

# SEMiX 353GB176HDs



SEMiX<sup>®</sup> 3s

## Trench IGBT Modules

### SEMiX 353GB176HDs

#### Preliminary Data

#### Features

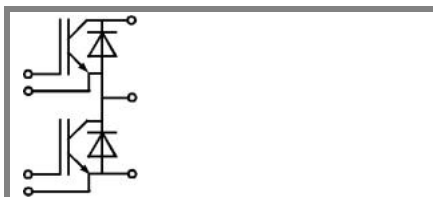
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$  with positive temperature coefficient
- High short circuit capability

#### Typical Applications

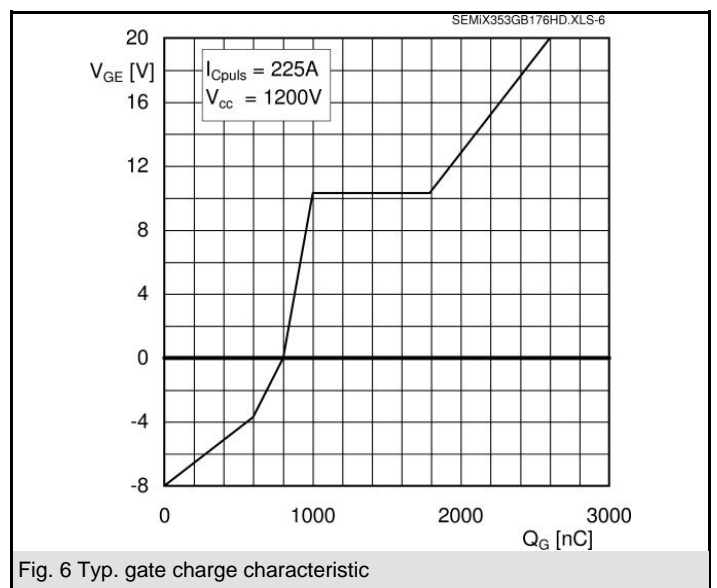
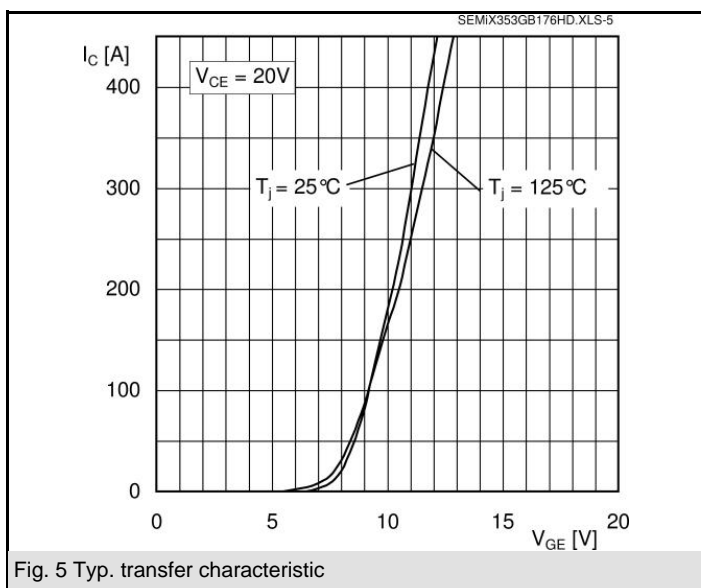
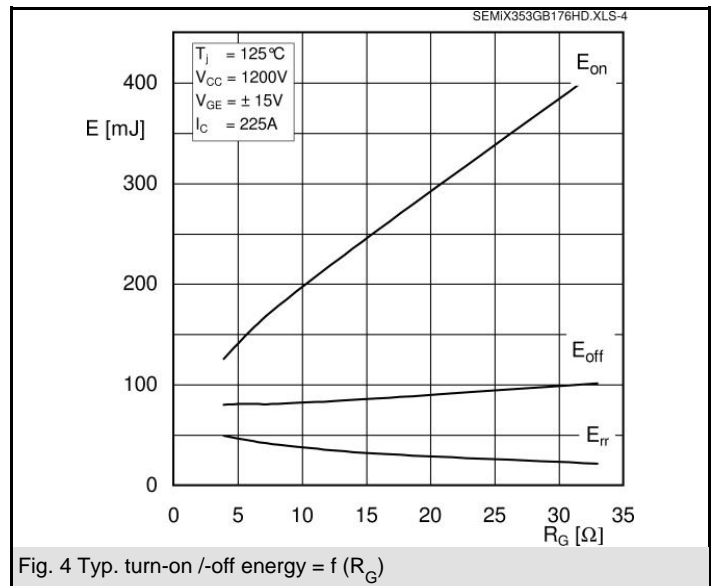
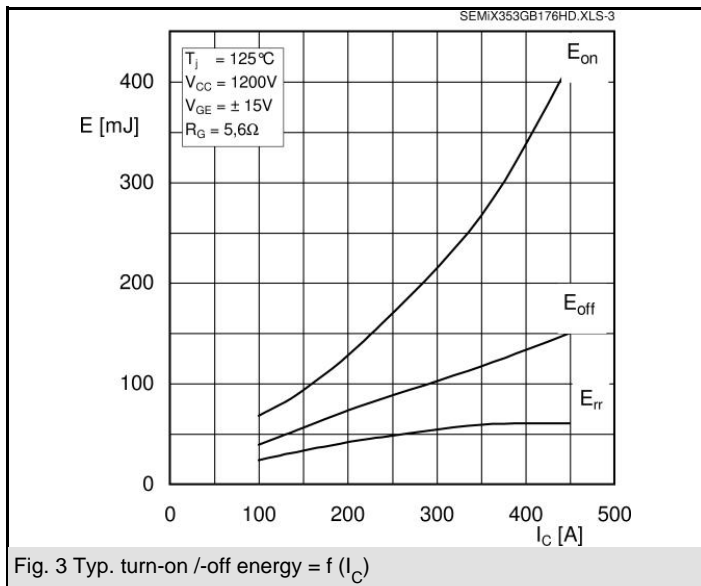
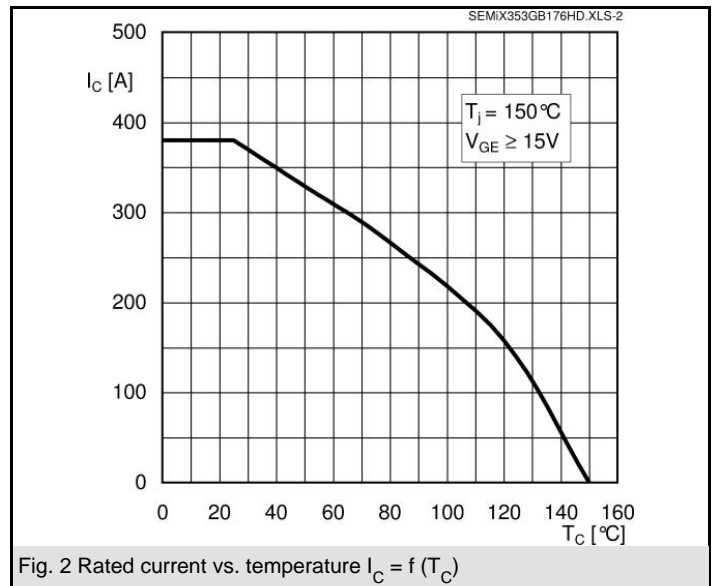
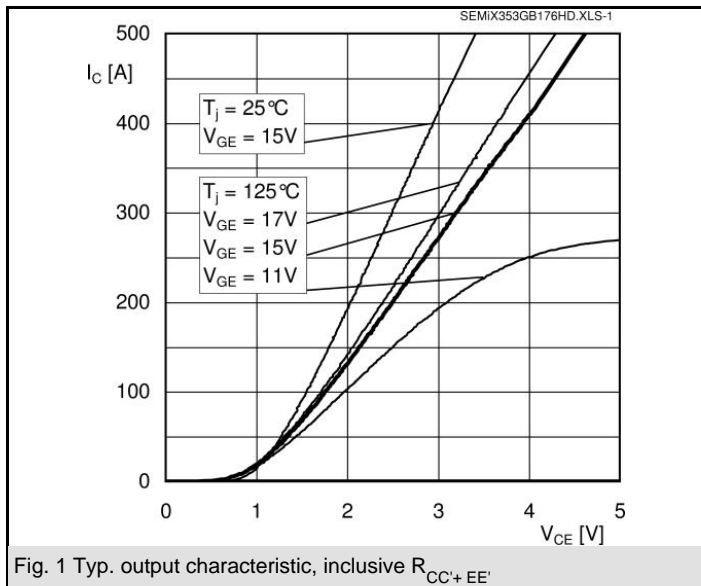
- AC inverter drives
- UPS
- Electronic welders

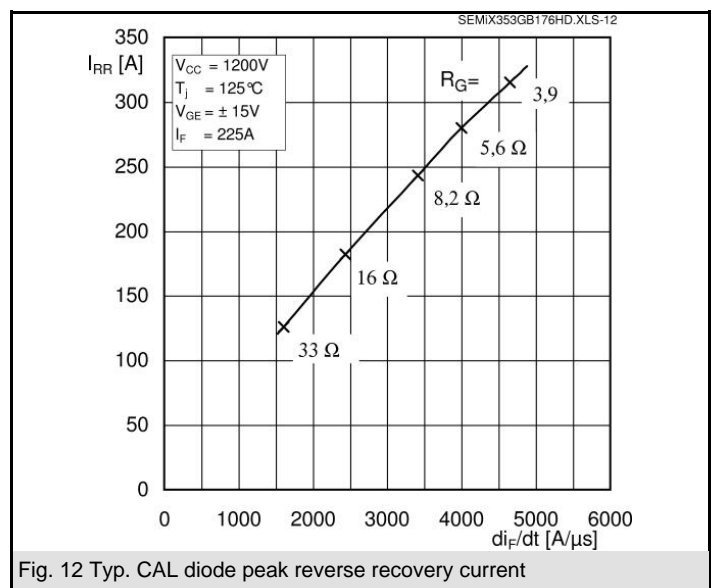
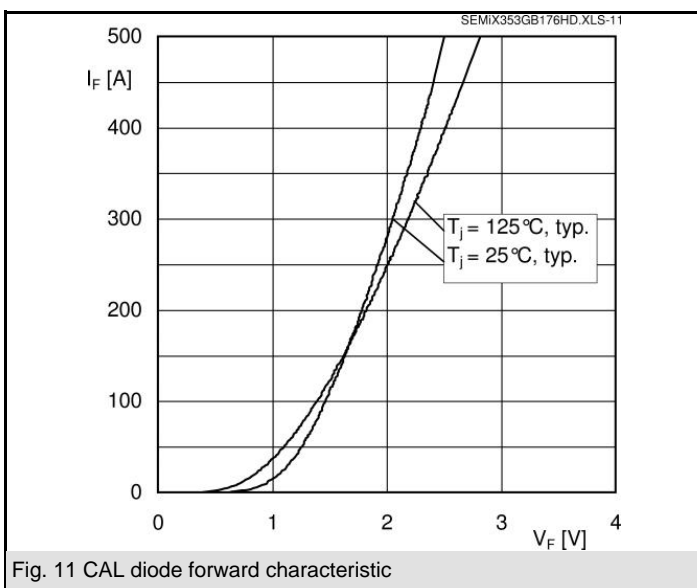
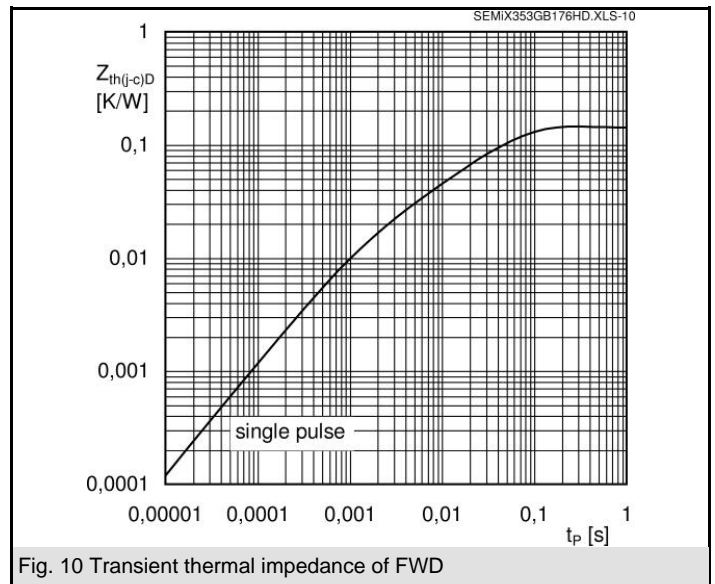
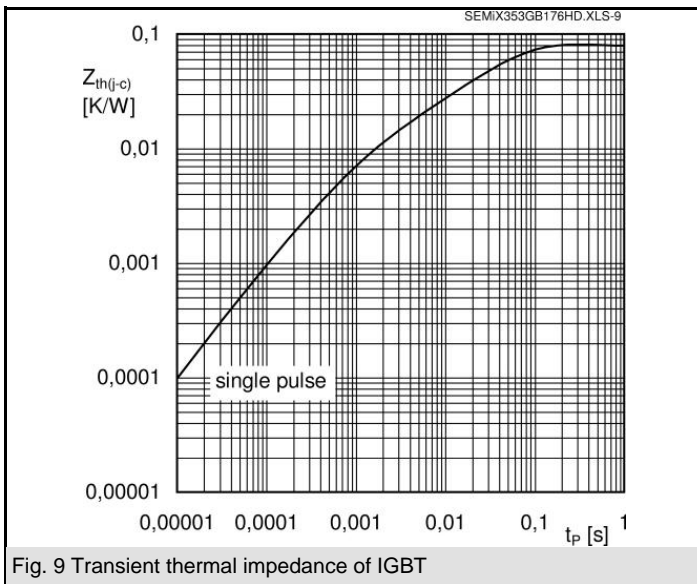
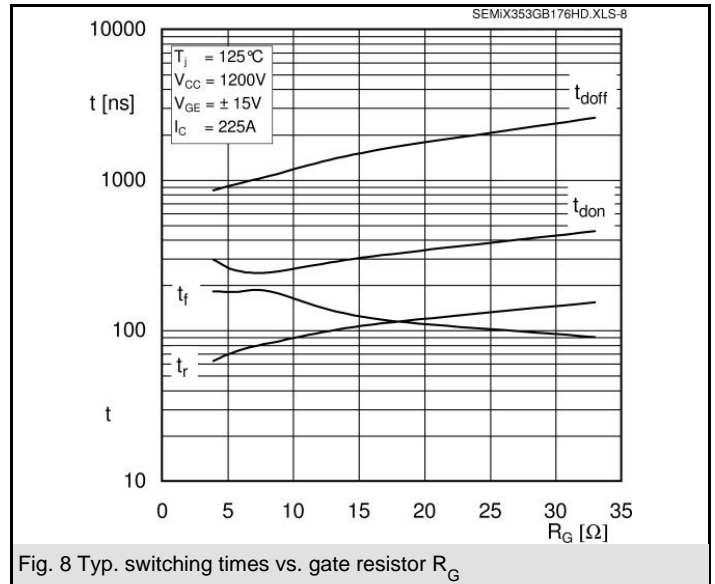
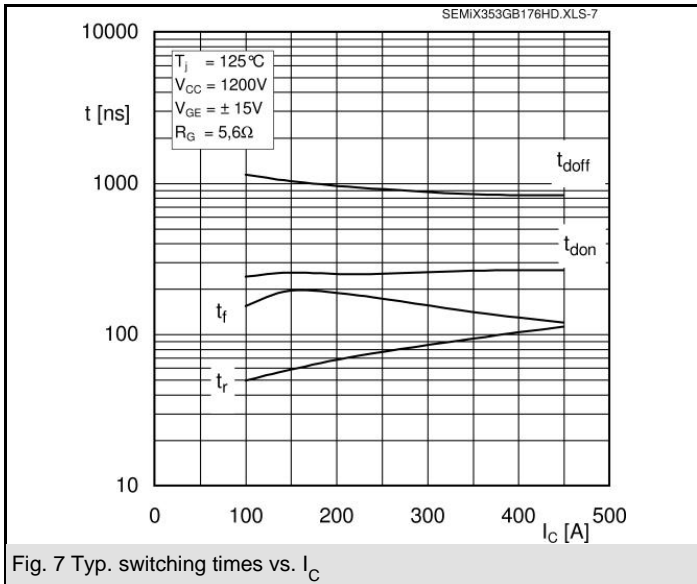
Absolute Maximum Ratings		$T_c = 25^\circ\text{C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT</b>			
$V_{CES}$		1700	V
$I_C$	$T_c = 25 (80)^\circ\text{C}$	380 (270)	A
$I_{CRM}$	$t_p = 1 \text{ ms}$	450	A
$V_{GES}$		$\pm 20$	V
$T_{vj}$ ( $T_{stg}$ )	$T_{OPERATION} \leq T_{stg}$	- 40 ... + 150 (125)	$^\circ\text{C}$
$V_{isol}$	AC, 1 min.	4000	V
<b>Inverse diode</b>			
$I_F$	$T_c = 25 (80)^\circ\text{C}$	310 (210)	A
$I_{FRM}$	$t_p = 1 \text{ ms}$	450	A
$I_{FSM}$	$t_p = 10 \text{ ms}; \text{sin.}; T_j = 25^\circ\text{C}$	1800	A

Characteristics		$T_c = 25^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 9 \text{ mA}$	5,2	5,8	6,4	V
$I_{CES}$	$V_{GE} = 0, V_{CE} = V_{CES}, T_j = 25 ( )^\circ\text{C}$			0,45	mA
$V_{CE(TO)}$	$T_j = 25 (125)^\circ\text{C}$		1 (0,9)	1,2 (1,1)	V
$r_{CE}$	$V_{GE} = 15 \text{ V}, T_j = 25 (125)^\circ\text{C}$		4,4 (6,9)	5,5 (8)	m $\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 225 \text{ A}, V_{GE} = 15 \text{ V}, T_j = 25 (125)^\circ\text{C}$ , chip level		2 (2,45)	2,45 (2,9)	V
$C_{ies}$	under following conditions		17,1		nF
$C_{oes}$	$V_{GE} = 0, V_{CE} = 25 \text{ V}, f = 1 \text{ MHz}$		0,8		nF
$C_{res}$			0,7		nF
$L_{CE}$			20		nH
$R_{CC'+EE'}$	terminal-chip, $T_c = 25 (125)^\circ\text{C}$		0,7 (1)		m $\Omega$
$t_{d(on)}/t_r$	$V_{CC} = 1200 \text{ V}, I_{Cnom} = 225 \text{ A}$		250 / 75		ns
$t_{d(off)}/t_f$	$V_{GE} = \pm 15 \text{ V}$		930 / 180		ns
$E_{on} (E_{off})$	$R_{Gon} = R_{Goff} = 5,6 \Omega, T_j = 125^\circ\text{C}$		148 (81)		mJ
<b>Inverse diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 225 \text{ A}; V_{GE} = 0 \text{ V}; T_j = 25 (125)^\circ\text{C}$ , chip level		1,7 (1,7)	1,9 (1,9)	V
$V_{(TO)}$	$T_j = 25 (125)^\circ\text{C}$		1,1 (0,9)	1,3 (1,1)	V
$r_T$	$T_j = 25 (125)^\circ\text{C}$		2,7 (3,6)	2,7 (3,6)	m $\Omega$
$I_{RRM}$	$I_{Fnom} = 225 \text{ A}; T_j = 25 (125)^\circ\text{C}$		(280)		A
$Q_{rr}$	$di/dt = 4000 \text{ A}/\mu\text{s}$		(83)		$\mu\text{C}$
$E_{rr}$	$V_{GE} = -15 \text{ V}$		(45)		mJ
<b>Thermal characteristics</b>					
$R_{th(j-c)}$	per IGBT			0,08	K/W
$R_{th(j-c)D}$	per Inverse Diode			0,143	K/W
$R_{th(j-c)FD}$	per FWD				K/W
$R_{th(c-s)}$	per module		0,04		K/W
<b>Temperature sensor</b>					
$R_{25}$	$T_c = 25^\circ\text{C}$		5 $\pm$ 5%		k $\Omega$
$B_{25/85}$	$R_2 = R_1 \exp[B(1/T_2 - 1/T_1)]; T[K]; B$		3420		K
<b>Mechanical data</b>					
$M_s/M_t$	to heatsink (M5) / for terminals (M6)	3/2,5		5 / 5	Nm
w			289		g

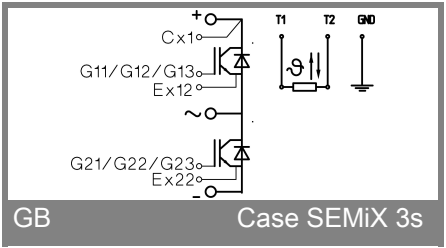
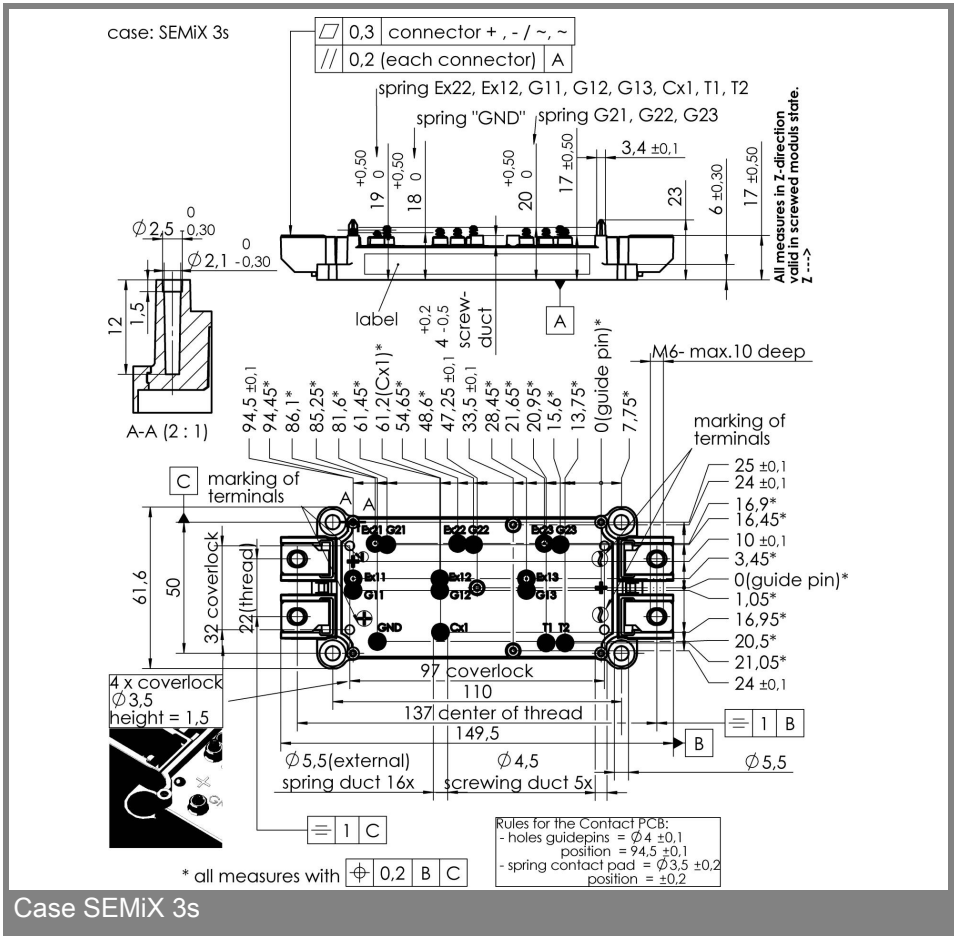
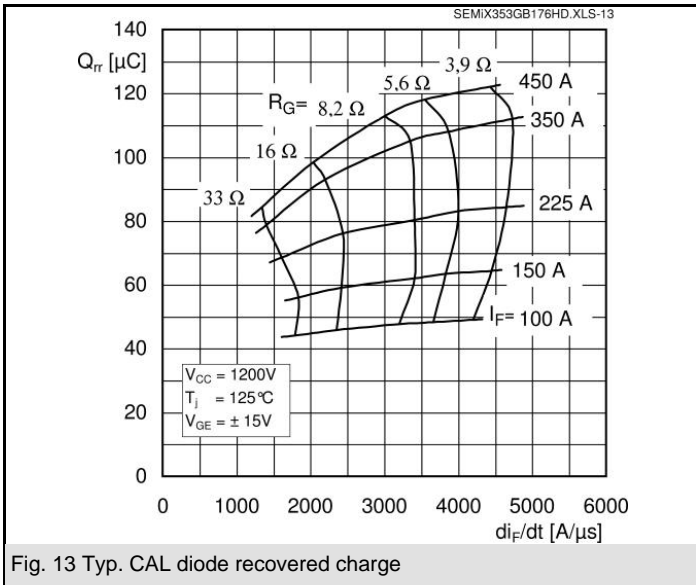


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This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

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