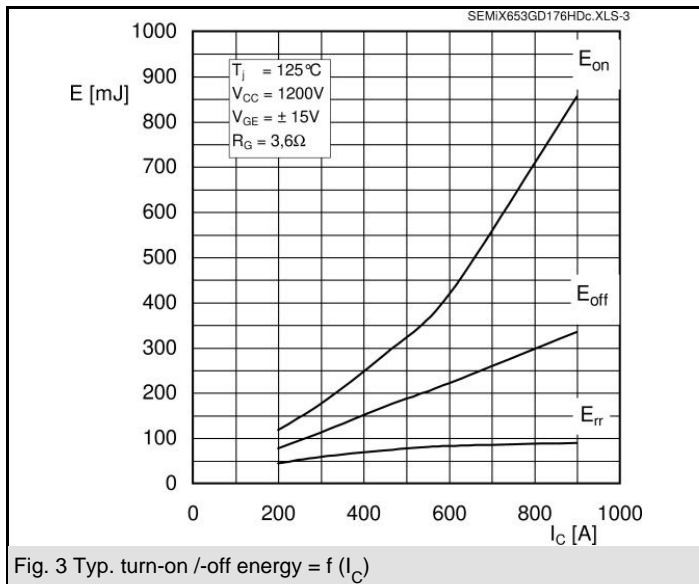
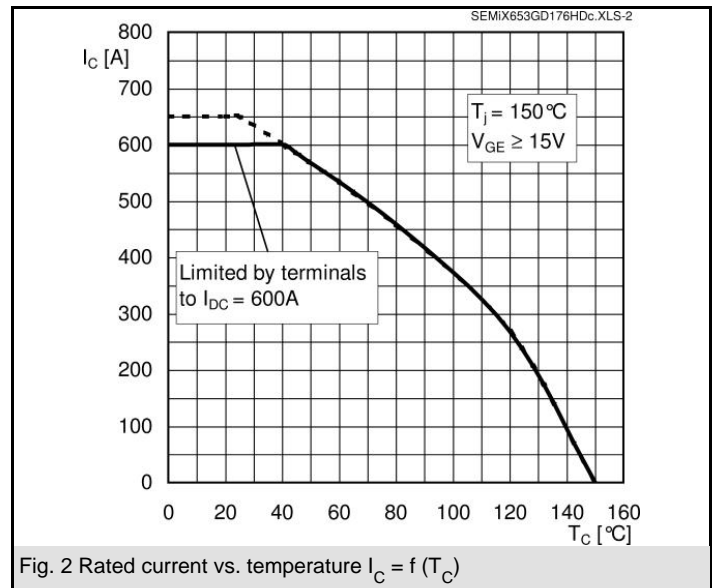
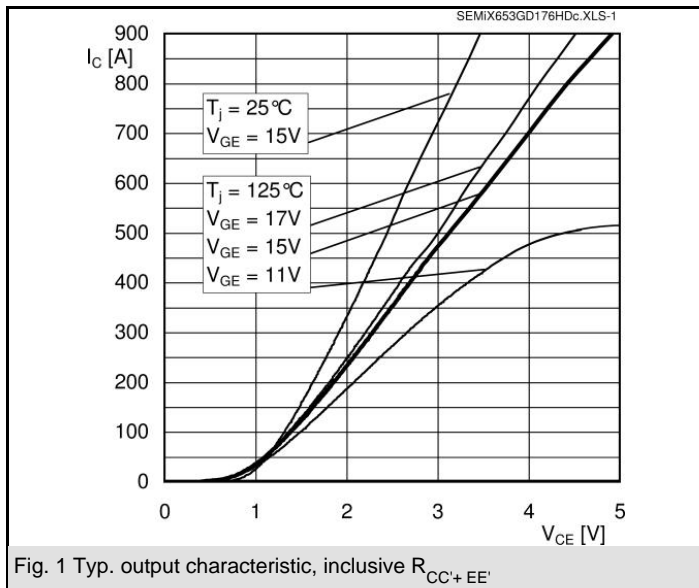
- Matrix Converter
- Resonant Inverter
- Current Source Inverter

Absolute Maximum Ratings		$T_{case} = 25^{\circ}C$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}		1700		V
I_C	$T_c = 25 (80)^{\circ}C$	650 (460)		A
I_{CRM}	$t_p = 1 ms$	900		A
V_{GES}		± 20		V
$T_{vj}, (T_{stg})$	$T_{OPERATION} \leq T_{stg}$	- 40 ... + 150 (125)		$^{\circ}C$
V_{isol}	AC, 1 min.	4000		V
Inverse diode				
I_F	$T_c = 25 (80)^{\circ}C$	500 (340)		A
I_{FRM}	$t_p = 1 ms$	900		A
I_{FSM}	$t_p = 10 ms; sin.; T_j = 150^{\circ}C$	2900		A

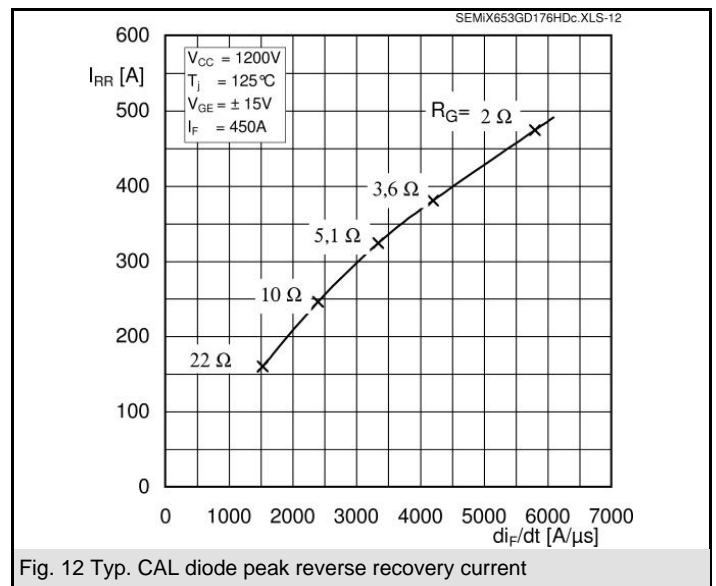
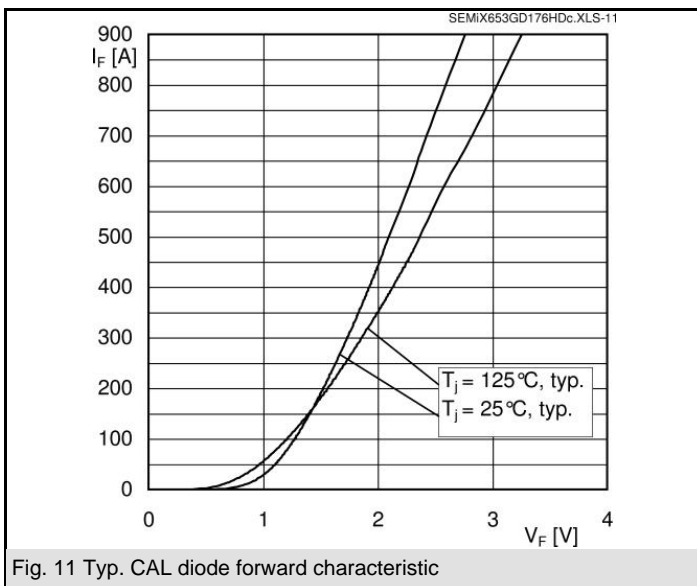
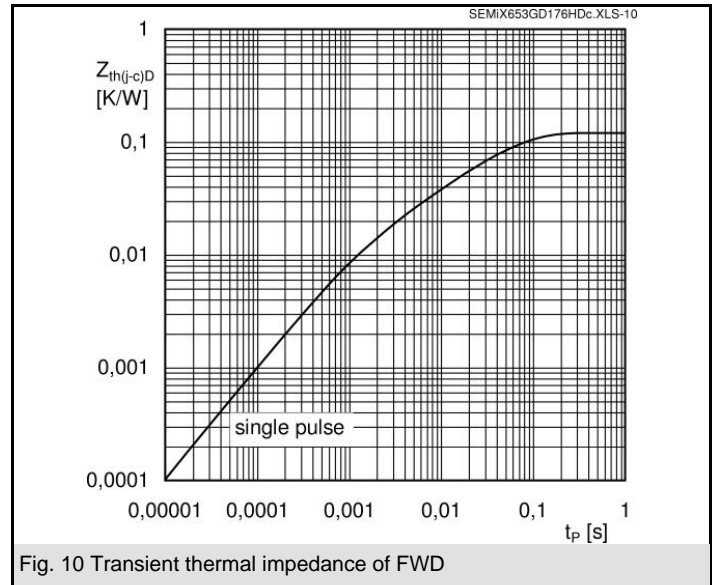
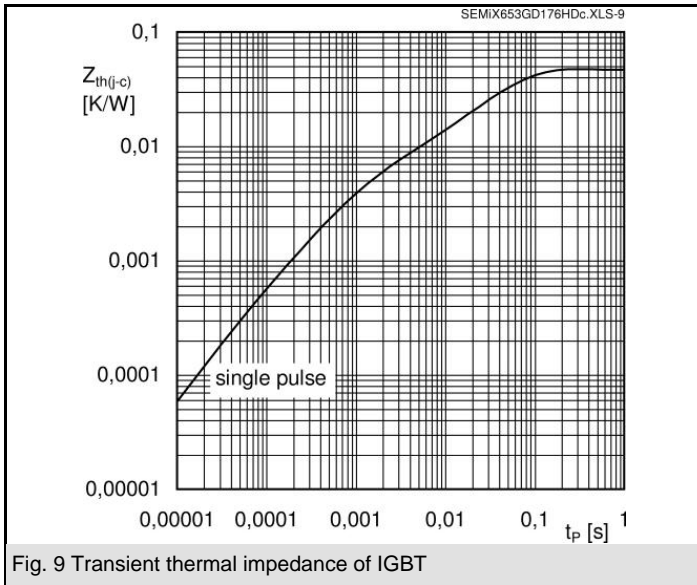
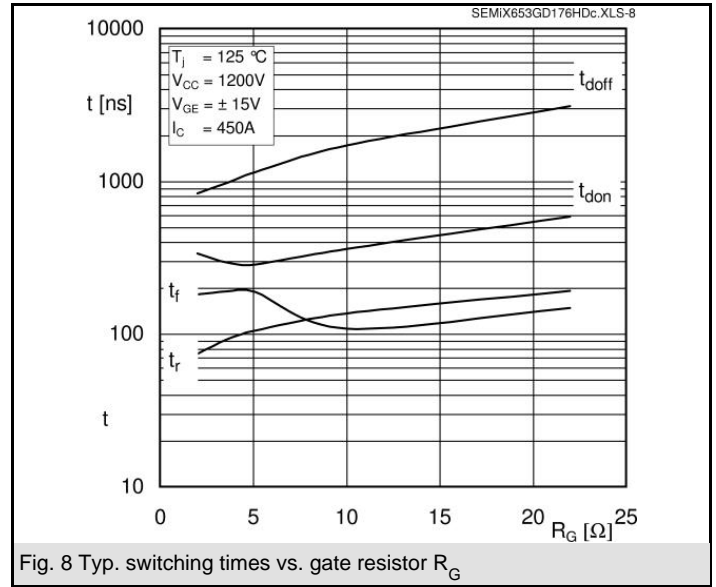
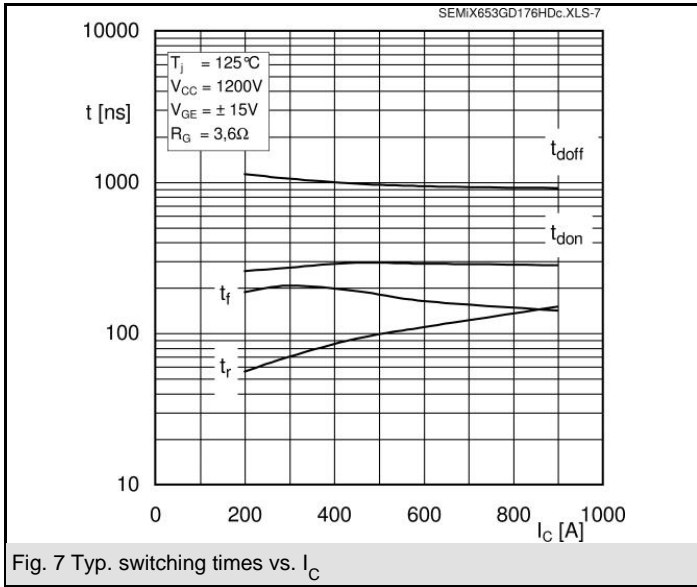
Characteristics		$T_{case} = 25^{\circ}C$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 18 mA$	5,2	5,8	6,4	V
I_{CES}	$V_{GE} = 0, V_{CE} = V_{CES}, T_j = 25 (^{\circ})^{\circ}C$			0,45	mA
$V_{CE(TO)}$	$T_j = 25 (125)^{\circ}C$		1 (0,9)	1,2 (1,1)	V
r_{CE}	$V_{GE} = 0 V, T_j = 25 (125)^{\circ}C$		2,2 (3,4)	2,8 (4)	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 450 A, V_{GE} = 15 V,$ $T_j = 25 (125)^{\circ}C, chip level$		2 (2,45)	2,45 (2,9)	V
C_{ies}	under following conditions		40		nF
C_{oes}	$V_{GE} = 0, V_{CE} = 25 V, f = 1 MHz$		1,7		nF
C_{res}			1,3		nF
L_{CE}			20		nH
$R_{CC+EE'}$	terminal-chip, $T_c = 25 (125)^{\circ}C$		0,7 (1)		m Ω
$t_{d(on)}/t_r$	$V_{CC} = 1200 V, I_{Cnom} = 450 A$		290 / 90		ns
$t_{d(off)}/t_f$	$V_{GE} = \pm 15 V$		975 / 190		ns
$E_{on} (E_{off})$	$R_{Gon} = R_{Goff} = 3,6 \Omega, T_j = 125^{\circ}C$		285 (170)		mJ
Inverse diode					
$V_F = V_{EC}$	$I_{Fnom} = 450 A; V_{GE} = 0 V; T_j = 25 (125)^{\circ}C, chip level$		1,7 (1,8)	2 (2,1)	V
$V_{(TO)}$	$T_j = 25 (125)^{\circ}C$		1,1 (0,9)	1,3 (1,1)	V
r_T	$T_j = 25 (125)^{\circ}C$		1,3 (2)	1,6 (2,2)	m Ω
I_{RRM}	$I_{Fnom} = 450 A; T_j = 25 (125)^{\circ}C$		(380)		A
Q_{rr}	$di/dt = 4200 A/\mu s$		(130)		μC
E_{rr}	$V_{GE} = -15 V$		(73)		mJ
Thermal characteristics					
$R_{th(j-c)}$	per IGBT			0,05	K/W
$R_{th(j-c)D}$	per Inverse Diode			0,11	K/W
$R_{th(j-c)FD}$	per FWD				K/W
$R_{th(c-s)}$	per module		0,014		K/W
Temperature sensor					
R_{25}	$T_c = 25^{\circ}C$		5 \pm 5%		k Ω
$B_{25/85}$	$R_2 = R_1 \exp[B(1/T_2 - 1/T_1)]; T[K]; B$		3420		K
Mechanical data					
M_s/M_t	to heatsink (M5) / for terminals (M6)	3/2,5		5 / 5	Nm
w			882		g



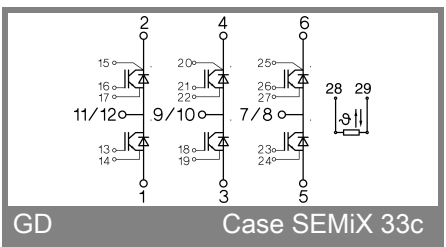
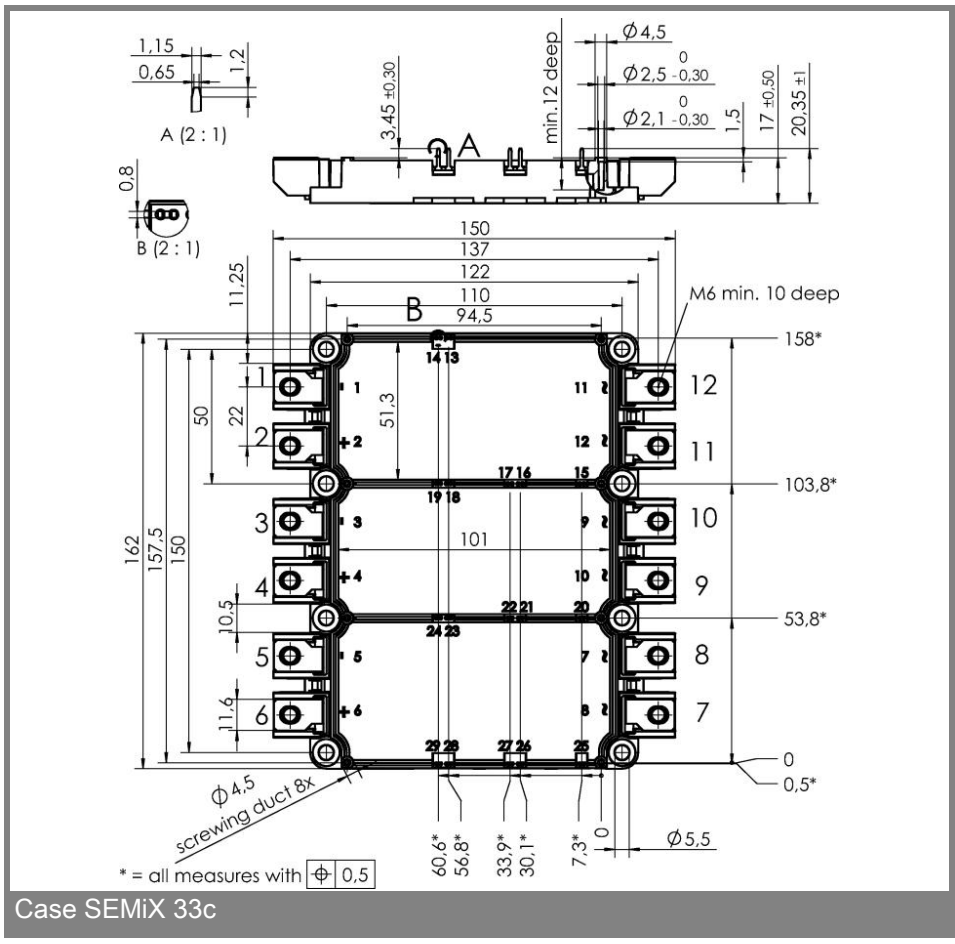
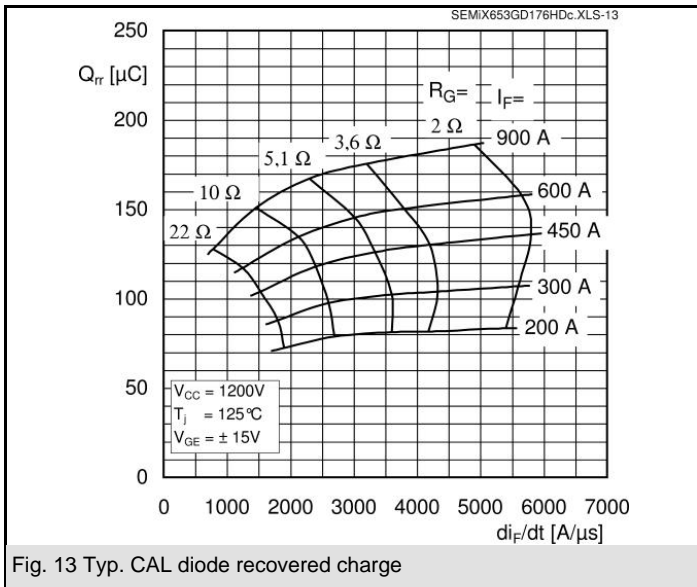
SEMiX 653GD176HDc



SEMiX 653GD176HDc



SEMiX 653GD176HDc



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

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