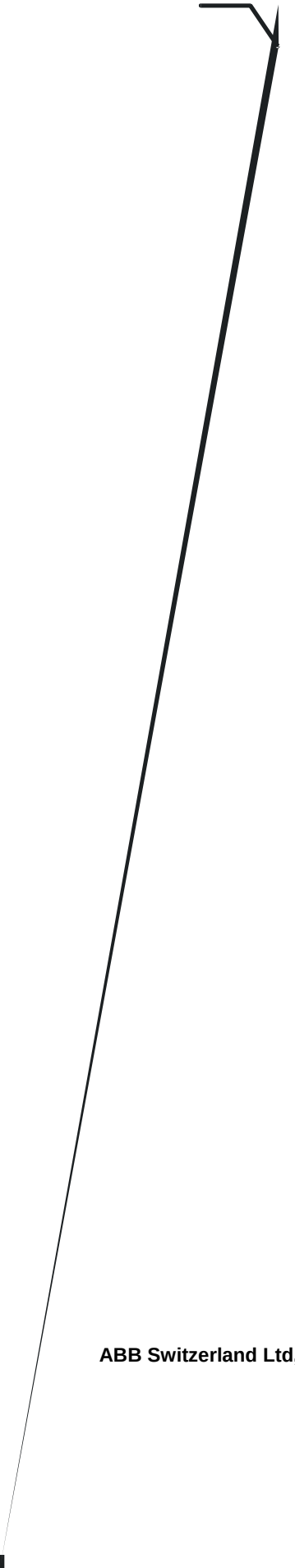
V_{CE}	=	6500 V
I_C	=	750 A



IGBT characteristic values [3]

Parameter	Symbol	Conditions		min	typ	max	Unit
Collector (-emitter) breakdown voltage	$V_{(BR)CES}$	V_{GE} = 0 V, I_C = 10 mA, T_{vj} = 25 °C		6500			V
Collector-emitter [4] saturation voltage	$V_{CE\ sat}$	I_C = 750 A, V_{GE} = 15 V	T_{vj} = 25 °C		2.9		V
			T_{vj} = 125 °C		3.9	4.5	V
Collector cut-off current	I_{CES}	V_{CE} = 6500 V, V_{GE} = 0 V	T_{vj} = 25 °C			12	mA
			T_{vj} = 125 °C		60	100	mA
Gate leakage current	I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V, T_{vj} = 125 °C		-500		500	nA
Gate-emitter threshold voltage	$V_{GE(TO)}$	I_C = 240 mA, V_{CE} = V_{GE}, T_{vj} = 25 °C		5.5		7.5	V
Gate charge	Q_{ge}	I_C = 750 A, V_{CE} = 3600 V, V_{GE} = -15 V .. 15 V			7.4		µC
Input capacitance	C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz, T_{vj} = 25 °C			113		nF
Output capacitance	C_{oes}				6.6		
Reverse transfer capacitance	C_{res}				2.0		
Turn-on delay time	$t_{d(on)}$	V_{CC} = 3600 V, I_C = 750 A, R_G = 2.7 Ω, C_{GE} = 220 nF, V_{GE} = ±15 V, L_σ = 280 nH, inductive load	T_{vj} = 25 °C		1060		ns
			T_{vj} = 125 °C		980		
Rise time	t_r		T_{vj} = 25 °C		260		ns
			T_{vj} = 125 °C		300		
Turn-off delay time	$t_{d(off)}$	V_{CC} = 3600 V, I_C = 750 A, R_G = 15 Ω, C_{GE} = 220 nF, V_{GE} = ±15 V, L_σ = 280 nH, inductive load	T_{vj} = 25 °C		4950		ns
			T_{vj} = 125 °C		5520		
Fall time	t_f		T_{vj} = 25 °C		610		ns
			T_{vj} = 125 °C		590		
Turn-on switching energy	E_{on}	V_{CC} = 3600 V, I_C = 750 A, R_G = 2.7 Ω, C_{GE} = 220 nF, V_{GE} = ±15 V, L_σ = 280 nH, inductive load	T_{vj} = 25 °C		4700		mJ
			T_{vj} = 125 °C		6400		
Turn-off switching energy	E_{off}	V_{CC} = 3600 V, I_C = 750 A, R_G = 15 Ω, C_{GE} = 220 nF, V_{GE} = ±15 V, L_σ = 280 nH, inductive load	T_{vj} = 25 °C		4200		mJ
			T_{vj} = 125 °C		5300		
Short circuit current	I_{SC}	t_{psc} ≤ 10 µs, V_{GE} = 15 V, T_{vj} = 125 °C, V_{CC} = 4400 V, $V_{CEM\ CHIP}$ ≤ 6500 V			3400		A
Module stray inductance	$L_{\sigma\ CE}$				18		nH
Resistance, terminal-chip	$R_{CC'+EE'}$		T_C = 25 °C		0.07		mΩ
			T_C = 125 °C		0.1		

[3] Characterc2t84Ti0410512 Tc34in aatanacarac2t84Ti096 Tc ((°) Tn 02976 Tc (a) Ti0gTc (te) Ti0096 Tc ((°) To -02976 Tc34i37+Ctaat at
ChaCacterrc2t84Tjt0096 Tc ((°) Te.02976 Tc37+c2t84T].096 Tc c2 Tj0 Tc (tə Tc (a) Tj0 Tc (c) Tj00096 Tc ((°) Td.02976 Tc37+) Tj0 Tc (c) Tj00096 Tc c34iaCteractat

Diode characteristic values [5]

Parameter	Symbol	Conditions		min	typ	max	Unit
Forward voltage [6]	V_F	I_F = 750 A	T_{vj} = 25 °C		3.2	3.8	V
			T_{vj} = 125 °C		3.4	4.0	
Reverse recovery current	I_{rr}	V_{CC} = 3600 V, I_F = 750 A, V_{GE} = ±15 V, R_G = 2.7 Ω, C_{GE} = 220 nF, L_σ = 280 nH inductive load	T_{vj} = 25 °C		860		A
			T_{vj} = 125 °C		930		
Recovered charge	Q_{rr}		T_{vj} = 25 °C		920		µC
			T_{vj} = 125 °C		1500		
Reverse recovery time	t_{rr}		T_{vj} = 25 °C		2100		ns
			T_{vj} = 125 °C		3200		
Reverse recovery energy	E_{rec}		T_{vj} = 25 °C		1400		mJ
			T_{vj} = 125 °C		2700		

[5] Characteristic values according to IEC 60747 – 2
[6] Forward voltage is given at chip level

Package properties [7]

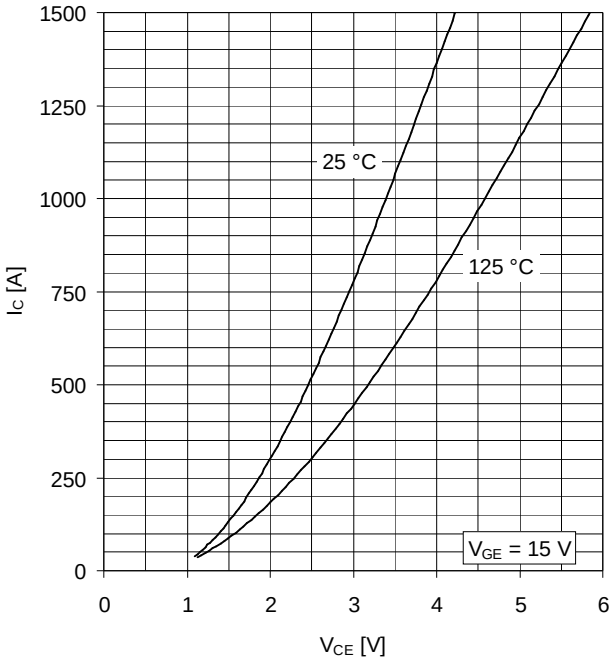
Parameter	Symbol	Conditions	min	typ	max	Unit
IGBT thermal resistance junction to case	$R_{th(j-c)IGBT}$				0.011	K/W
Diode thermal resistance junction to case	$R_{th(j-c)DIODE}$				0.021	K/W
IGBT thermal resistance case to heatsink [2]	$R_{th(c-s)IGBT}$	IGBT per switch, λ grease = 1W/m x K		0.009		K/W
Diode thermal resistance case to heatsink [7]	$R_{th(c-s)DIODE}$	Diode per switch, λ grease = 1W/m x K		0.018		K/W
Partial discharge extinction voltage	V_e	f = 50 Hz, Q_{PD} ≤ 10pC (acc. to IEC 61287)	5100			V
Comparative tracking index	CTI		≥ 600			

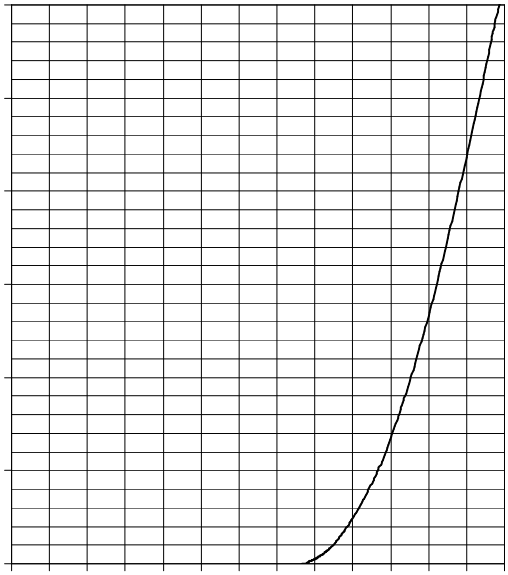
[2] For detailed mounting instructions refer to ABB Document No. 5SYA2039

Mechanical properties [7]

Parameter	Symbol	Conditions		min	typ	max	Unit
Dimensions	L x W x H	Typical , see outline drawing		190 x 140 x 48			mm
Clearance distance in air	d_a	according to IEC 60664-1 and EN 50124-1	Term. to base:	40			mm
			Term. to term:	26			
Surface creepage distance	d_s	according to IEC 60664-1 and EN 50124-1	Term. to base:	64			mm
			Term. to term:	56			
Mass	m				1760		g

[7] Package and mechanical properties according to IEC 60747 – 15


1500
1250
1000
750
500
250
0
I_C [A]
25 °C
125 °C
V_{GE} = 15 V
0
1
2
3
4
5
6
V_{CE} [V]



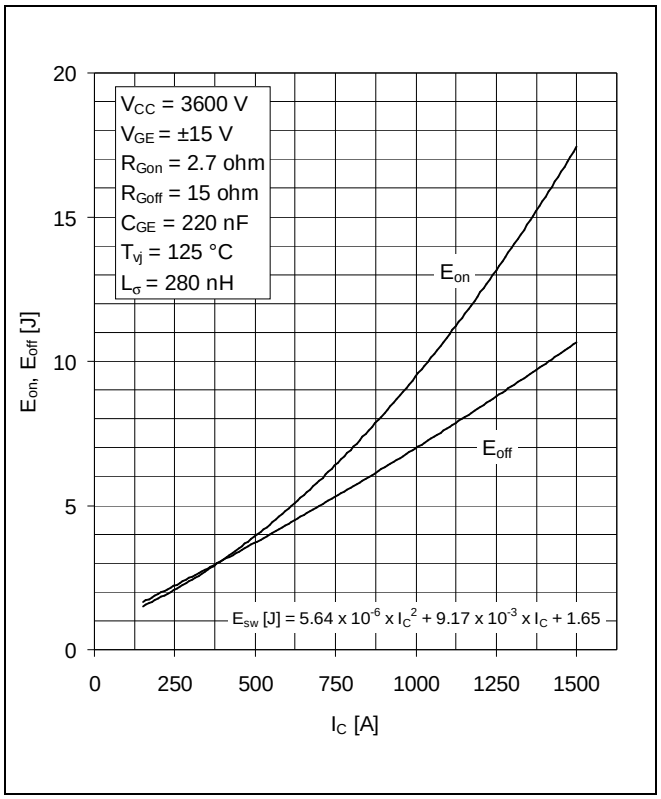


Fig. 5 Typical switching energies per pulse vs collector current

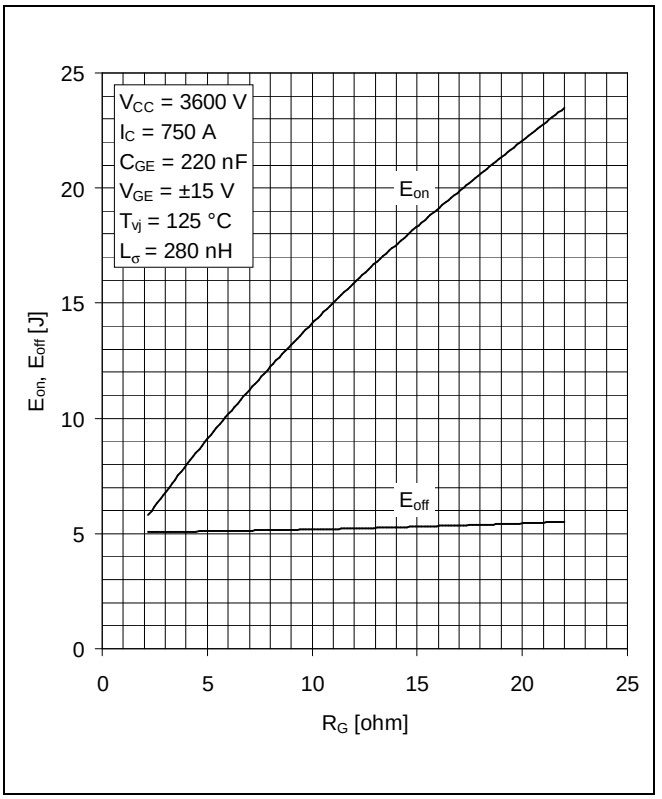
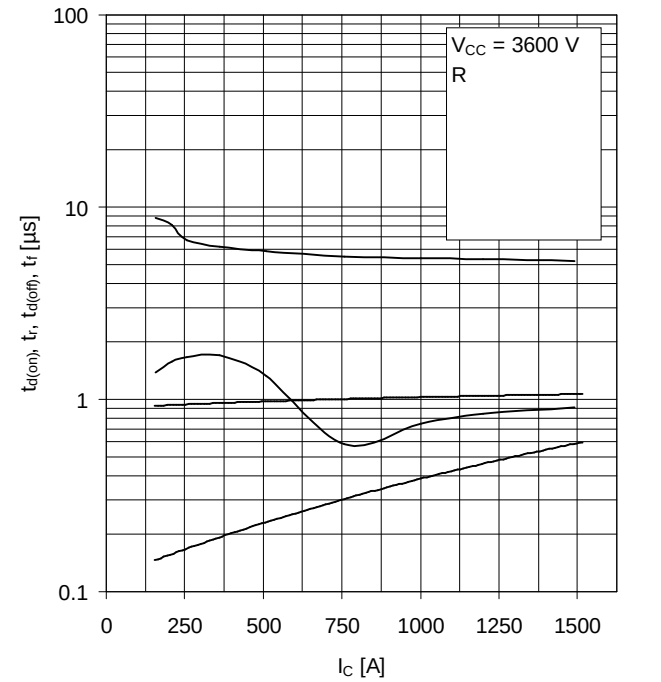
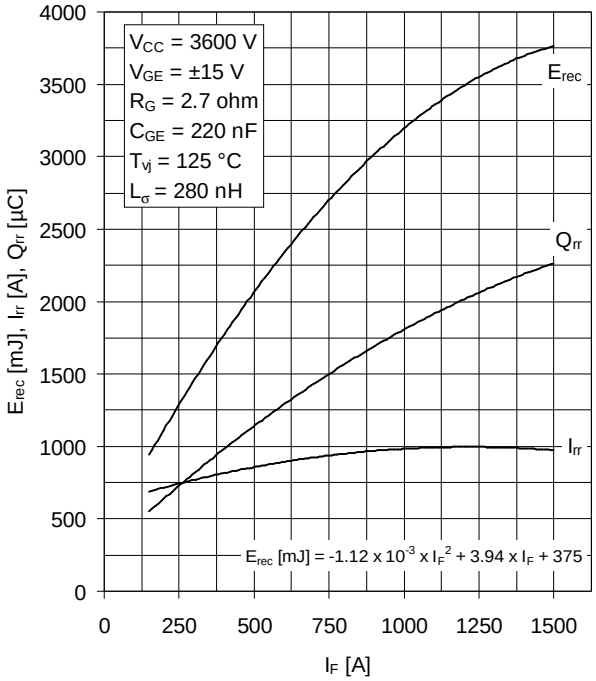
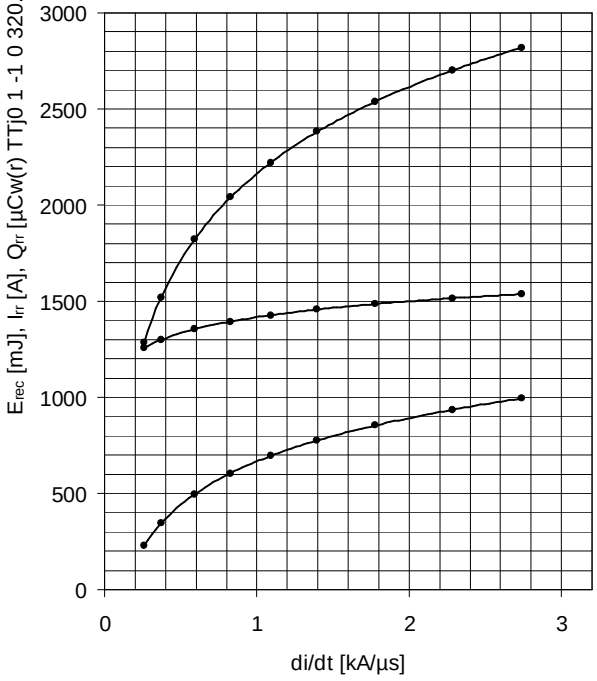


Fig. 6 Typical switching energies per pulse vs gate resistor



= 3600 VIC = 750 ACGE = 220 nFVGE = ±15 VTvj = 125 °CLs = 280 nH


V_{CC} = 3600 V
V_{GE} = ±15 V
R_G = 2.7 ohm
C_{GE} = 220 nF
T_{vj} = 125 °C
L_σ = 280 nH
E_{rec}
Q_{rr}
I_{rr}
E_{rec} [mJ] = -1.12 x 10^{-3} x I_F^2 + 3.94 x I_F + 375
E_{rec} [mJ], I_{rr} [A], Q_{rr} [µC]
I_F [A]
0
500
1000
1500
2000
2500
3000
3500
4000
0
250
500
750
1000
1250
1500


E_{rec} [mJ], I_{rr} [A], Q_{rr} [µCw(r) TTj0 1 -1 0 320.16 667.68 Tm (r) Tj06 6
di/dt [kA/µs)
0
500
1000
1500
2000
2500
3000
0
1
2
3

Analytical function for transient thermal impedance:

$$Z_{th\,(j\text{-}c)}(t) = \sum_{i=1}^{n} R_i \left(1 - e^{-t/t_i}\right)$$

	i	1	2	3	4	5
IGBT	R_i(K/kW)	8.5	2			

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Doc. No. 5SYA 1600-01 Feb 09