Vincotech

10-xY07NIB080SM03-L095F03x
datasheet

flow **NPC 1** **650 V / 80 A**

Features

- Neutral Point Clamped Topology (I-Type)
- 4 quadrant operation, very high speed
- Integrated DC capacitor and temperature sensor
- Press-Fit pins
- Kelvin Emitter for improved switching performance
- Press-fit pins and solder pins

flow 1 12mm housing

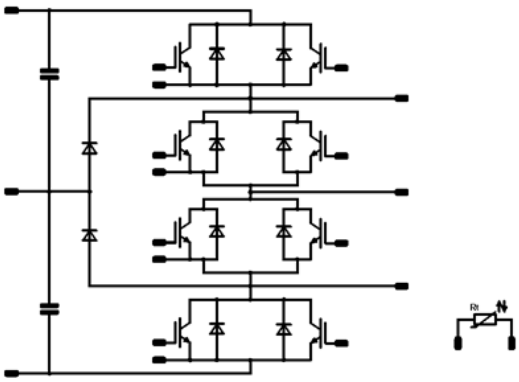
Solder pin

Press-fit pin

Target applications

- Power Supply
- Solar Inverters
- UPS

Schematic



Types

- 10-FY07NIB080SM03-L095F03
- 10-PY07NIB080SM03-L095F03Y

Maximum Ratings

T_j=25°C, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
Buck Switch\Boost Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	$T_j = T_{jmax}$ T_s = 80 °C	60	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	240	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	109	W
Gate-emitter voltage	V_{GES}		±20	V
Maximum Junction Temperature	T_{jmax}		175	°C

Parameter	Symbol	Conditions	Value	Unit
Buck Diode				
Peak Repetitive Reverse Voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80°C$	76	A
Repetitive peak forward current	I_{FRM}		160	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80°C$	103	W
Maximum Junction Temperature	T_{jmax}		175	°C
Boost Diode				
Peak Repetitive Reverse Voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80°C$	103	A
Repetitive peak forward current	I_{FRM}		240	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80°C$	140	W
Maximum Junction Temperature	T_{jmax}		175	°C
Boost Inverse Diode				
Peak Repetitive Reverse Voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80°C$	63	A
Repetitive peak forward current	I_{FRM}		120	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80°C$	98	W
Maximum Junction Temperature	T_{jmax}		175	°C
DC Link Capacitance				
Maximum DC voltage	V_{MAX}		630	V
Operation Temperature	T_{op}		-55...+125	°C

Parameter	Symbol	Conditions	Value	Unit
Module properties				
Thermal Properties				
Storage temperature	T_{stg}		-40…+125	°C
Operation temperature under switching condition	T_{jop}		-40…+(T_{jmax} - 25)	°C
Isolation Properties				
Isolation voltage	V_{isol}	DC Test Voltage* t_p = 2 s	6000	V
		AC Voltage t_p = 1 min	2500	V
Creepage distance			min 12,7	mm
Clearance		Press-fit pin	min 8,15	mm
		Solder pin	min 8,33	mm
Comparative Tracking Index	CTI		>200	

* 100 % tested in production

Characteristic Values

Buck Switch

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j[°C]	Min	Typ	Max	
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	V_{GE}=V_{CE}			0,0008	25 125	3,3	4	4,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		80	25 125 150		1,64 1,89 1,95	2,22	V
Collector-emitter cut-off current	I_{CES}		0	650		25 125			80	µA
Gate-emitter leakage current	I_{GES}		20	0		25 125			240	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}	f=1MHz	0	25		25		5000		pF
Output capacitance	C_{oes}							80		
Reverse transfer capacitance	C_{res}							18		
Gate charge	Q_g		15	520	80	25		190		nC
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						0,87		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{goff} = 8 Ω R_{gon} = 8 Ω	+15/-5	350	40	25 125		44 44		ns
Rise time	t_r					25 125		6 7		
Turn-off delay time	$t_{d(off)}$					25 125		126 146		
Fall time	t_f					25 125		6 6		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 1,5 µC Q_{rFWD} = 3 µC				25 125		0,440 0,669		mWs
Turn-off energy (per pulse)	E_{off}					25 125		0,158 0,267		

Buck Diode

Parameter	Symbol	Conditions					Value			Unit
				V_r [V]	I_F [A]	T_j [°C]	Min	Typ	Max	
Static										
Forward voltage	V_F				80	25 125 150		1,51 1,43 1,41	2,4	V
Reverse leakage current	I_r			650		25			4,2	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						0,92		K/W
Dynamic										
Peak recovery current	I_{RRM}	di/dt = 3990 A/µs di/dt = 3809 A/µs	+15/-5	350	40	25 125		57 76		A
Reverse recovery time	t_{rr}					25 125		40 59		ns
Recovered charge	Q_r					25 125		1,546 3,004		µC
Reverse recovered energy	E_{rec}					25 125		0,307 0,632		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125		4196 2993		A/µs

Boost Switch

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j[°C]	Min	Typ	Max	
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	V_{GE}=V_{CE}			0,0008	25 125	3,3	4	4,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		80	25 125 150		1,64 1,89 1,95	2,22	V
Collector-emitter cut-off current	I_{CES}		0	650		25 125			80	µA
Gate-emitter leakage current	I_{GES}		20	0		25 125			240	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}	f=1MHz	0	25		25		5000		pF
Output capacitance	C_{oes}							80		
Reverse transfer capacitance	C_{res}							18		
Gate charge	Q_g		15	520	80	25		190		nC
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material ʎ = 3,4 W/mK						0,87		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	Rgoff=8Ω Rgon=8Ω	±15	350	40	25 125		40 41		ns
Rise time	t_r					25 125		7 8		
Turn-off delay time	$t_{d(off)}$					25 125		113 136		
Fall time	t_f					25 125		4 5		
Turn-on energy loss per pulse	E_{on}	QrrFWD=1,8µC QrrFWD=3,6µC				25 125		0,578 0,847		mWs
Turn-off energy loss per pulse	E_{off}					25 125		0,165 0,275		

Boost Diode

Parameter	Symbol	Conditions					Value			Unit
				V_r [V]	I_F [A]	T_j [°C]	Min	Typ	Max	
Static										
Forward voltage	V_F				120	25 125 150		1,51 1,47 1,45	1,77	V
Reverse leakage current	I_r			650		25			6,4	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						0,68		K/W
Dynamic										
Peak recovery current	I_{RRM}	di/dt=5986A/µs di/dt=5229A/µs	±15	350	40	25 125		54 68		A
Reverse recovery time	t_{rr}					25 125		47 68		ns
Reverse recovery charge	Q_{rr}					25 125		1,842 3,593		µC
Reverse recovered energy	E_{rec}					25 125		0,371 0,788		mWs
Peak rate of fall of recovery current	di(rec)max/dt					25 125		3877 4290		A/uµs

Boost Inverse Diode

Static										
Forward voltage	V_F				60	25 125		1,70 1,59	1,87	V
Reverse leakage current	I_r			650		25 150			0,72	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						0,96		K/W

DC Link Capacitance

Capacitance	C							47		nF
Tolerance							-10		+10	%

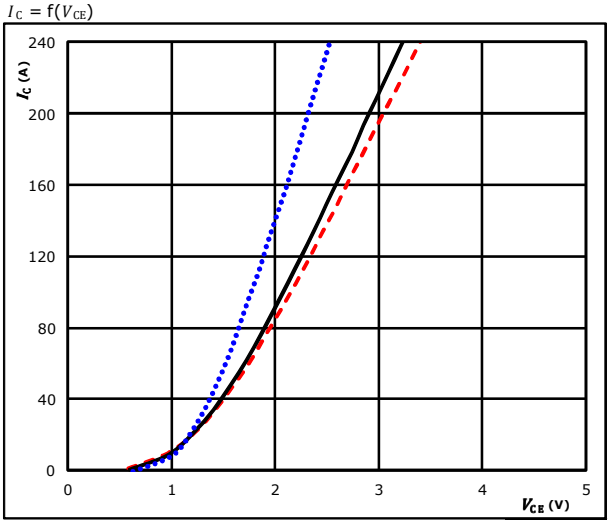
Parameter	Symbol	Conditions					Value			Unit
Thermistor			V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j [°C]	Min	Typ	Max	
Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	R_{100} = 1486 Ω				100	-12		+14	%
Power dissipation	P					25		200		mW
Power dissipation constant						25		2		mW/K
B-value	$B_{(25/50)}$	Tol. ±3%				25		3950		K
B-value	$B_{(25/100)}$	Tol. ±3%				25		3998		K
Vincotech NTC Reference									B	

Buck Switch / Boost Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

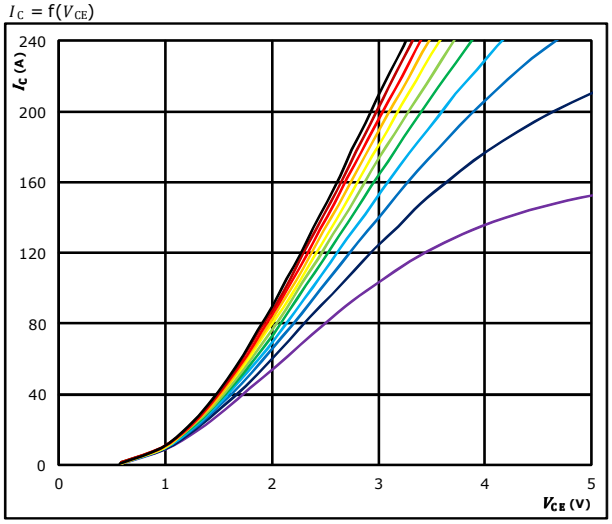


t_p =	250	µs		
V_{GE} =	15	V	T_j:	25 °C
				125 °C
				150 °C

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

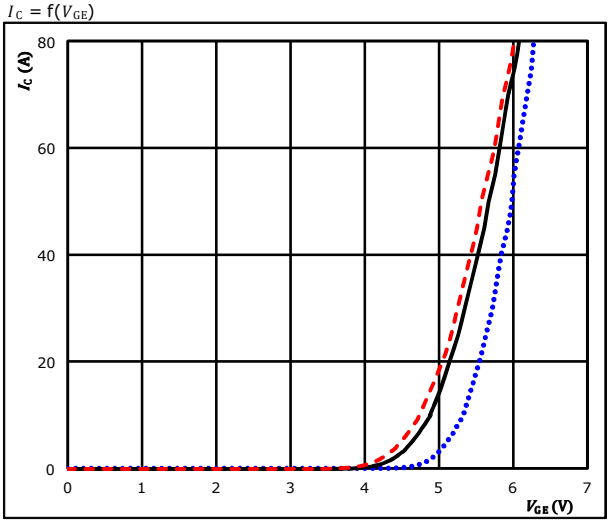


t_p =	250	µs
T_j =	150	°C
V_{GE} from	7 V to 17 V in steps of 1 V	

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

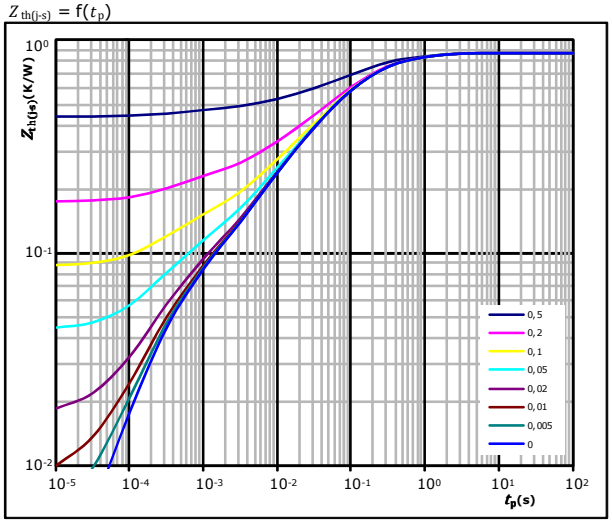


t_p =	100	µs		
V_{CE} =	3634	V	T_j:	25 °C
				125 °C
				150 °C

figure 4. **IGBT**

Transient Thermal Impedance as function of Pulse duration

$Z_{th(j-s)} = f(t_p)$



D =	t_p / T	
$R_{th(j-s)}$ =	0,87	K/W

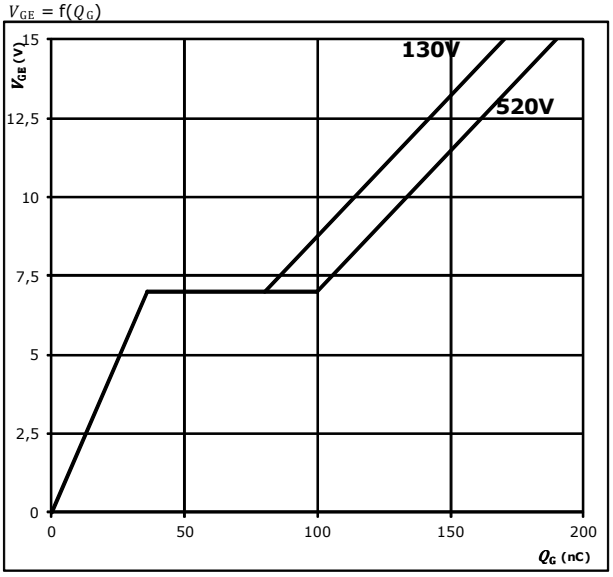
IGBT thermal model values

R (K/W)	τ (s)
1,42E-01	7,24E-01
3,44E-01	1,23E-01
1,79E-01	3,69E-02
1,18E-01	9,05E-03
3,80E-02	2,24E-03
5,36E-02	3,22E-04

Buck Switch / Boost Switch Characteristics

Gate voltage vs Gate charge **IGBT**

$V_{GE} = f(Q_G)$

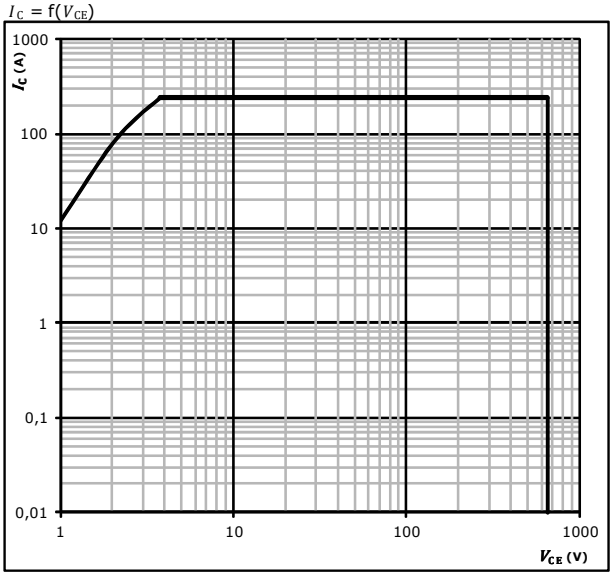


At

I_C= 80 A

Safe operating area **IGBT**

$I_C = f(V_{CE})$

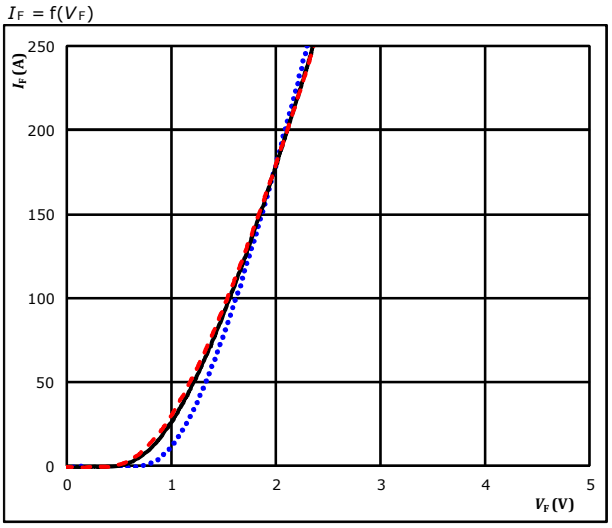


At

D = single pulse
T_s = 80 °C
V_{GE} = ±15 V
T_j = T_{jmax} °C

Buck Diode Characteristics

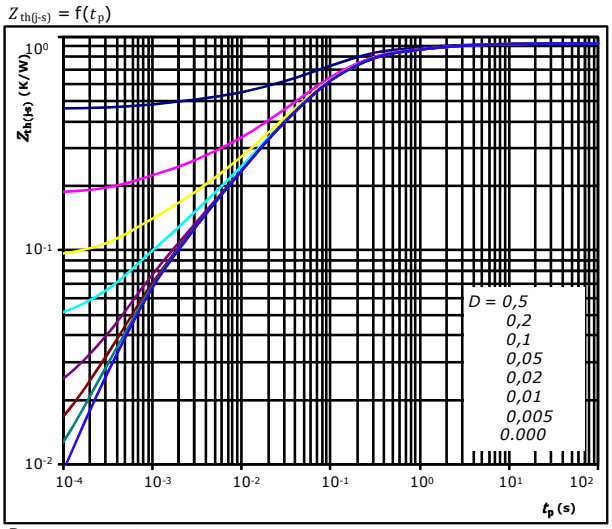
Typical forward characteristics **FWD**



t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

Transient thermal impedance as a function of pulse width **FWD**



D = t_p / T

$R_{th(j-s)}$ = 0,92 K/W

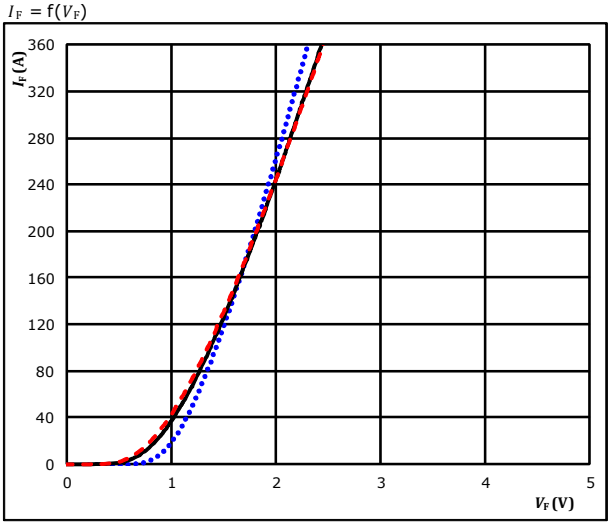
FWD thermal model values

R (K/W)	τ (s)
4,25E-02	4,35E+00
1,12E-01	6,58E-01
3,86E-01	1,10E-01
2,10E-01	3,30E-02
1,09E-01	7,30E-03
6,17E-02	8,74E-04

Boost Diode Characteristics

Typical forward characteristics **FWD**

$I_F = f(V_F)$

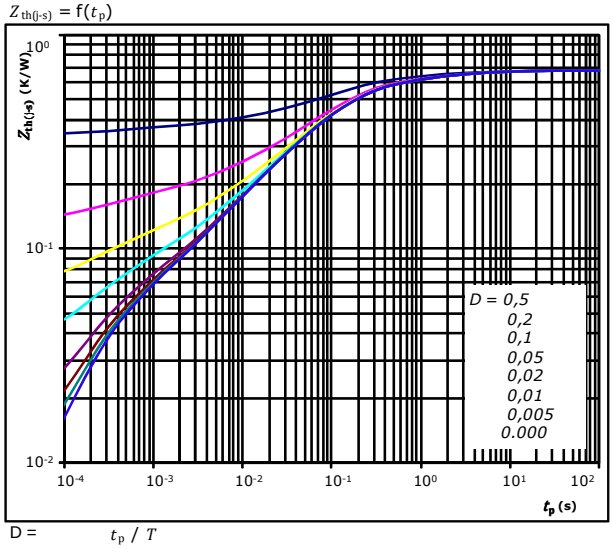


t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

Transient thermal impedance as a function of pulse width **FWD**

$Z_{th(j-s)} = f(t_p)$



D = t_p / T

$R_{th(j-s)}$ = 0,68 K/W

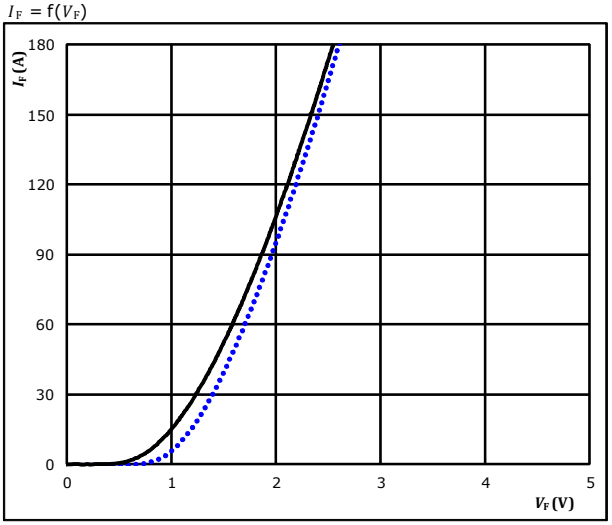
FWD thermal model values

R (K/W)	τ (s)
3,9220E-02	5,7450E+00
8,2170E-02	9,8270E-01
2,5490E-01	1,5140E-01
1,5790E-01	4,0170E-02
7,1160E-02	8,2320E-03
2,9880E-02	1,8120E-03
4,2490E-02	2,7440E-04

Boost Inverse Diode Characteristics

Typical forward characteristics **FWD**

$I_F = f(V_F)$



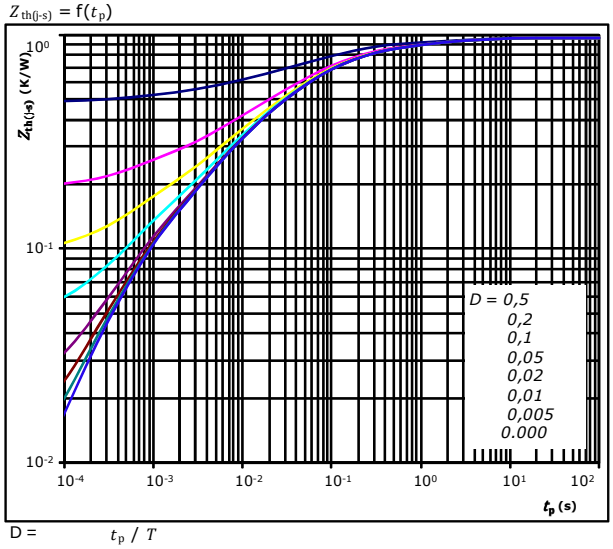
t_p = 250 µs

T_j: 25 °C ••••••••••••

125 °C ——————

Transient thermal impedance as a function of pulse width **FWD**

$Z_{th(j-s)} = f(t_p)$



D = t_p / T

$R_{th(j-s)}$ = 0,96 K/W

FWD thermal model values

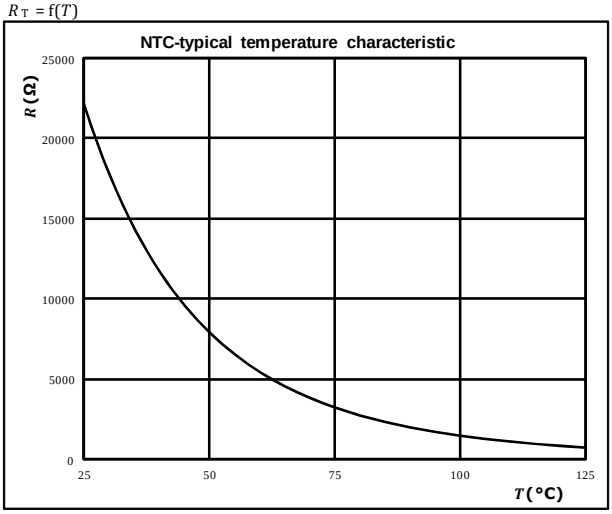
R (K/W)	τ (s)
7,2470E-02	3,3700E+00
1,2780E-01	5,1300E-01
3,4120E-01	8,2850E-02
2,2760E-01	1,7580E-02
1,2730E-01	3,8490E-03
6,8280E-02	5,3180E-04

Thermistor Characteristics

Thermistor typical temperature characteristic

Typical NTC characteristic
as a function of temperature

$R_T = f(T)$

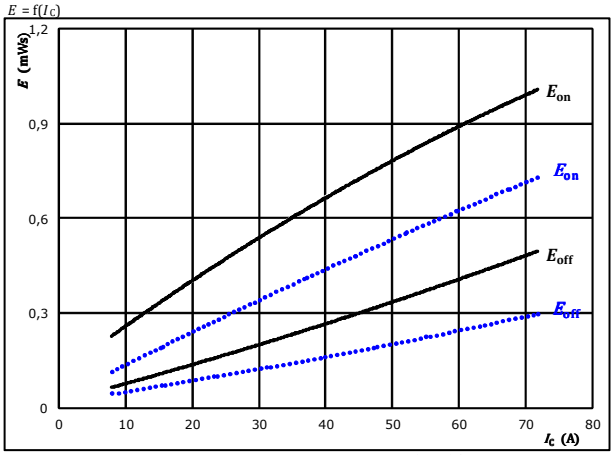


Buck Switching Characteristics

Figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



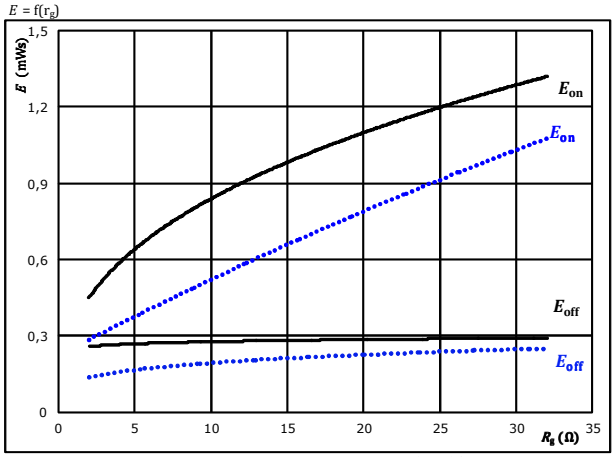
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	·····
V_{GE} =	+15/-5	V		125 °C	———
R_{gon} =	8	Ω			
R_{goff} =	8	Ω			

Figure 2. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(r_g)$



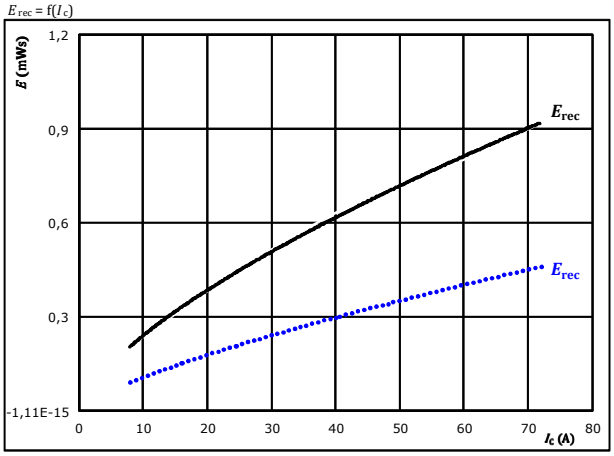
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	·····
V_{GE} =	+15/-5	V		125 °C	———
I_C =	40	A			

Figure 3. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



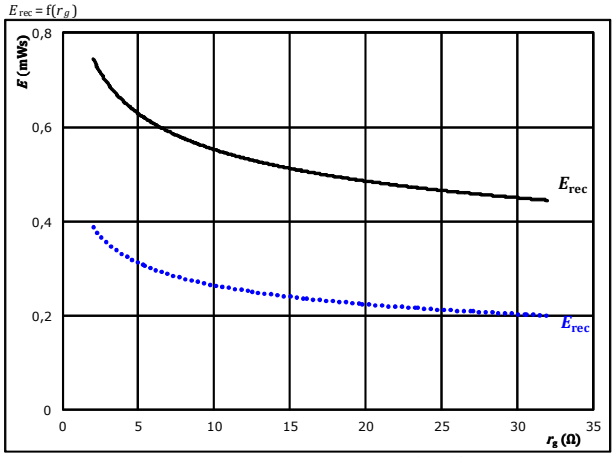
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C	·····
V_{GE} =	+15/-5	V		125 °C	———
R_{gon} =	8	Ω			

Figure 4. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(r_g)$



With an inductive load at

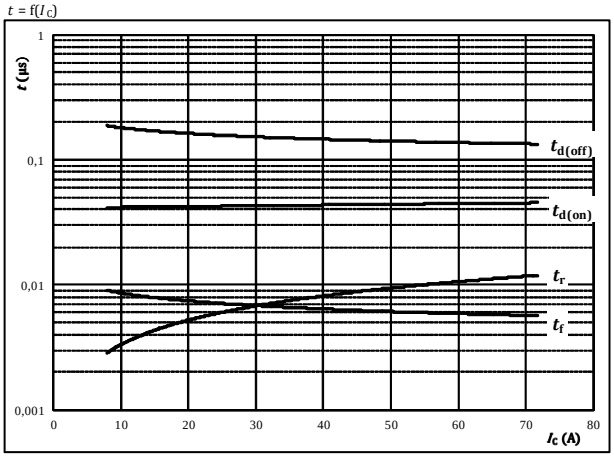
V_{CE} =	350	V	T_j:	25 °C	·····
V_{GE} =	+15/-5	V		125 °C	———
I_C =	40	A			

Buck Switching Characteristics

Figure 5. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



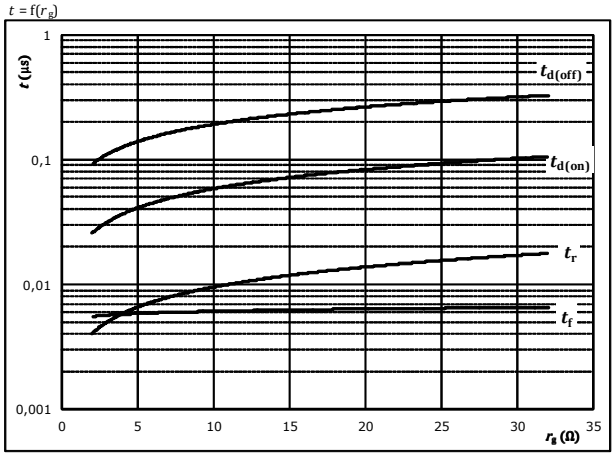
With an inductive load at

T_j =	125	°C
V_{CE} =	350	V
V_{GE} =	+15/-5	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

Figure 6. **IGBT**

Typical switching times as a function of gate resistor

$t = f(r_g)$



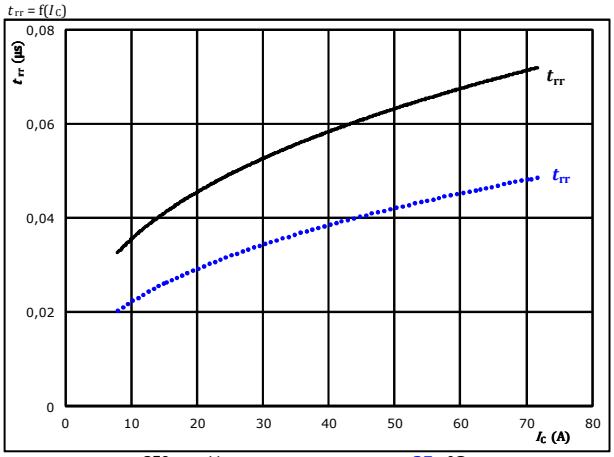
With an inductive load at

T_j =	125	°C
V_{CE} =	350	V
V_{GE} =	+15/-5	V
I_C =	40	A

Figure 7. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



At

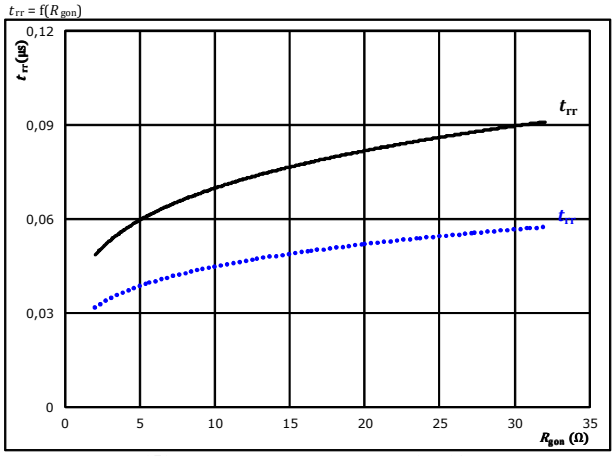
V_{CE} =	350	V
V_{GE} =	+15/-5	V
R_{gon} =	8	Ω

T_j: 25 °C, 125 °C

Figure 8. **FWD**

Typical reverse recovery time as a function of IGBT turn on gate resistor

$t_{rr} = f(R_{gon})$



At

V_{CE} =	350	V
V_{GE} =	+15/-5	V
I_C =	40	A

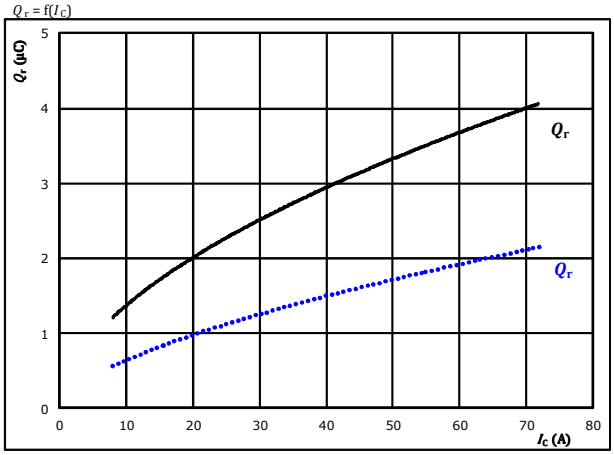
T_j: 25 °C, 125 °C

Buck Switching Characteristics

Figure 9. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$

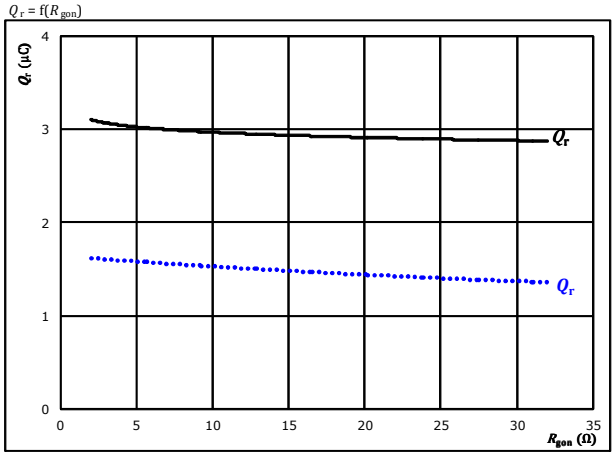


At						
	V_{CE} =	350	V		25 °C	
	V_{GE} =	+15/-5	V	T_j:	125 °C	
	R_{gon} =	8	Ω			

Figure 10. **FWD**

Typical recoved charge as a function of IGBT turn on gate resistor

$Q_r = f(R_{gon})$

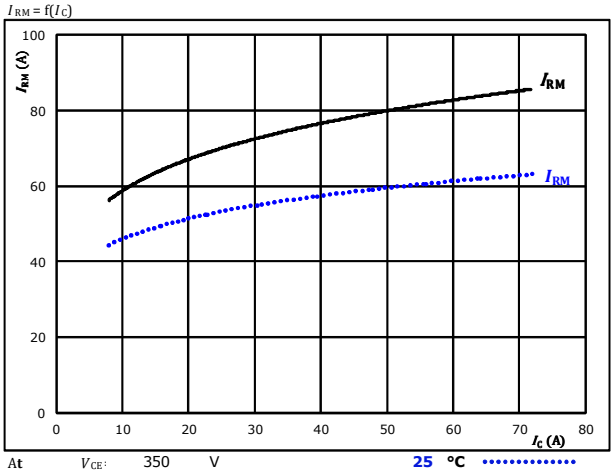


At						
	V_{CE}=	350	V		25 °C	
	V_{GE} =	+15/-5	V	T_j:	125 °C	
	I_C=	40	A			

Figure 11. **FWD**

Typical peak reverse recovery current current as a function of collector current

$I_{RM} = f(I_C)$

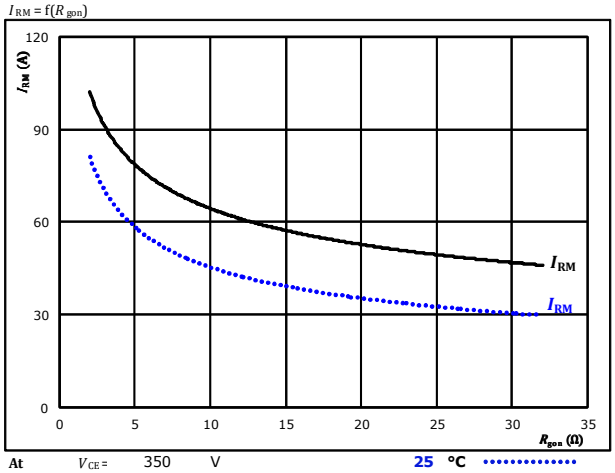


At						
	V_{CE} =	350	V		25 °C	
	V_{GE} =	+15/-5	V	T_j:	125 °C	
	R_{gon} =	8	Ω			

Figure 12. **FWD**

Typical peak reverse recovery current as a function of IGBT turn on gate resistor

$I_{RM} = f(R_{gon})$



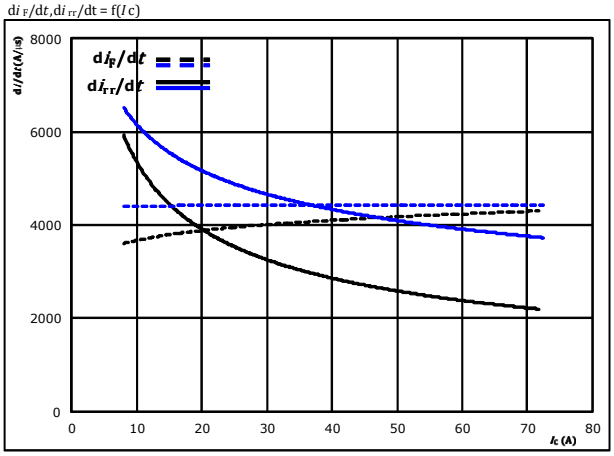
At						
	V_{CE} =	350	V		25 °C	
	V_{GE} =	+15/-5	V	T_j:	125 °C	
	I_C =	40	A			

Buck Switching Characteristics

Figure 13. **FWD**

Typical rate of fall of forward and reverse recovery current as a function of collector current

$di_F/dt, di_{rr}/dt = f(I_C)$

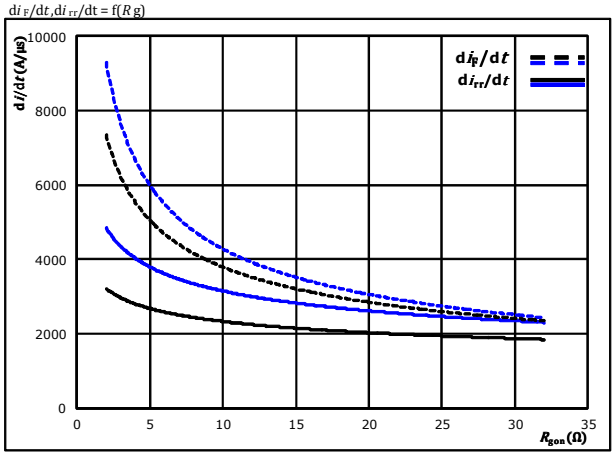


At					
V_{CE}=	350	V		25 °C	
V_{GE}=	+15/-5	V	T_j:	125 °C	
R_{gon}=	8	Ω			

Figure 14. **FWD**

Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor

$di_F/dt, di_{rr}/dt = f(R_g)$

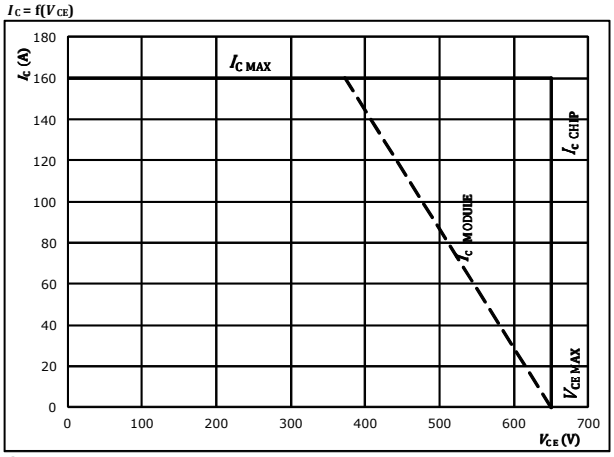


At					
V_{CE}=	350	V		25 °C	
V_{GE}=	+15/-5	V	T_j:	125 °C	
I_C=	40	A			

Figure 15. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



At

T_j=	175	°C
R_{gon}=	8	Ω
R_{goff}=	8	Ω

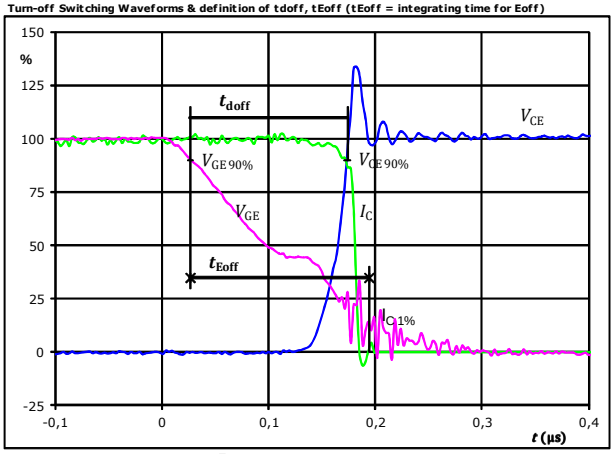
Buck Switching Definitions

General conditions

T_j	=	125 °C
R_{gon}	=	8 Ω
R_{goff}	=	8 Ω

Figure 1. IGBT

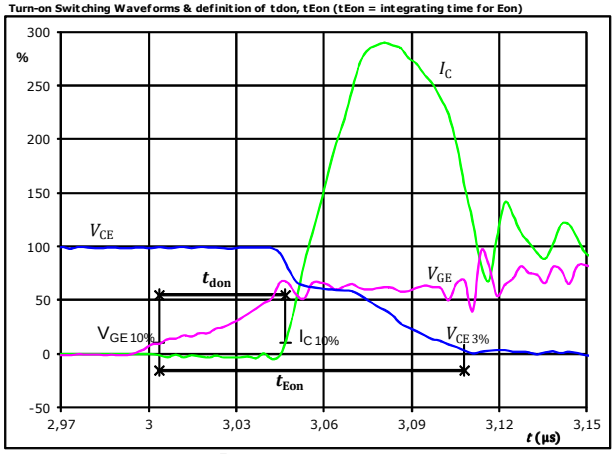
Turn-off Switching Waveforms & definition of tdoff, tEoff (tEoff = integrating time for Eoff)



$V_{GE}(0\%)$ =	-5	V
$V_{GE}(100\%)$ =	15	V
$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	40	A
t_{doff} =	0,146	µs
t_{Eoff} =	0,168	µs

Figure 2. IGBT

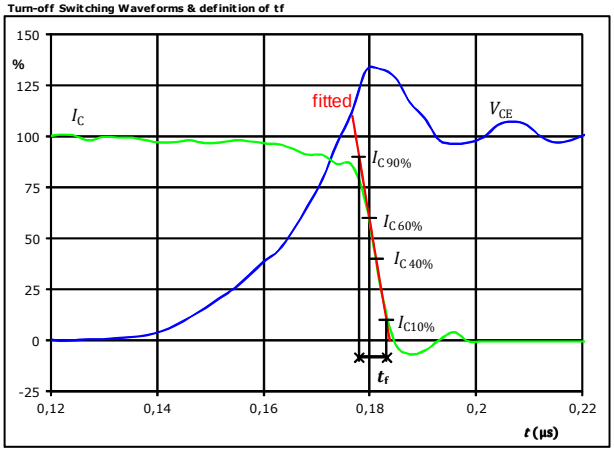
Turn-on Switching Waveforms & definition of tdon, tEon (tEon = integrating time for Eon)



$V_{GE}(0\%)$ =	-5	V
$V_{GE}(100\%)$ =	15	V
$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	40	A
t_{don} =	0,044	µs
t_{Eon} =	0,104	µs

Figure 3. IGBT

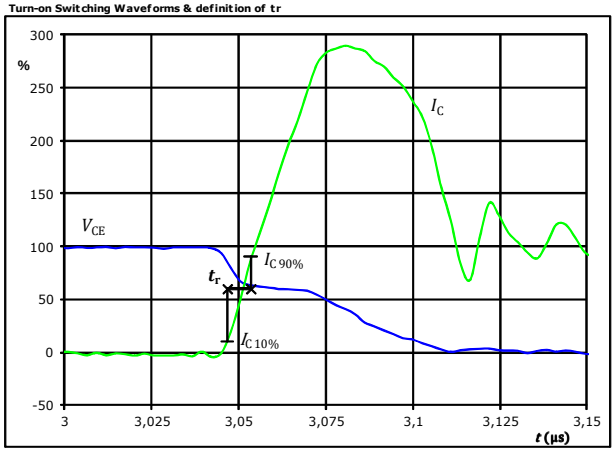
Turn-off Switching Waveforms & definition of tf



$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	40	A
t_f =	0,006	µs

Figure 4. IGBT

Turn-on Switching Waveforms & definition of tr

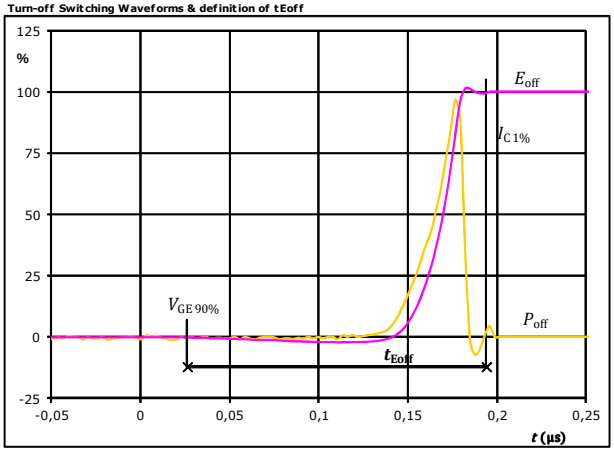


$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	40	A
t_r =	0,007	µs

Buck Switching Definitions

Figure 5. **IGBT**

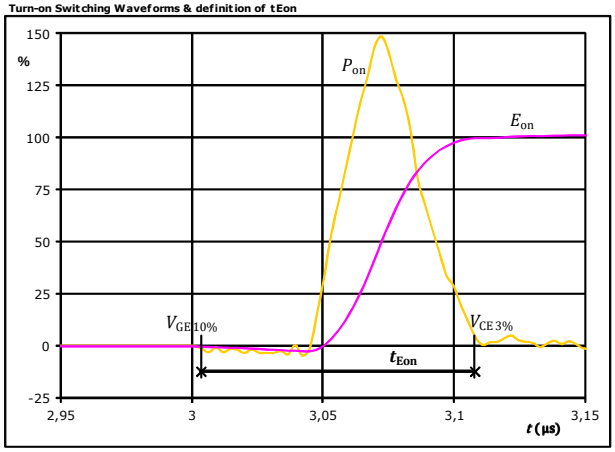
Turn-off Switching Waveforms & definition of tEoff



$P_{off}(100\%)$ =	13,98	kW
$E_{off}(100\%)$ =	0,27	mJ
t_{Eoff} =	0,17	µs

Figure 6. **IGBT**

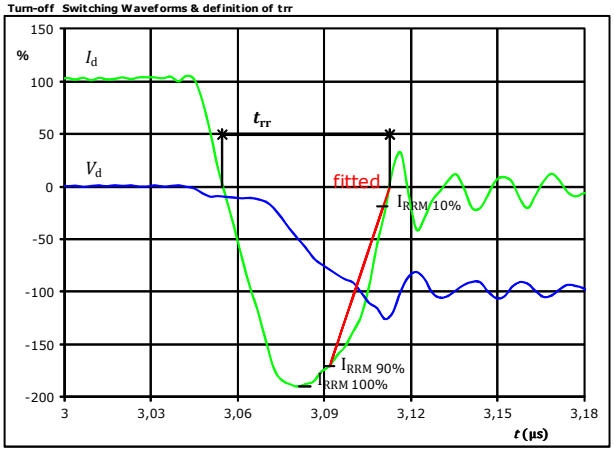
Turn-on Switching Waveforms & definition of tEon



$P_{on}(100\%)$ =	13,98	kW
$E_{on}(100\%)$ =	0,67	mJ
t_{Eon} =	0,10	µs

Figure 7. **FWD**

Turn-off Switching Waveforms & definition of trr

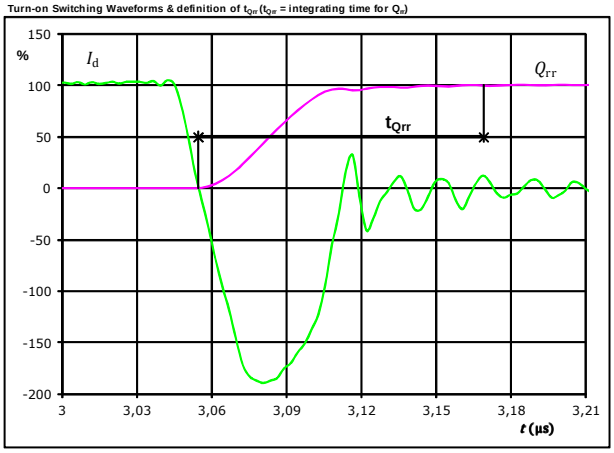


$V_d(100\%)$ =	350	V
$I_d(100\%)$ =	40	A
$I_{RRM}(100\%)$ =	-76	A
t_{rr} =	0,058	µs

Buck Switching Definitions

Figure 8. **FWD**

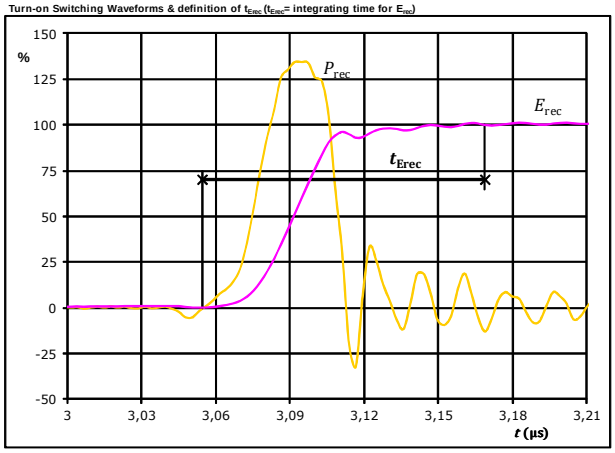
Turn-on Switching Waveforms & definition of t_{Qrr} (t_{Qrr} = integrating time for Q_{rr})



I_d (100%) =	40	A
Q_{rr} (100%) =	3,00	µC
t_{Qrr} =	0,11	µs

Figure 9. **FWD**

Turn-on Switching Waveforms & definition of t_{Erec} (t_{Erec}= integrating time for E_{rec})



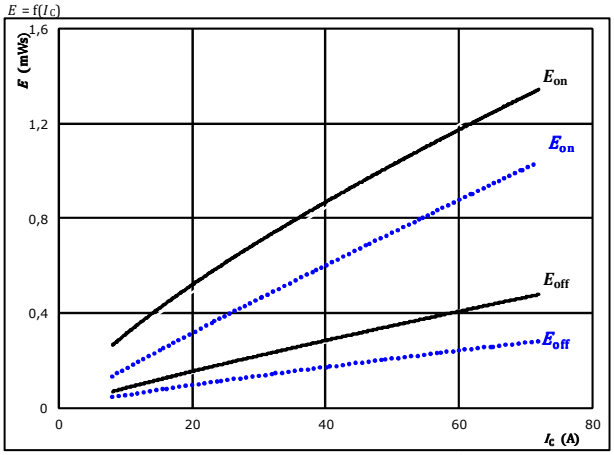
P_{rec} (100%) =	13,98	kW
E_{rec} (100%) =	0,63	mJ
t_{Erec} =	0,11	µs

Boost Switching Characteristics

Figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



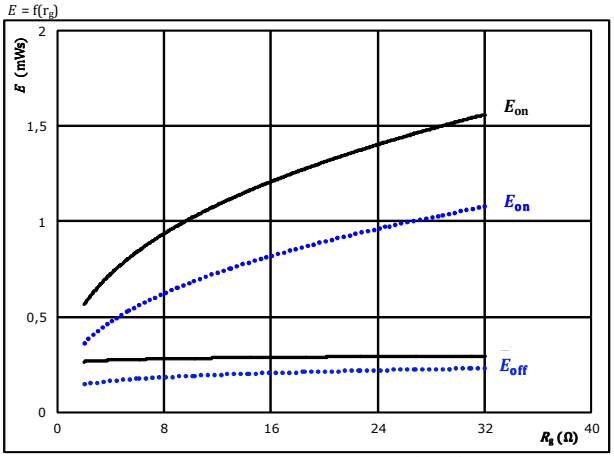
With an inductive load at — 25 °C ····· / T_j: 125 °C ——

V_{CE} =	350	V
V_{GE} =	+15/-5	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

Figure 2. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(r_g)$



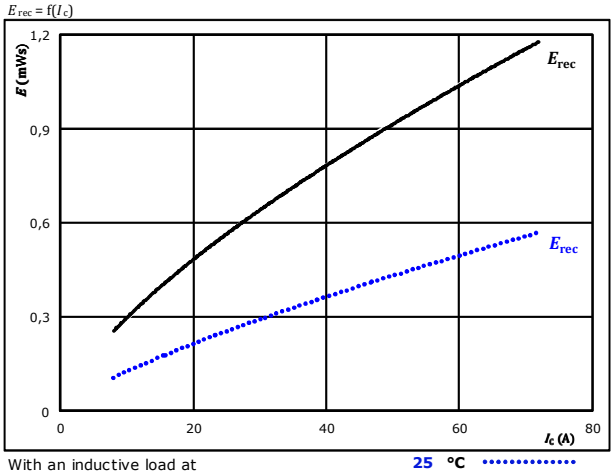
With an inductive load at — 25 °C ····· / T_j: 125 °C ——

V_{CE} =	350	V
V_{GE} =	+15/-5	V
I_C =	40	A

Figure 3. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



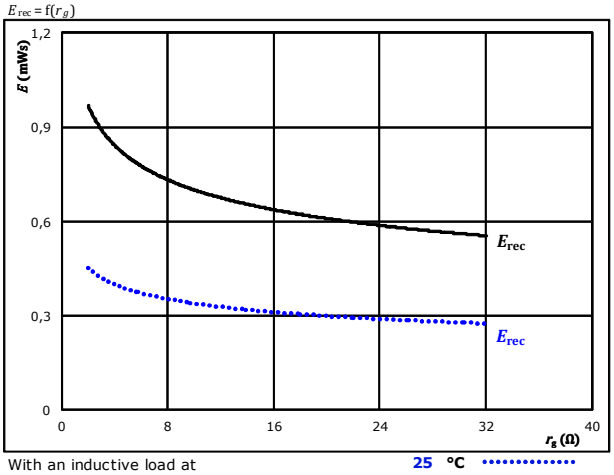
With an inductive load at — 25 °C ····· / T_j: 125 °C ——

V_{CE} =	350	V
V_{GE} =	+15/-5	V
R_{gon} =	8	Ω

Figure 4. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(r_g)$



With an inductive load at — 25 °C ····· / T_j: 125 °C ——

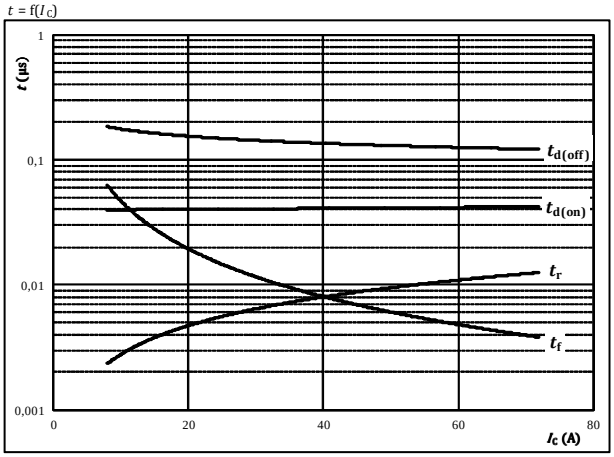
V_{CE} =	350	V
V_{GE} =	+15/-5	V
I_C =	40	A

Boost Switching Characteristics

Figure 5. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



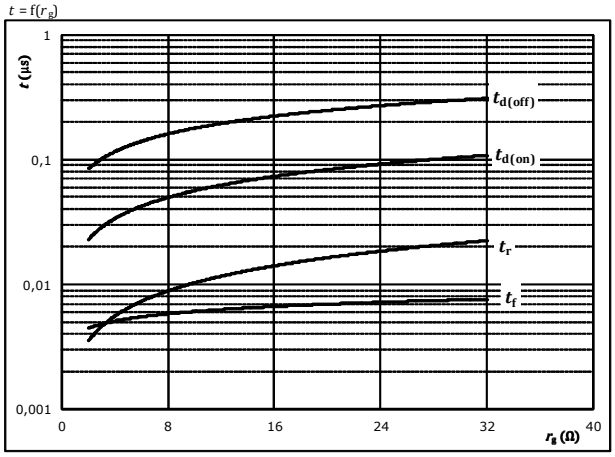
With an inductive load at

T_j =	125	°C
V_{CE} =	350	V
V_{GE} =	+15/-5	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

Figure 6. **IGBT**

Typical switching times as a function of gate resistor

$t = f(r_g)$



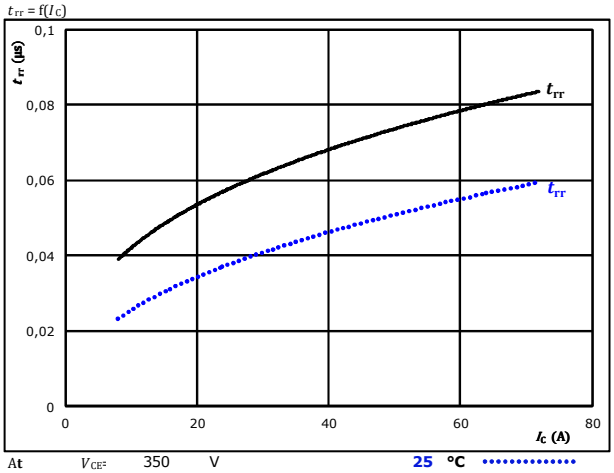
With an inductive load at

T_j =	125	°C
V_{CE} =	350	V
V_{GE} =	+15/-5	V
I_C =	40	A

Figure 7. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



At

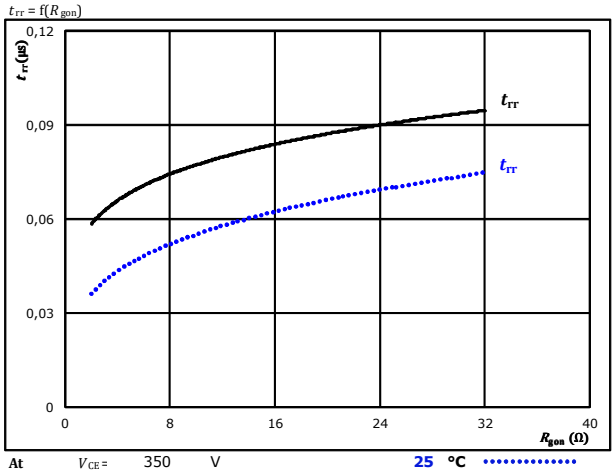
V_{CE} =	350	V
V_{GE} =	+15/-5	V
R_{gon} =	8	Ω

T_j: 25 °C, 125 °C

Figure 8. **FWD**

Typical reverse recovery time as a function of IGBT turn on gate resistor

$t_{rr} = f(R_{gon})$



At

V_{CE} =	350	V
V_{GE} =	+15/-5	V
I_C =	40	A

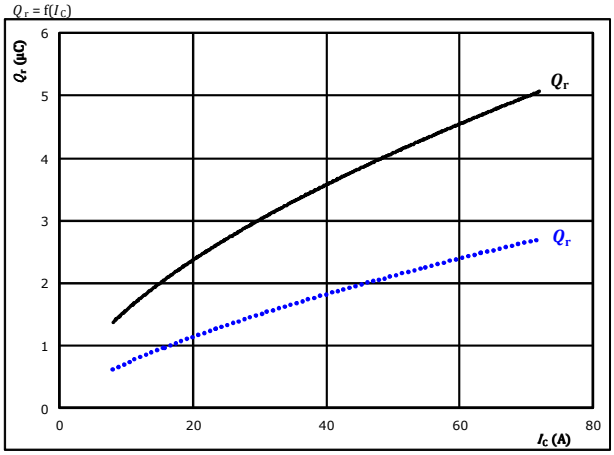
T_j: 25 °C, 125 °C

Boost Switching Characteristics

Figure 9. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$

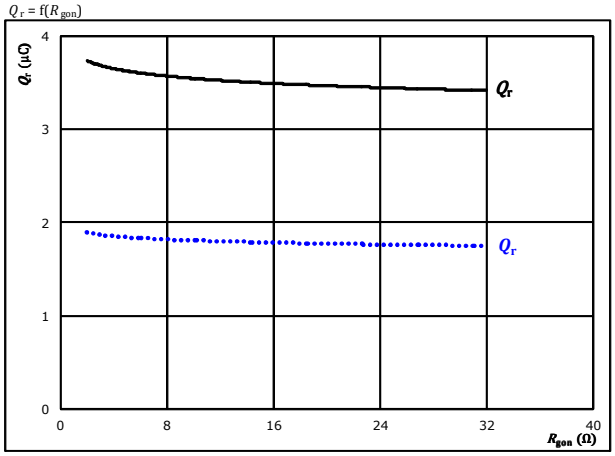


At						
	V_{CE} =	350	V		25 °C	·····
	V_{GE} =	+15/-5	V	T_j:	125 °C	———
	R_{gon} =	8	Ω			

Figure 10. **FWD**

Typical recoved charge as a function of IGBT turn on gate resistor

$Q_r = f(R_{gon})$

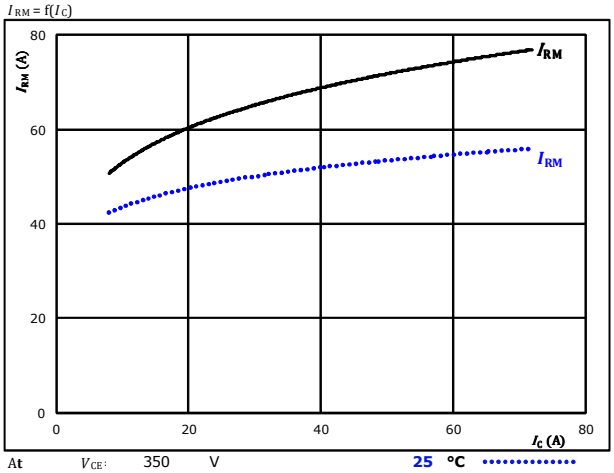


At						
	V_{CE}=	350	V		25 °C	·····
	V_{GE} =	+15/-5	V	T_j:	125 °C	———
	I_C=	40	A			

Figure 11. **FWD**

Typical peak reverse recovery current current as a function of collector current

$I_{RM} = f(I_C)$

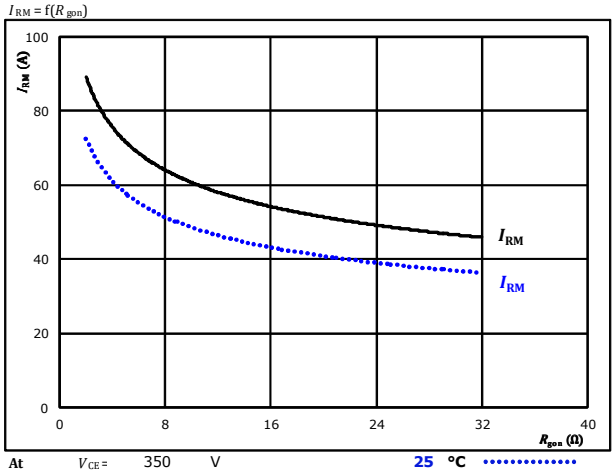


At						
	V_{CE}=	350	V		25 °C	·····
	V_{GE} =	+15/-5	V	T_j:	125 °C	———
	R_{gon} =	8	Ω			

Figure 12. **FWD**

Typical peak reverse recovery current as a function of IGBT turn on gate resistor

$I_{RM} = f(R_{gon})$



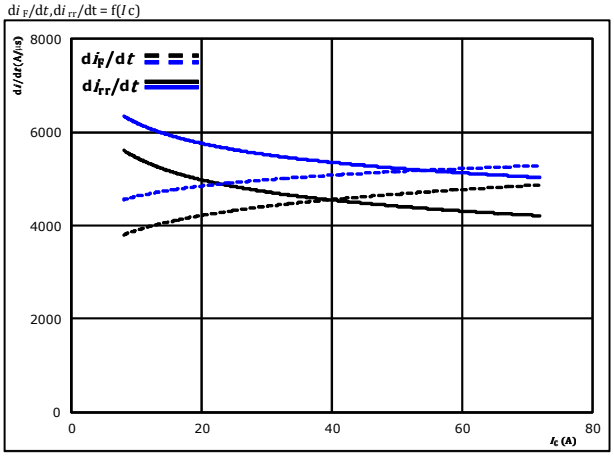
At						
	V_{CE} =	350	V		25 °C	·····
	V_{GE} =	+15/-5	V	T_j:	125 °C	———
	I_C =	40	A			

Boost Switching Characteristics

Figure 13. **FWD**

Typical rate of fall of forward and reverse recovery current as a function of collector current

$di_F/dt, di_{rr}/dt = f(I_C)$

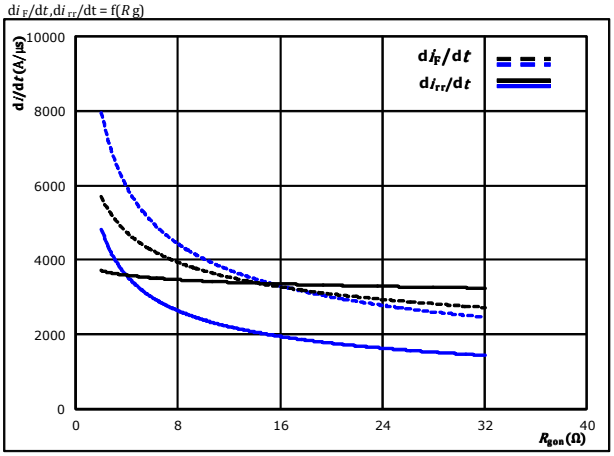


At					
V_{CE} =	350	V		25 °C	
V_{GE} =	+15/-5	V	T_j:	125 °C	
R_{gon} =	8	Ω			

Figure 14. **FWD**

Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor

$di_F/dt, di_{rr}/dt = f(R_g)$

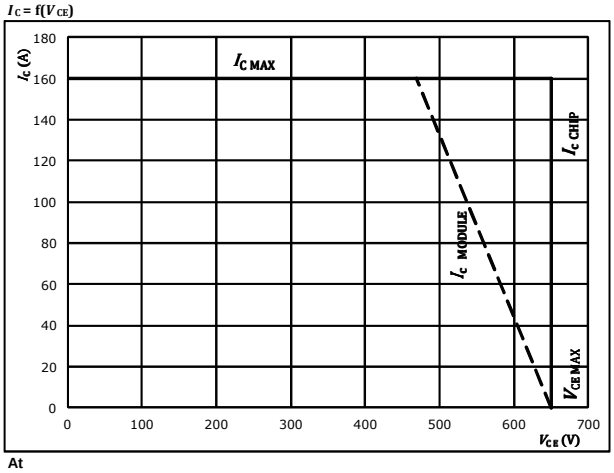


At					
V_{CE} =	350	V		25 °C	
V_{GE} =	+15/-5	V	T_j:	125 °C	
I_C =	40	A			

Figure 15. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



At

T_j =	175	°C
R_{gon} =	8	Ω
R_{goff} =	8	Ω

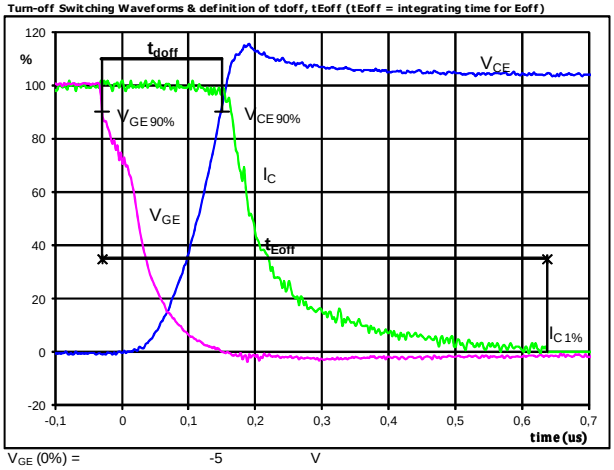
Boost Switching Definitions

General conditions

T_j	=	125 °C
R_{gon}	=	8 Ω
R_{goff}	=	8 Ω

Figure 1. IGBT

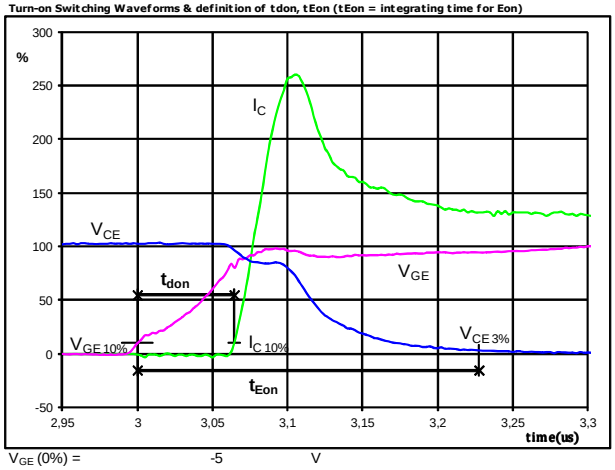
Turn-off Switching Waveforms & definition of tdoff, tEoff (tEoff = integrating time for Eoff)



V_{GE} (0%) =	-5	V
V_{GE} (100%) =	15	V
V_C (100%) =	600	V
I_C (100%) =	50	A
t_{doff} =	0,179	µs
t_{Eoff} =	0,667	µs

Figure 2. IGBT

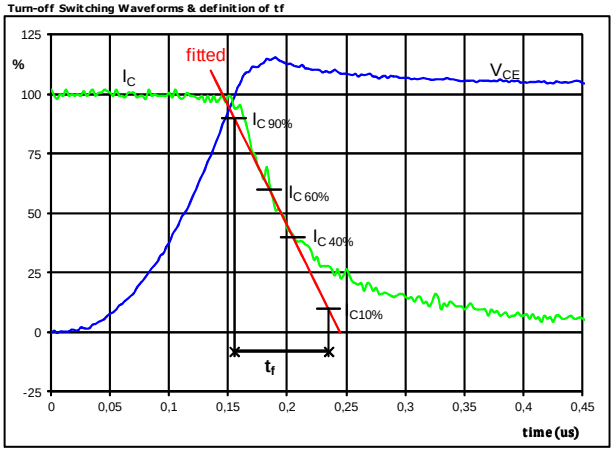
Turn-on Switching Waveforms & definition of tdon, tEon (tEon = integrating time for Eon)



V_{GE} (0%) =	-5	V
V_{GE} (100%) =	15	V
V_C (100%) =	600	V
I_C (100%) =	50	A
t_{don} =	0,064	µs
t_{Eon} =	0,227	µs

Figure 3. IGBT

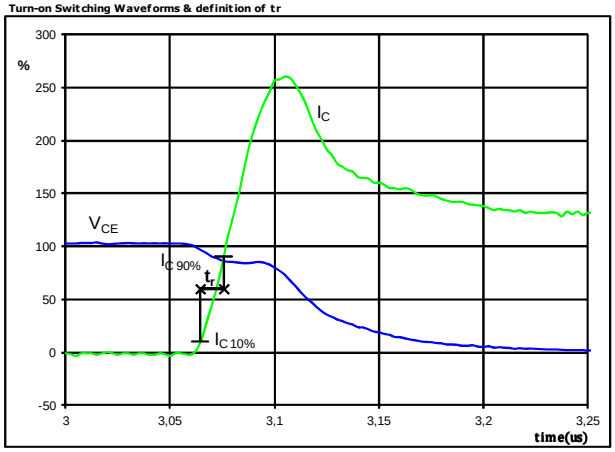
Turn-off Switching Waveforms & definition of tf



V_C (100%) =	600	V
I_C (100%) =	50	A
t_f =	0,096	µs

Figure 4. IGBT

Turn-on Switching Waveforms & definition of tr

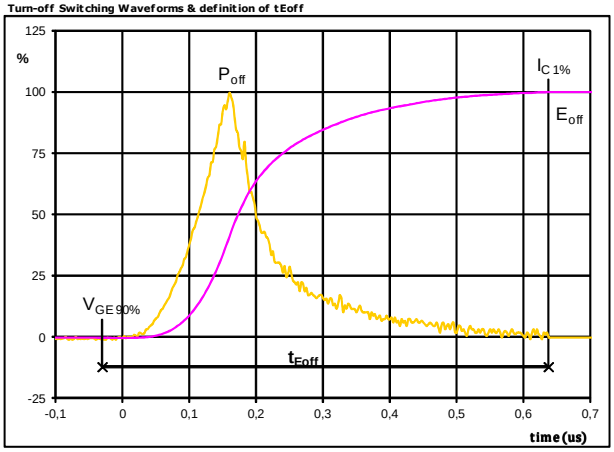


V_C (100%) =	600	V
I_C (100%) =	50	A
t_r =	0,011	µs

Boost Switching Definitions

Figure 5. **IGBT**

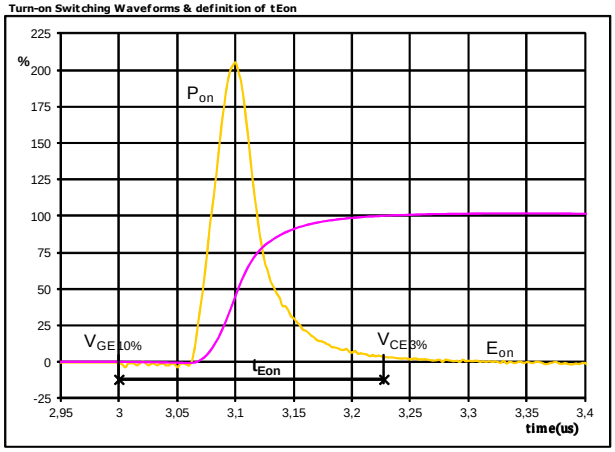
Turn-off Switching Waveforms & definition of tEoff



P_{off} (100%) =	29,96	kW
E_{off} (100%) =	3,90	mJ
t_{Eoff} =	0,67	µs

Figure 6. **IGBT**

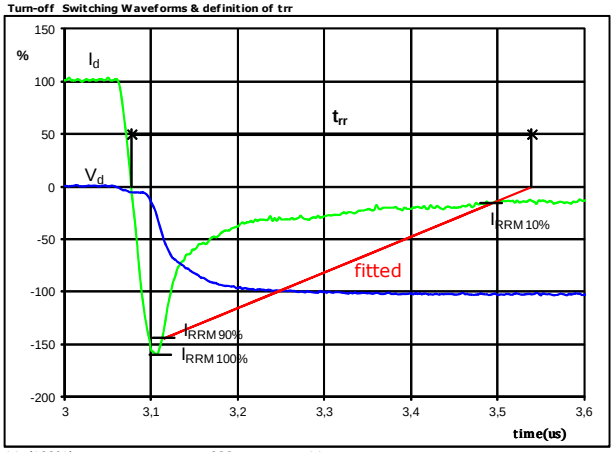
Turn-on Switching Waveforms & definition of tEon



P_{on} (100%) =	29,96	kW
E_{on} (100%) =	2,93	mJ
t_{Eon} =	0,23	µs

Figure 7. **FWD**

Turn-off Switching Waveforms & definition of trr

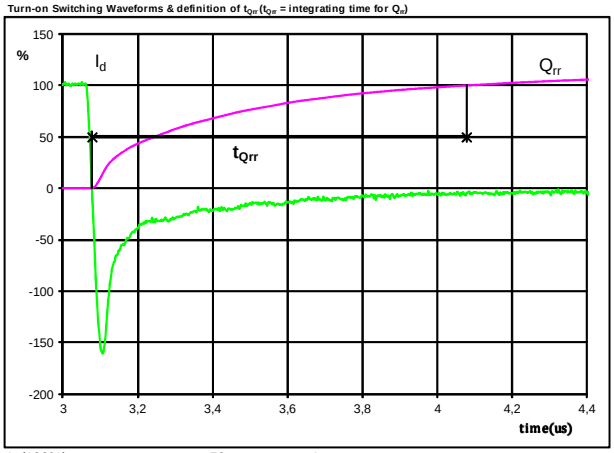


V_d (100%) =	600	V
I_d (100%) =	50	A
I_{RRM} (100%) =	-80	A
t_{rr} =	0,443	µs

Boost Switching Definitions

Figure 8. **FWD**

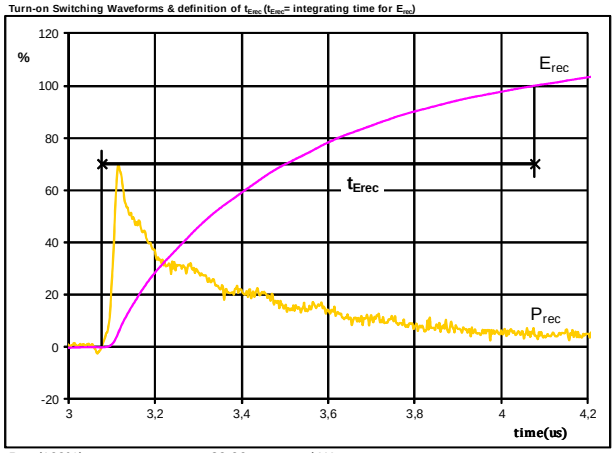
Turn-on Switching Waveforms & definition of t_{Qrr} (t_{Qrr} = integrating time for Q_{rr})



I_d (100%) =	50	A
Q_{rr} (100%) =	11,16	µC
t_{Qrr} =	1,00	µs

Figure 9. **FWD**

Turn-on Switching Waveforms & definition of t_{Erec} (t_{Erec}= integrating time for E_{rec})



P_{rec} (100%) =	29,96	kW
E_{rec} (100%) =	5,40	mJ
t_{Erec} =	1,00	µs

Ordering Code & Marking

Version	Ordering Code
with thermal paste 12mm housing with Solder pins	10-FY07NIB080SM03-L095F03
with thermal paste 12mm housing with Press-fit pins	10-PY07NIB080SM03-L095F03Y

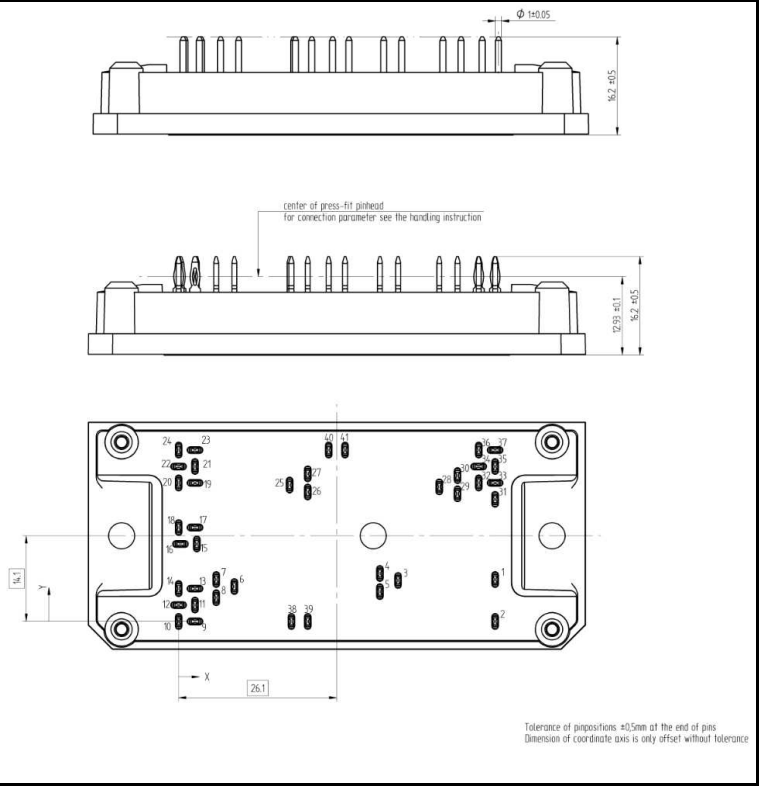
	Name	Date code	UL & Vinco	Lot	Serial
Text	NN-NNNNNNNNNNNNNN-TTTTTTTVV	WWYY	UL Vinco	LLLLL	SSSS

	Type	Lot number	Serial	Date code		
Datamatrix	TTTTTTTVV	LLLLL	SSSS	WWYY		

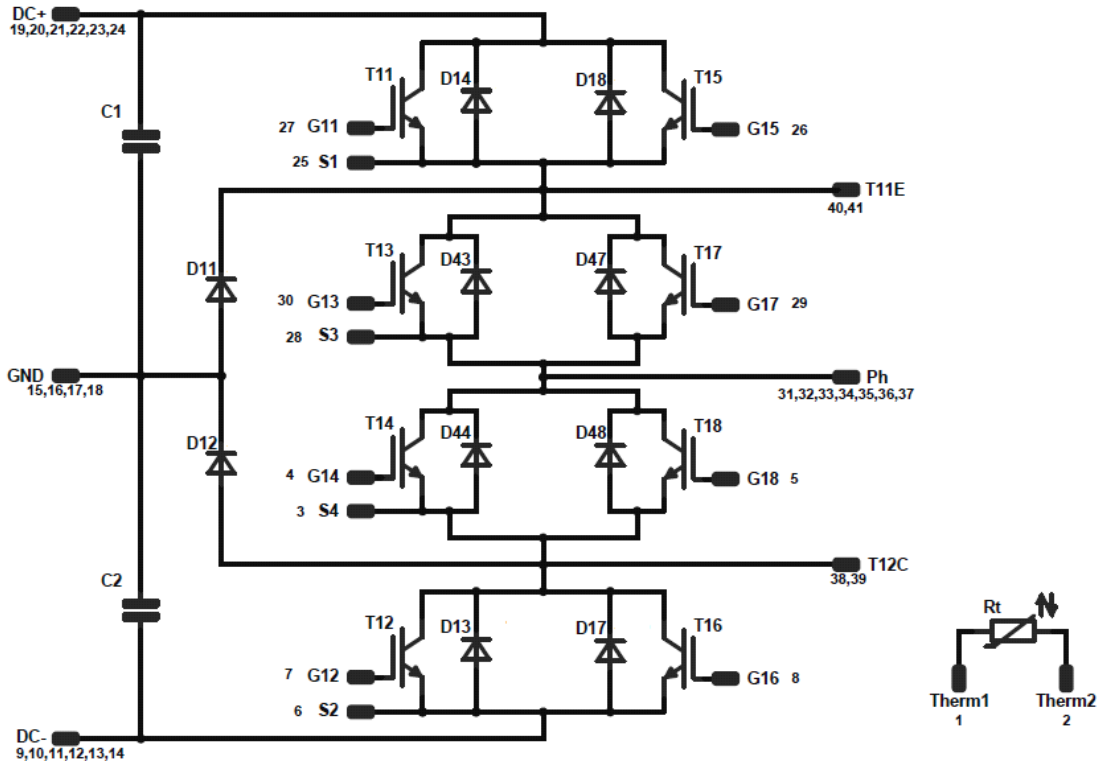
Outline

Pin table [mm]			
Pin	X	Y	Pos
1	52,2	6,9	Therm1
2	52,2	0	Therm2
3	36,2	6,75	S4
4	33,2	7,9	G14
5	33,2	4,9	G18
6	9,2	5,75	S2
8	6,2	3,9	G16
9	2,7	0	DC-
10	0	0	DC-
11	2,7	2,7	DC-
12	0	2,7	DC-
13	2,7	5,4	DC-
14	0	5,4	DC-
15	3	12,75	GND
16	0,3	12,75	GND
17	2,7	15,45	GND
18	0	15,45	GND
19	2,7	22,8	DC+
20	0	22,8	DC+
21	2,7	25,5	DC+
22	0	25,5	DC+
23	2,7	28,2	DC+
24	0	28,2	DC+
25	18,3	22,45	S1
26	21,3	21,3	G15
27	21,3	24,3	G11
28	43	22,15	S3
29	46	21	G17

Pin table [mm]			
Pin	X	Y	Pos
30	46	24	G13
31	52,2	20,1	Ph
32	49,5	22,8	Ph
33	52,2	22,8	Ph
34	49,5	25,5	Ph
35	52,2	25,5	Ph
36	49,5	28,2	Ph
37	52,2	28,2	Ph
38	18,6	0	T12C
39	21,3	0	T12C
40	24,75	28,2	T11E
41	27,45	28,2	T11E



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11||T15	IGBT	650V	2*40A	HS Buck switch	Parallel devices with separate control. Values pretains to complete device.
T12||T16	IGBT	650V	2*40A	LS Buck switch	Parallel devices with separate control. Values pretains to complete device.
T13||T17	IGBT	650V	2*40A	HS Boost switch	Parallel devices with separate control. Values pretains to complete device.
T14||T18	IGBT	650V	2*40A	LS Boost switch	Parallel devices with separate control. Values pretains to complete device.
D14||D18	FWD	650V	2*60A	HS Boost diode	Parallel devices with separate control. Values pretains to complete device.
D13||D17	FWD	650V	2*60A	LS Boost diode	Parallel devices with separate control. Values pretains to complete device.
D43,D47,D44,D48	FWD	650V	30A	Boost inverse diode	
D11,D12	FWD	650V	80A	Buck diode	
R_t	NTC			Thermistor	22kΩ
C1, C2	Capacitor	630V		DC Link Capacitance	47nF +/- 10%

Packaging instruction					
Standard packaging quantity (SPQ)	100	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* 1 packages see vincotech.com website.

Package data
Package data for *flow* 1 packages see vincotech.com website.

Document No.:	Date:	Modification:	Pages
10-xY07NIB080SM03-L095F03x-D5-14	22 May. 2017	Solder pin option	1,28