Vincotech

10-PZ07BIA030SM01-P894E68Y
10-FZ07BIA030SM01-P894E68
datasheet

flow SOL 0 BI — 650 V / 30 A

Features

- High efficiency
- Ultra fast switching frequency
- Low inductive design
- Boost: MOSFET +SiC diode
- H-bridge: IGBT H5 and ultrafast Si diode

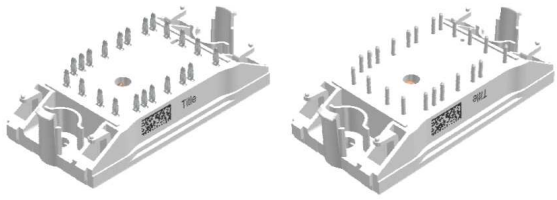
Target applications

- Transformerless solar inverters

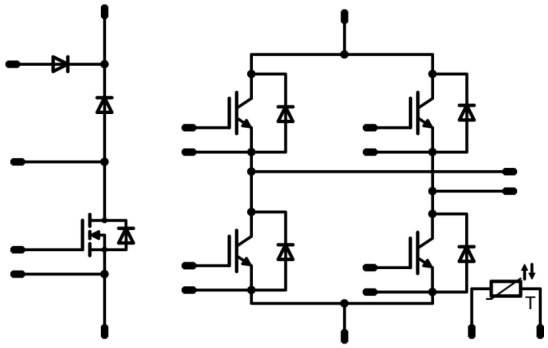
Types

- 10-PZ07BIA030SM01-P894E68Y
- 10-FZ07BIA030SM01-P894E68

flow 0 12mm housing



Schematic



H-Bridge switch Maximum Ratings

Tj=25°C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Collector-emitter break down voltage	V_{CES}			650	V
DC collector current	I_C	$T_j=T_j max$	T_h=80°C	30	A
Pulsed collector current	I_{Cpulse}	t_p limited by $T_j max$		90	A
Power dissipation per IGBT	P_{tot}	$T_j=T_j max$	T_h=80°C	57	W
Gate-emitter peak voltage	V_{GE}			±20	V
Maximum Junction Temperature	$T_j max$			175	°C

Inp. Boost switch Maximum Ratings

Tj=25°C, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
Drain to source breakdown voltage	V_{DS}		600	V
DC drain current	I_D	T_j=$T_j$max T_h=80°C	23	A
Pulsed drain current	I_{Dpulse}	t_p limited by $T_j$max	159	A
Avalanche energy, single pulse	E_{AS}	ID=9,3 VDD=50	1135	mJ
Avalanche energy, repetitive	E_{AR}	ID=9,3 VDD=50	1,7	mJ
Avalanche current, repetitive	I_{AR}	t_p limited by $T_{j\,MAX}$ P_{AV}=E_{AR}*f	9,3	A
MOSFET dv/dt ruggedness	dv/dt	VDS= 0-480V	50	V/ns
Power dissipation	P_{tot}	Tj=Tjmax T_h=80°C	90	W
Gate-source peak voltage	V_{GS}		±20	V
Reverse diode dv/dt	dv/dt		15	V/ns
Maximum Junction Temperature	$T_j$max		150	°C

H-Bridge diode Maximum Ratings

Tj=25°C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Peak Repetitive Reverse Voltage	V_{RRM}		650	V
DC forward current	I_F	T_j=$T_j$max T_h=80°C	30	A
Power dissipation	P_{tot}	T_j=$T_j$max T_h=80°C	25	W
Maximum Junction Temperature	$T_j$max		175	°C

Inp. Boost diode Maximum Ratings

Tj=25°C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Peak Repetitive Reverse Voltage	V_{RRM}			650	V
DC forward current	I_F	T_j=$T_j$max	T_h=80°C	16	A
Repetitive peak forward current	I_{FRM}			40A	A
Non-repetitive peak surge current	I_{FSM}	60Hz Single Half Sine Wave		40	A
Power dissipation	P_{tot}	T_j=$T_j$max	T_h=80°C	34	W
Maximum Junction Temperature	$T_j$max			175	°C

Module Properties

Parameter	Symbol	Conditions		Value	Unit
Thermal Properties					
Storage temperature	T_{stg}			-40...+125	°C
Operation Junction Temperature	T_{jop}			-40...+(T_{jmax} - 25)	°C
Isolation Properties					
Isolation voltage	V_{isol}	DC voltage	t_p=2s	4000	V
Creepage distance				min 12,7	mm
Clearance				min 8,96	mm
Comparative Tracking Index	CTI			>200	

H-Bridge switch Characteristic Values

Tj=25°C, unless otherwise specified

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	$V_{GE(th)}$	$V_{GE}=V_{CE}$			0,0003	25 125	3,3	4	4,7	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		30	25 125 150		1,63 1,65 -	2,22	V
Collector-emitter cut-off	I_{CES}		0	650		25 125			40	µA
Gate-emitter leakage current	I_{GES}		20	0		25 125			120	nA
Integrated Gate resistor	R_{gint}							none		Ω
Input capacitance	C_{ies}	f=1MHz	0	25		25		1800		pF
Output capacitance	C_{oss}							45		
Reverse transfer capacitance	C_{rss}							7		
Gate charge	Q_{Gate}		15	520	30	25		70		nC
Thermal										
Thermal resistance chip to heatsink	R_{thJH}	Phase-Change Material λ=3,4W/mK						1,67		K/W

H-Bridge switch Dynamic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V]	V_r [V] or V_{CE} [V]	I_C [A] or I_F [A] or I_D [A]	T_j [°C]	Min	Typ	Max	
IGBT Switching										
Turn-on delay time	$t_{d(on)}$	R_{goff} = 16 Ω R_{gon} = 16 Ω	±15	400	30	25 125 150		66 66 67		ns
Rise time	t_r					25 125 150		7 9 10		
Turn-off delay time	$t_{d(off)}$					25 125 150		70 86 88		
Fall time	t_f					25 125 150		4 10 13		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 1,1 µC Q_{rFWD} = 2,4 µC Q_{rFWD} = 3,5 µC				25 125 150		0,659 0,963 1,042		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,142 0,253 0,281		
FWD Switching										
Peak recovery current	I_{RRM}	di/dt = 3260 A/µs di/dt = 2940 A/µs di/dt = 3459 A/µs	±15	400	30	25 125 150		33 48 54		A
Reverse recovery time	t_{rr}					25 125 150		89 115 129		ns
Recovered charge	Q_r					25 125 150		1,082 2,368 3,499		µC
Reverse recovered energy	E_{rec}					25 125 150		0,198 0,481 0,888		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		2649 1253 1360		A/µs

Inp. Boost switch Characteristic Values

Tj=25°C, unless otherwise specified

Parameter	Symbol	Conditions					Value			Unit
			V_{GS} [V]	V_{DS} [V]	I_D [A]	T_j [°C]	Min	Typ	Max	
Static										
Static drain to source ON resistance	$R_{DS(on)}$		10		25	25 125 150		71 151 -	80	mΩ
Gate threshold voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}$			0,00172	25 125	2,5	3	3,5	V
Gate to Source Leakage Current	I_{GSS}		20	0		25 125			100	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	600		25 125			5	µA
Integrated Gate resistor	R_{gint}							0,85		Ω
Total gate charge	Q_G							170		
Gate to source charge	Q_{GS}		0/10	480	25,8	25		21		nC
Gate to drain charge	Q_{GD}							87		
Input capacitance	C_{iss}							3800		
Output capacitance	C_{oss}	f=1MHz	0	100		25		215		pF
Reverse transfer capacitance	C_{rss}							35		
Thermal										
Thermal resistance chip to heatsink per chip	R_{thJH}	Phase-Change Material λ=3,4W/mK						0,78		K/W

Inp. Boost switch Dynamic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] or V_{GS} [V]	V_r [V] or V_{CE} [V] or V_{DS} [V]	I_C [A] or I_F [A] or I_D [A]	T_j[°C]	Min	Typ	Max	
MOSFET Switching										
Turn-on delay time	$t_{d(on)}$	R_{goff}=2Ω R_{gon}=2Ω	±15	400	25	25 125 150		19 19 18		ns
Rise time	t_r					25 125 150		5 6 6		
Turn-off delay time	$t_{d(off)}$					25 125 150		105 108 108		
Fall time	t_f					25 125 150		100 41 40		
Turn-on energy loss per pulse	E_{on}	Q_{rr}FWD=0uC Q_{rr}FWD=0uC				25 125 150		0,083 0,095 0,098		mWs
Turn-off energy loss per pulse	E_{off}					25 125 150		0,054 0,065 0,069		
FWD Switching										
Peak recovery current	I_{RRM}	di /dt =3768A/µs di /dt =3660A/µs di /dt =3343A/µs	±15	400	25	25 125 150		16 15 14		A
Reverse recovery time	t_{rr}	di /dt =3768A/µs di /dt =3660A/µs di /dt =3343A/µs				25 125 150		7 7 7		ns
Reverse recovery charge	Q_{rr}	di /dt =3768A/µs di /dt =3660A/µs di /dt =3343A/µs				25 125 150		0,048 0,042 0,035		µC
Reverse recovered energy	E_{rec}	di /dt =3768A/µs di /dt =3660A/µs di /dt =3343A/µs				25 125 150		0,003 0,003 0,003		mWs
Peak rate of fall of recovery current	E_{rec}	di /dt =3768A/µs di /dt =3660A/µs di /dt =3343A/µs				25 125 150		7093 6750 7081		A/µs

H-bridge diode Characteristic values

Parameter	Symbol	Conditions					Value			Unit
		dI_F/dt [A/us]		V_r [V]	I_F [A]	T_j	Min	Typ	Max	
Static										
Forward voltage	V_F				15	25°C 125°C 150°C		1,44 1,20 1,14	1,52	V
Reverse leakage current	I_{rm}			650		25°C 150°C			5 -	µA
Thermal										
Thermal resistance chip to heatsink	R_{thJH}	Phase-Change Material λ=3,4W/mK						1,81		K/W

Inp. Boost diode Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
		dI_F/dt [A/us]		V_r [V]	I_F [A]	T_j	Min	Typ	Max	
Static										
Forward voltage	V_F				10	25°C 125°C 150°C		1,40 1,54 1,61	1,55	V
Reverse leakage current	I_{rm}			650		25°C 150°C			2 30	µA
Thermal										
Thermal resistance chip to heatsink	R_{thJH}	Phase-Change Material λ=3,4W/mK						2,80		K/W

Bypass diode Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
		dI_F/dt [A/us]		V_r [V]	I_F [A]	T_j	Min	Typ	Max	
Static										
Forward voltage	V_F				13	25°C 125°C 150°C		0,99 0,90 -	1,21	V
Reverse leakage current	I_{rm}			1600		25°C 150°C			50 1100	µA
Thermal										
Thermal resistance chip to heatsink	R_{thJH}	Phase-Change Material λ=3,4W/mK						1,16		K/W

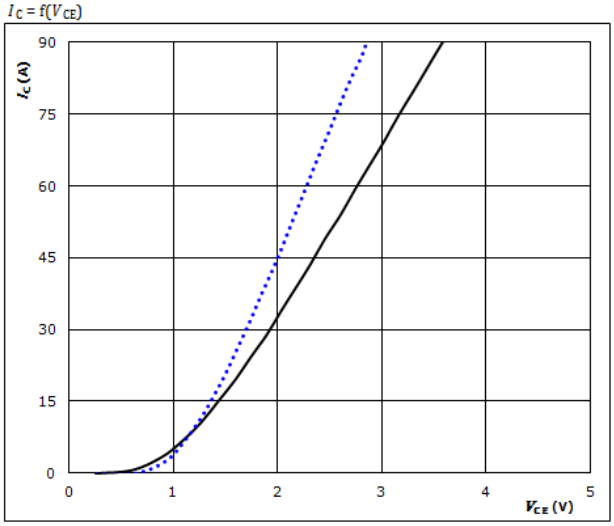
Thermistor

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j [°C]	Min	Typ	Max	
Rated resistance	R					25		22		kΩ
Deviation of R100	$\Delta_{R/R}$	R100=1486 Ω				100	-12		+12	%
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	

H-Bridge switch Characteristics

Typical output characteristics IGBT

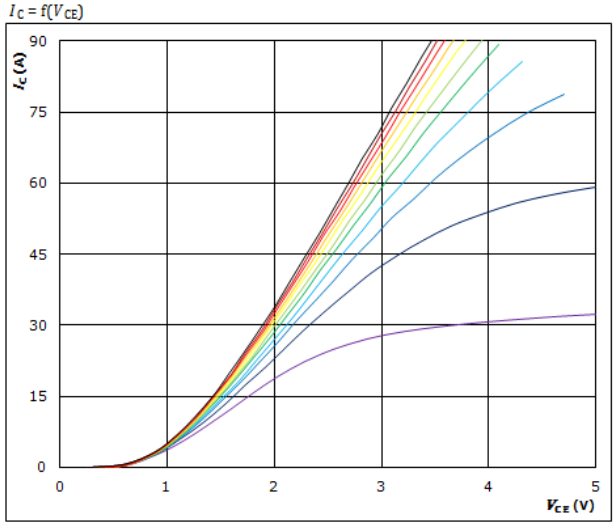
$I_C = f(V_{CE})$



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

Typical output characteristics IGBT

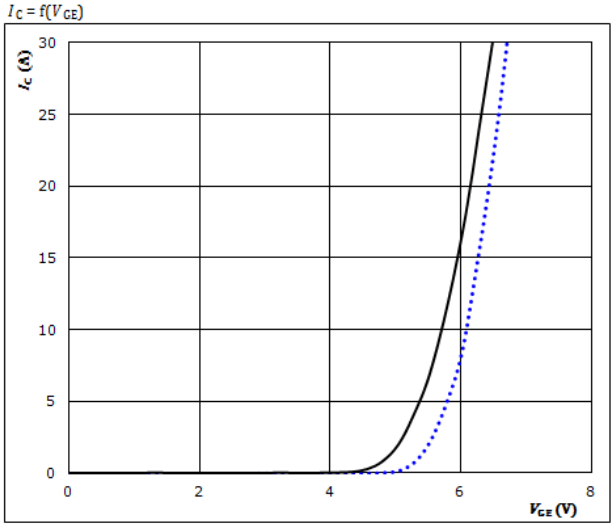
$I_C = f(V_{CE})$



t_p =	250	µs
T_j =	125	°C
V_{GE} from	7 V to 17 V in steps of 1 V	

Typical transfer characteristics IGBT

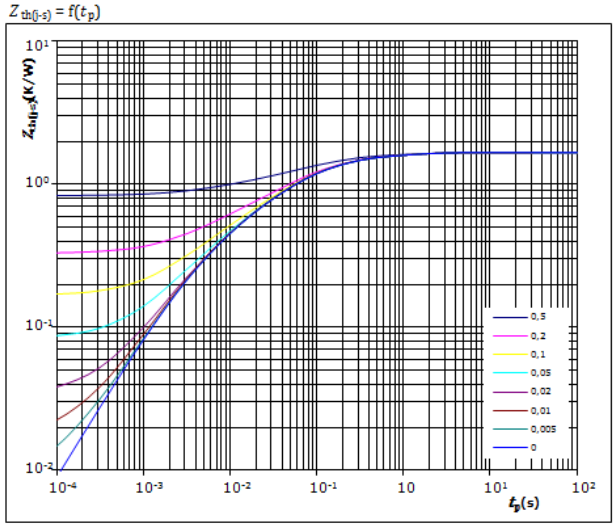
$I_C = f(V_{CE})$



t_p =	100	µs	25 °C
V_{CE} =	10	V	125 °C
			150 °C

Transient Thermal Impedance as function of Pulse duration IGBT

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



D =	t_p / T	
$R_{th(j-s)}$ =	1,67	K/W

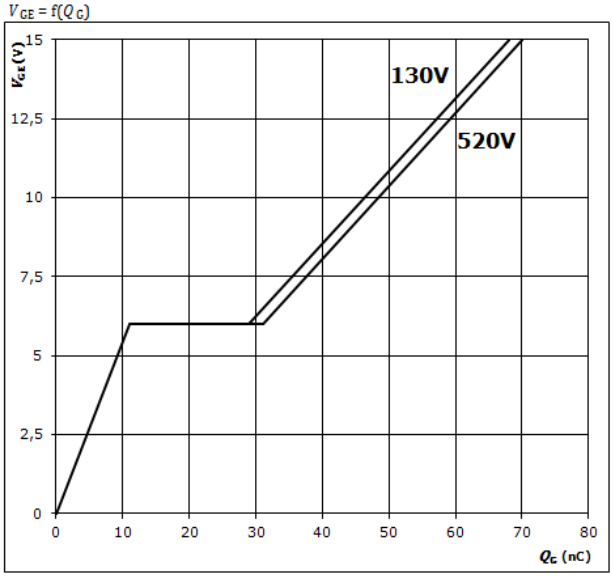
IGBT thermal model values

R_{th} (K/W)	τ (s)
1,80E-01	1,06E+00
3,72E-01	1,72E-01
6,39E-01	5,52E-02
3,20E-01	1,27E-02
1,54E-01	3,03E-03

H-Bridge switch Characteristics

Gate voltage vs Gate charge **IGBT**

$V_{GE} = f(Q_G)$



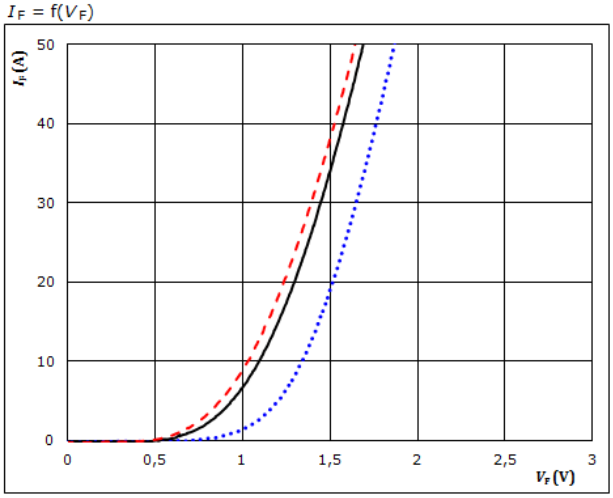
At

I_C= 30 A

H-Bridge diode Characteristics

Typical forward characteristics **FWD**

$I_F = f(V_F)$

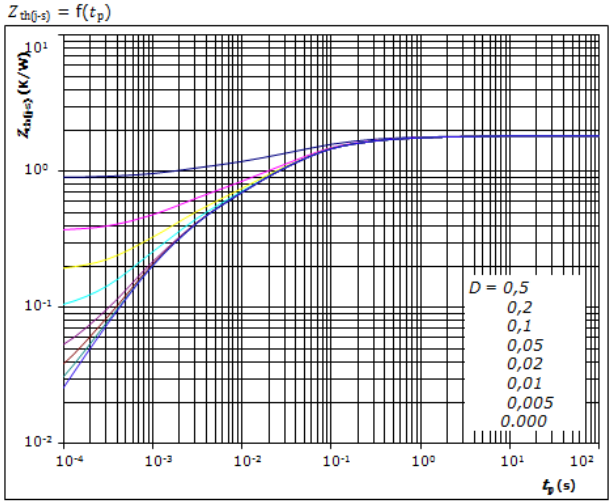


t_p = 250 µs

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

$R_{th(j-s)}$ = 1,81 K/W

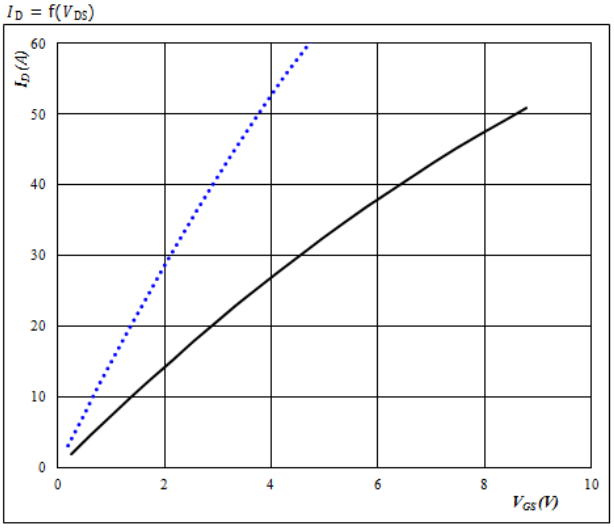
FWD thermal model values

R (K/W)	τ (s)
7,18E-02	2,84E+00
2,48E-01	2,83E-01
8,26E-01	5,02E-02
3,94E-01	8,85E-03
2,67E-01	1,33E-03

Inp. Boost switch Characteristics

Typical output characteristics **MOSFET**

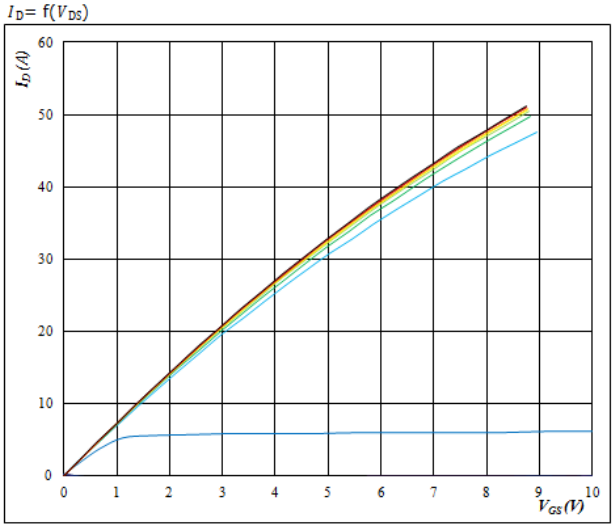
$I_D = f(V_{DS})$



t_p =	250	µs		25 °C
V_{GS}=	10	V	T_j:	125 °C
				150 °C

Typical output characteristics **MOSFET**

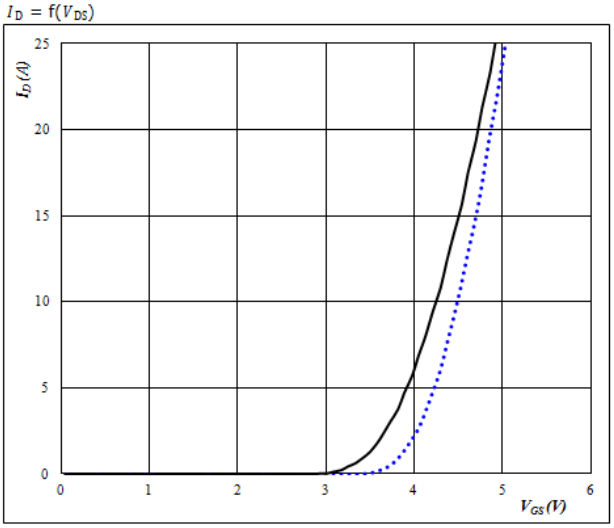
$I_D = f(V_{DS})$



t_p =	250	µs
T_j =	25oC	°C
V_{GS} from	0 V to 20 V in steps of 2 V	

Typical transfer characteristics **MOSFET**

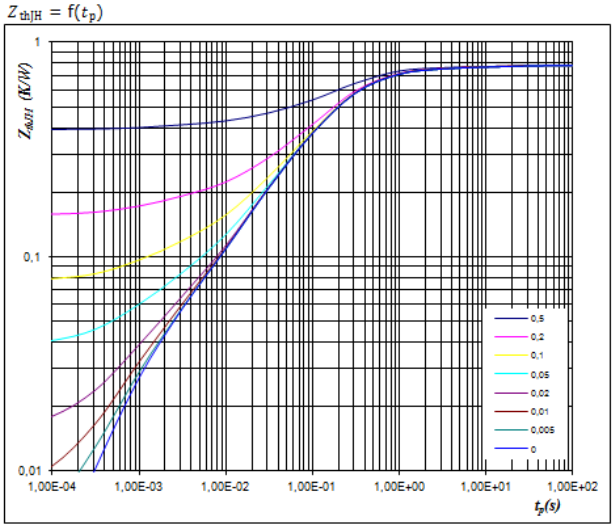
$I_D = f(V_{DS})$



t_p =	100	µs		25 °C
V_{DS} =	0	V	T_j:	125 °C
				150 °C

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

$Z_{thJH} = f(t_p)$



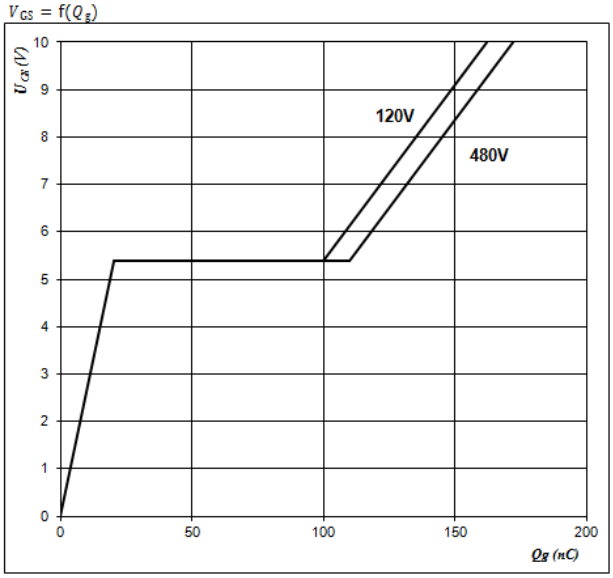
D =	t_p / T	
R_{thJH} =	0,78	K/W

R (K/W)	Tau (s)
2,79E-02	1,48E+01
9,18E-02	1,22E+00
4,16E-01	2,24E-01
1,49E-01	5,85E-02
6,36E-02	1,29E-02
3,14E-02	1,19E-03

Inp. Boost switch Characteristics

Gate voltage vs Gate charge MOSFET

$V_{GS} = f(Q_g)$



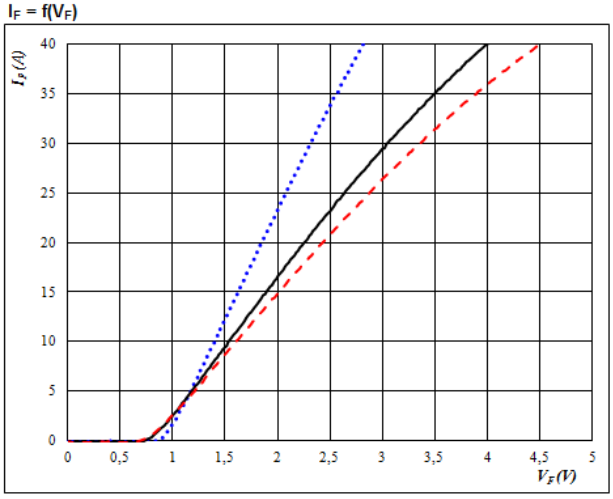
At

I_C= 25 A

Inp. Boost diode Characteristics

Typical forward characteristics FWD

$I_F = f(V_F)$

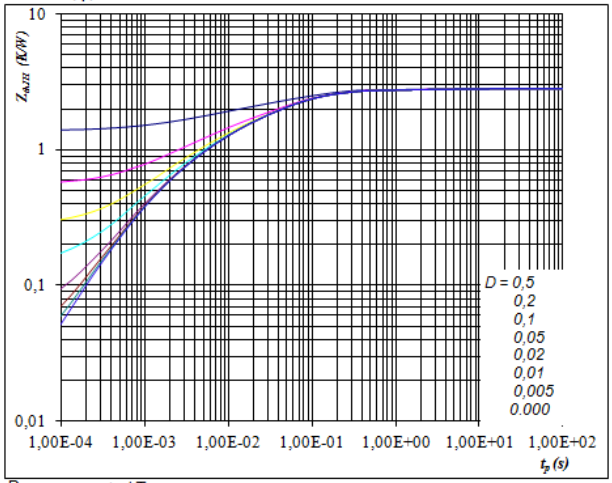


t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

Transient thermal impedance as a function of pulse width FWD

$Z_{thJH} = f(t_p)$



D = t_p / T

R_{thJH} = 2,8 K/W

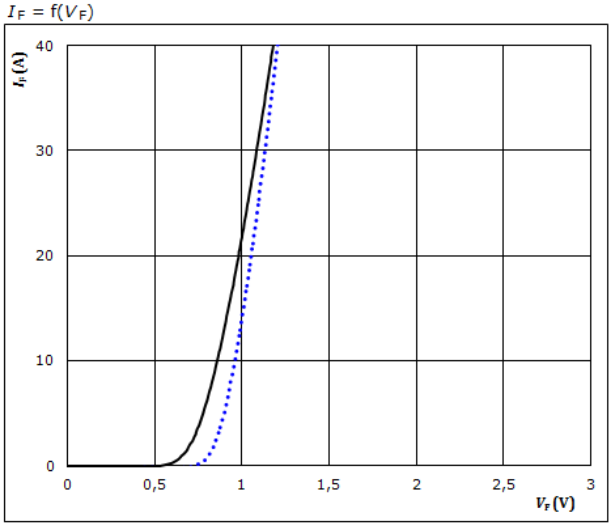
FWD thermal model values

R (K/W)	Tau (s)
4,81E-02	9,47E+00
1,46E-01	6,52E-01
1,16E+00	6,96E-02
7,19E-01	1,27E-02
5,28E-01	2,90E-03
1,98E-01	6,80E-04

Bypass diode Characteristics

Typical forward characteristics **Diode**

$I_F = f(V_F)$

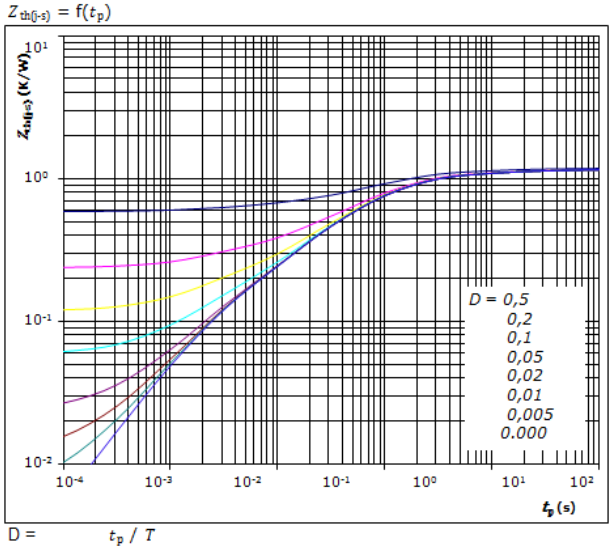


t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

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

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



D = t_p / T

$R_{th(j-s)}$ = 1,16 K/W

Diode thermal model values

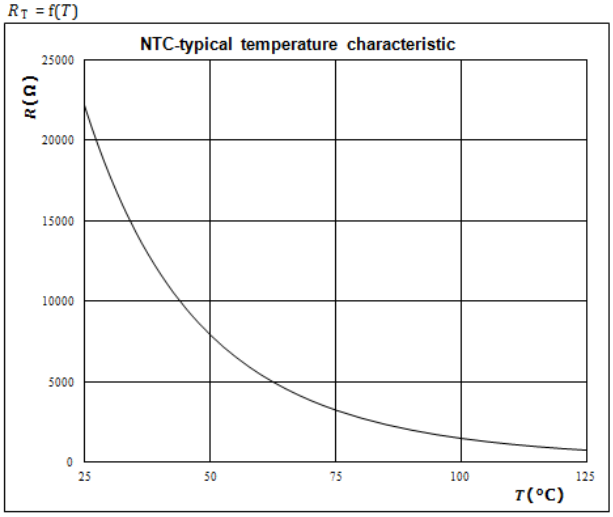
R (K/W)	τ (s)
5,14E-02	1,28E+01
1,22E-01	9,21E-01
5,42E-01	1,28E-01
3,74E-01	2,87E-02
9,37E-02	2,38E-03

Thermistor Characteristics

Thermistor typical temperature characteristic

Typical NTC characteristic as a function of temperature

$R_T = f(T)$

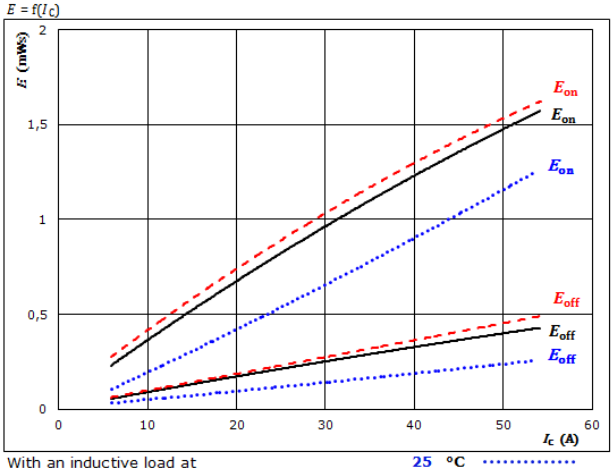


H-bridge Switching Characteristics

Figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



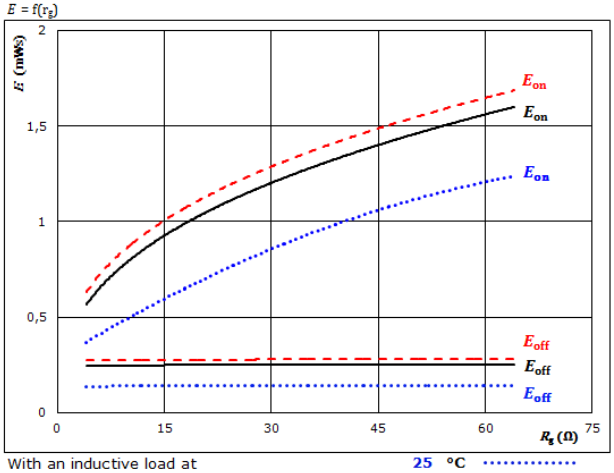
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	16	Ω		150 °C
R_{goff} =	16	Ω		

Figure 2. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(r_g)$



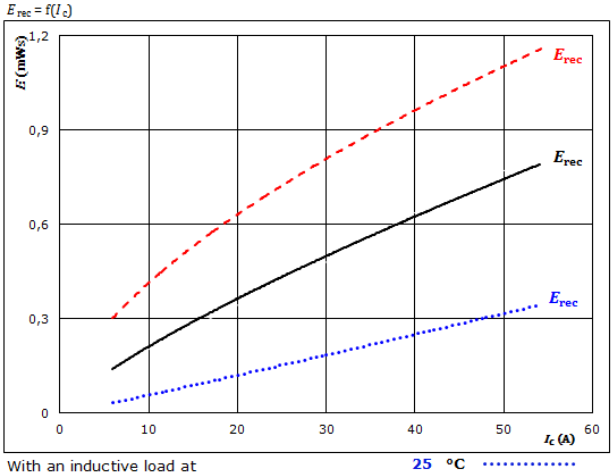
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	30	A		150 °C

Figure 3. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_c)$



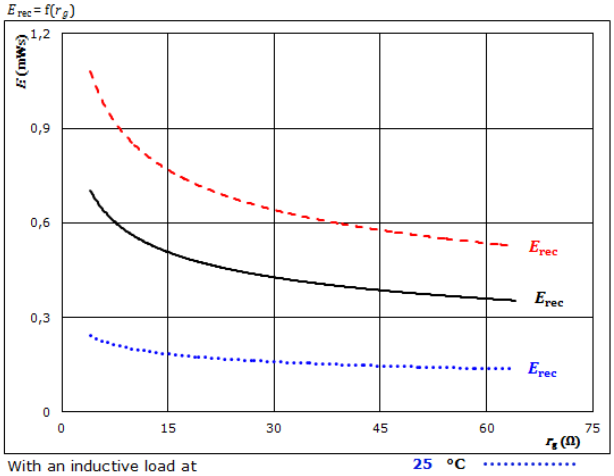
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	16	Ω		150 °C

Figure 4. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(r_g)$



With an inductive load at

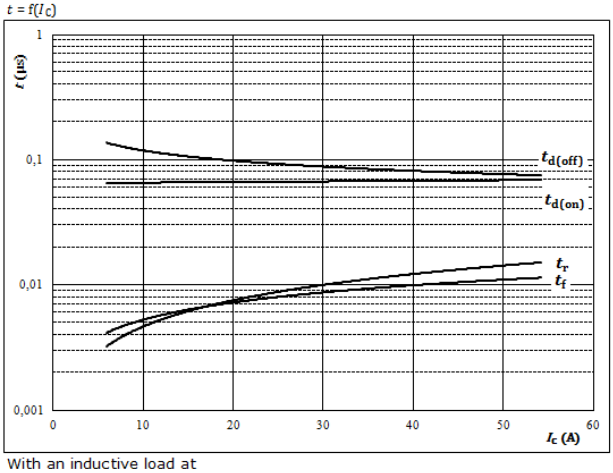
V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	30	A		150 °C

H-bridge Switching Characteristics

Figure 5. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



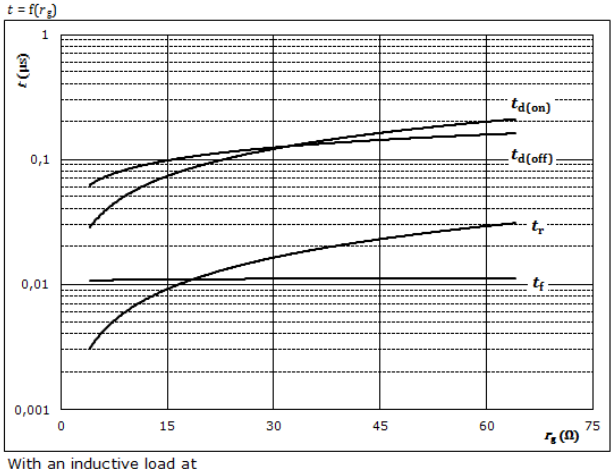
With an inductive load at

T_j =	150	°C
V_{CE} =	400	V
V_{GE} =	±15	V
R_{gon} =	16	Ω
R_{goff} =	16	Ω

Figure 6. **IGBT**

Typical switching times as a function of gate resistor

$t = f(r_g)$



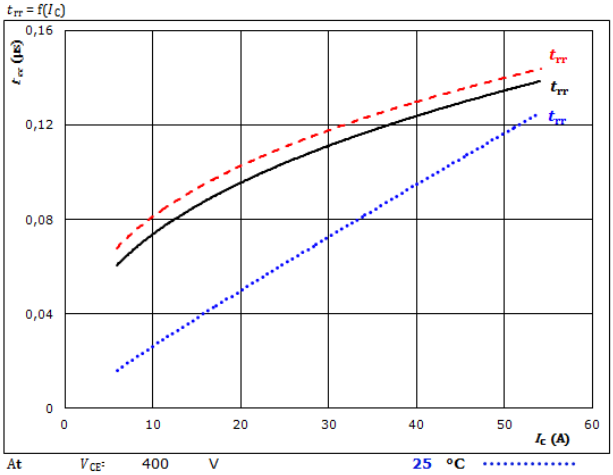
With an inductive load at

T_j =	150	°C
V_{CE} =	400	V
V_{GE} =	±15	V
I_C =	30	A

Figure 7. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$

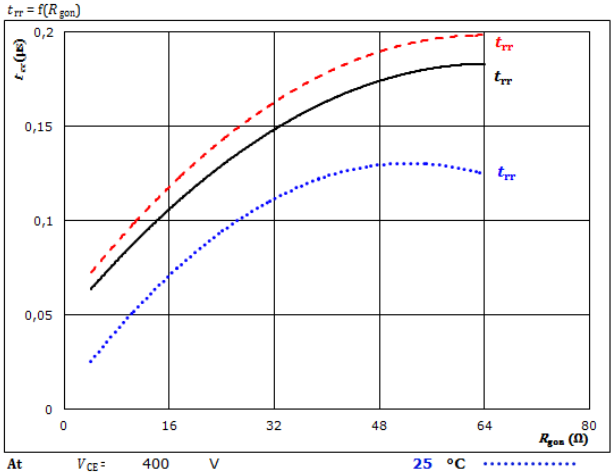


At					
V_{CE}:	400	V	T_j:	25 °C	·····
V_{GE} =	±15	V		125 °C	———
R_{gon} =	16	Ω		150 °C	– – – –

Figure 8. **FWD**

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

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



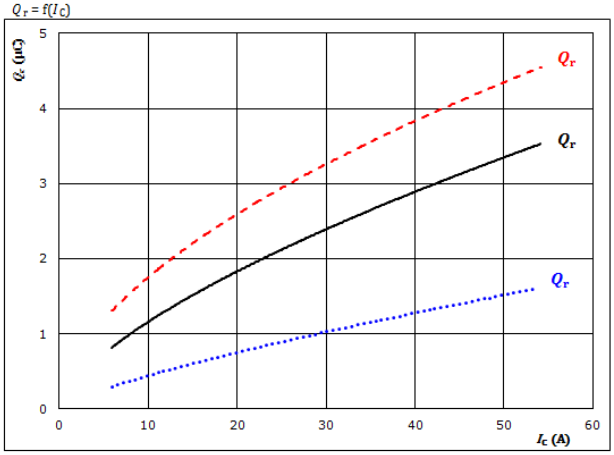
At					
V_{CE} =	400	V	T_j:	25 °C	·····
V_{GE} =	±15	V		125 °C	———
I_C =	30	A		150 °C	– – – –

H-bridge Switching Characteristics

Figure 9. FWD

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$

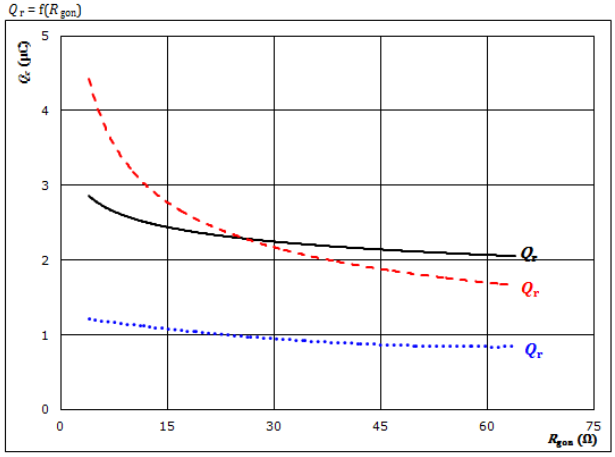


At					
V_{CE} =	400	V		25 °C	·····
V_{GE} =	±15	V	T_j:	125 °C	———
R_{gon} =	16	Ω		150 °C	– – – –

Figure 10. FWD

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

$Q_r = f(R_{gon})$

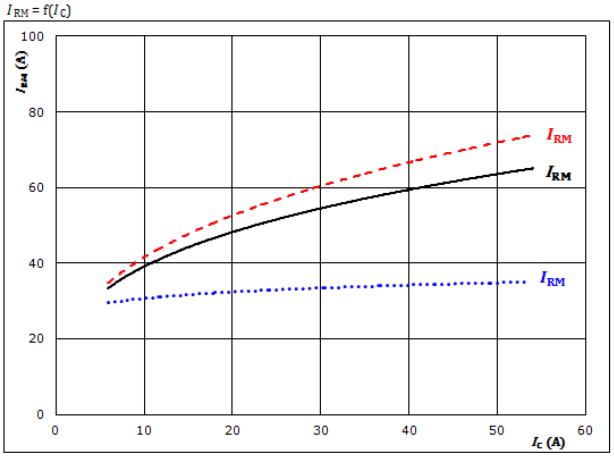


At					
V_{CE} =	400	V		25 °C	·····
V_{GE} =	±15	V	T_j:	125 °C	———
I_C =	30	A		150 °C	– – – –

Figure 11. FWD

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

$I_{RM} = f(I_C)$

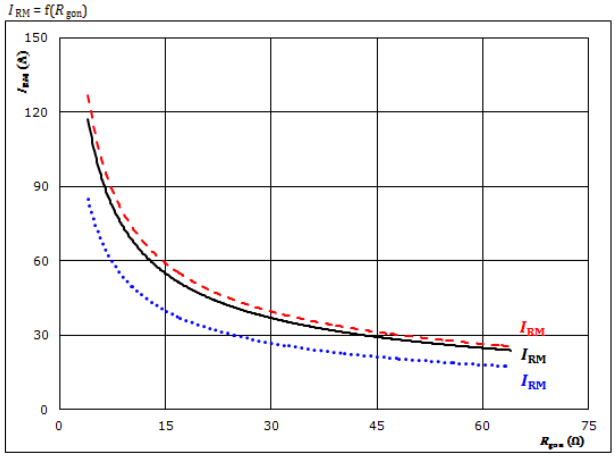


At					
V_{CE}	400	V		25 °C	·····
V_{GE} =	±15	V	T_j:	125 °C	———
R_{gon} =	16	Ω		150 °C	– – – –

Figure 12. FWD

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

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



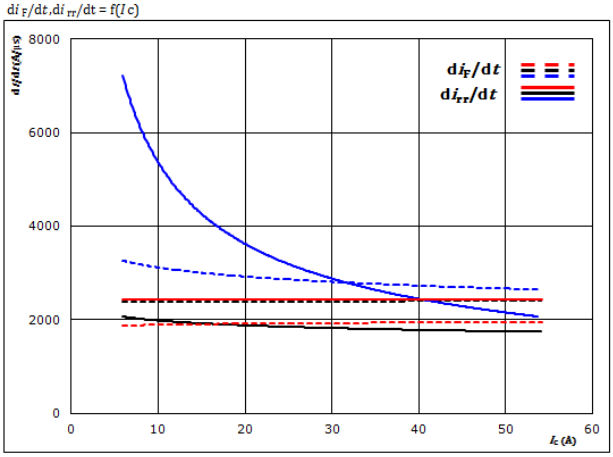
At					
V_{CE} =	400	V		25 °C	·····
V_{GE} =	±15	V	T_j:	125 °C	———
I_C =	30	A		150 °C	– – – –

H-bridge Switching Characteristics

Figure 13. **FWD**

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

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

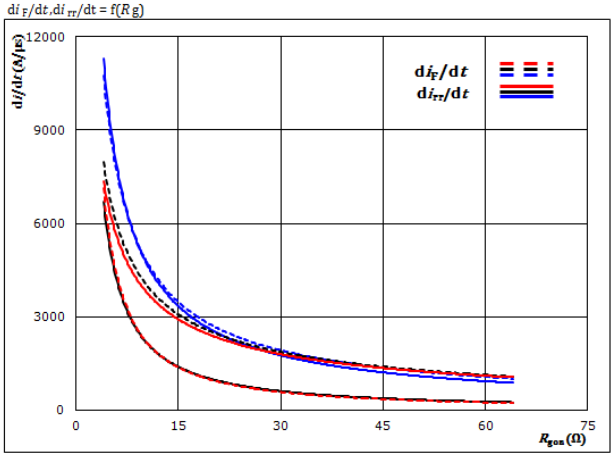


At					
V_{CE}	400	V		25 °C	
V_{GE} =	±15	V	T_j:	125 °C	
R_{gon} =	16	Ω		150 °C	

Figure 14. **FWD**

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

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

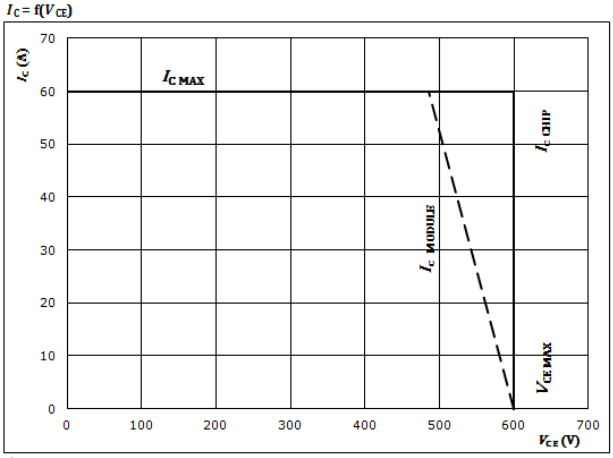


At			
V_{CE} =	400	V	
V_{GE} =	±15	V	
I_C =	30	A	

Figure 15. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



At

T_j =	175	°C
Rgon =	16	Ω
Rgoff =	16	Ω

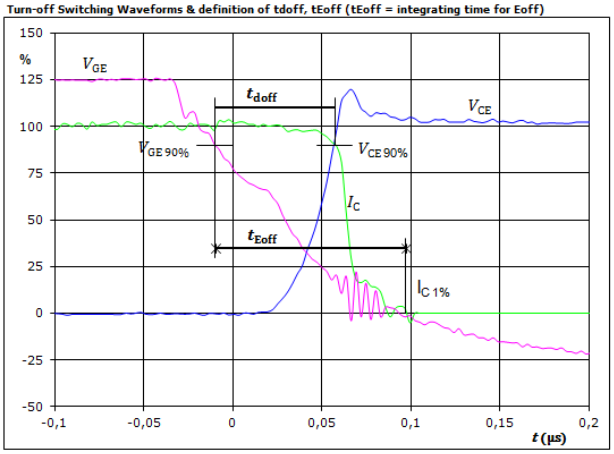
H-bridge Switching Definitions

General conditions

T_j	=	125 °C
R_{gon}	=	16 Ω
R_{goff}	=	16 Ω

Figure 1. IGBT

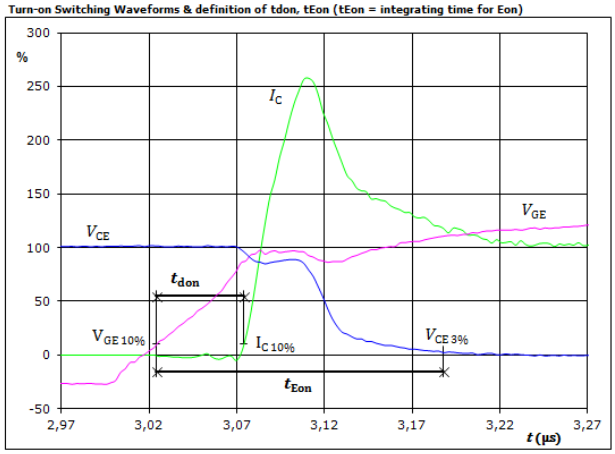
Turn-off Switching Waveforms & definition of tdoff, tEoff (tEoff = integrating time for Eoff)



V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	400	V
I_C (100%) =	30	A
t_{doff} =	0,086	µs
t_{Eoff} =	0,107	µs

Figure 2. IGBT

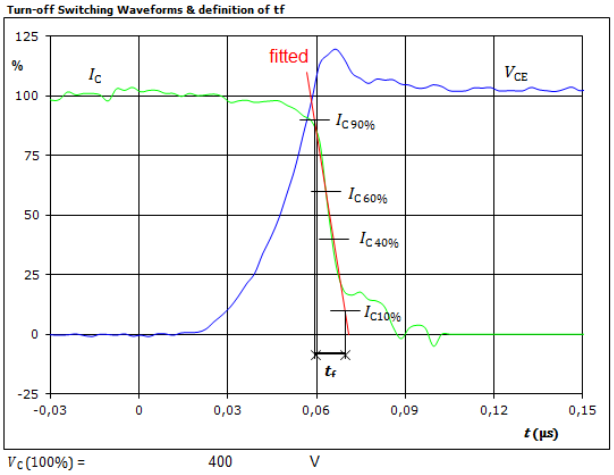
Turn-on Switching Waveforms & definition of tdon, tEon (tEon = integrating time for Eon)



V_{GE} (0%) =	-15	V
V_{GE} (100%) =	15	V
V_C (100%) =	400	V
I_C (100%) =	30	A
t_{don} =	0,066	µs
t_{Eon} =	0,164	µs

Figure 3. IGBT

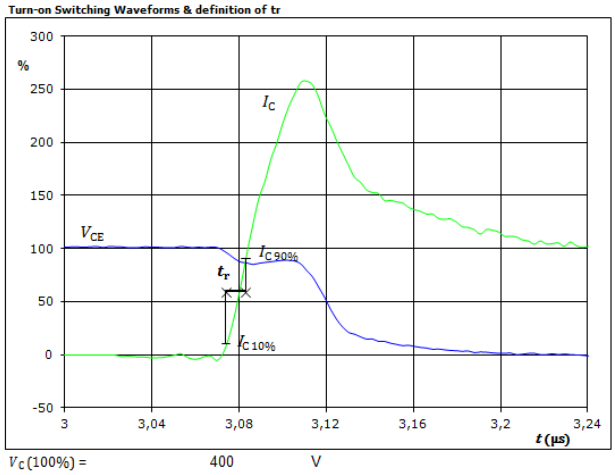
Turn-off Switching Waveforms & definition of tf



V_C (100%) =	400	V
I_C (100%) =	30	A
t_f =	0,01	µs

Figure 4. IGBT

Turn-on Switching Waveforms & definition of tr

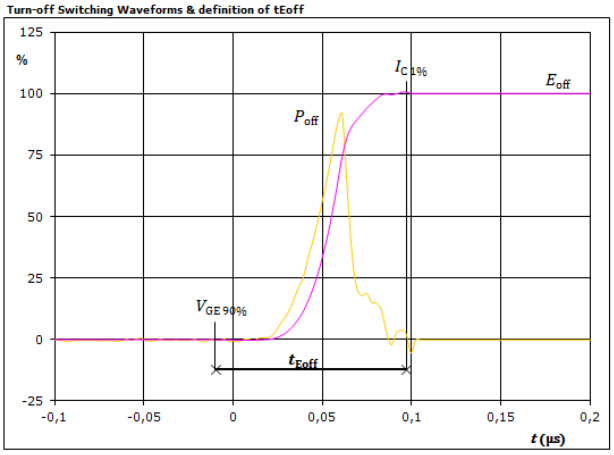


V_C (100%) =	400	V
I_C (100%) =	30	A
t_r =	0,009	µs

H-bridge Switching Definitions

Figure 5. **IGBT**

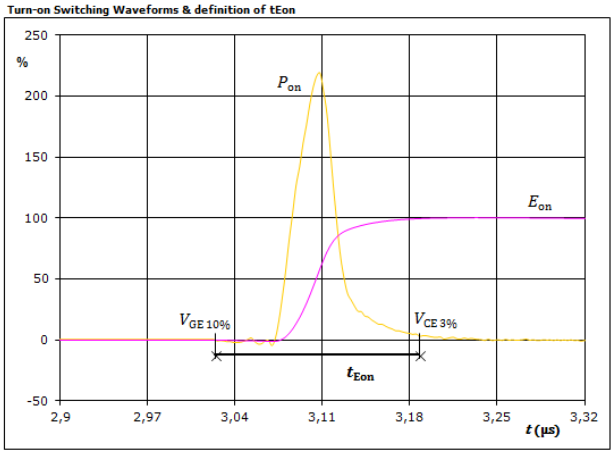
Turn-off Switching Waveforms & definition of tEoff



P_{off} (100%) =	11,99	kW
E_{off} (100%) =	0,25	mJ
t_{Eoff} =	0,11	µs

Figure 6. **IGBT**

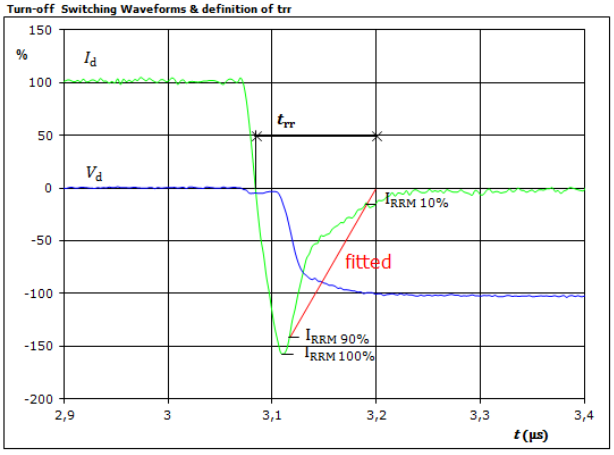
Turn-on Switching Waveforms & definition of tEon



P_{on} (100%) =	11,99	kW
E_{on} (100%) =	0,96	mJ
t_{Eon} =	0,16	µs

Figure 7. **FWD**

Turn-off Switching Waveforms & definition of trr

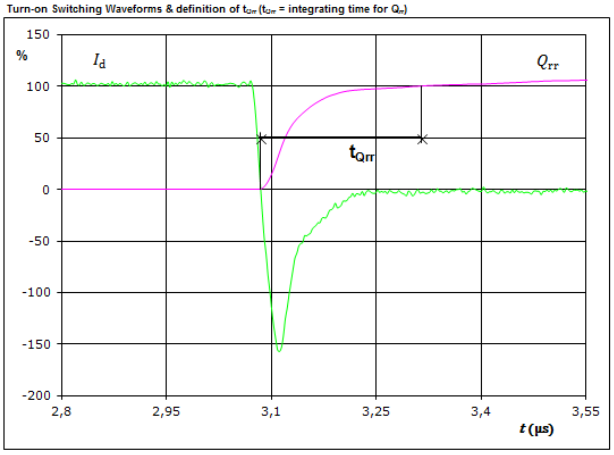


V_d (100%) =	400	V
I_d (100%) =	30	A
I_{RRM} (100%) =	-48	A
t_{rr} =	0,115	µs

H-bridge Switching Definitions

Figure 8. **FWD**

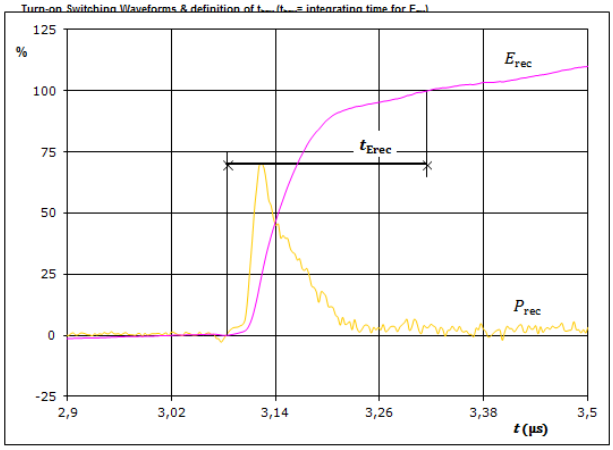
Turn-on Switching Waveforms & definition of t_{Qrr} (t_{Qrr} = integrating time for Q_{rr})



I_d (100%) =	30	A
Q_{rr} (100%) =	2,37	µC
t_{Qrr} =	0,23	µs

Figure 9. **FWD**

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



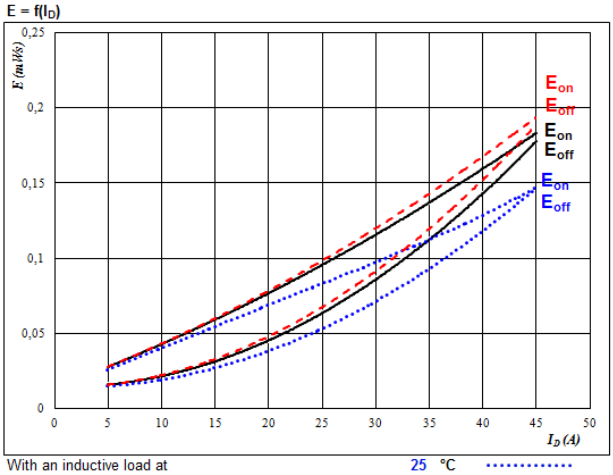
P_{rec} (100%) =	11,99	kW
E_{rec} (100%) =	0,48	mJ
t_{Erec} =	0,23	µs

Inp. Boost Switching Characteristics

Figure 1. MOSFET

Typical switching energy losses as a function of drain current

$E = f(I_D)$



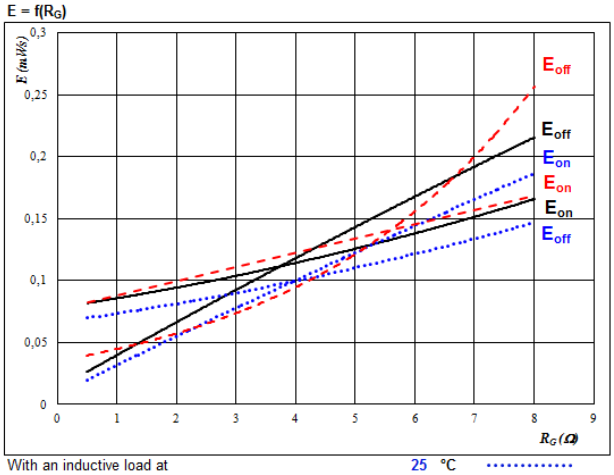
With an inductive load at

V_{DS} =	400	V	T_j:	25 °C	·····
V_{GS} =	±15	V		125 °C	———
R_{gon} =	2	Ω		150 °C	– – – –
R_{goff} =	2	Ω			

Figure 2. MOSFET

Typical switching energy losses as a function of gate resistor

$E = f(R_G)$



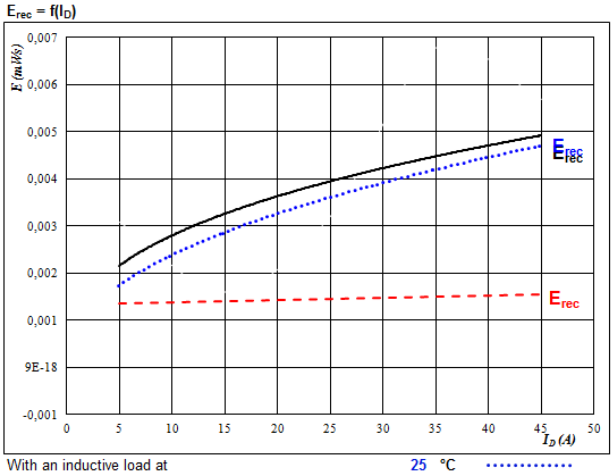
With an inductive load at

V_{DS} =	400	V	T_j:	25 °C	·····
V_{GS} =	±15	V		125 °C	———
I_D =	25	A		150 °C	– – – –

Figure 3. FWD

Typical reverse recovery energy loss as a function of drain current

$E_{rec} = f(I_D)$



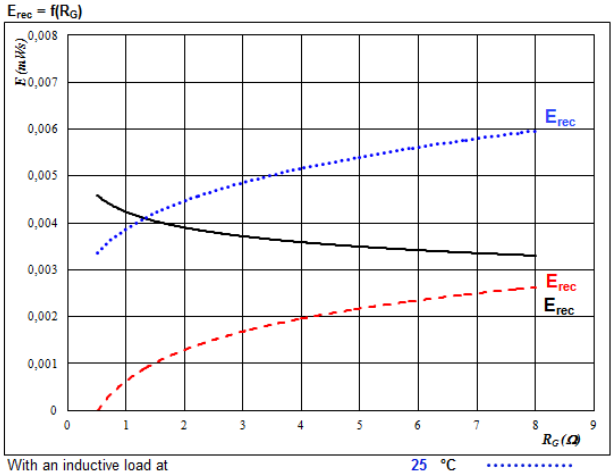
With an inductive load at

V_{DS} =	400	V	T_j:	25 °C	·····
V_{GS} =	±15	V		125 °C	———
R_{gon} =	2	Ω		150 °C	– – – –
R_{goff} =	2	Ω			

Figure 4. FWD

Typical reverse recovery energy loss as a function of gate resistor

$E_{rec} = f(R_G)$



With an inductive load at

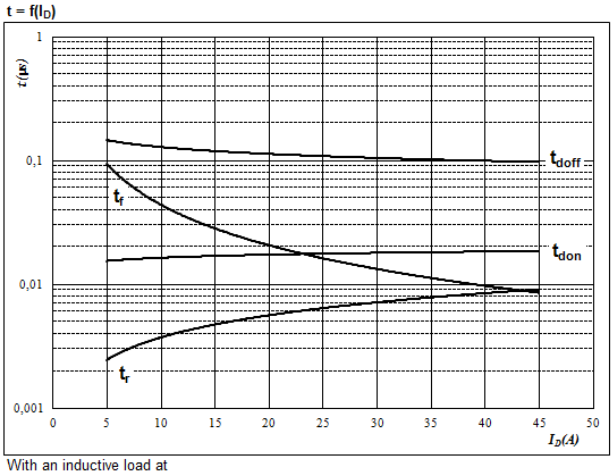
V_{DS} =	400	V	T_j:	25 °C	·····
V_{GS} =	±15	V		125 °C	———
I_D =	25	A		150 °C	– – – –

Inp. Boost Switching Characteristics

Figure 5. MOSFET

Typical switching times as a function of drain current

$t = f(I_D)$



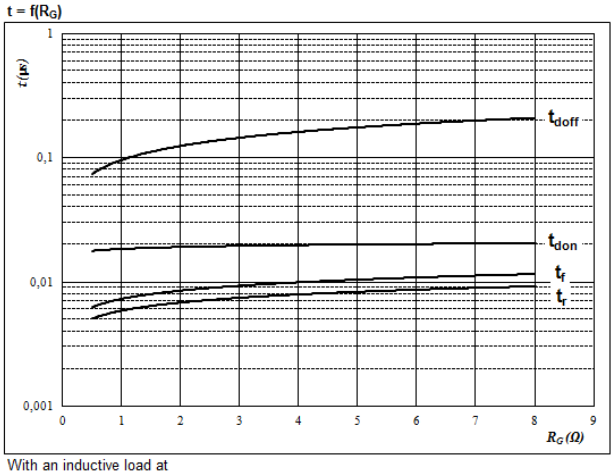
With an inductive load at

T_j =	125	°C
V_{DS} =	400	V
V_{GS} =	±15	V
R_{gon} =	2	Ω
R_{goff} =	2	Ω

Figure 6. MOSFET

Typical switching times as a function of gate resistor

$t = f(R_G)$



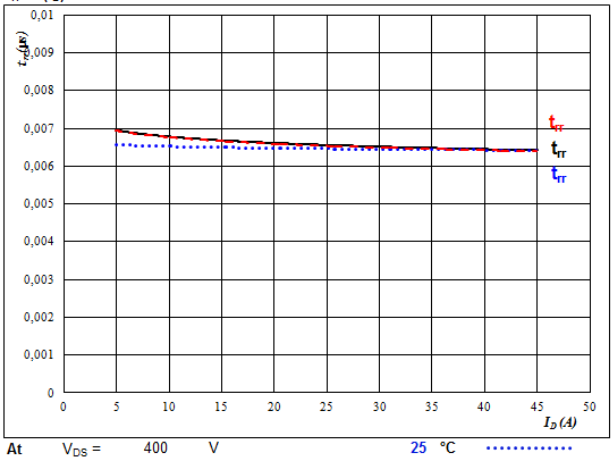
With an inductive load at

T_j =	125	°C
V_{DS} =	400	V
V_{GS} =	±15	V
I_D =	25	A

Figure 7. FWD

Typical reverse recovery time as a function of drain current

$t_{rr} = f(I_D)$

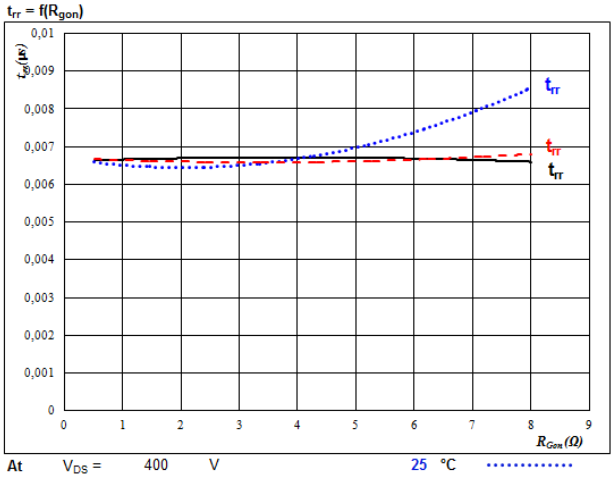


At	V_{DS} =	400	V		25 °C
	V_{GS} =	±15	V	T_j:	125 °C
	R_{gon} =	2	Ω		150 °C

Figure 8. FWD

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

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



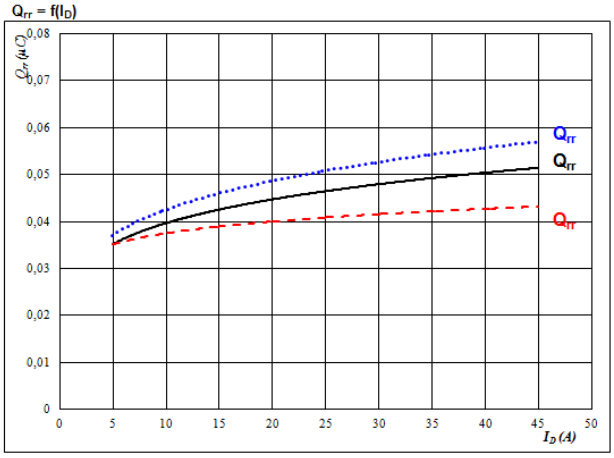
At	V_{DS} =	400	V		25 °C
	V_{GS} =	±15	V	T_j:	125 °C
	I_D =	25	A		150 °C

Inp. Boost Switching Characteristics

Figure 9. FWD

Typical reverse recovery charge as a function of drain current

$Q_{rr} = f(I_D)$

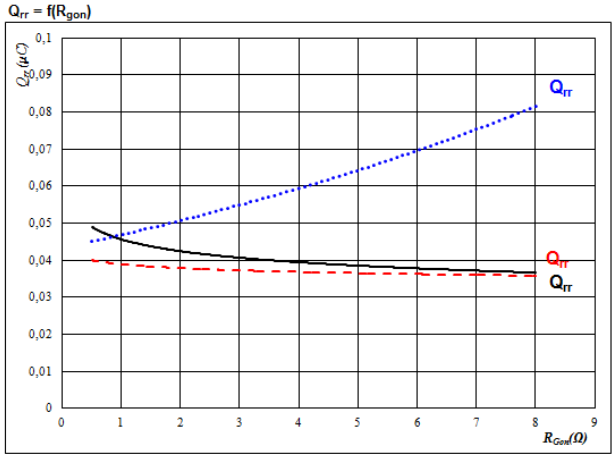


At	V_{DS} =	400	V		25 °C
	V_{GS} =	±15	V	T_j:	125 °C
	R_{gon} =	2	Ω		150 °C

Figure 10. FWD

Typical reverse recovery charge as a function of MOSFET turn on gate resistor

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

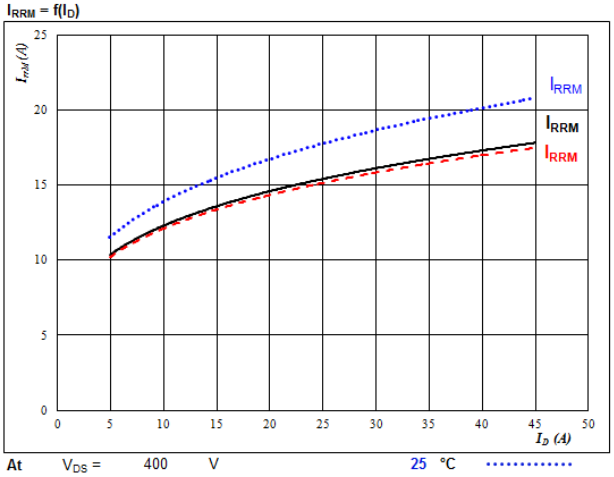


At	V_{DS} =	400	V		25 °C
	V_{GS} =	±15	V	T_j:	125 °C
	I_D =	25	A		150 °C

Figure 11. FWD

Typical reverse recovery current as a function of drain current

$I_{RRM} = f(I_D)$

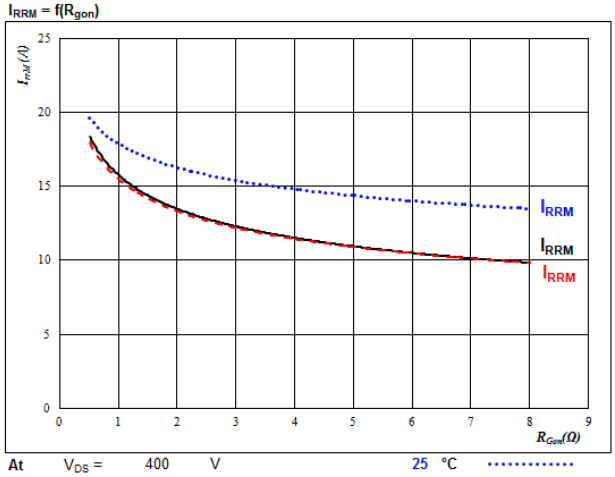


At	V_{DS} =	400	V		25 °C
	V_{GS} =	±15	V	T_j:	125 °C
	R_{gon} =	2	Ω		150 °C

Figure 12. FWD

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

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

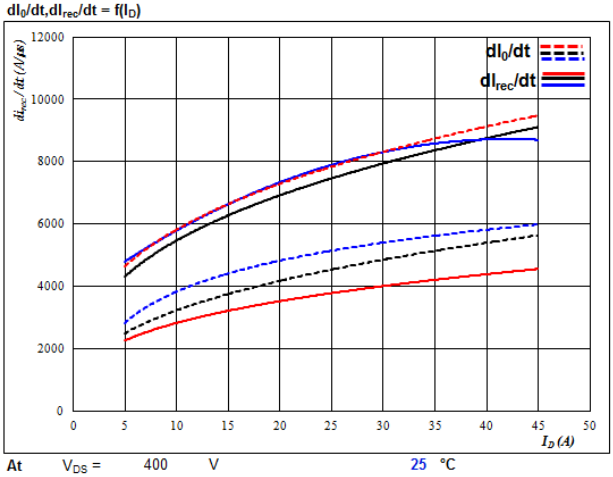


At	V_{DS} =	400	V		25 °C
	V_{GS} =	±15	V	T_j:	125 °C
	I_D =	25	A		150 °C

Inp. Boost Switching Characteristics

Figure 13. FWD

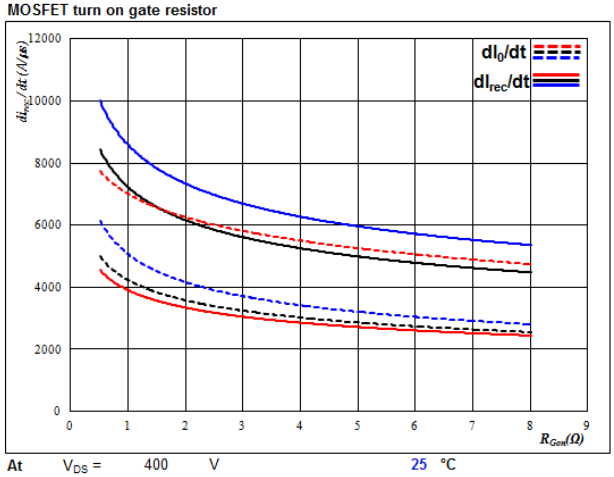
Typical rate of fall of forward and reverse recovery current as a function of drain current
$dI_0/dt, dI_{rec}/dt = f(I_D)$



At						
	V_{DS} =	400	V		25	°C
	V_{GS} =	±15	V	T_j:	125	°C
	R_{gon} =	2	Ω		150	°C

Figure 14. FWD

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

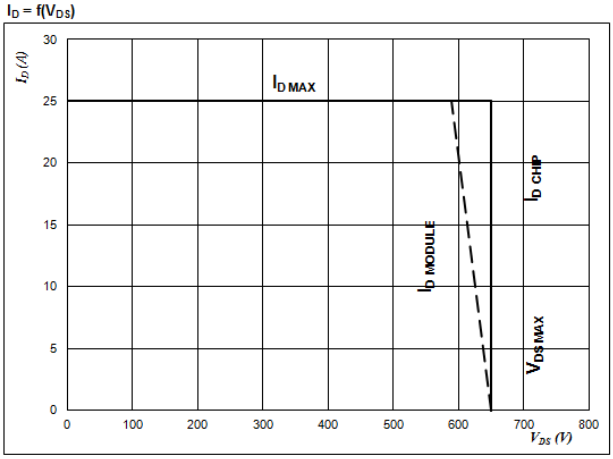


At						
	V_{DS} =	400	V		25	°C
	V_{GS} =	±15	V	T_j:	125	°C
	I_D =	25	A		150	°C

Figure 15. MOSFET

Reverse bias safe operating area

$I_D = f(V_{DS})$



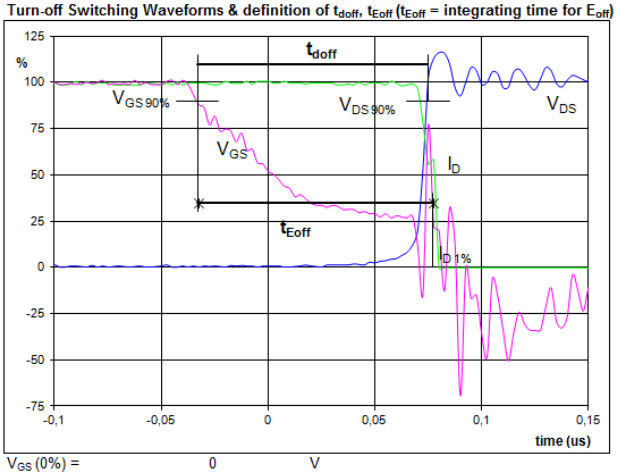
At			
	T_j =	175	°C
	Rgon =	2	Ω
	Rgoff =	2	Ω

Inp. Boost Switching Definitions

General conditions		
T_j	=	125 °C
R_{gon}	=	2 Ω
R_{goff}	=	2 Ω

Figure 1. MOSFET

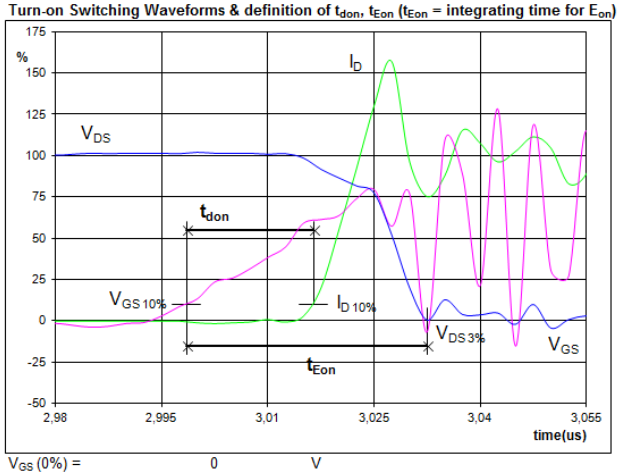
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff} (t_{Eoff} = integrating time for E_{off})



V_{GS} (0%) =	0	V
V_{GS} (100%) =	10	V
V_{DS} (100%) =	400	V
I_D (100%) =	25	A
t_{doff} =	0,108	µs
t_{Eoff} =	0,110	µs

Figure 2. MOSFET

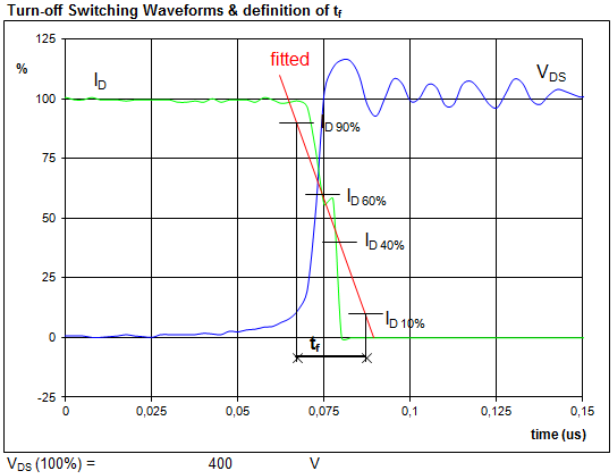
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon} (t_{Eon} = integrating time for E_{on})



V_{GS} (0%) =	0	V
V_{GS} (100%) =	10	V
V_{DS} (100%) =	400	V
I_D (100%) =	25	A
t_{don} =	0,019	µs
t_{Eon} =	0,034	µs

Figure 3. MOSFET

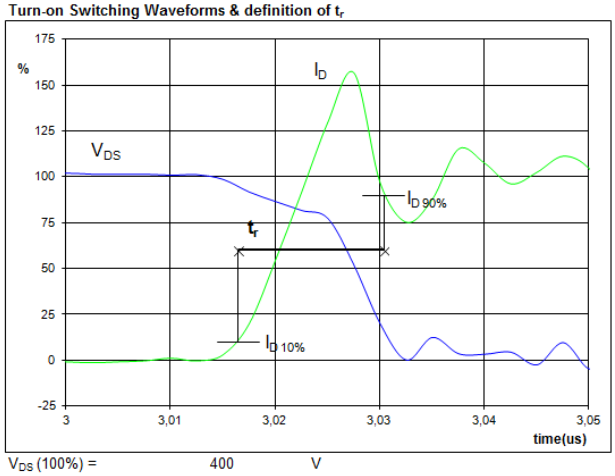
Turn-off Switching Waveforms & definition of t_f



V_{DS} (100%) =	400	V
I_D (100%) =	25	A
t_f =	0,041	µs

Figure 4. MOSFET

Turn-on Switching Waveforms & definition of t_r

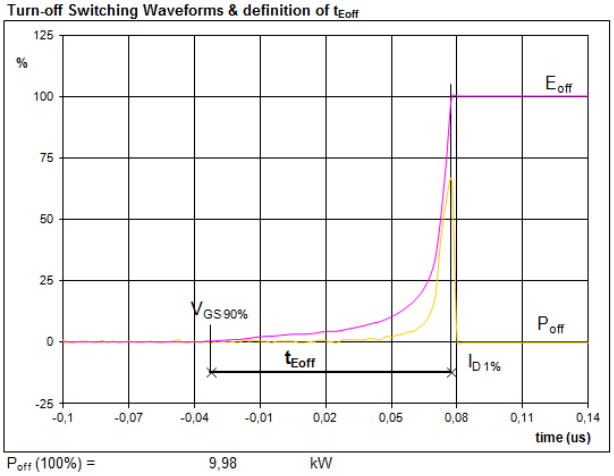


V_{DS} (100%) =	400	V
I_D (100%) =	25	A
t_r =	0,006	µs

Inp. Boost Switching Definitions

Figure 5. MOSFET

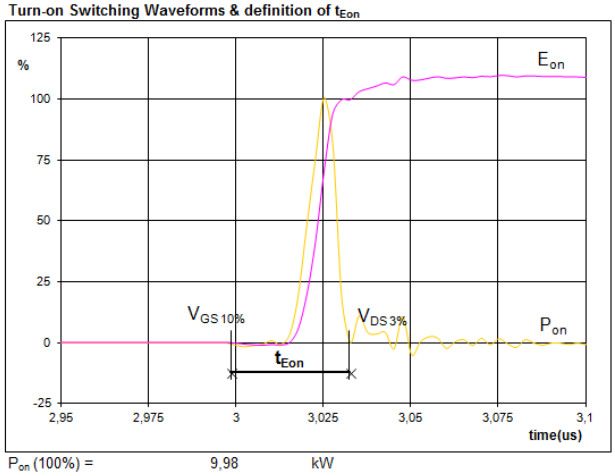
Turn-off Switching Waveforms & definition of t_{Eoff}



P_{off} (100%) =	9,98	kW
E_{off} (100%) =	0,07	mJ
t_{Eoff} =	0,11	µs

Figure 6. MOSFET

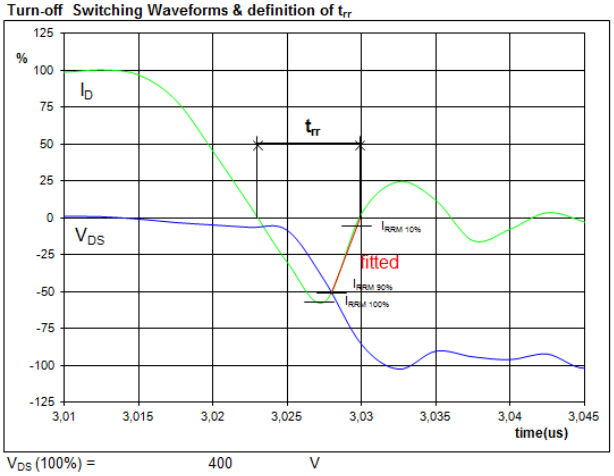
Turn-on Switching Waveforms & definition of t_{Eon}



P_{on} (100%) =	9,98	kW
E_{on} (100%) =	0,10	mJ
t_{Eon} =	0,03	µs

Figure 7. FWD

Turn-off Switching Waveforms & definition of t_{rr}

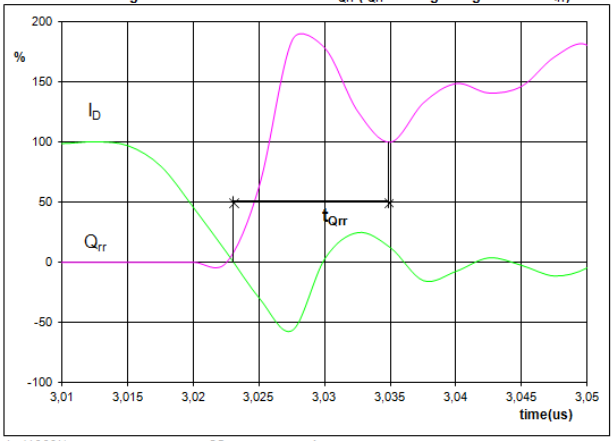


V_{DS} (100%) =	400	V
I_D (100%) =	25	A
I_{RRM} (100%) =	-15	A
t_{rr} =	0,007	µs

Inp. Boost Switching Definitions

Figure 8. FWD

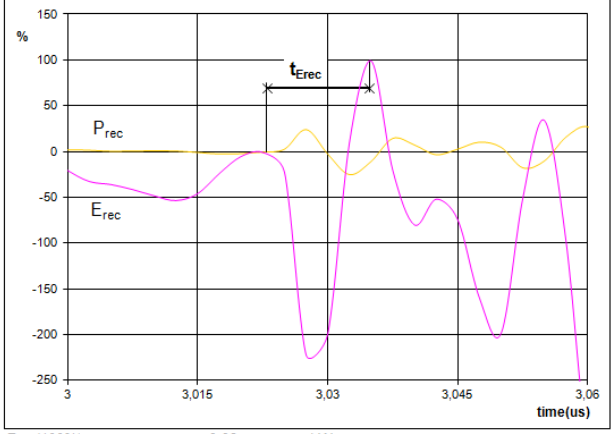
Turn-on Switching Waveforms & definition of t_{Qrr} (t_{Qrr} = integrating time for Q_{rr})



I_D (100%) =	25	A
Q_{rr} (100%) =	0,04	µC
t_{Qrr} =	0,01	µs

Figure 9. FWD

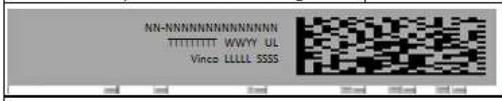
Turn-on Switching Waveforms & definition of t_{Erec} (t_{Erec}= integrating time for E_{rec})



P_{rec} (100%) =	9,98	kW
E_{rec} (100%) =	0,00	mJ
t_{Erec} =	0,01	µs

Ordering Code & Marking

Version	Ordering Code	in DataMatrix as	in packaging barcode as
without thermal paste 12mm housing	10-PZ07BIA030SM01-P894E68Y-PM	P894E68Y	P894E68Y
with thermal paste 12mm housing	10-PZ07BIA030SM01-P894E68Y-/3/-PM	P894E68Y	P894E68Y-/3/
without thermal paste 12mm housing	10-FZ07BIA030SM01-P894E68-PM	P894E68	P894E68
with thermal paste 12mm housing	10-FZ07BIA030SM01-P894E68-/3/-PM	P894E68	P894E68-/3/



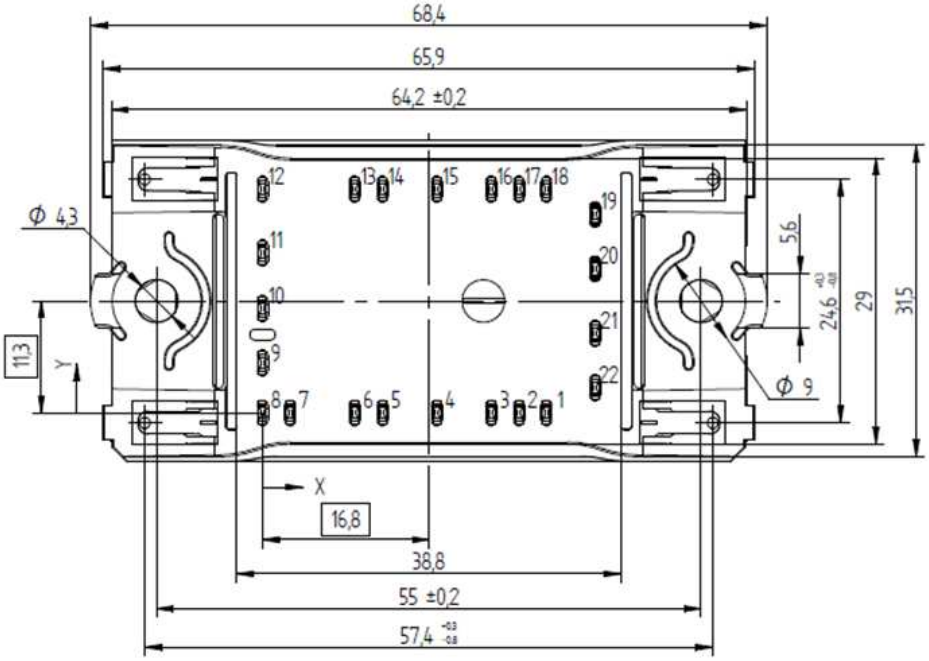
	Name	Date code	UL & Vinco	Lot	Serial
Text	NN-NNNNNNNNNNNNNN-TTTTTTTT	WWYY	UL Vinco	LLLLL	SSSS

Datamatrix	Type	Lot number	Serial	Date code		
	TTTTTTTT	LLLLL	SSSS	WWYY		

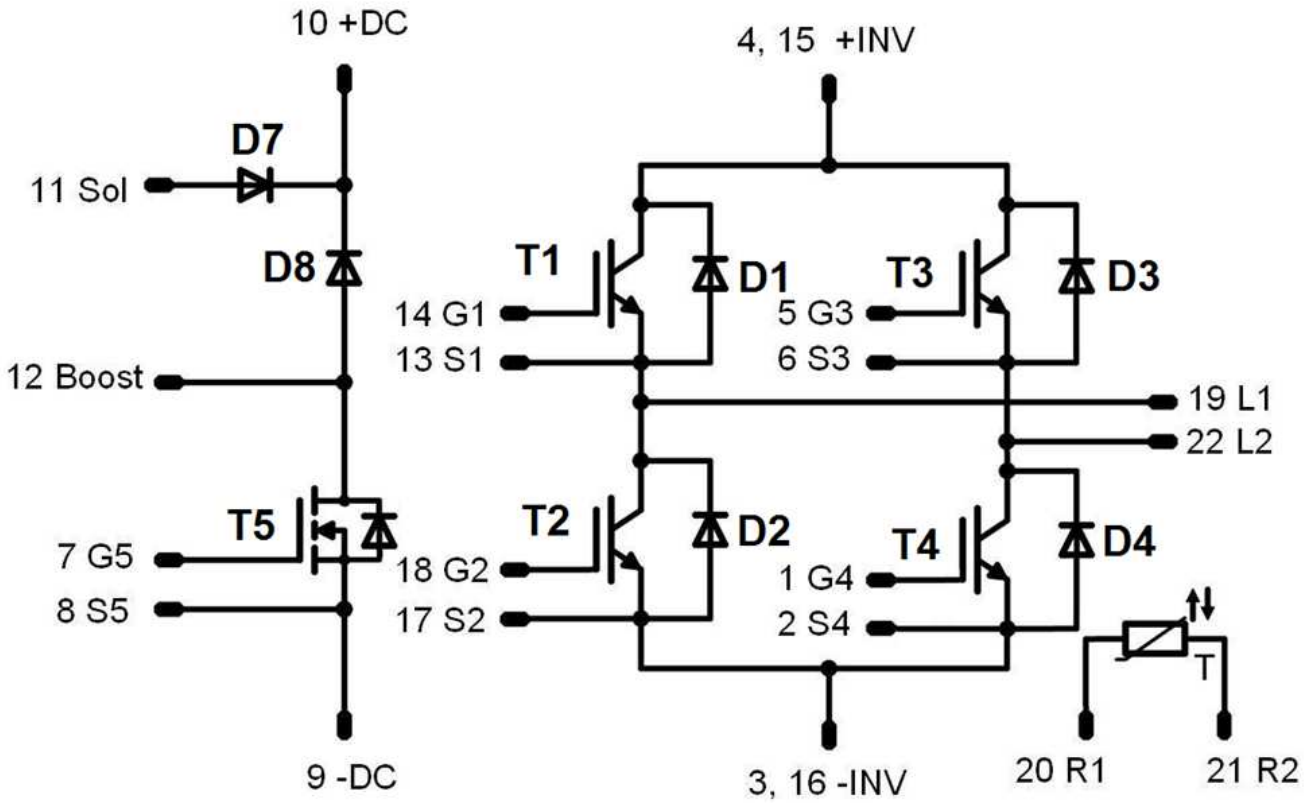
Outline

Pin table [mm]

Pin	X	Y	Pos
1	28,7	0	G4
2	25,9	0	S4
3	23,1	0	INV-
4	17,6	0	INV+
5	12,1	0	G3
6	9,3	0	S3
7	2,8	0	G5
8	0	0	S5
9	0	5,05	DC-
10	0	10,55	DC+
11	0	16,15	Sol
12	0	22,6	Boost
13	9,3	22,6	S1
14	12,1	22,6	G1
15	17,6	22,6	INV+
16	23,1	22,6	INV-
17	25,9	22,6	S2
18	28,7	22,6	G2
19	33,6	20,05	L1
20	33,6	14,55	R1
21	33,6	8,05	R2
22	33,6	2,55	L2



Pinout



Identification						
ID	Component	Voltage	Technology	Current	Function	Comment
T1,T2,T3,T4	IGBT	650V		30A	H-bridge switch	
T5	MOSFET	600V		25,8A	Inp. Boost switch	
D1,D2,D3,D4	Diode	650V		15A	H-bridge diode	
D8	Diode	650V		10A	Inp. Boost diode	
D7	Diode	1600V		35A	Bypass diode	
R_t	NTC	-		-	Thermistor	

Packaging instruction					
Standard packaging quantity (SPQ)	135	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* 0 packages see vincotech.com website.

Document No.:	Date:	Modification:	Pages
10-PZ07BIA030SM01-P894E68Y-D4-14	06 Oct. 2015		