



Vincotech

B0-SP10NDA100S7-LU18F08T

datasheet

flow3xBUCK-BOOST S3

950 V / 100 A

Features

- Compact and low inductive design
- Integrated capacitors for improved EMC
- 3-leg buck/boost topology
- Interleaved operation
- Integrated NTC

Target applications

- Energy Storage Systems
- Power Supply

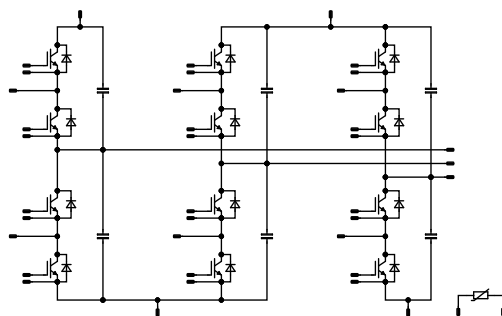
Types

- B0-SP10NDA100S7-LU18F08T

flow S3 12 mm housing



Schematic





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Maximum Ratings

$T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
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Boost Switch

Collector-emitter voltage	V_{CES}		950	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	77	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	145	W
Gate-emitter voltage	V_{GES}		± 20	V
Maximum junction temperature	T_{jmax}		175	°C

Boost Diode

Peak repetitive reverse voltage	V_{RRM}		950	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	58	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	106	W
Maximum junction temperature	T_{jmax}		175	°C

Buck Switch

Collector-emitter voltage	V_{CES}		950	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	77	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	145	W
Gate-emitter voltage	V_{GES}		± 20	V
Maximum junction temperature	T_{jmax}		175	°C

Buck Diode

Peak repetitive reverse voltage	V_{RRM}		950	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	58	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	106	W
Maximum junction temperature	T_{jmax}		175	°C



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Maximum Ratings

$T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Capacitor (DC)				
Maximum DC voltage	V_{MAX}		1000	V
Operation Temperature	T_{op}		0 ... 125	°C

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* $t_p = 2\text{ s}$	6000	V
Isolation voltage	V_{isol}	AC Voltage $t_p = 1\text{ min}$	2500	V
Creepage distance			9,32	mm
Clearance			8,03	mm
Comparative Tracking Index	CTI		≥ 600	

*100 % tested in production



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Characteristic Values

Parameter	Symbol	Conditions						Values			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max		

Boost Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,00167	25	4,35	5,1	5,85	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		100	25 125 150		1,67 1,94 2,01	2,35 ⁽¹⁾	V
Collector-emitter cut-off current	I_{CES}		0	950		25			2	µA
Gate-emitter leakage current	I_{GES}		20	0		25			100	nA
Internal gate resistance	r_g							1,5		Ω
Input capacitance	C_{ies}	$f = 100 \text{ kHz}$	0	25		25		6500		pF
Output capacitance	C_{oes}							139		pF
Reverse transfer capacitance	C_{res}							20		pF
Gate charge	Q_g		15		0	25		230		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 4,4 \text{ W/mK}$ (PTM)						0,66		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 4 \text{ } \Omega$ $R_{goff} = 4 \text{ } \Omega$	0/15	600	65	25 125 150		33,28 32 31,68		ns
Rise time	t_r					25 125 150		8,96 10,56 10,88		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		188,8 231,04 242,56		ns
Fall time	t_f					25 125 150		27,86 56,83 68,06		ns
Turn-on energy (per pulse)	E_{on}					25 125 150		1,63 2,16 2,32		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		1,77 3,08 3,43		mWs



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Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	

Boost Diode

Static

Forward voltage	V_F				100	25 125 150	2,1	2,64 2,44 2,36	2,8 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 950$ V				25			4	µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 4,4$ W/mK (PTM)						0,89		K/W
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Dynamic

Peak recovery current	I_{RRM}	$di/dt=6787$ A/µs $di/dt=6246$ A/µs $di/dt=6082$ A/µs	0/15	600	65	25 125 150		96,42 137,93 151,14		A
Reverse recovery time	t_{rr}					25 125 150		81,51 111,66 122,49		ns
Recovered charge	Q_r					25 125 150		2,7 5,78 6,91		µC
Reverse recovered energy	E_{rec}					25 125 150		1,1 2,51 3,05		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		6507 5759 5793		A/µs



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Characteristic Values

Parameter	Symbol	Conditions						Values			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max		

Buck Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,00167	25	4,35	5,1	5,85	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		100	25 125 150		1,67 1,94 2,01	2,35 ⁽¹⁾	V
Collector-emitter cut-off current	I_{CES}		0	950		25			2	µA
Gate-emitter leakage current	I_{GES}		20	0		25			100	nA
Internal gate resistance	r_g							1,5		Ω
Input capacitance	C_{ies}	$f = 100 \text{ kHz}$	0	25		25		6500		pF
Output capacitance	C_{oes}							139		pF
Reverse transfer capacitance	C_{res}							20		pF
Gate charge	Q_g		15		0	25		230		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 4,4 \text{ W/mK}$ (PTM)						0,66		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 4 \text{ } \Omega$ $R_{goff} = 4 \text{ } \Omega$	0/15	600	65	25 125 150		33,28 32 31,68		ns
Rise time	t_r					25 125 150		8,96 10,56 10,88		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		188,8 231,04 242,56		ns
Fall time	t_f					25 125 150		27,86 56,83 68,06		ns
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD}=2,7 \text{ } \mu\text{C}$ $Q_{tFWD}=5,78 \text{ } \mu\text{C}$ $Q_{tFWD}=6,91 \text{ } \mu\text{C}$				25 125 150		1,63 2,16 2,32		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		1,77 3,08 3,43		mWs



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Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	

Buck Diode

Static

Forward voltage	V_F				100	25 125 150	2,1	2,64 2,44 2,36	2,8 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 950$ V				25			4	µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 4,4$ W/mK (PTM)						0,89		K/W
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Dynamic

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Reverse recovery time	t_{rr}					25 125 150		81,51 111,66 122,49		ns
Recovered charge	Q_r					25 125 150		2,7 5,78 6,91		µC
Reverse recovered energy	E_{rec}					25 125 150		1,1 2,51 3,05		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		6507 5759 5793		A/µs



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Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	

Capacitor (DC)

Static

Capacitance	C	DC bias voltage = 0 V				25		47		nF
Tolerance							-10		10	%

Thermistor

Static

Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	$R_{100} = 1484 \Omega$				100	-5		5	%
Power dissipation	P							5		mW
Power dissipation constant	d					25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ± 1 %						3962		K
B-value	$B_{(25/100)}$	Tol. ± 1 %						4000		K
Vincotech Thermistor Reference									I	

⁽¹⁾ Value at chip level

⁽²⁾ Only valid with pre-applied Vincotech thermal interface material.



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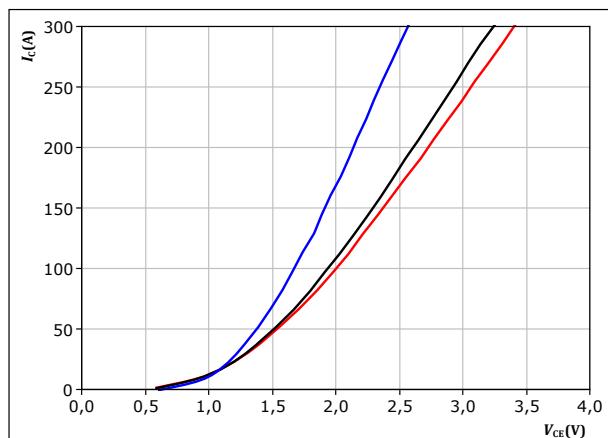
datasheet

Boost Switch Characteristics

figure 1. IGBT

Typical output characteristics

$$I_C = f(V_{CE})$$



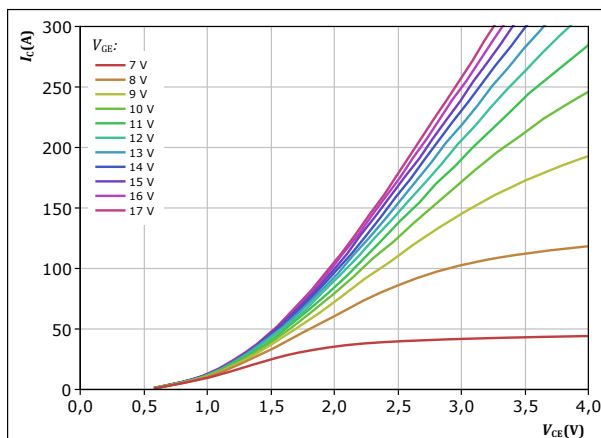
$t_p = 250 \mu s$
 $V_{GE} = 15 V$

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 2. IGBT

Typical output characteristics

$$I_C = f(V_{CE})$$

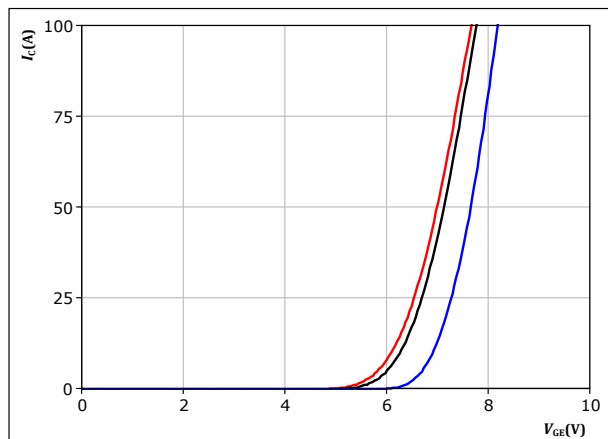


$t_p = 250 \mu s$
 $T_j = 150 ^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

$$I_C = f(V_{GE})$$



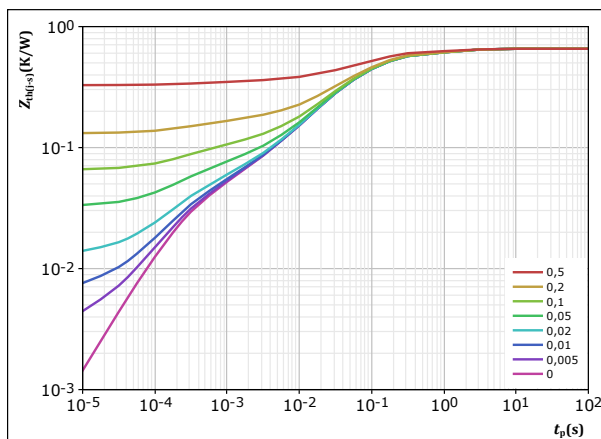
$t_p = 250 \mu s$
 $V_{CE} = 10 V$

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 4. IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 0,656 K/W$
IGBT thermal model values

$R (K/W)$	$\tau (s)$
8,75E-02	1,42E+00
3,39E-01	1,02E-01
1,74E-01	2,16E-02
2,53E-02	1,80E-03
3,08E-02	2,55E-04



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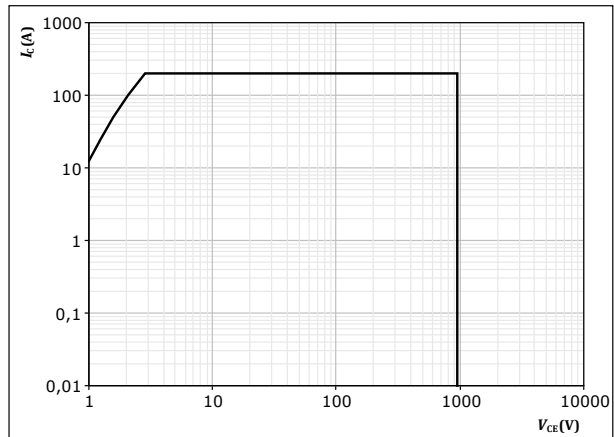
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Boost Switch Characteristics

figure 5. IGBT

Safe operating area

$$I_C = f(V_{CE})$$



$D =$ single pulse

$T_s = 80 \text{ } ^\circ\text{C}$

$V_{GE} = 15 \text{ V}$

$T_j = T_{jmax}$



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Boost Diode Characteristics

figure 6. FWD

Typical forward characteristics

$$I_F = f(V_F)$$

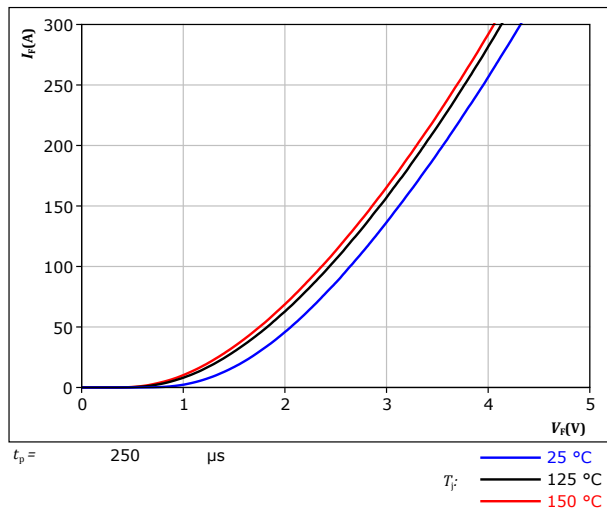
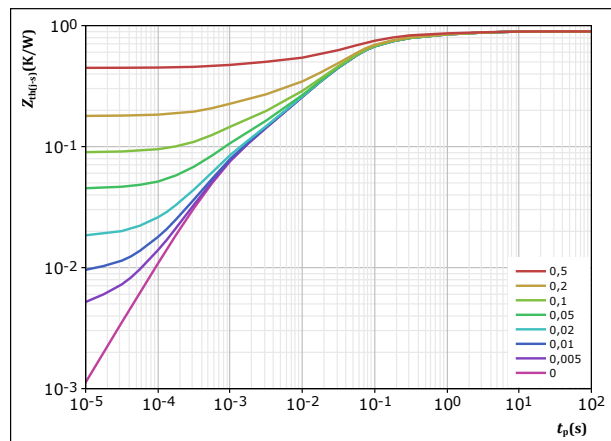


figure 7. FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T
$R_{th(j-s)} =$	0,895 K/W
FWD thermal model values	
R (K/W)	τ (s)
5,60E-02	2,84E+00
1,11E-01	4,12E-01
5,01E-01	5,45E-02
1,52E-01	1,00E-02
7,48E-02	8,47E-04



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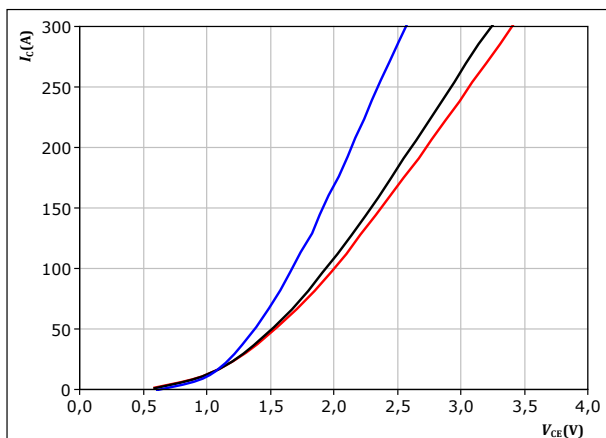
Buck Switch Characteristics

figure 8.

IGBT

Typical output characteristics

$$I_C = f(V_{CE})$$



$t_p = 250 \mu s$
 $V_{GE} = 15 V$

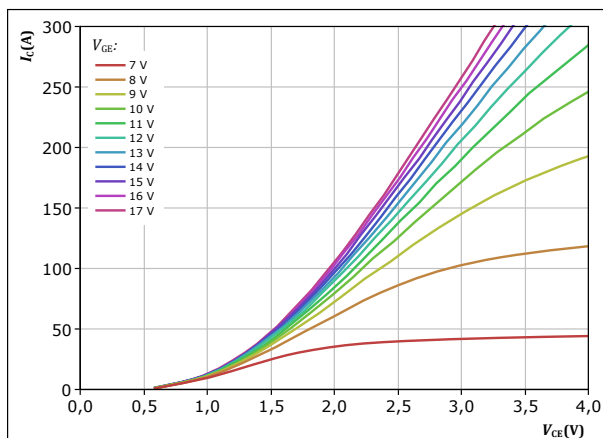
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 9.

IGBT

Typical output characteristics

$$I_C = f(V_{CE})$$



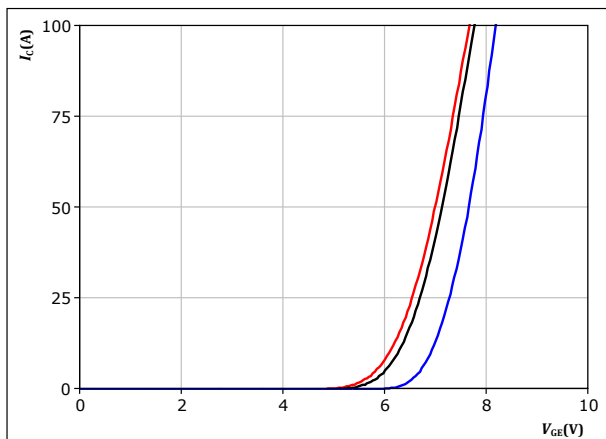
$t_p = 250 \mu s$
 $T_j = 150 ^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 10.

IGBT

Typical transfer characteristics

$$I_C = f(V_{GE})$$



$t_p = 250 \mu s$
 $V_{CE} = 10 V$

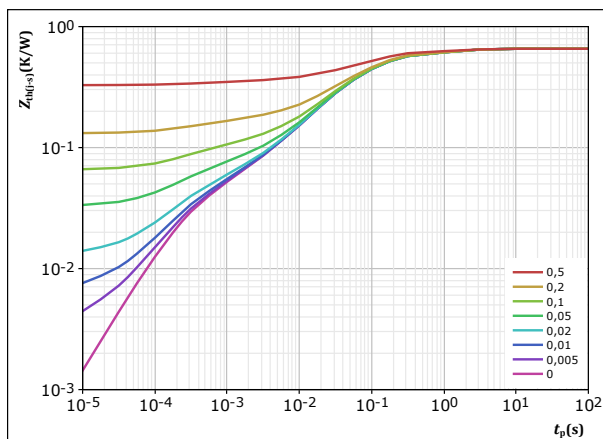
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 11.

IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 0,656 K/W$
IGBT thermal model values

$R (K/W)$	$\tau (s)$
8,75E-02	1,42E+00
3,39E-01	1,02E-01
1,74E-01	2,16E-02
2,53E-02	1,80E-03
3,08E-02	2,55E-04



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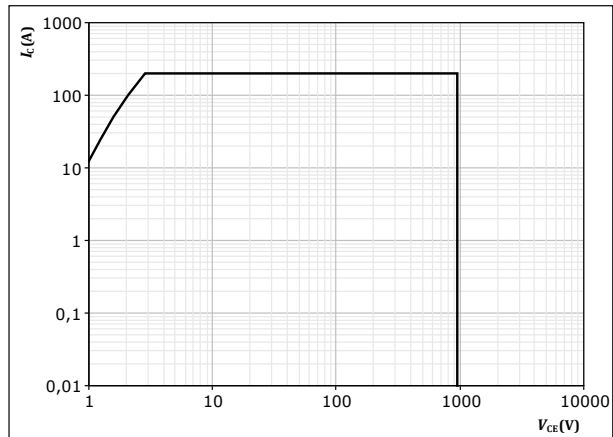
Buck Switch Characteristics

figure 12.

IGBT

Safe operating area

$$I_C = f(V_{CE})$$



$D =$ single pulse

$T_s = 80 \text{ } ^\circ\text{C}$

$V_{GE} = 15 \text{ V}$

$T_j = T_{jmax}$



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datasheet

Buck Diode Characteristics

figure 13.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

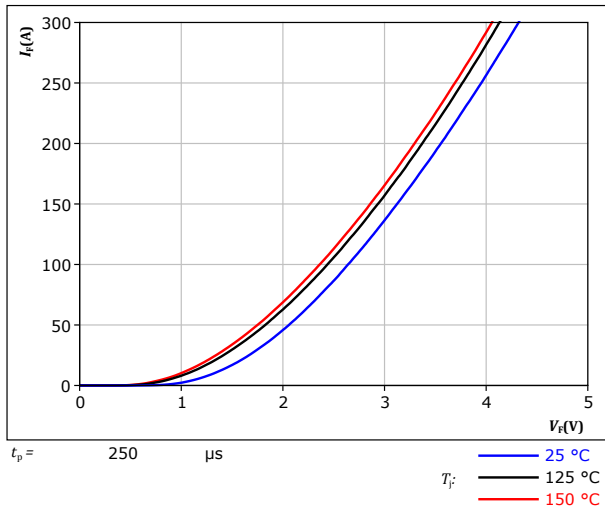
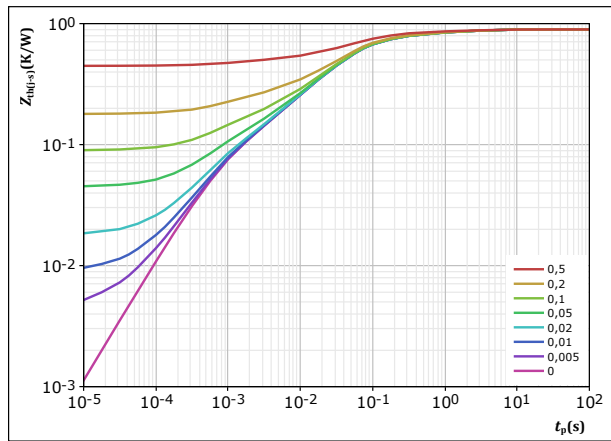


figure 14.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T
$R_{th(j-s)} =$	0,895 K/W
FWD thermal model values	
R (K/W)	τ (s)
5,60E-02	2,84E+00
1,11E-01	4,12E-01
5,01E-01	5,45E-02
1,52E-01	1,00E-02
7,48E-02	8,47E-04



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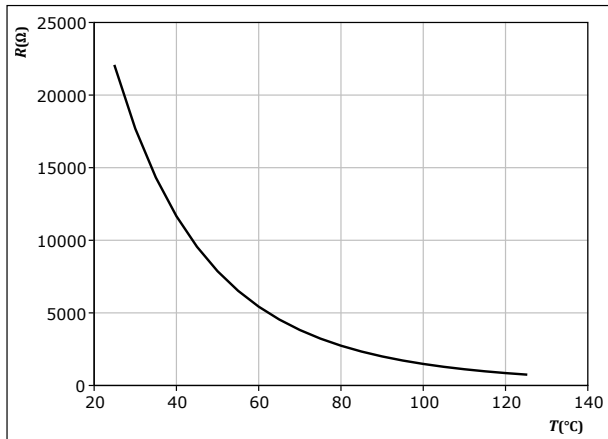
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Thermistor Characteristics

figure 15. Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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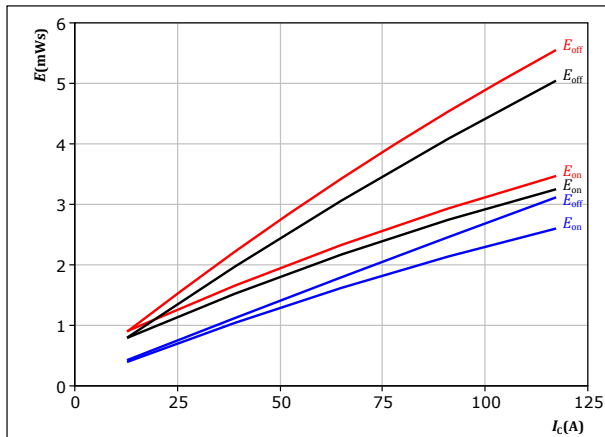
Boost Switching Characteristics

figure 16.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $R_{gon} = 4 \text{ } \Omega$
 $R_{goff} = 4 \text{ } \Omega$

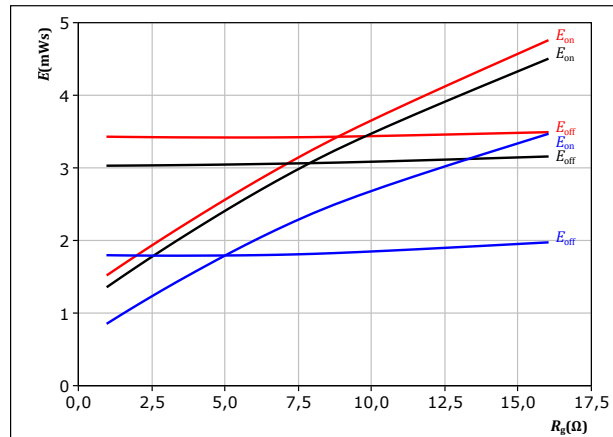
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 17.

IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $I_C = 65 \text{ A}$

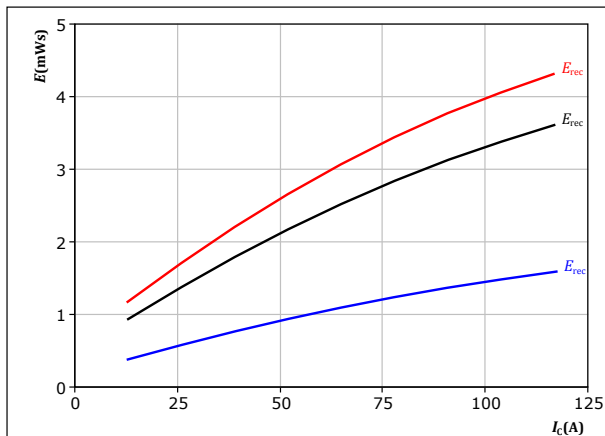
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 18.

FWD

Typical reverse recovered energy loss as a function of collector current

$$E_{rec} = f(I_C)$$



With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $R_{gon} = 4 \text{ } \Omega$

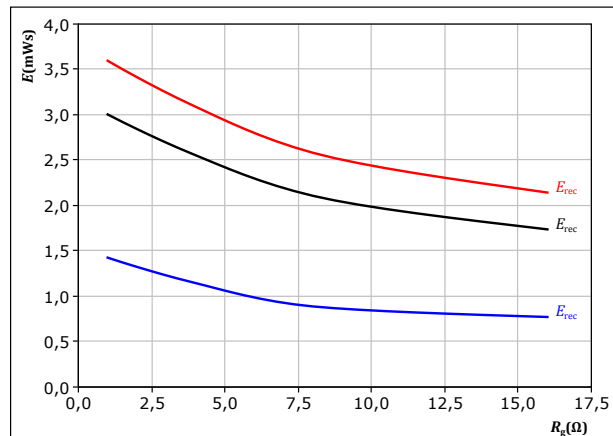
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 19.

FWD

Typical reverse recovered energy loss as a function of gate resistor

$$E_{rec} = f(R_g)$$



With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $I_C = 65 \text{ A}$

T_j :
— 25 °C
— 125 °C
— 150 °C



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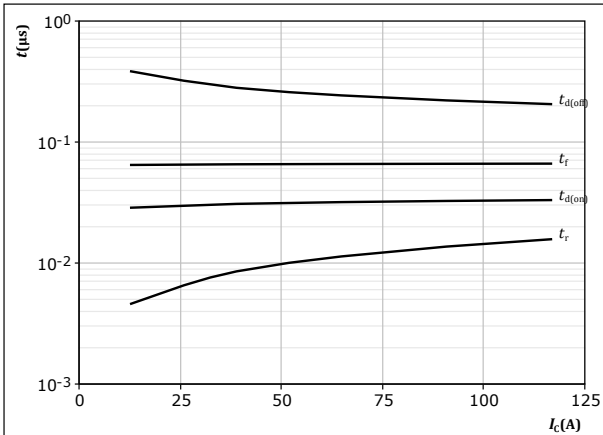
datasheet

Boost Switching Characteristics

figure 20.

IGBT

Typical switching times as a function of collector current
 $t = f(I_c)$



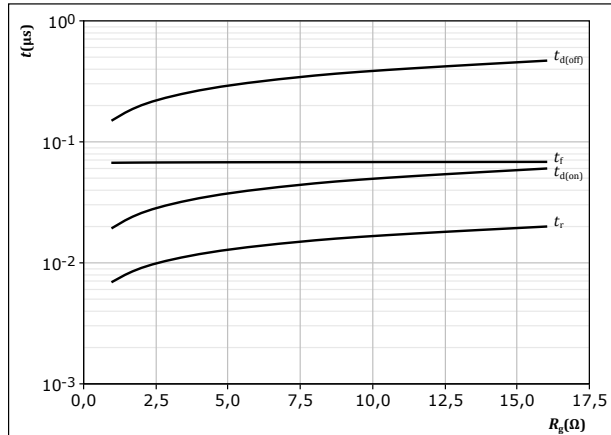
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 600$ V
 $V_{GE} = 0/15$ V
 $R_{gon} = 4$ Ω
 $R_{goff} = 4$ Ω

figure 21.

IGBT

Typical switching times as a function of gate resistor
 $t = f(R_g)$



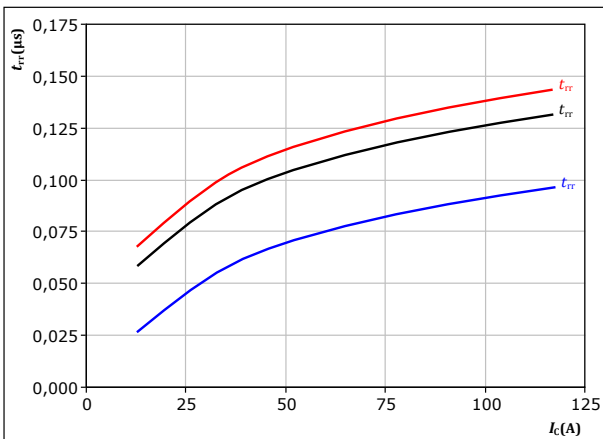
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 600$ V
 $V_{GE} = 0/15$ V
 $I_c = 65$ A

figure 22.

FWD

Typical reverse recovery time as a function of collector current
 $t_{rr} = f(I_c)$



With an inductive load at

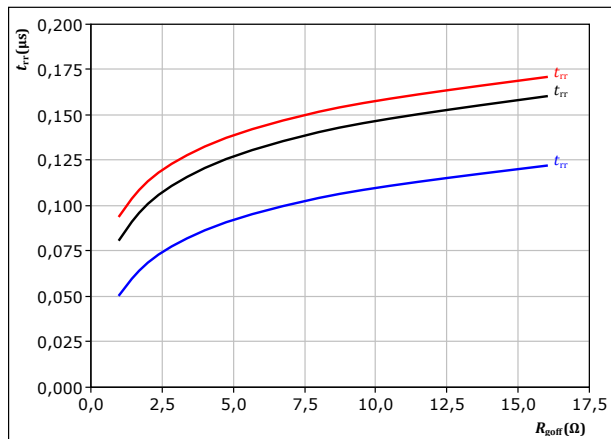
$V_{CE} = 600$ V
 $V_{GE} = 0/15$ V
 $R_{gon} = 4$ Ω

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 23.

FWD

Typical reverse recovery time as a function of IGBT turn off gate resistor
 $t_{rr} = f(R_{goff})$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = 0/15$ V
 $I_c = 65$ A

T_j :
— 25 °C
— 125 °C
— 150 °C



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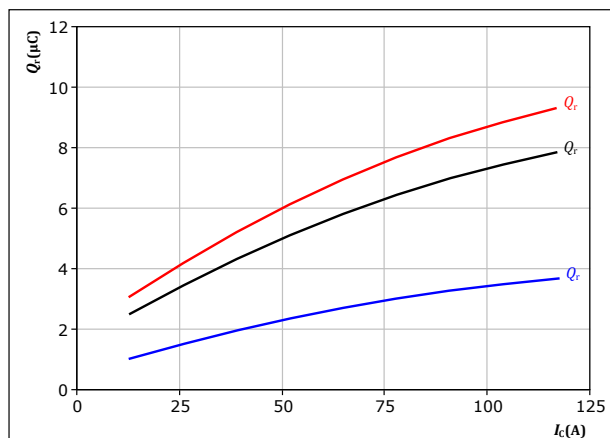
Boost Switching Characteristics

figure 24.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_C)$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = 0/15$ V
 $R_{gon} = 4$ Ω

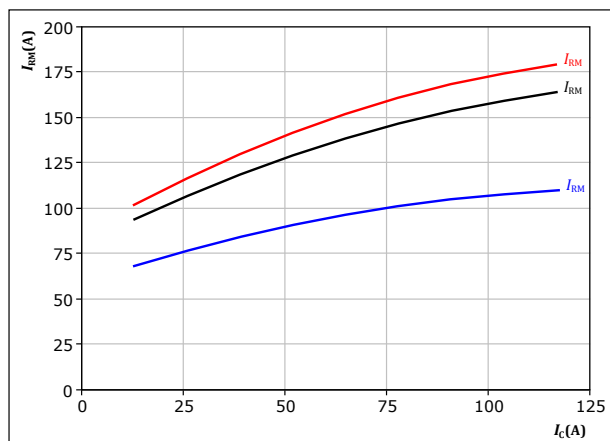
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 26.

FWD

Typical peak reverse recovery current as a function of collector current

$$I_{RM} = f(I_C)$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = 0/15$ V
 $R_{gon} = 4$ Ω

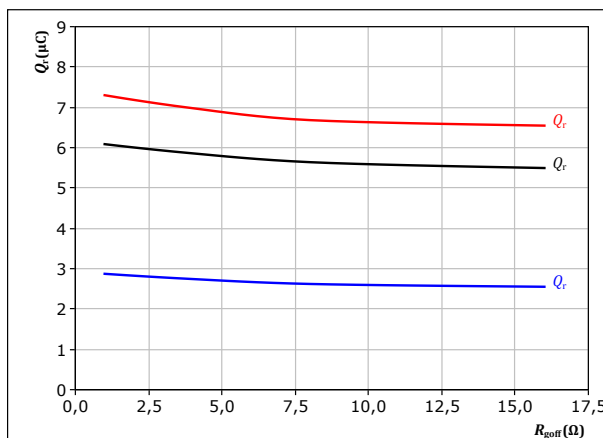
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 25.

FWD

Typical recovered charge as a function of turn off gate resistor

$$Q_r = f(R_{goff})$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = 0/15$ V
 $I_C = 65$ A

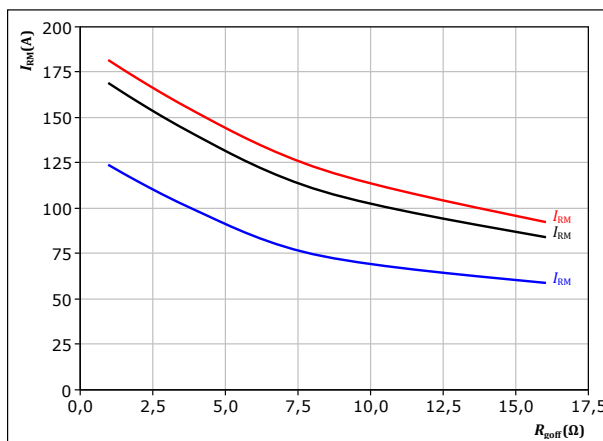
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 27.

FWD

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

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



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = 0/15$ V
 $I_C = 65$ A

T_j :
— 25 °C
— 125 °C
— 150 °C



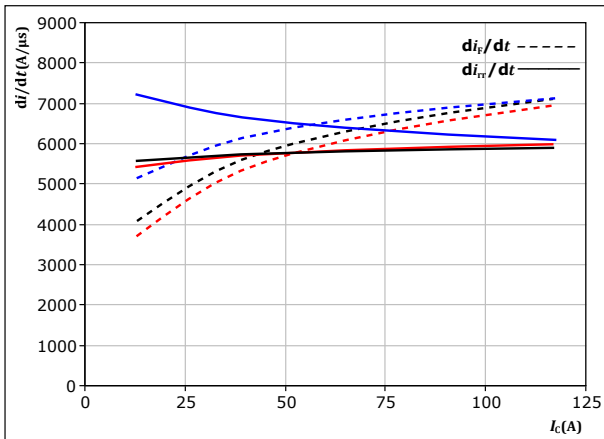
Vincotech

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datasheet

Boost Switching Characteristics

figure 28. FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_f/dt, di_r/dt = f(I_C)$



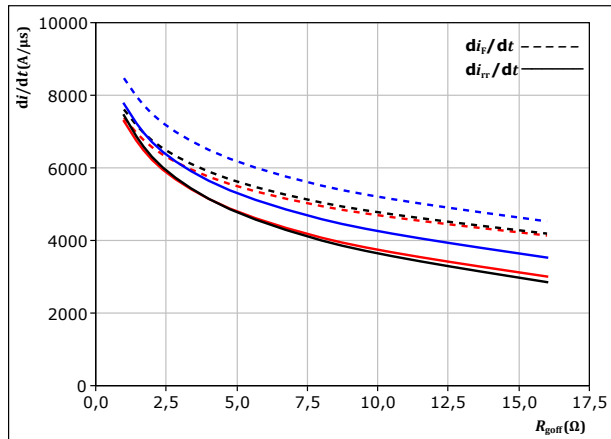
With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $R_{goff} = 4 \text{ } \Omega$

$T_j:$ — 25 °C
— 125 °C
— 150 °C

figure 29. FWD

Typical rate of fall of forward and reverse recovery current as a function of turn off gate resistor
 $di_f/dt, di_r/dt = f(R_{goff})$



With an inductive load at

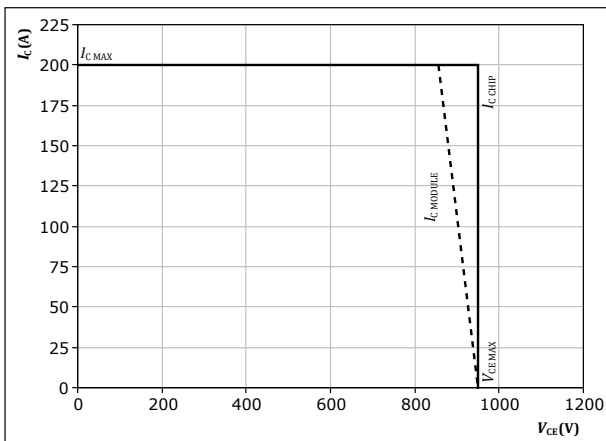
$V_{CE} = 600 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $I_C = 65 \text{ A}$

$T_j:$ — 25 °C
— 125 °C
— 150 °C

figure 30. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At $T_j = 150 \text{ } ^\circ\text{C}$
 $R_{goff} = 4 \text{ } \Omega$
 $R_{goff} = 4 \text{ } \Omega$



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datasheet

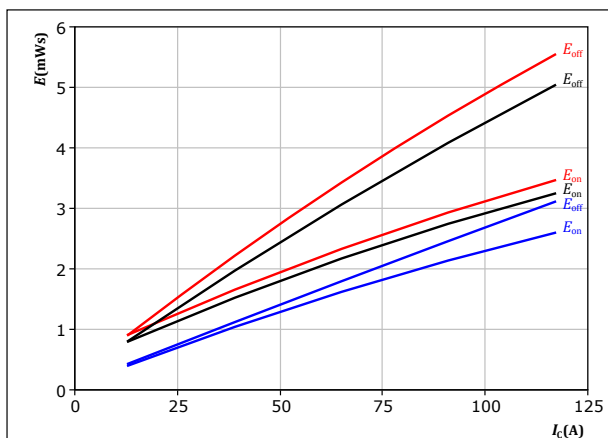
Buck Switching Characteristics

figure 31.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $R_{gon} = 4 \text{ } \Omega$
 $R_{goff} = 4 \text{ } \Omega$

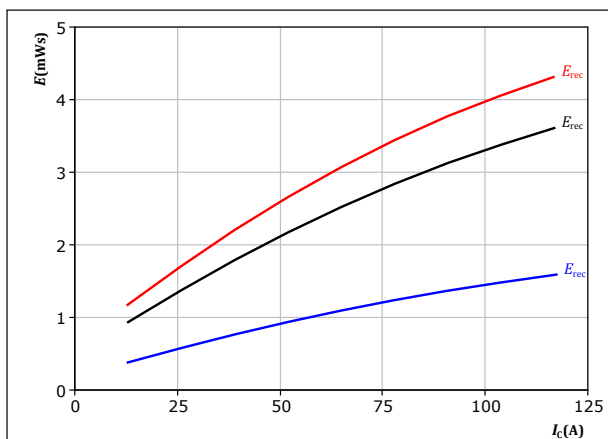
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 33.

FWD

Typical reverse recovered energy loss as a function of collector current

$$E_{rec} = f(I_C)$$



With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $R_{gon} = 4 \text{ } \Omega$

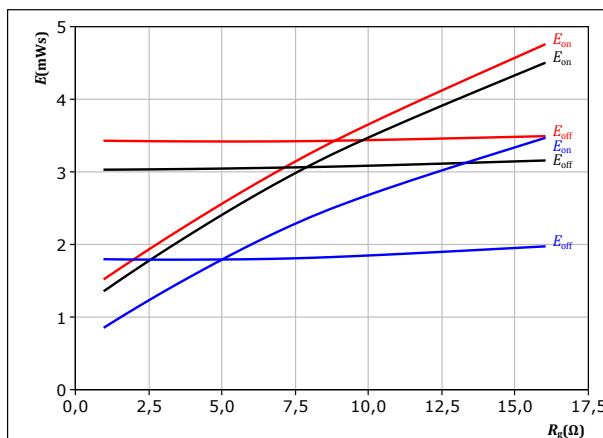
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 32.

IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $I_C = 65 \text{ A}$

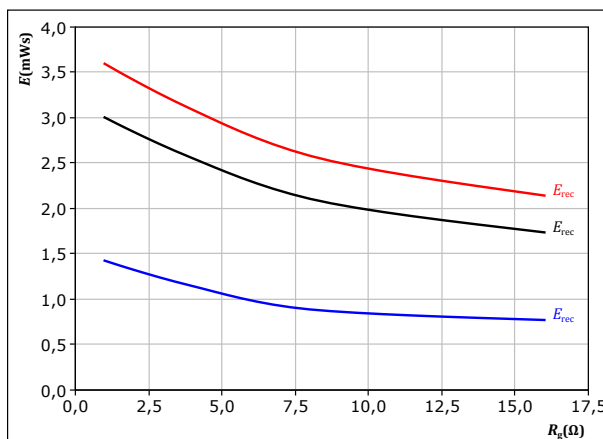
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 34.

FWD

Typical reverse recovered energy loss as a function of gate resistor

$$E_{rec} = f(R_g)$$



With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $I_C = 65 \text{ A}$

T_j :
— 25 °C
— 125 °C
— 150 °C



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datasheet

Buck Switching Characteristics

figure 35.

IGBT

Typical switching times as a function of collector current

$$t = f(I_c)$$

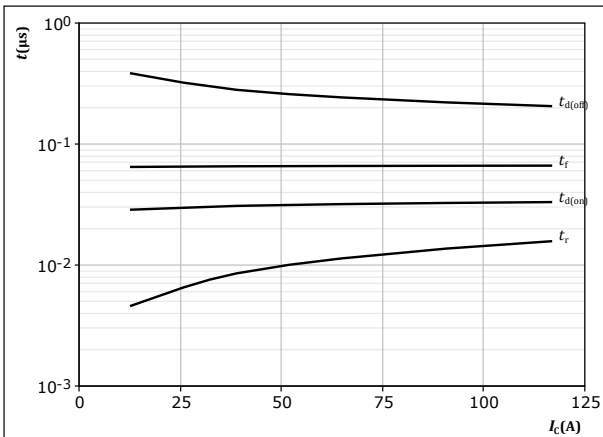


figure 36.

IGBT

Typical switching times as a function of gate resistor

$$t = f(R_g)$$

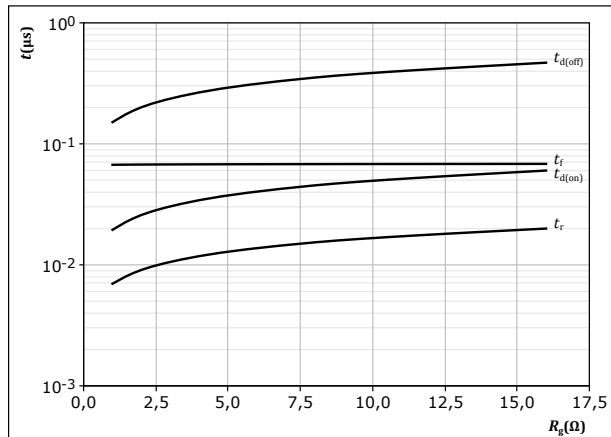


figure 37.

FWD

Typical reverse recovery time as a function of collector current

$$t_{rr} = f(I_c)$$

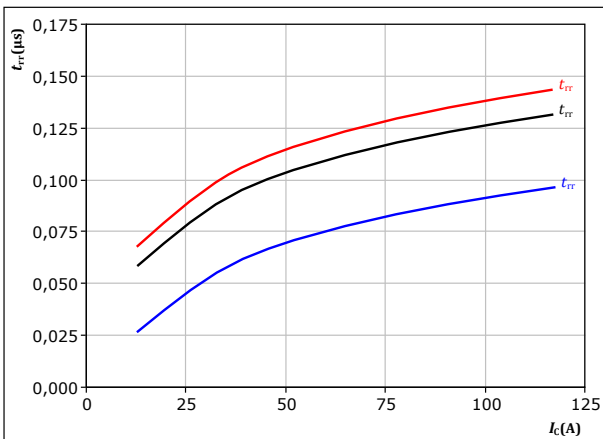
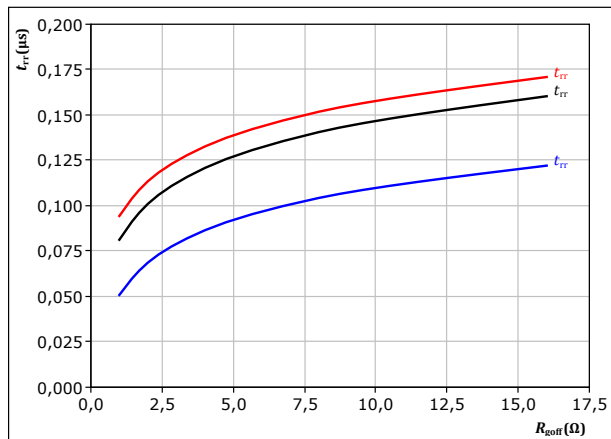


figure 38.

FWD

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

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





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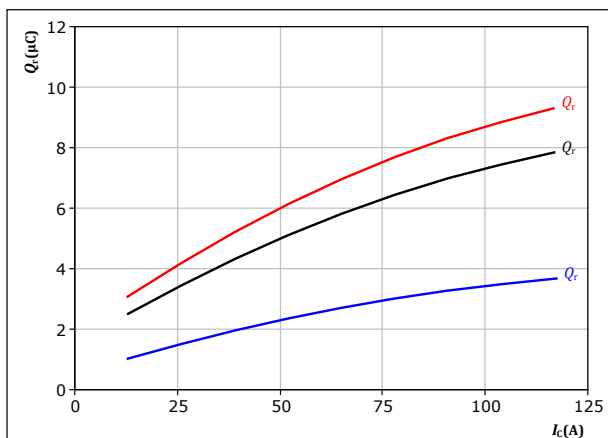
Buck Switching Characteristics

figure 39.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_C)$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = 0/15$ V
 $R_{gon} = 4$ Ω

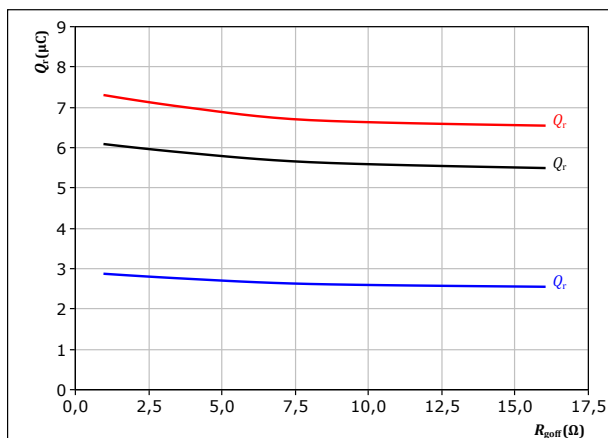
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 40.

FWD

Typical recovered charge as a function of turn off gate resistor

$$Q_r = f(R_{goff})$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = 0/15$ V
 $I_C = 65$ A

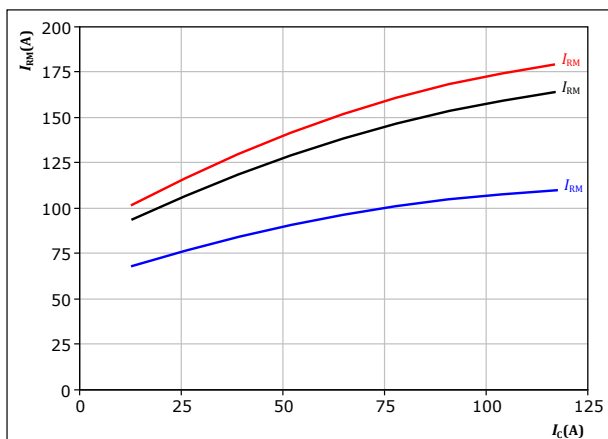
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 41.

FWD

Typical peak reverse recovery current as a function of collector current

$$I_{RM} = f(I_C)$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = 0/15$ V
 $R_{gon} = 4$ Ω

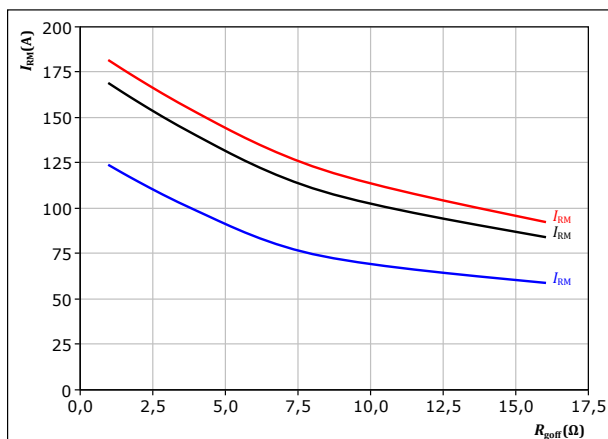
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 42.

FWD

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

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



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = 0/15$ V
 $I_C = 65$ A

T_j :
— 25 °C
— 125 °C
— 150 °C



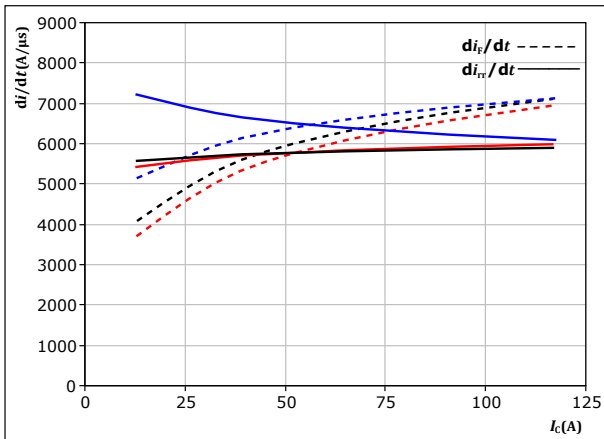
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B0-SP10NDA100S7-LU18F08T
datasheet

Buck Switching Characteristics

figure 43. FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_f/dt, di_r/dt = f(I_C)$



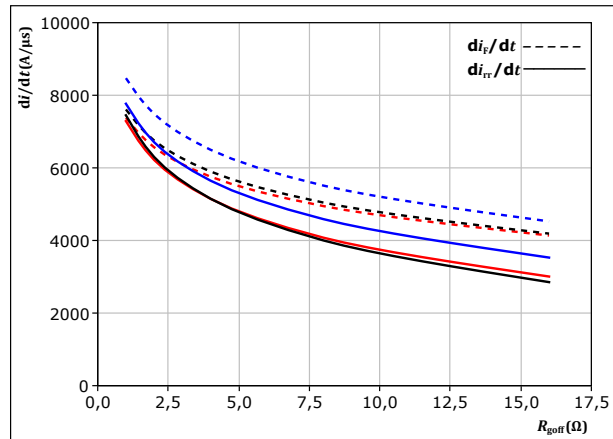
With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $R_{goff} = 4 \text{ } \Omega$

$T_j = 25 \text{ } ^\circ\text{C}$
 $125 \text{ } ^\circ\text{C}$
 $150 \text{ } ^\circ\text{C}$

figure 44. FWD

Typical rate of fall of forward and reverse recovery current as a function of turn off gate resistor
 $di_f/dt, di_r/dt = f(R_{goff})$



With an inductive load at

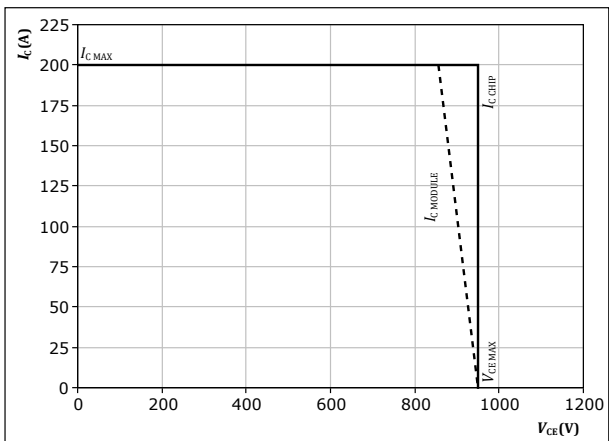
$V_{CE} = 600 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $I_C = 65 \text{ A}$

$T_j = 25 \text{ } ^\circ\text{C}$
 $125 \text{ } ^\circ\text{C}$
 $150 \text{ } ^\circ\text{C}$

figure 45. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At $T_j = 150 \text{ } ^\circ\text{C}$
 $R_{goff} = 4 \text{ } \Omega$
 $R_{goff} = 4 \text{ } \Omega$



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Switching Definitions

figure 46. IGBT

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

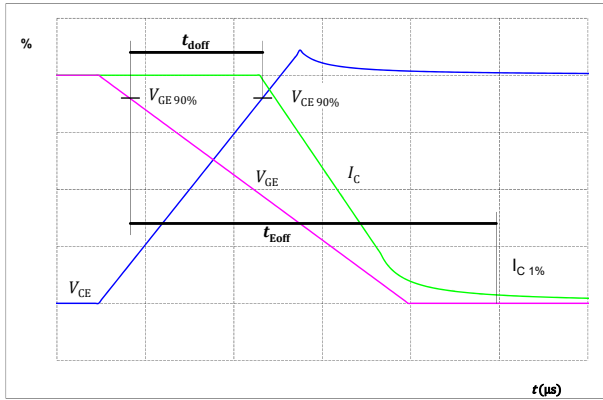


figure 47. IGBT

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

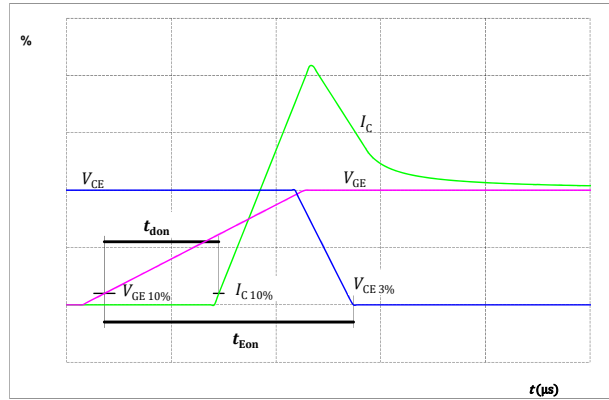


figure 48. IGBT

Turn-off Switching Waveforms & definition of t_f

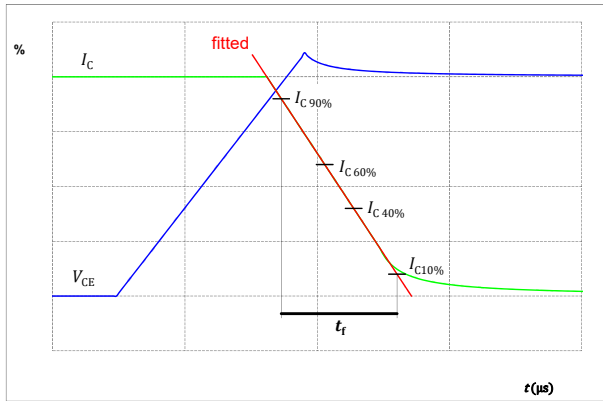
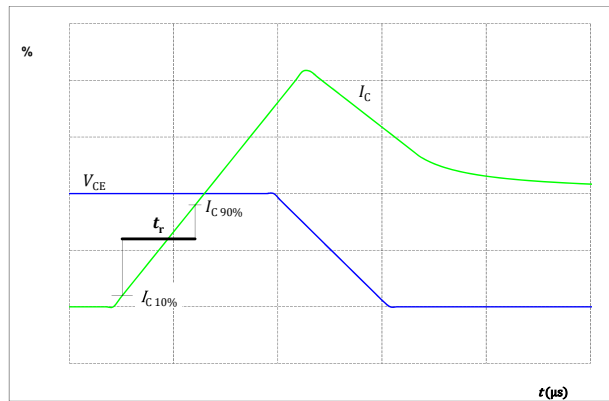


figure 49. IGBT

Turn-on Switching Waveforms & definition of t_r





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Switching Definitions

figure 50.

FWD

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

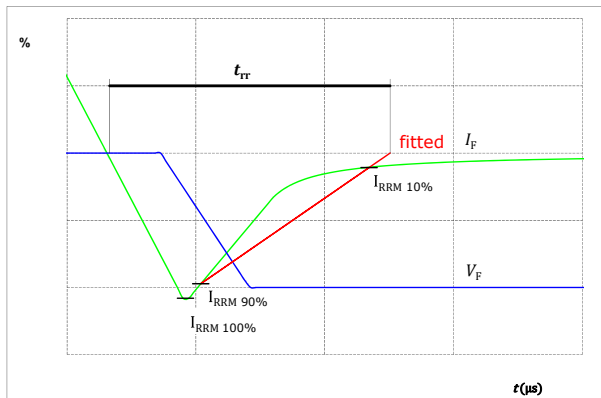
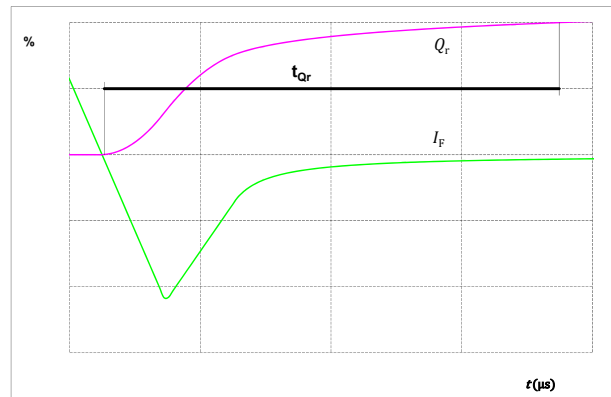


figure 51.

FWD

Turn-on Switching Waveforms & definition of t_{Qr} (t_{Qr} = integrating time for Q_r)





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Ordering Code	
Version	Ordering Code
With thermal paste (4.4 W/mK, PTM6000)	B0-SP10NDA100S7-LU18F08T-/7/

Marking							
	Text	Name NN-NNNNNNNNNNNNNN- TTTTTV		Date code WWYY	UL & VIN UL VIN	Lot LLLLL	Serial SSSS
		Datamatrix	Type&Ver TTTTTV	Lot number LLLL	Serial SSSS	Date code WWYY	

Outline							
Pin table [mm]							
Pin	X	Y	Function	28	3	42,15	S35
1	52,4	5,55	DC+1	29	7,25	47,7	P3
2	52,4	8,25	DC+1	30	7,25	50,4	P3
3	45,8	5,55	GND1	31	26,65	47,7	P2
4	45,8	8,25	GND1	32	26,65	50,4	P2
5	38,15	0	DC-12	33	37,3	47,7	N2
6	35,45	0	DC-12	34	37,3	50,4	N2
7	32,75	0	DC-12	35	47,35	50,4	S16
8	39,95	3	G12	36	50,35	50,4	G16
9	36,95	3	S12	37	52,4	37,3	P1
10	33,9	3	G22	38	52,4	34,6	P1
11	30,9	3	S22	39	52,4	31,6	G11
12	25,05	5,55	GND2	40	52,4	28,6	S11
13	25,05	8,25	GND2	41	41,4	42,15	S15
14	18,65	3,25	DC+23	42	38,95	39,45	G15
15	18,65	5,95	DC+23	43	36,6	32	N1
16	18,65	8,65	DC+23	44	36,6	29,3	N1
17	12,25	5,55	GND3	45	31,85	43,1	G25
18	12,25	8,25	GND3	46	30,6	40,1	S25
19	8,85	0	DC-3	47	24,2	39,45	G26
20	6,15	0	DC-3	48	21,2	37,3	S26
21	6,85	3	S32	49	22,4	31,6	S21
22	3,85	3	G32	50	22,4	28,6	G21
23	3	0	Therm1	51	11,5	28,6	G31
24	0	0	Therm2	52	11,5	31,6	S31
25	0	35,9	N3	53	12,7	37,3	S36
26	0	38,6	N3	54	9,7	39,45	G36
27	0	41,6	G35				

Top view of the PCB showing dimensions and pin locations. Dimensions include 52.4, 45.8, 38.15, 35.45, 32.75, 39.95, 36.95, 33.9, 30.9, 25.05, 18.65, 12.25, 8.85, 6.15, 6.85, 3.85, 3, 0, 52.4, 45.8, 38.15, 35.45, 32.75, 39.95, 36.95, 33.9, 30.9, 25.05, 18.65, 12.25, 8.85, 6.15, 6.85, 3.85, 3, 0. Pin locations are marked with numbers 1 through 54.

Bottom view of the PCB showing dimensions and pin locations. Dimensions include 52.4, 45.8, 38.15, 35.45, 32.75, 39.95, 36.95, 33.9, 30.9, 25.05, 18.65, 12.25, 8.85, 6.15, 6.85, 3.85, 3, 0, 52.4, 45.8, 38.15, 35.45, 32.75, 39.95, 36.95, 33.9, 30.9, 25.05, 18.65, 12.25, 8.85, 6.15, 6.85, 3.85, 3, 0. Pin locations are marked with numbers 1 through 54.

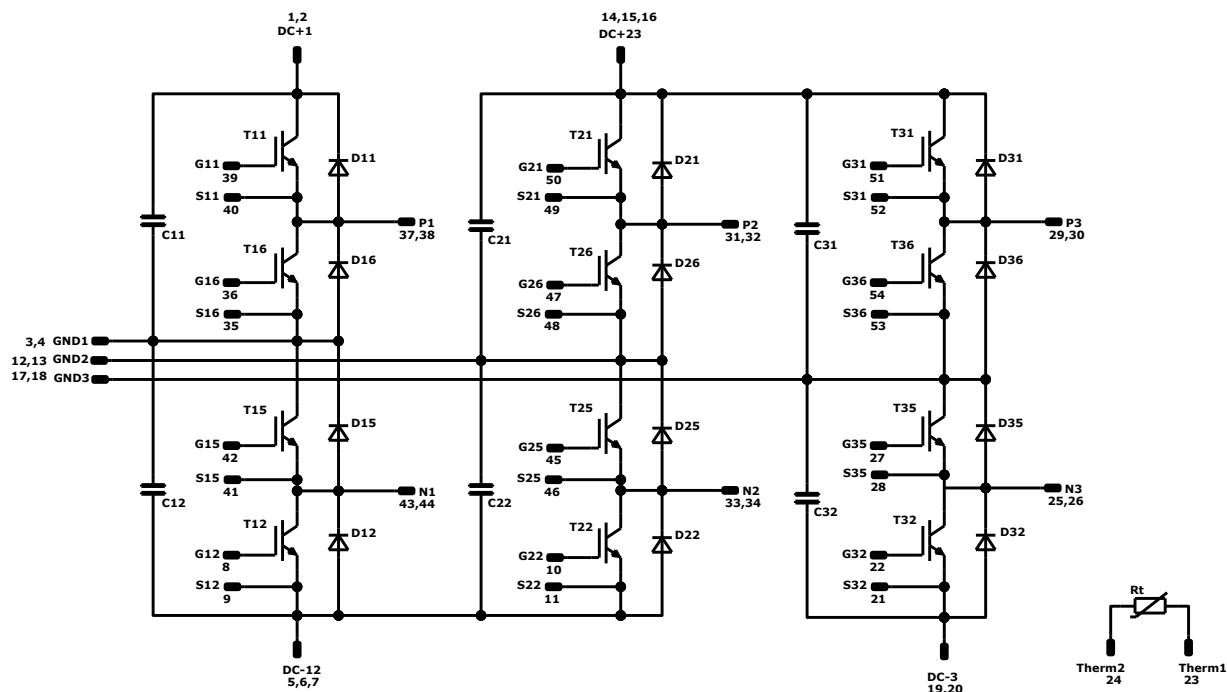
Notes:

- 1. All dimensions are in mm.
- 2. All dimensions are given as maximum values.
- 3. All dimensions are given as minimum values.
- 4. All dimensions are given as nominal values.
- 5. All dimensions are given as typical values.
- 6. All dimensions are given as average values.
- 7. All dimensions are given as median values.
- 8. All dimensions are given as mode values.
- 9. All dimensions are given as range values.
- 10. All dimensions are given as standard deviation values.
- 11. All dimensions are given as variance values.
- 12. All dimensions are given as covariance values.
- 13. All dimensions are given as correlation values.
- 14. All dimensions are given as regression values.
- 15. All dimensions are given as confidence intervals.
- 16. All dimensions are given as hypothesis tests.
- 17. All dimensions are given as statistical significance values.
- 18. All dimensions are given as p-values.
- 19. All dimensions are given as z-scores.
- 20. All dimensions are given as t-scores.
- 21. All dimensions are given as F-scores.
- 22. All dimensions are given as chi-square values.
- 23. All dimensions are given as Fisher's exact test values.
- 24. All dimensions are given as binomial test values.
- 25. All dimensions are given as Poisson test values.
- 26. All dimensions are given as geometric test values.
- 27. All dimensions are given as hypergeometric test values.
- 28. All dimensions are given as multinomial test values.
- 29. All dimensions are given as log-rank test values.
- 30. All dimensions are given as Kaplan-Meier test values.
- 31. All dimensions are given as Cox proportional hazards test values.
- 32. All dimensions are given as logistic regression test values.
- 33. All dimensions are given as linear regression test values.
- 34. All dimensions are given as multiple regression test values.
- 35. All dimensions are given as principal component analysis test values.
- 36. All dimensions are given as factor analysis test values.
- 37. All dimensions are given as cluster analysis test values.
- 38. All dimensions are given as discriminant analysis test values.
- 39. All dimensions are given as decision tree test values.
- 40. All dimensions are given as random forest test values.
- 41. All dimensions are given as support vector machine test values.
- 42. All dimensions are given as neural network test values.
- 43. All dimensions are given as deep learning test values.
- 44. All dimensions are given as reinforcement learning test values.
- 45. All dimensions are given as unsupervised learning test values.
- 46. All dimensions are given as supervised learning test values.
- 47. All dimensions are given as machine learning test values.
- 48. All dimensions are given as artificial intelligence test values.
- 49. All dimensions are given as computer science test values.
- 50. All dimensions are given as engineering test values.
- 51. All dimensions are given as physics test values.
- 52. All dimensions are given as chemistry test values.
- 53. All dimensions are given as biology test values.
- 54. All dimensions are given as medicine test values.



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Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T16, T26, T36, T15, T25, T35	IGBT	950 V	100 A	Boost Switch	
D11, D21, D31, D12, D22, D32	FWD	950 V	100 A	Boost Diode	
T11, T21, T31, T12, T22, T32	IGBT	950 V	100 A	Buck Switch	
D16, D26, D36, D15, D25, D35	FWD	950 V	100 A	Buck Diode	
C11, C12, C21, C22, C31, C32	Capacitor	1000 V		Capacitor (DC)	
Rt	Thermistor			Thermistor	



Vincotech

B0-SP10NDA100S7-LU18F08T
datasheet

Packaging instruction				
Standard packaging quantity (SPQ) 45	>SPQ	Standard	<SPQ	Sample
Handling instruction				
Handling instructions for <i>flow</i> S3 packages see vincotech.com website.				
Package data				
Package data for <i>flow</i> S3 packages see vincotech.com website.				
Vincotech thermistor reference				
See Vincotech thermistor reference table at vincotech.com website.				
UL recognition and file number				
This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website.				

Document No.:	Date:	Modification:	Pages
B0-SP10NDA100S7-LU18F08T-D2-14	30 Jun. 2021	Module marking is updated with UL logo, product is unchanged	

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1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labelling can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.