Vincotech

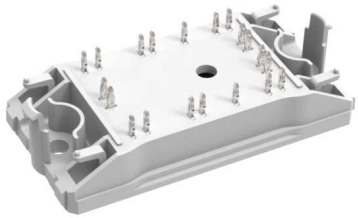
10-PZ12NMA027MR-M340F68Y
datasheet

flow MNPC 0-SiC — **1200 V / 27 mΩ**

Features

- Rohm™ Silicon Carbide Power MOSFET
- Rohm™ Silicon Carbide Power Schottky Diode
- MNPC Topology with Split Output
- Ultra Low Inductance with Integrated DC-capacitors
- Extremly Fast Switching with No "Tail" Current
- Unsensitivity for Cross Through Conduction
- Solderless Press-fit Mounting Technology
- Temperature Sensor

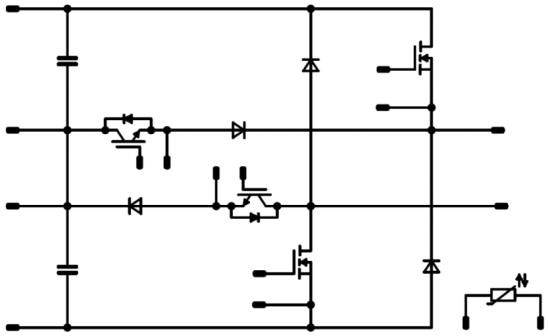
flow 0 12mm housing



Target applications

- High Efficient Solar Inverter
- UPS

Schematic



Types

- 10-PZ12NMA027MR-M340F68Y

Maximum Ratings

T_j=25°C, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
Buck Switch				
Drain-source voltage	V_{DSS}		1200	V
Drain current	I_D	$T_j = T_{jmax}$ T_S = 80 °C	46	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	240	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_S = 80 °C	129	W
Gate-source voltage	V_{GSS}		22	V
Maximum Junction Temperature	T_{jmax}		150	°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_h = 80°C	32	A
Repetitive peak forward current	I_{FRM}		120	A
Surge (non-repetitive) forward current	I_{FSM}	PW=8,3ms Single Sine Wave T_j = °C	120	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_h = 80°C	57	W
Maximum Junction Temperature	T_{jmax}		175	°C

Parameter	Symbol	Condition	Value	Unit
Boost Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	T_j=$T_j$max T_S=80°C	60	A
Repetitive peak collector current	I_{CRM}	t_p limited by $T_j$max	240	A
Total power dissipation	P_{tot}	T_j=$T_j$max 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
Boost Diode				
Peak Repetitive Reverse Voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ T_h = 80°C	13	A
Repetitive peak forward current	I_{FRM}		46	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_h = 80°C	29	W
Maximum Junction Temperature	T_{jmax}		175	°C

Parameter	Symbol	Conditions	Value	Unit
Boost Inverse Diode				
Peak Repetitive Reverse Voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	T_j=T_{jmax} T_h=80°C	12	A
Repetitive peak forward current	I_{FRM}		12	A
Total power dissipation	P_{tot}	T_j=T_{jmax} T_h=80°C	30	W
Maximum Junction Temperature	T_{jmax}		175	°C

Parameter	Symbol	Conditions	Value	Unit
DC Link Capacitor				
Maximum DC voltage	V_{MAX}		500	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 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				9,17	mm
Comparative Tracking Index	CTI			>200	

Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
Buck Switch			V_{GS} [V]	V_{DS} [V]	I_D [A]	T_j[°C]	Min	Typ	Max	
Static										
Drain-source on-state resistance	$r_{DS(on)}$		18		30	25 125 150		27 47 52	37	mΩ
Gate-source threshold voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}$			0,0044	25 125	1,6		4	V
Gate to Source Leakage Current	I_{GSS}		22	0		25 125			300	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1200		25 125			30	µA
Internal gate resistance	r_g							3		Ω
Gate charge	Q_g		18	400	10	25		318		nC
Gate to source charge	Q_{GS}							81		
Gate to drain charge	Q_{GD}							93		
Short-circuit input capacitance	C_{iss}	f=1MHz	0	800		25		6240		pF
Short-circuit output capacitance	C_{oss}							231		
Reverse transfer capacitance	C_{rss}							48		
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	Phase-Change Material λ=3,4 W/mK						0,54		K/W
MOSFET Switching										
Turn-on delay time	$t_{d(on)}$	R_{goff} = 4 Ω R_{gon} = 4 Ω	±15	700	44	25 125 150		36 32 32		ns
Rise time	t_r					25 125 150		20 18 17		
Turn-off delay time	$t_{d(off)}$					25 125 150		108 118 121		
Fall time	t_f					25 125 150		17 23 29		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 0,2 µC Q_{rFWD} = 0,3 µC Q_{rFWD} = 0,2 µC				25 125 150		0,601 0,463 0,448		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,189 0,149 0,181		

Parameter	Symbol	Conditions					Value			Unit
Buck Diode				V_r [V]	I_F [A]	T_j [°C]	Min	Typ	Max	
Static										
Forward voltage	V_F				30	25 125 150		1,39 1,53 1,59	1.55	V
Reverse leakage current	I_r			650		25 150			6 90	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	Phase-Change Material λ=3,4W/mK						1,68		K/W
FWD Switching										
Peak recovery current	I_{RRM}	di/dt = 2580 A/µs di/dt = 3640 A/µs di/dt = 2520 A/µs	±15	700	44	25 125 150		17 19 18		A
Reverse recovery time	t_{rr}					25 125 150		13 13 12		ns
Recovered charge	Q_r					25 125 150		0,235 0,257 0,244		µC
Reverse recovered energy	E_{rec}					25 125 150		0,032 0,040 0,038		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		4300 3600 3780		A/µs

Parameter	Symbol	Conditions					Value			Unit
Boost Switch			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			0,08	µA
Gate-emitter leakage current	I_{GES}		15	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=3,4W/mK						0,87		K/W
IGBT Switching										
Turn-on delay time	$t_{d(on)}$	R_{goff} = 8 Ω R_{gon} = 8 Ω	±15	700	44	25 125 150		89 92 90		ns
Rise time	t_r					25 125 150		5 7 7		
Turn-off delay time	$t_{d(off)}$					25 125 150		80 101 104		
Fall time	t_f					25 125 150		13 11 11		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 0,3 µC Q_{rFWD} = 0,4 µC Q_{rFWD} = 0,4 µC				25 125 150		0,284 0,347 0,353		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,139 0,267 0,301		

Parameter	Symbol	Conditions					Value			Unit
Boost Diode				V_r [V]	I_F [A]	T_j [°C]	Min	Typ	Max	
Static										
Forward voltage	V_F				10	25 125 150		1,37 1,66 1,78	1,6	V
Reverse leakage current	I_r			1200		25 150			10 80	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	Phase-Change Material λ=3,4W/mK						3,27		K/W
FWD Switching										
Peak recovery current	I_{RRM}	di/dt = 7701 A/µs di/dt = 4480 A/µs di/dt = 5440 A/µs	±15	700	44	25 125 150		30 27 30		A
Reverse recovery time	t_{rr}					25 125 150		21 26 27		ns
Recovered charge	Q_r					25 125 150		0,344 0,393 0,446		µC
Reverse recovered energy	E_{rec}					25 125 150		0,039 0,047 0,060		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		4675 5074 2825		A/µs

Parameter	Symbol	Conditions					Value			Unit
Boost Inverse Diode				V_r [V]	I_F [A]	T_j [°C]	Min	Typ	Max	
Static										
Forward voltage	V_F				6	25 125 150		1,73 1,59 1,54	1,95	V
Reverse leakage current	I_r			650		25 150			27	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	Phase-Change Material λ=3,4W/mK						3,52		K/W

Parameter	Symbol	Conditions					Value			Unit
DC Link Capacitor						T_j[°C]	Min	Typ	Max	
Capacitance	C							270		nF
Tolerance							-20		20	%

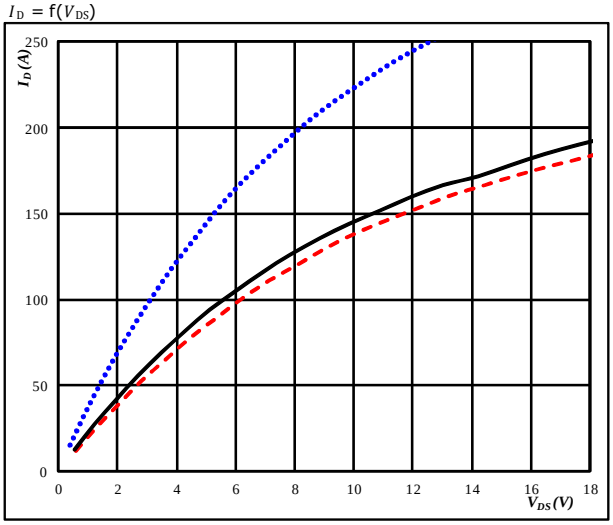
Thermistor

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	

Buck Switch Characteristics

Typical output characteristics **MOSFET**

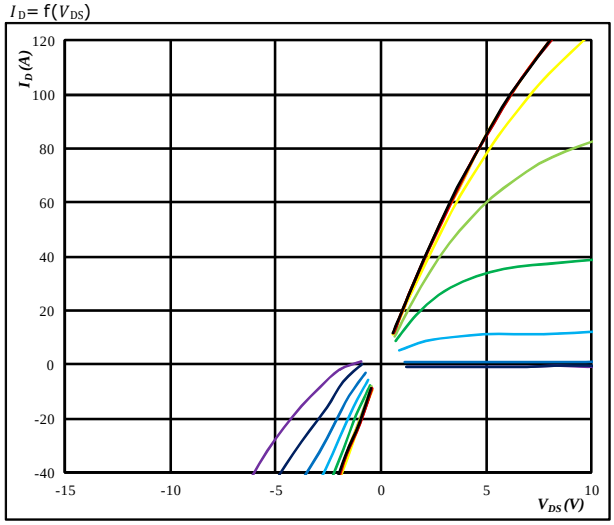
$I_D = f(V_{DS})$



t_p =	250	µs		**25 °C**
V_{GS}=	18	V	T_j:	**125 °C**
				150 °C

Typical output characteristics **MOSFET**

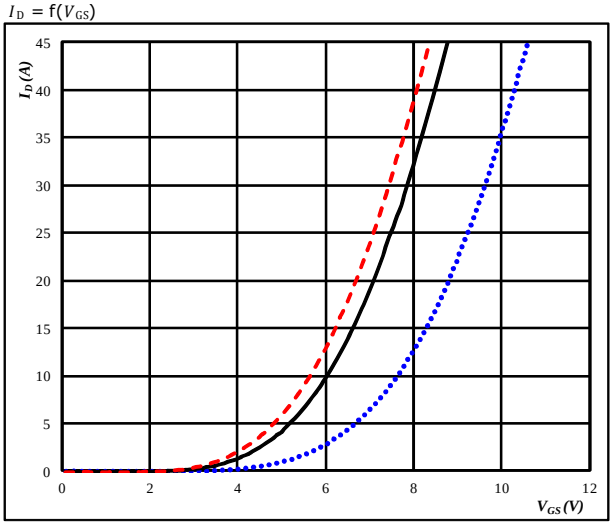
$I_D = f(V_{DS})$



t_p =	250	µs
T_j =	150	°C
V_{GS} from	0 V to 20 V in steps of 2 V	

Typical transfer characteristics **MOSFET**

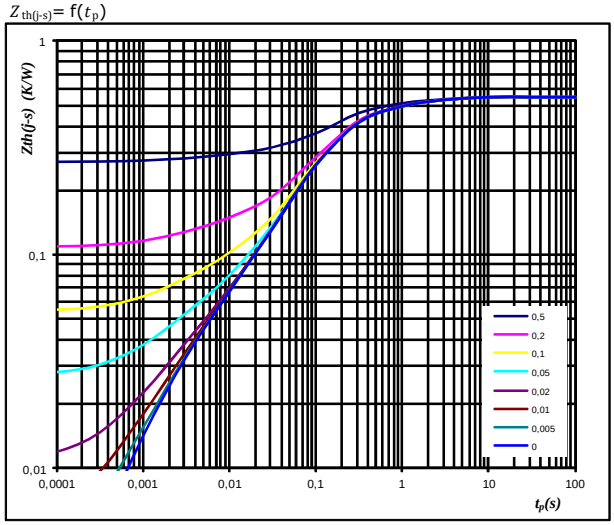
$I_D = f(V_{GS})$



t_p =	100	µs		**25 °C**
V_{DS} =	1	V	T_j:	**125 °C**
				150 °C

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

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



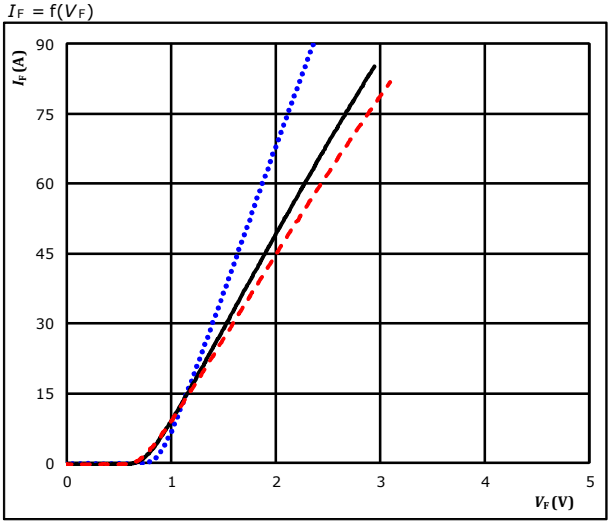
D =	t_p / T	
$R_{th(j-s)}$ =	0,54	K/W

R (K/W)	Tau(s)
6,67E-02	2,13E+00
1,21E-01	3,98E-01
3,14E-01	1,09E-01
2,90E-02	7,15E-03
1,43E-02	1,48E-03

Buck Diode Characteristics

Typical forward characteristics **FWD**

$I_F = f(V_F)$

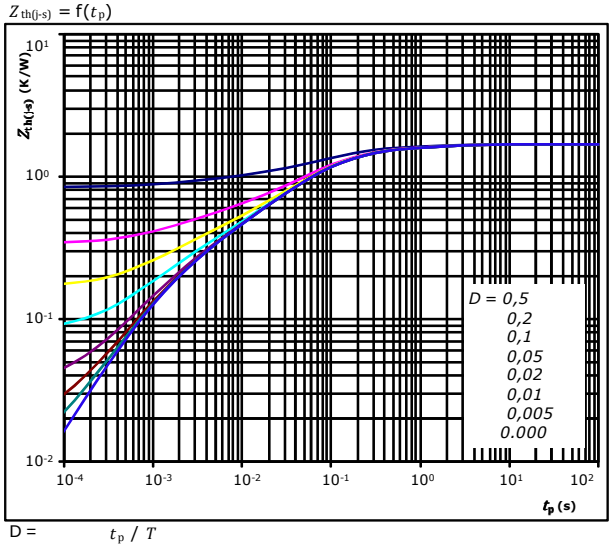


t_p = 250 µs

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

$R_{th(j-s)}$ = 1,68 K/W

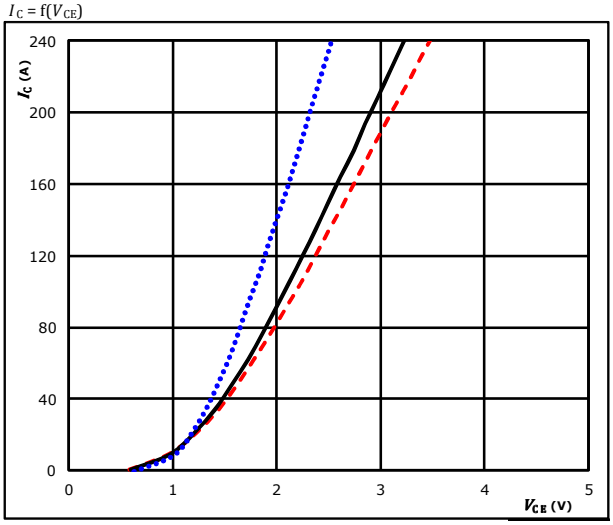
FWD thermal model values

R (K/W)	τ (s)
8,42E-02	3,42E+00
2,22E-01	5,14E-01
7,39E-01	9,06E-02
3,21E-01	2,76E-02
1,85E-01	5,81E-03
1,30E-01	1,14E-03

Boost Switch Characteristics

Typical output characteristics **IGBT**

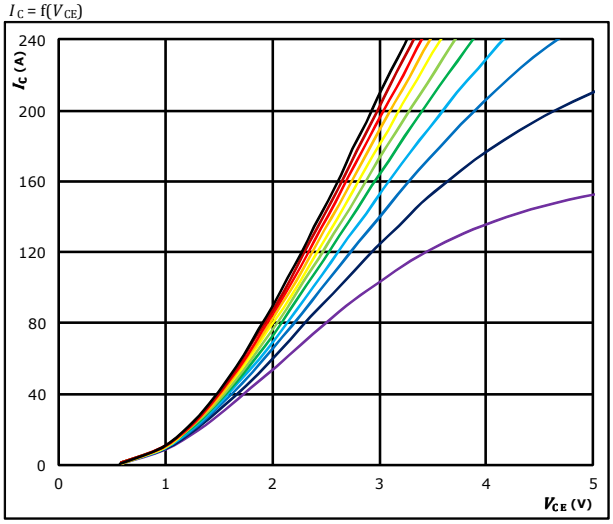
$I_C = f(V_{CE})$



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

Typical output characteristics **IGBT**

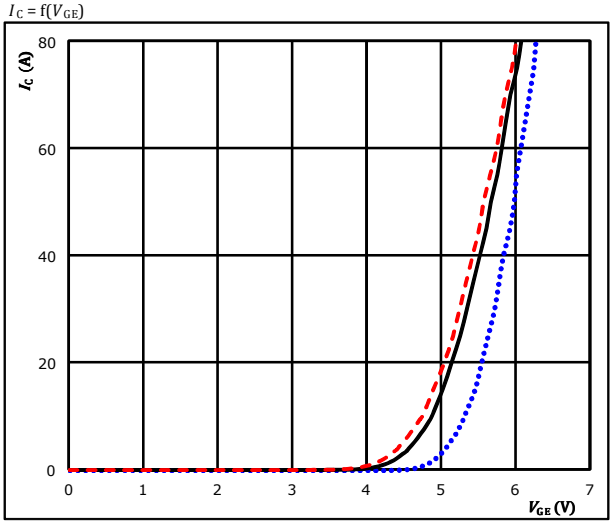
$I_C = f(V_{CE})$



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

Typical transfer characteristics **IGBT**

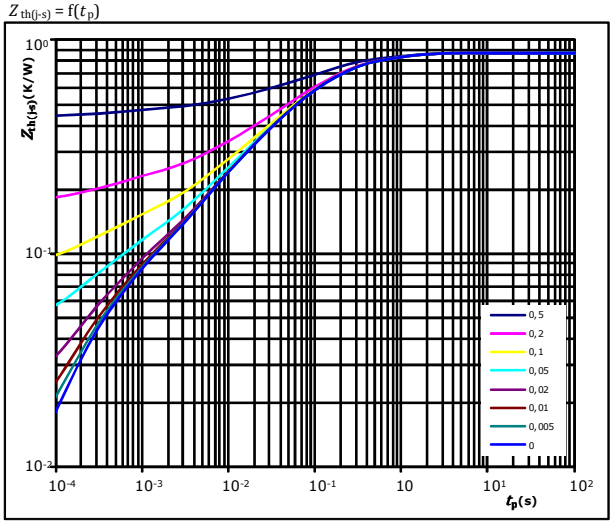
$I_C = f(V_{GE})$



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

Transient Thermal Impedance as function of Pulse duration **IGBT**

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



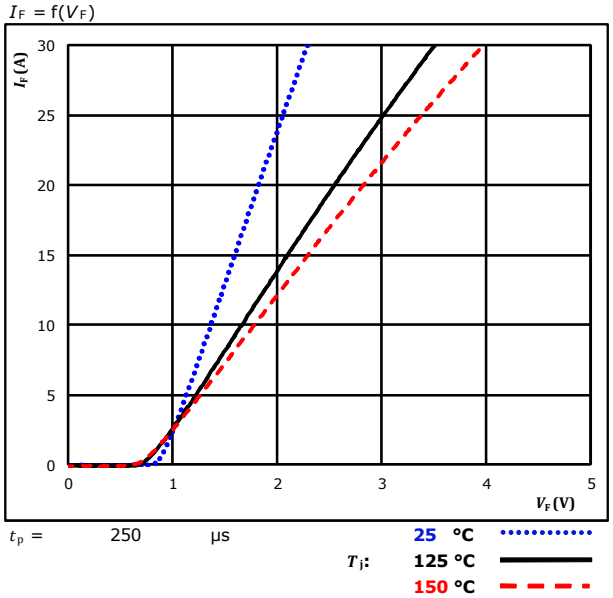
D =	t_p / T	
$R_{th(j-s)}$ =	0,87	K/W

IGBT thermal model values

R_{th} (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

Boost Diode Characteristics

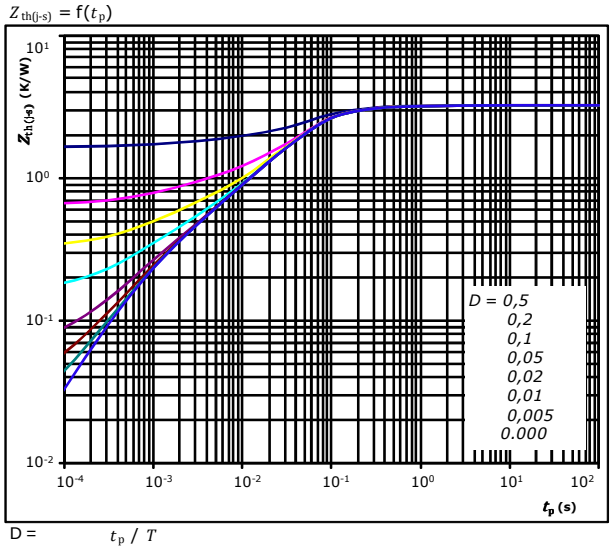
Typical forward characteristics **FWD**



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

$R_{th(j-s)}$ = 3,27 K/W

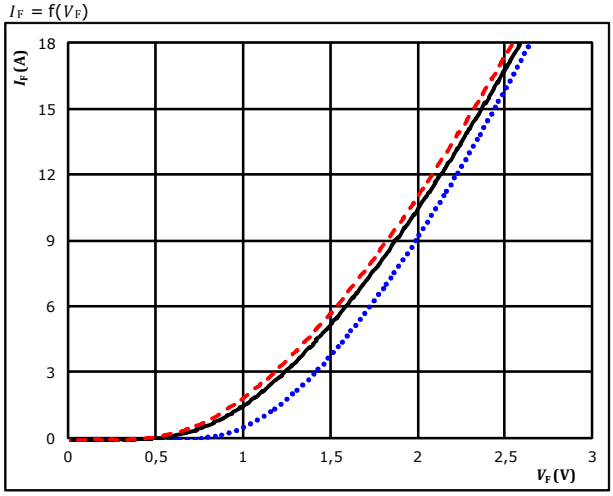
FWD thermal model values

R (K/W)	τ (s)
7,61E-02	2,29E+00
4,56E-01	1,98E-01
2,28E+00	4,66E-02
3,22E-01	3,65E-03
1,34E-01	6,58E-04

Boost Inverse Diode Characteristics

Typical forward characteristics **FWD**

$I_F = f(V_F)$

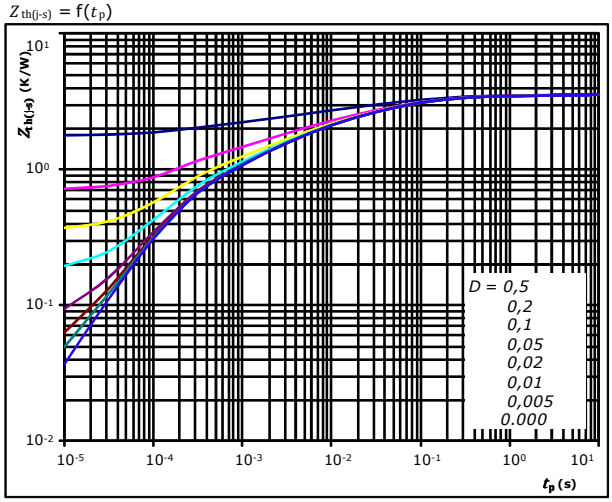


t_p = 250 µs

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

$R_{th(j-s)}$ = 3,52 K/W

FWD thermal model values

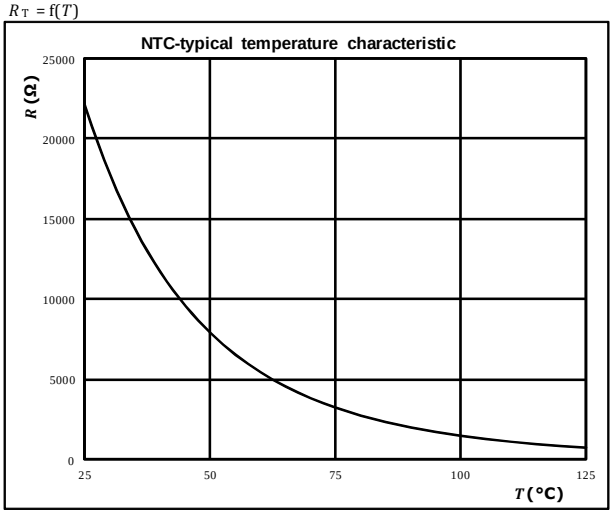
R (K/W)	τ (s)
1,33E-01	2,28E+00
5,44E-01	1,47E-01
8,05E-01	3,33E-02
8,35E-01	6,52E-03
6,02E-01	1,27E-03
6,01E-01	1,89E-04

Thermistor

Thermistor typical temperature characteristic

Typical NTC characteristic as a function of temperature

$R_T = f(T)$

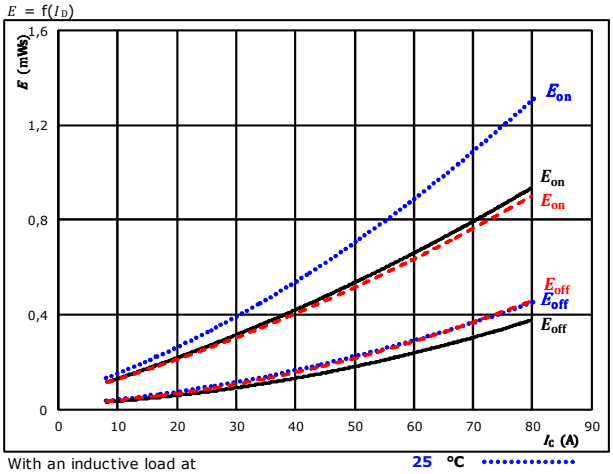


Buck Switching Characteristics

Figure 1. **MOSFET**

Typical switching energy losses as a function of collector current

$E = f(I_D)$



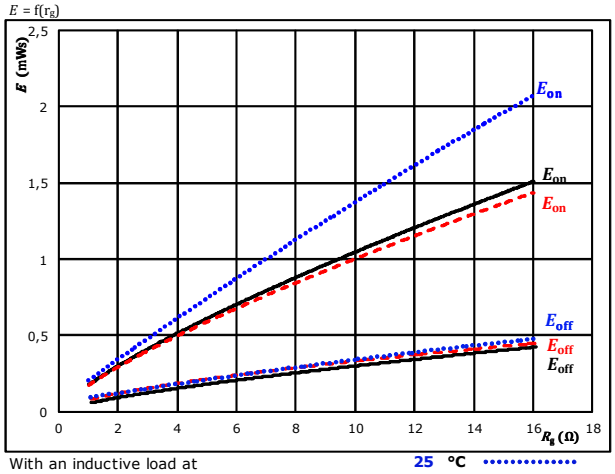
With an inductive load at

V_{DS} =	700	V	T_j:	25 °C
V_{GS} =	±15	V		125 °C
R_{gon} =	4	Ω		150 °C
R_{goff} =	4	Ω		

Figure 2. **MOSFET**

Typical switching energy losses as a function of gate resistor

$E = f(r_g)$



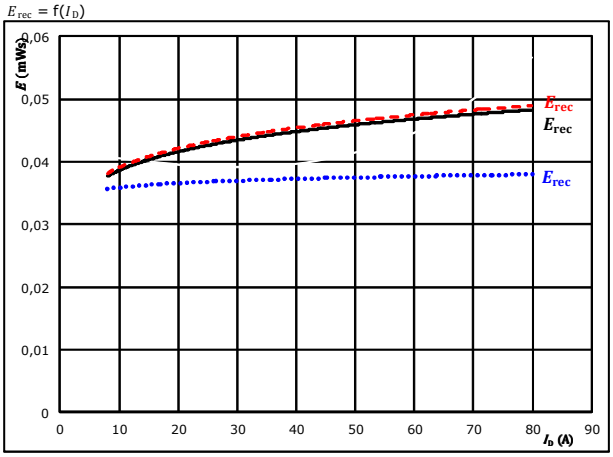
With an inductive load at

V_{DS} =	700	V	T_j:	25 °C
V_{GS} =	±15	V		125 °C
I_D =	44	A		150 °C

Figure 3. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_D)$



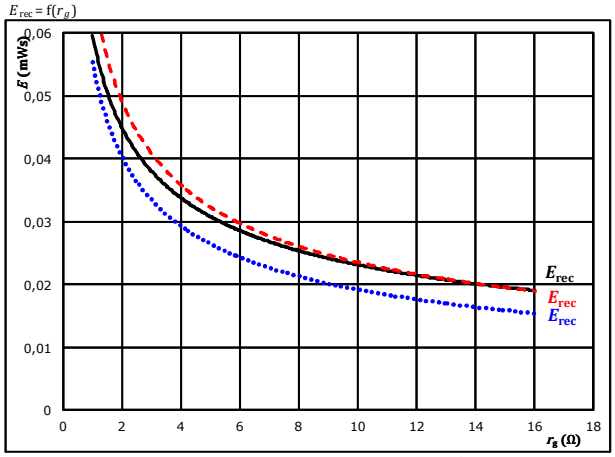
With an inductive load at

V_{DS} =	700	V	T_j:	25 °C
V_{GS} =	±15	V		125 °C
R_{gon} =	4	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

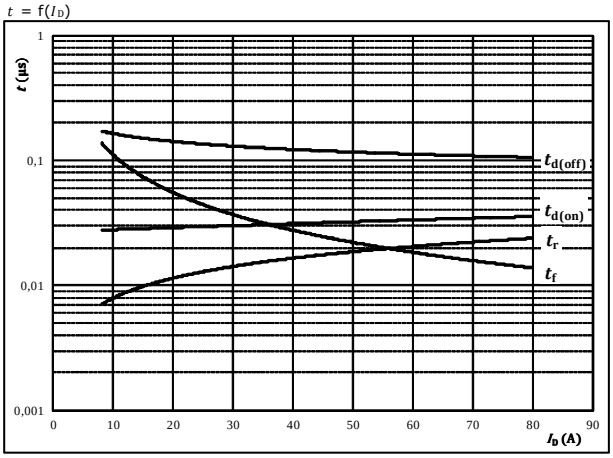
V_{DS} =	700	V	T_j:	25 °C
V_{GS} =	±15	V		125 °C
I_D =	44	A		150 °C

Buck Switching Characteristics

Figure 5. **MOSFET**

Typical switching times as a function of collector current

$t = f(I_D)$



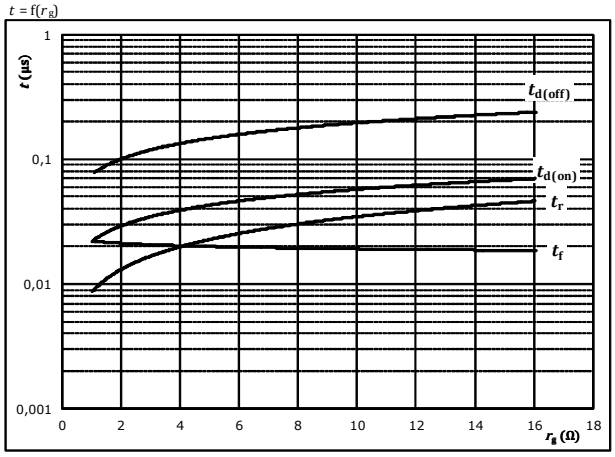
With an inductive load at

T_j =	150	°C
V_{DS} =	700	V
V_{GS} =	±15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

Figure 6. **MOSFET**

Typical switching times as a function of gate resistor

$t = f(r_g)$



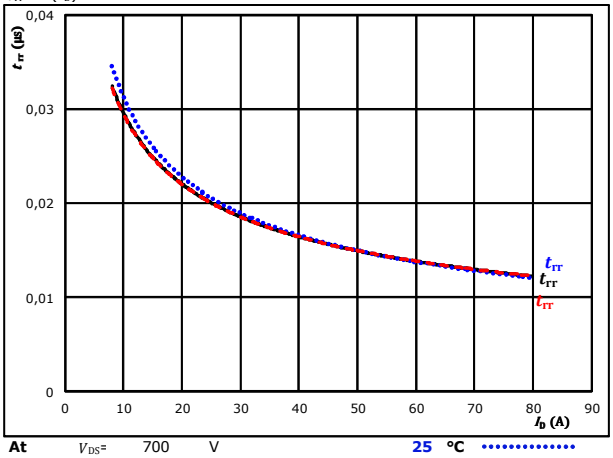
With an inductive load at

T_j =	150	°C
V_{DS} =	700	V
V_{GS} =	±15	V
I_D =	44	A

Figure 7. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_D)$

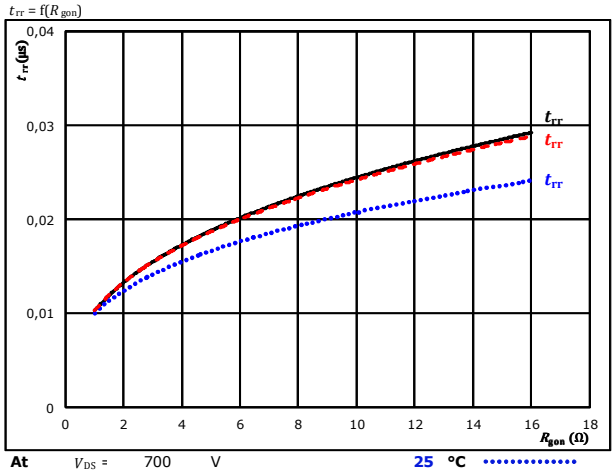


At	V_{DS}=	700	V		25 °C
	V_{GS} =	±15	V	T_j:	125 °C
	R_{gon} =	4	Ω		150 °C

Figure 8. **FWD**

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

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



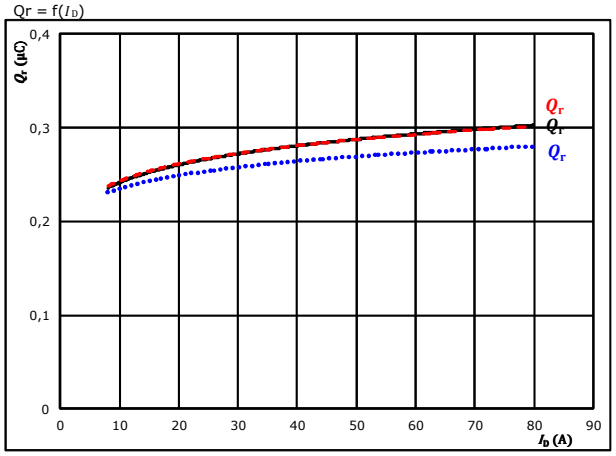
At	V_{DS} =	700	V		25 °C
	V_{GS} =	±15	V	T_j:	125 °C
	I_D =	44	A		150 °C

Buck Switching Characteristics

Figure 9. **FWD**

Typical recovered charge as a function of collector current

Qr = f(I_D)

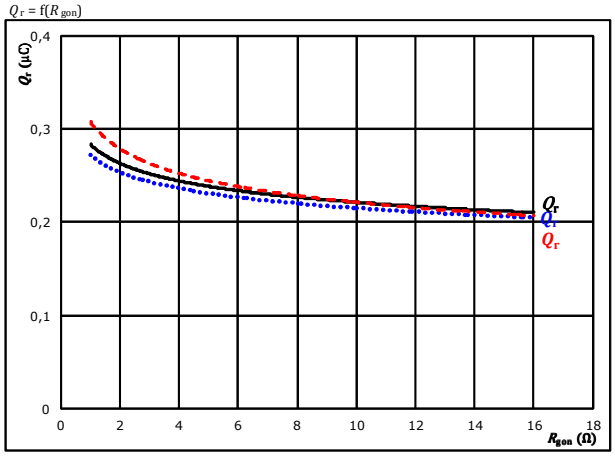


A	V_{DS} =	700	V		25 °C	
	V_{GS} =	±15	V	T_j:	125 °C	
	R_{gon} =	4	Ω		150 °C	

Figure 10. **FWD**

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

$Q_r = f(R_{gon})$

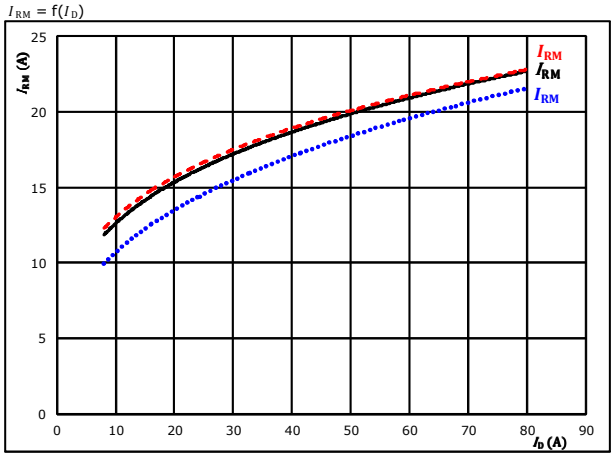


At	V_{DS} =	700	V		25 °C	
	V_{GS} =	±15	V	T_j:	125 °C	
	I_D =	44	A		150 °C	

Figure 11. **FWD**

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

$I_{RM} = f(I_D)$

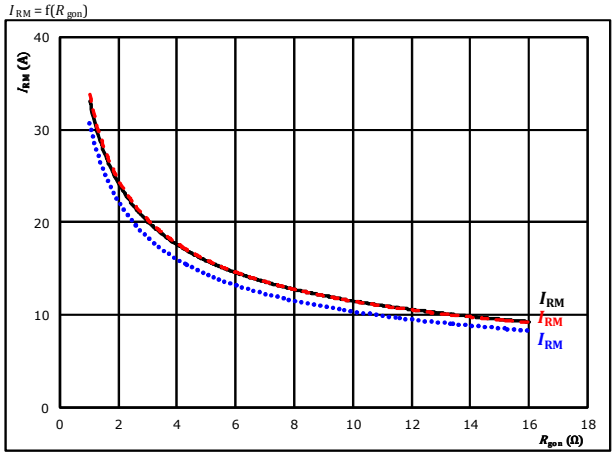


At	V_{DS} =	700	V		25 °C	
	V_{GS} =	±15	V	T_j:	125 °C	
	R_{gon} =	4	Ω		150 °C	

Figure 12. **FWD**

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

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



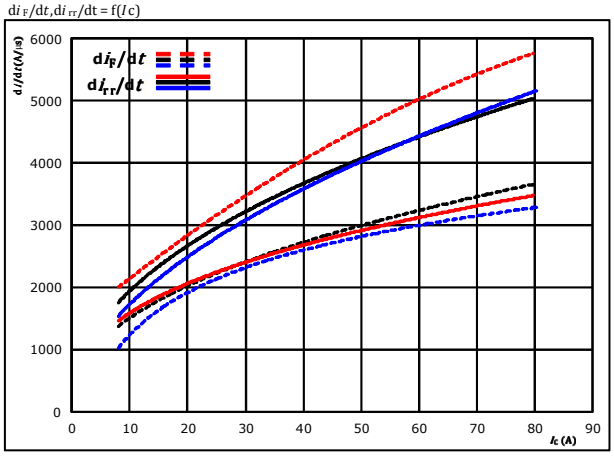
At	V_{DS} =	700	V		25 °C	
	V_{GS} =	±15	V	T_j:	125 °C	
	I_D =	44	A		150 °C	

Buck Switching Characteristics

Figure 13. **FWD**

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

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

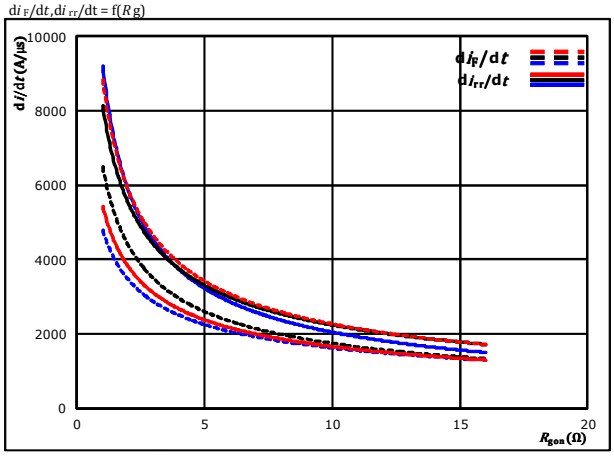


At	V_{DS} =	700	V		
	V_{GS} =	±15	V	T_j:	25 °C
	R_{gon} =	4	Ω		125 °C
					150 °C

Figure 14. **FWD**

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

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

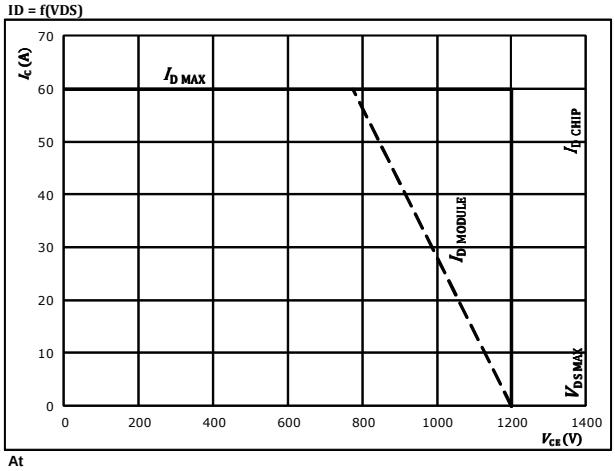


At	V_{DS} =	700	V
	V_{GS} =	±15	V
	I_D=	44	A

Figure 15. **MOSFET**

Reverse bias safe operating area

ID = f(VDS)



At

T_j =	175	°C
R_{gon} =	4	Ω
R_{goff} =	4	Ω

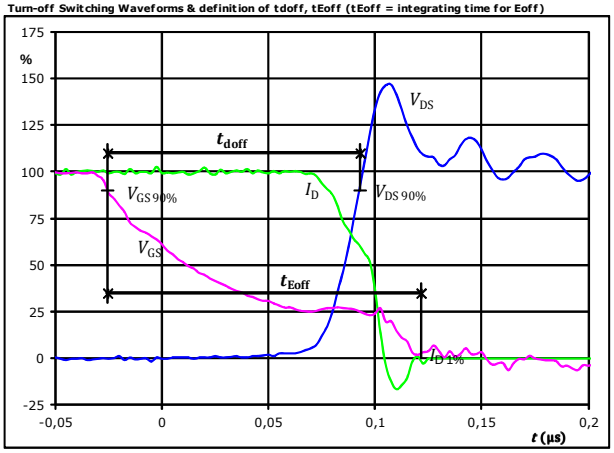
Buck Switching Definition

General conditions

T_j	=	125 °C
R_{gon}	=	4 Ω
R_{goff}	=	4 Ω

Figure 1. MOSFET

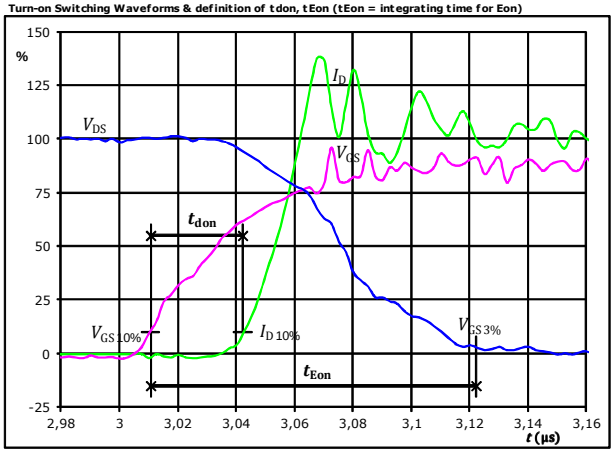
Turn-off Switching Waveforms & definition of tdoff, tEoff (tEoff = integrating time for Eoff)



V_{GS} (0%) =	0	V
V_{GS} (100%) =	24	V
V_{DS} (100%) =	700	V
I_D (100%) =	44	A
t_{doff} =	0,118	µs
t_{Eoff} =	0,147	µs

Figure 2. MOSFET

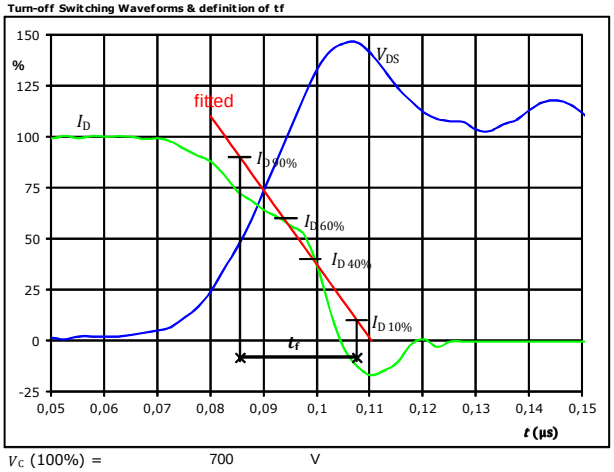
Turn-on Switching Waveforms & definition of tdon, tEon (tEon = integrating time for Eon)



V_{GS} (0%) =	0	V
V_{GS} (100%) =	24	V
V_{DS} (100%) =	700	V
I_D (100%) =	44	A
t_{don} =	0,032	µs
t_{Eon} =	0,111	µs

Figure 3. MOSFET

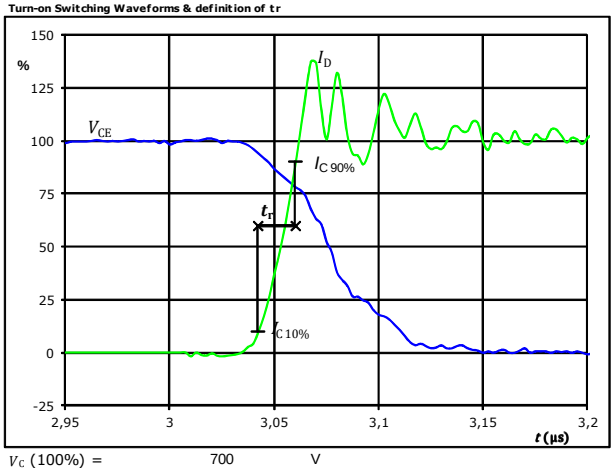
Turn-off Switching Waveforms & definition of tf



V_C (100%) =	700	V
I_D (100%) =	44	A
t_f =	0,023	µs

Figure 4. MOSFET

Turn-on Switching Waveforms & definition of tr

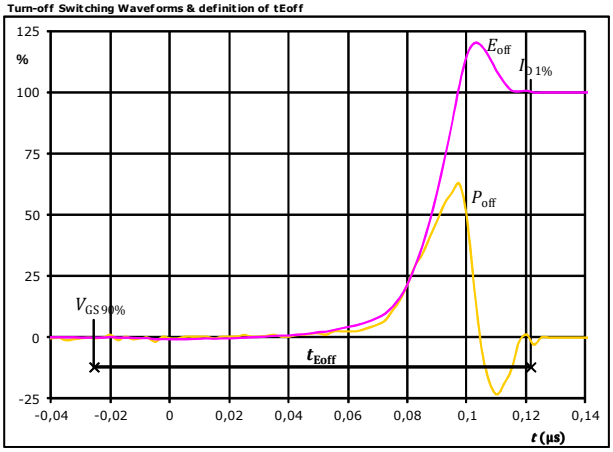


V_C (100%) =	700	V
I_D (100%) =	44	A
t_r =	0,018	µs

Buck Switching Definition

Figure 5. **MOSFET**

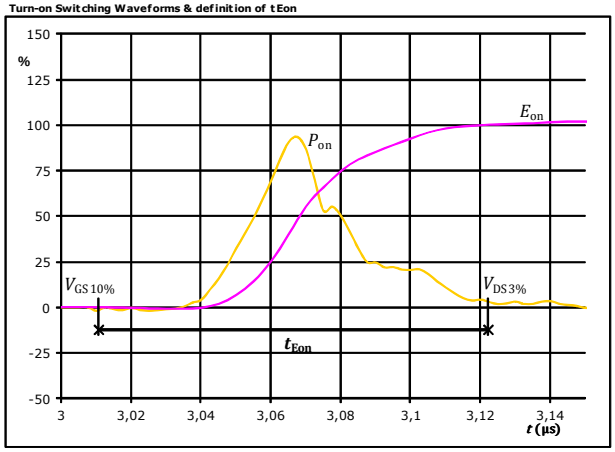
Turn-off Switching Waveforms & definition of tEoff



P_{off} (100%) =	30,63	kW
E_{off} (100%) =	0,15	mJ
t_{Eoff} =	0,15	µs

Figure 6. **MOSFET**

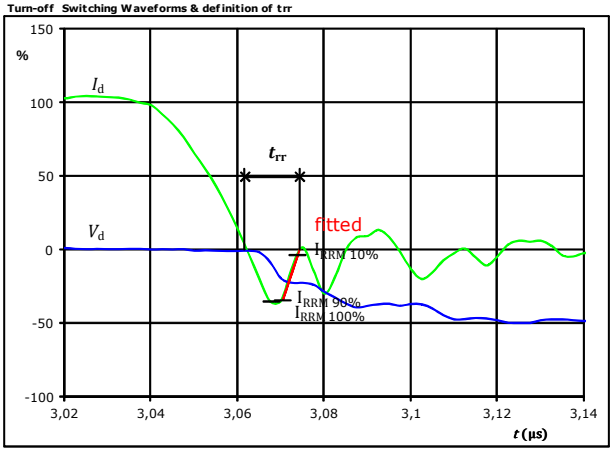
Turn-on Switching Waveforms & definition of tEon



P_{on} (100%) =	30,63	kW
E_{on} (100%) =	0,46	mJ
t_{Eon} =	0,11	µs

Figure 7. **FWD**

Turn-off Switching Waveforms & definition of trr

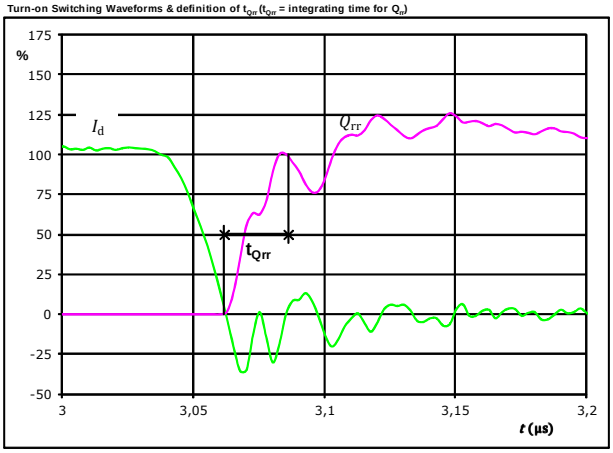


V_d (100%) =	700	V
I_d (100%) =	44	A
I_{RRM} (100%) =	-19	A
t_{rr} =	0,013	µs

Buck Switching Definition

Figure 8. **FWD**

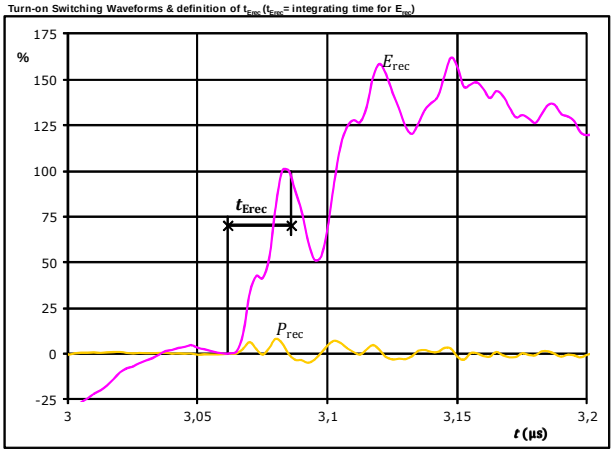
Turn-on Switching Waveforms & definition of t_{Qrr} (t_{Qrr} = integrating time for Q_{rr})



I_d (100%) =	44	A
Q_{rr} (100%) =	0,26	µC
t_{Qrr} =	0,02	µs

Figure 9. **FWD**

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



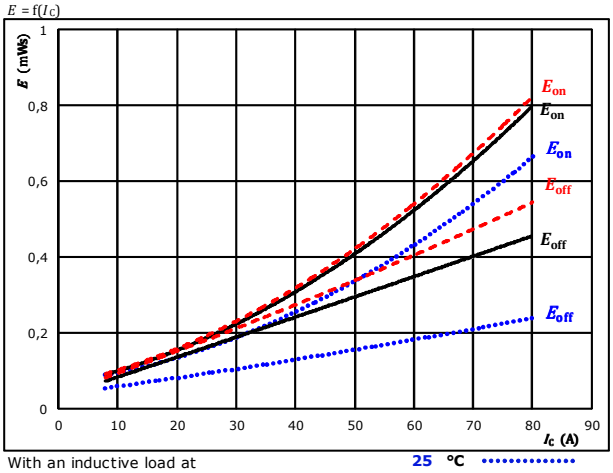
P_{rec} (100%) =	30,63	kW
E_{rec} (100%) =	0,04	mJ
t_{Erec} =	0,02	µs

Boost Switching Characteristics

Figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



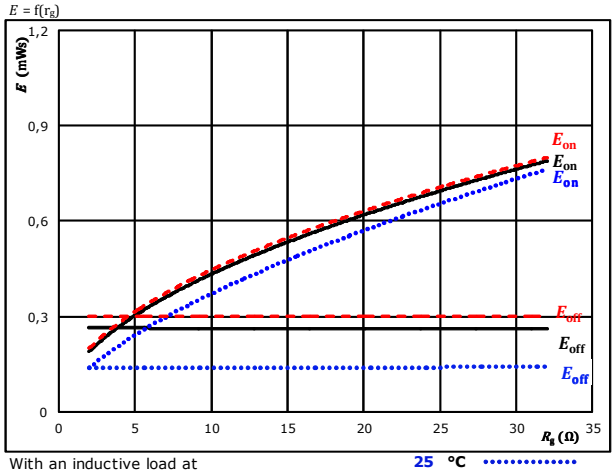
With an inductive load at

V_{CE} =	700	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	8	Ω		150 °C
R_{goff} =	8	Ω		

Figure 2. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(r_g)$



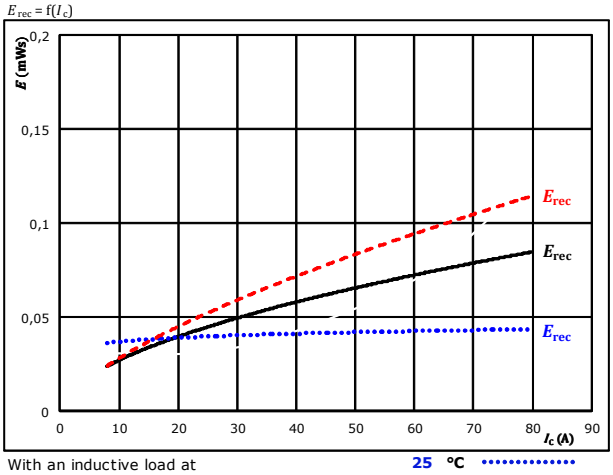
With an inductive load at

V_{CE} =	700	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	44	A		150 °C

Figure 3. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



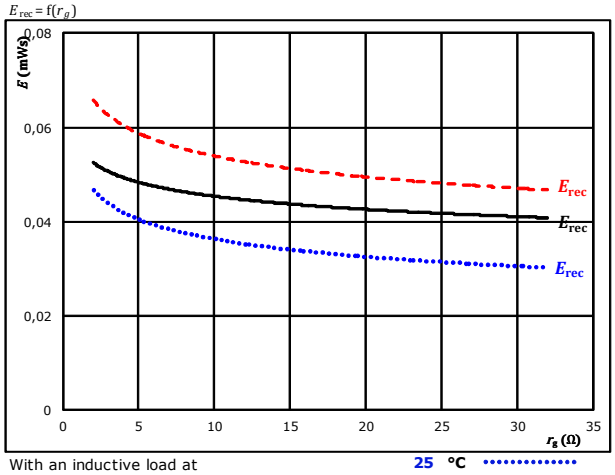
With an inductive load at

V_{CE} =	700	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	8	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

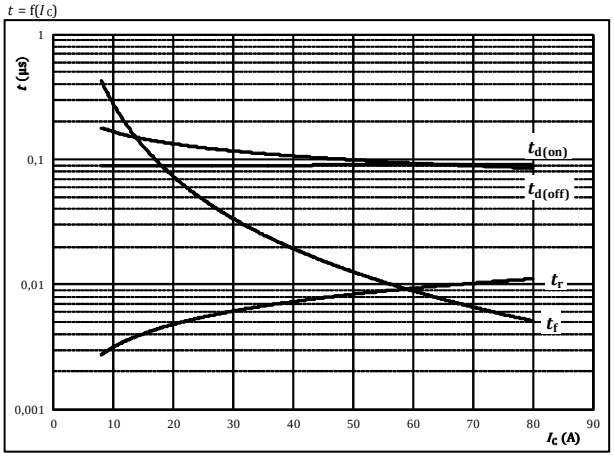
V_{CE} =	700	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	44	A		150 °C

Boost Switching Characteristics

Figure 5. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



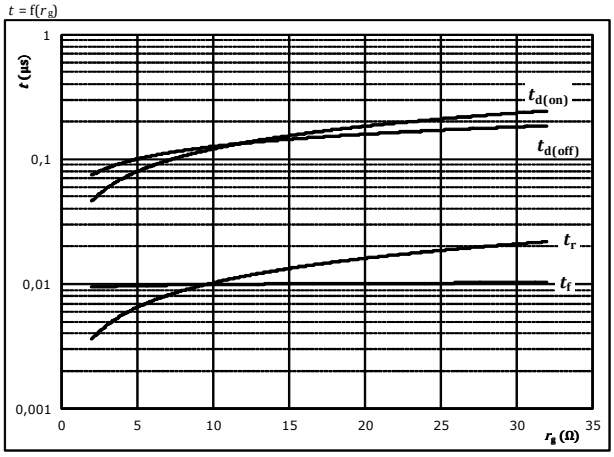
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	700	V
$V_{GE} =$	±15	V
$R_{gon} =$	8	Ω
$R_{goff} =$	8	Ω

Figure 6. **IGBT**

Typical switching times as a function of gate resistor

$t = f(r_g)$



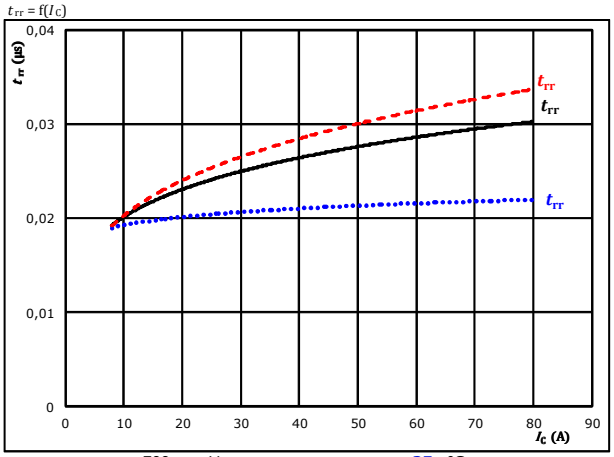
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	700	V
$V_{GE} =$	±15	V
$I_C =$	44	A

Figure 7. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



At

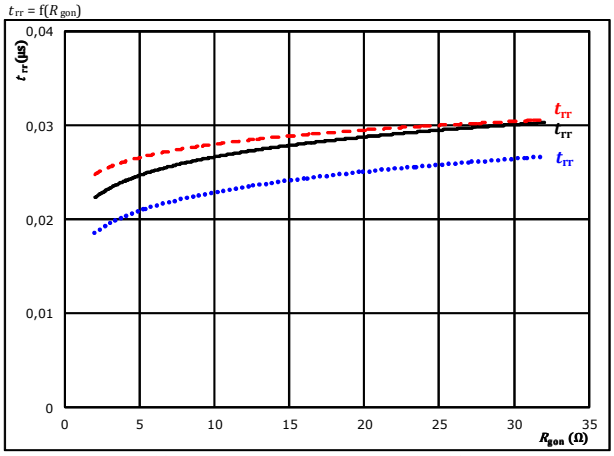
$V_{CE} =$	700	V
$V_{GE} =$	±15	V
$R_{gon} =$	8	Ω

T_j: 25 °C, 125 °C, 150 °C

Figure 8. **FWD**

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

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



At

$V_{CE} =$	700	V
$V_{GE} =$	±15	V
$I_C =$	44	A

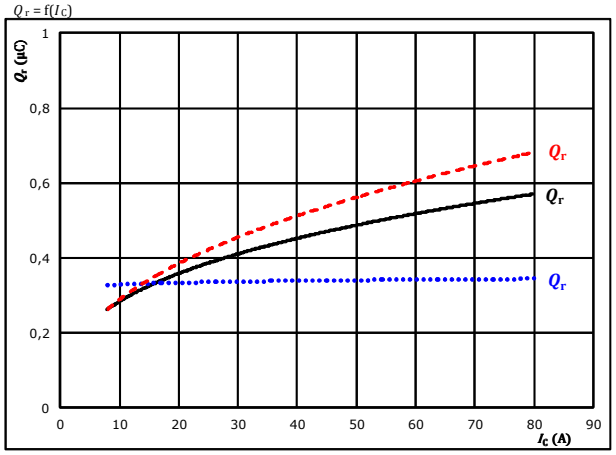
T_j: 25 °C, 125 °C, 150 °C

Boost Switching Characteristics

Figure 9. FWD

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$

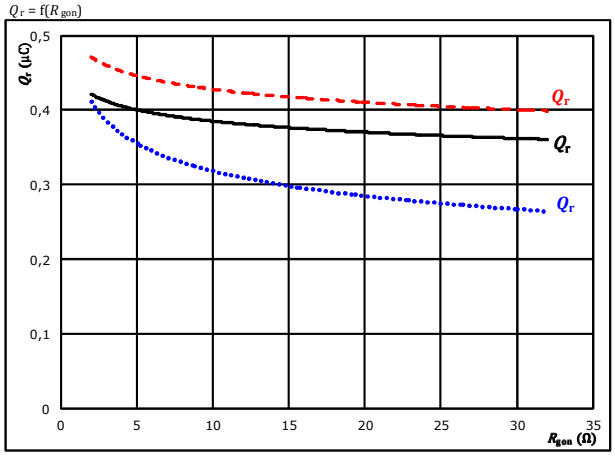


At					
	V_{CE} =	700	V		25 °C
	V_{GE} =	±15	V	T_j:	125 °C
	R_{gon} =	8	Ω		150 °C

Figure 10. FWD

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

$Q_r = f(R_{gon})$

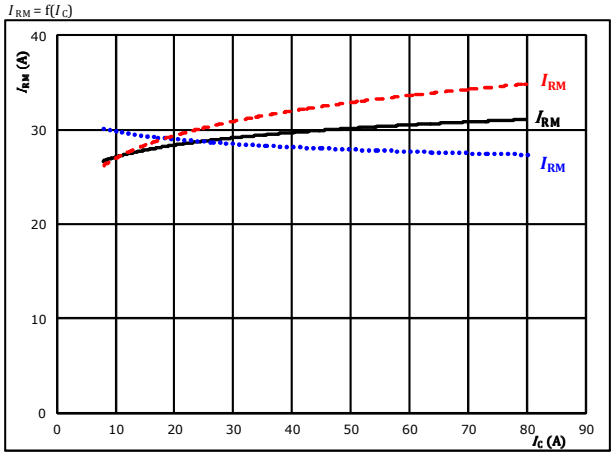


At					
	V_{CE}=	700	V		25 °C
	V_{GE} =	±15	V	T_j:	125 °C
	I_C=	44	A		150 °C

Figure 11. FWD

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

$I_{RM} = f(I_C)$

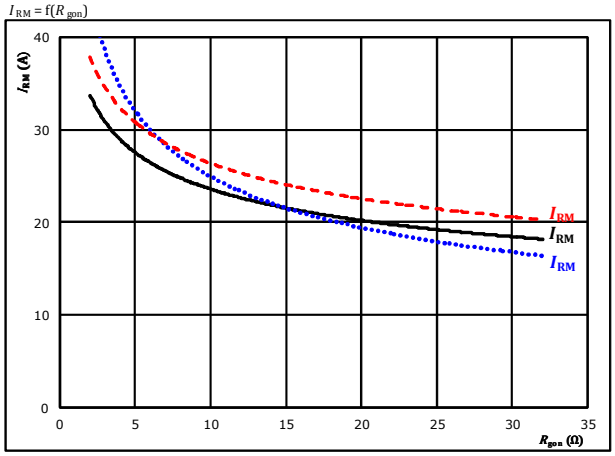


At					
	V_{CE} =	700	V		25 °C
	V_{GE} =	±15	V	T_j:	125 °C
	R_{gon} =	8	Ω		150 °C

Figure 12. FWD

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

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



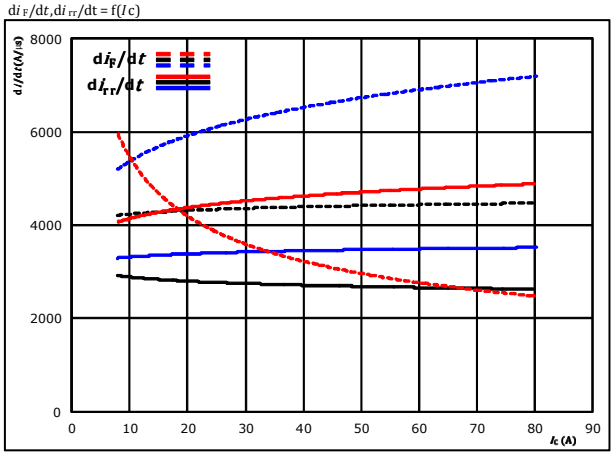
At					
	V_{CE} =	700	V		25 °C
	V_{GE} =	±15	V	T_j:	125 °C
	I_C =	44	A		150 °C

Boost Switching Characteristics

Figure 13. **FWD**

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

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

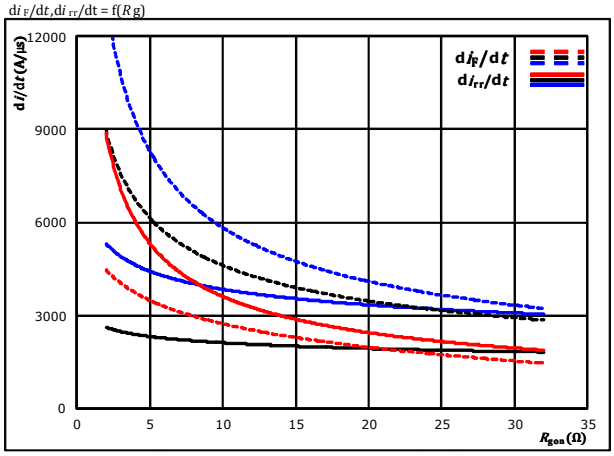


At					
V_{CE} =	700	V	T_j:	25 °C	•••••••••••••••
V_{GE} =	±15	V		125 °C	———
R_{gon} =	8	Ω		150 °C	– – – –

Figure 14. **FWD**

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

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

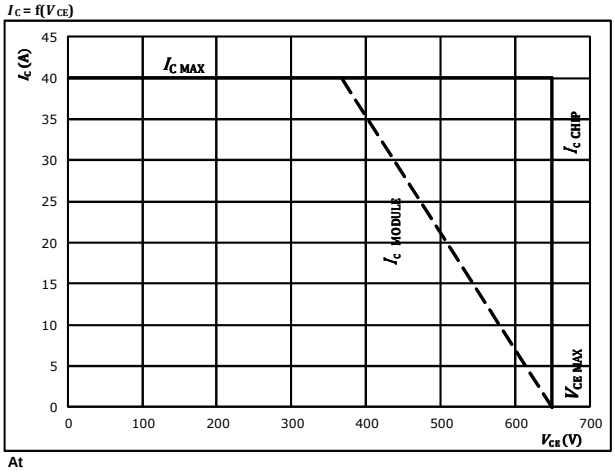


At					
V_{CE} =	700	V	T_j:	25 °C	•••••••••••••••
V_{GE} =	±15	V		125 °C	———
I_C =	44	A		150 °C	– – – –

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

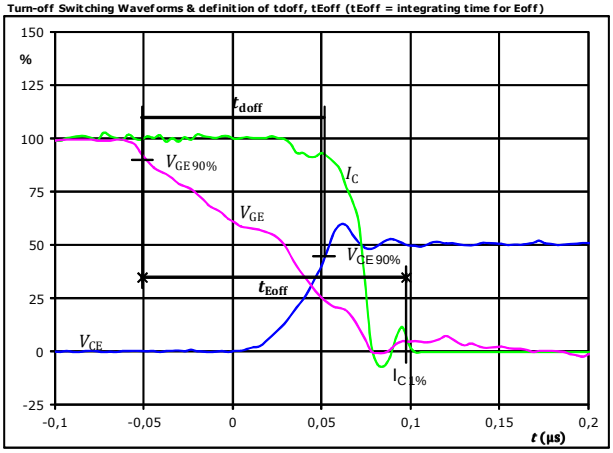
Boost Switching Definition

General conditions

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

Figure 1. IGBT

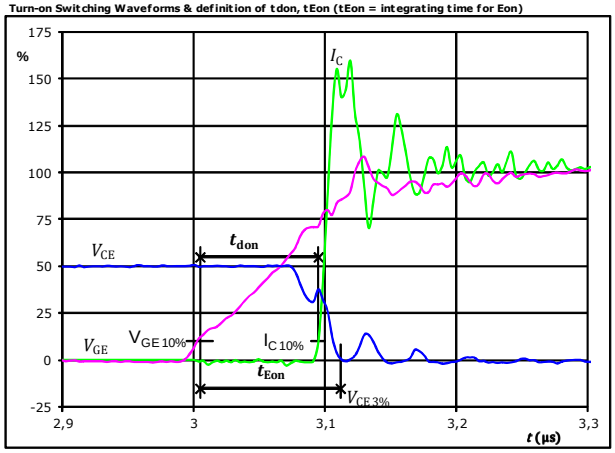
Turn-off Switching Waveforms & definition of tdoff, tEoff (tEoff = integrating time for Eoff)



$V_{GE}(0\%)$ =	-15	V
$V_{GE}(100\%)$ =	15	V
$V_C(100\%)$ =	700	V
$I_C(100\%)$ =	44	A
t_{doff} =	0,101	µs
t_{Eoff} =	0,148	µs

Figure 2. IGBT

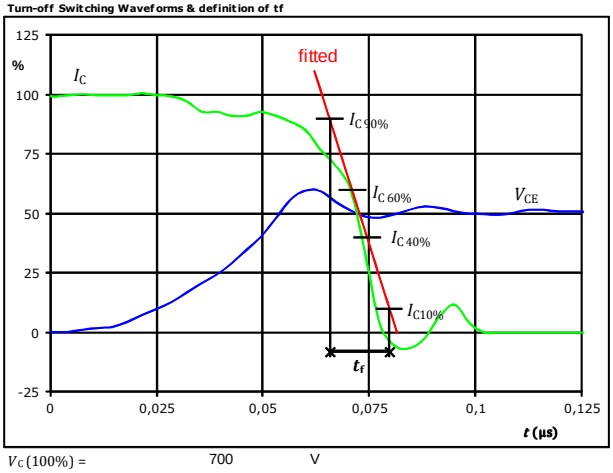
Turn-on Switching Waveforms & definition of tdon, tEon (tEon = integrating time for Eon)



$V_{GE}(0\%)$ =	-15	V
$V_{GE}(100\%)$ =	15	V
$V_C(100\%)$ =	700	V
$I_C(100\%)$ =	44	A
t_{don} =	0,092	µs
t_{Eon} =	0,107	µs

Figure 3. IGBT

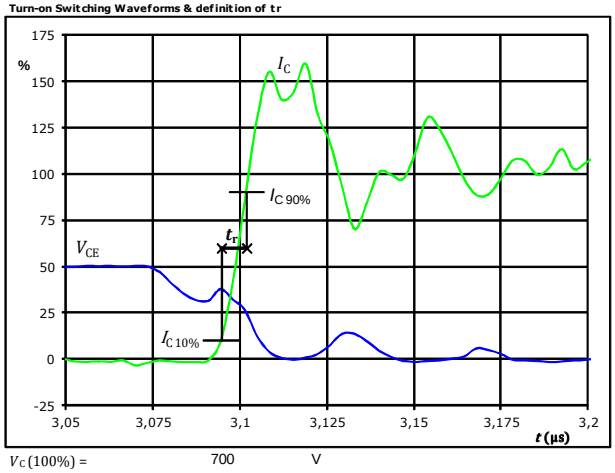
Turn-off Switching Waveforms & definition of tf



$V_C(100\%)$ =	700	V
$I_C(100\%)$ =	44	A
t_f =	0,011	µs

Figure 4. IGBT

Turn-on Switching Waveforms & definition of tr

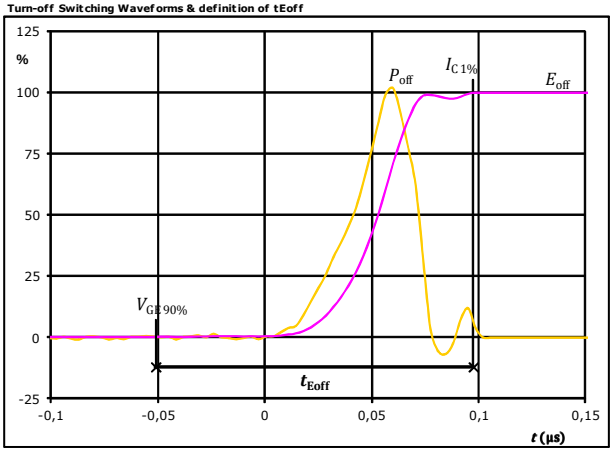


$V_C(100\%)$ =	700	V
$I_C(100\%)$ =	44	A
t_r =	0,007	µs

Boost Switching Definition

Figure 5. **IGBT**

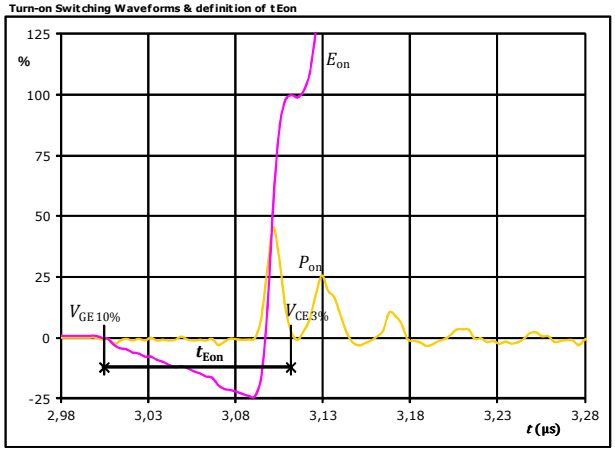
Turn-off Switching Waveforms & definition of tEoff



$P_{off}(100\%)$ =	30,78	kW
$E_{off}(100\%)$ =	0,27	mJ
t_{Eoff} =	0,15	µs

Figure 6. **IGBT**

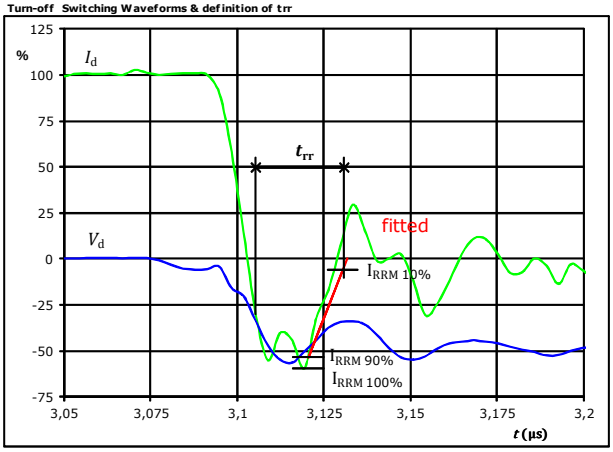
Turn-on Switching Waveforms & definition of tEon



$P_{on}(100\%)$ =	30,78	kW
$E_{on}(100\%)$ =	0,35	mJ
t_{Eon} =	0,11	µs

Figure 7. **FWD**

Turn-off Switching Waveforms & definition of trr

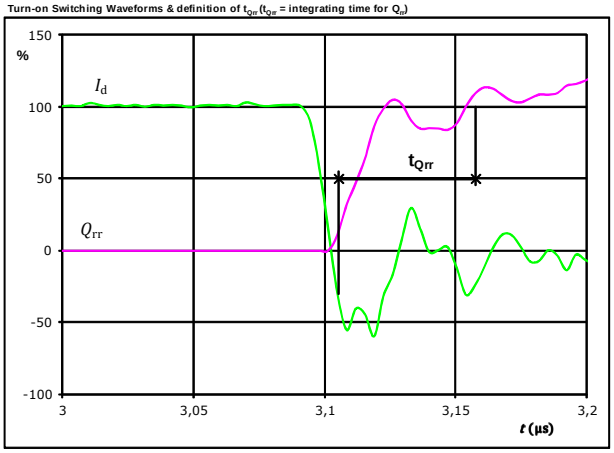


$V_d(100\%)$ =	700	V
$I_d(100\%)$ =	44	A
$I_{RRM}(100\%)$ =	-27	A
t_{rr} =	0,026	µs

Boost Switching Definition

Figure 8. **FWD**

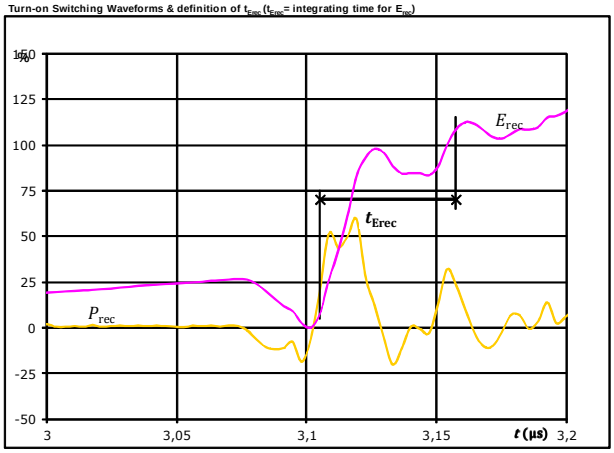
Turn-on Switching Waveforms & definition of t_{Qrr} (t_{Qrr} = integrating time for Q_{rr})



I_d (100%) =	44	A
Q_{rr} (100%) =	0,39	µC
t_{Qrr} =	0,05	µs

Figure 9. **FWD**

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



P_{rec} (100%) =	30,78	kW
E_{rec} (100%) =	0,05	mJ
t_{Erec} =	0,05	µs

Vincotech

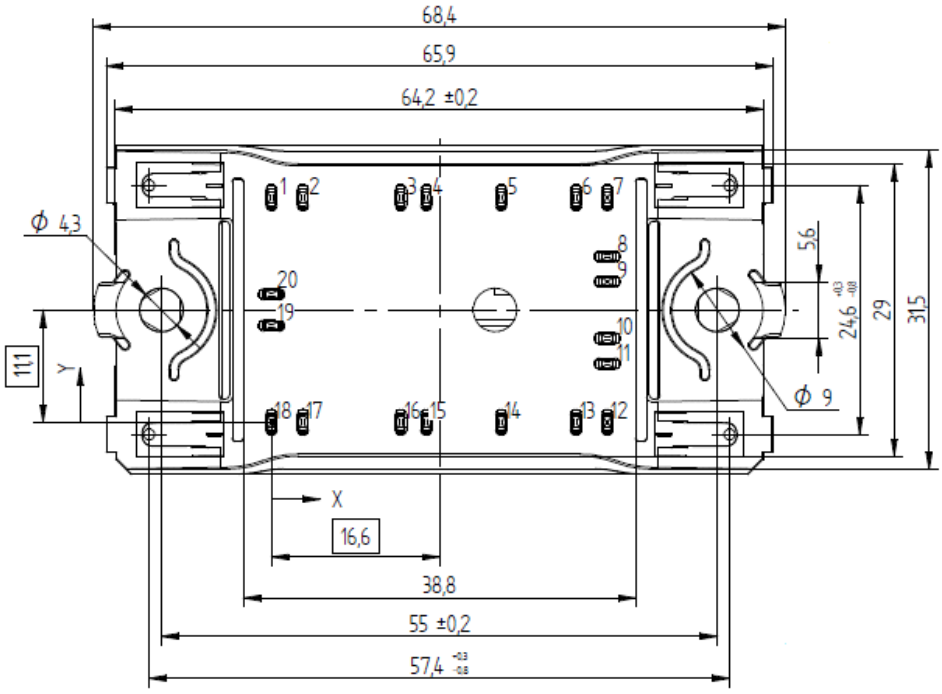
Ordering Code & Marking

Version	Ordering Code	in DataMatrix as	in packaging barcode as
without thermal paste 12mm housing	10-PZ12NMA027MR-M340F68Y	M340F68Y	M340F68Y

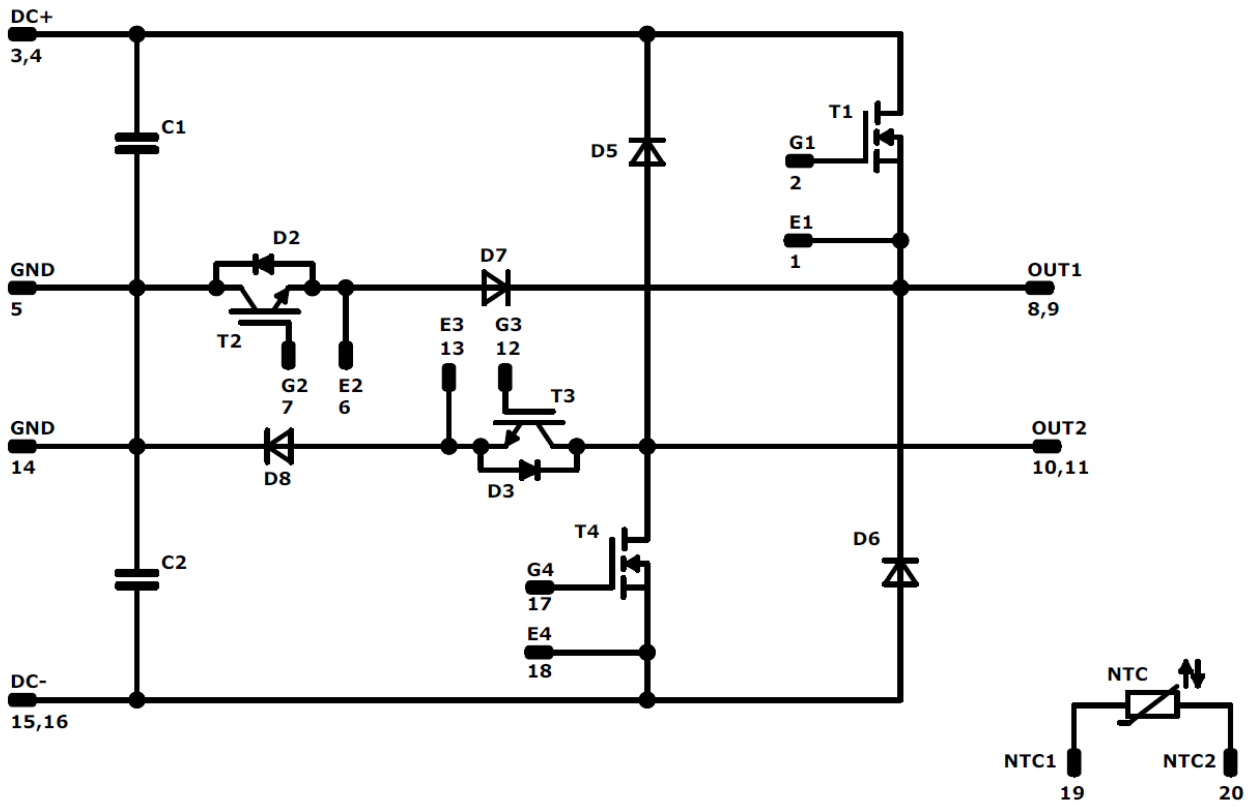
	Name		Date code	UL & Vinco	Lot	Serial
Text	NN-NNNNNNNNNNNNN-NNNNNNNN		WWYY	UL Vinco	LLLLL	SSSS
Datamatrix	Type&Ver	Lot number	Serial	Date code		
	TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]			
Pin	X	Y	Function
1	0	22,2	E1
2	3,1	22,2	G1
3	12,8	22,2	DC+
4	15,3	22,2	DC+
5	22,7	22,2	GND
6	30,1	22,2	E2
7	33,2	22,2	G2
8	33,2	16,4	OUT1
9	33,2	13,9	OUT1
10	33,2	8,3	OUT2
11	33,2	5,8	OUT2
12	33,2	0	G3
13	30,1	0	E3
14	22,7	0	GND
15	15,3	0	DC-
16	12,8	0	DC-
17	3,1	0	G4
18	0	0	E4
19	0	9,55	NTC1
20	0	12,65	NTC2



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T1,T4	MOSFET	1200V	27mΩ	Buck Switch	3*S2303TCST
D7,D8	FWD	650V	30A	Buck Diode	3*S6202TCSF
T2,T3	IGBT	650V	80A	Boost Switch	2*IGC13T65U8Q
D5,D6	FWD	1200V	10A	Boost Diode	S6302TCS
D2,D3	FWD	650V	6A	Boost Inverse Diode	SIDC02D65C(6,8)
C1,C2	Capacitor	500V	-	DC Link	
NTC	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-PZ12NMA027MR-M340F68Y-D1-14	17 Jul. 2015		

单击下面可查看定价，库存，交付和生命周期等信息

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