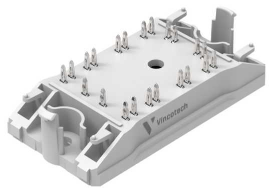
10-PZ124PA075ME03-L627F28Y
datasheet

fastPACK 0 SiC | **1200 V / 75 mΩ**

Features

- Compact and low inductive design
- High frequency SiC MOSFET
- High power low inductive package
- Integrated DC-capacitor
- Integrated NTC

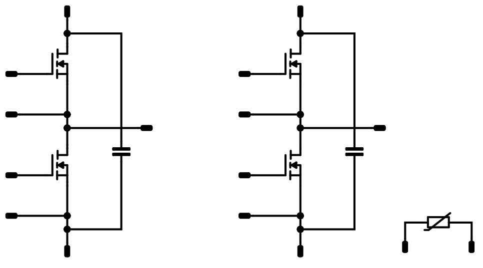
flow 0 12 mm housing



Target applications

- Charging Stations
- Power Supply

Schematic



Types

- 10-PZ124PA075ME03-L627F28Y

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Half-Bridge Switch					
Drain-source voltage	V_{DSS}			1200	V
Drain current (DC current)	I_D	$T_j = T_{jmax}$	T_s = 80 °C	20	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}		80	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	52	W
Gate-source voltage	V_{GSS}			-4 / 15	V
		dynamic		-8 / 19	
Maximum Junction Temperature	T_{jmax}			175	°C
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 s	6000	V
Isolation voltage	V_{isol}	AC Voltage	t_p = 1 min	2500	V
Creepage distance				min. 12,7	mm
Clearance				9,15	mm
Comparative Tracking Index	CTI			≥ 200	

*100 % tested in production

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	
Half-Bridge Switch										
Static										
Drain-source on-state resistance	$r_{DS(on)}$		15		20	25 125 150		82 105 117	90(1)	mΩ
Gate-source threshold voltage	$V_{GS(th)}$		0		0,005	25	1,7	2,5	4	V
Gate to Source Leakage Current	I_{GSS}		15	0		25		10	250	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1200		25		1	100	µA
Internal gate resistance	r_g							10,5		Ω
Gate charge	Q_g		-4/15	800	20	25		54		nC
Short-circuit input capacitance	C_{iss}							1350		
Short-circuit output capacitance	C_{oss}	f = 1 Mhz	0	1000	0	25		58		pF
Reverse transfer capacitance	C_{rss}							3		
Diode forward voltage	V_{SD}		0		10	25		4,5		V
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,84		K/W

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	
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 8 Ω R_{goff} = 8 Ω	0/15	600	16	25 125 150		12,48 11,2 10,88		ns
Rise time	t_r					25 125 150		8,32 7,04 7,36		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		66,24 77,12 80,64		ns
Fall time	t_f					25 125 150		23,17 22,22 21,04		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,174 μC Q_{rFWD}=0,249 μC Q_{rFWD}=0,301 μC				25 125 150		0,282 0,295 0,315		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,058 0,069 0,074		mWs
Peak recovery current	I_{RRM}	d*i*/d*t*=1991 A/μs d*i*/d*t*=2360 A/μs d*i*/d*t*=2533 A/μs				25 125 150		14,38 16,6 18,32		A
Reverse recovery time	t_{rr}					25 125 150		29,91 27,26 26,97		ns
Recovered charge	Q_r					25 125 150		0,174 0,249 0,301		μC
Reverse recovered energy	E_{rec}					25 125 150		0,031 0,054 0,068		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		1936 500,51 1838		A/μs

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		2,2		nF
Tolerance							-5		5	%
Dissipation factor		f = 1 kHz				25		1,5		%
Thermistor										
Static										
Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	R_{100} = 1484 Ω				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

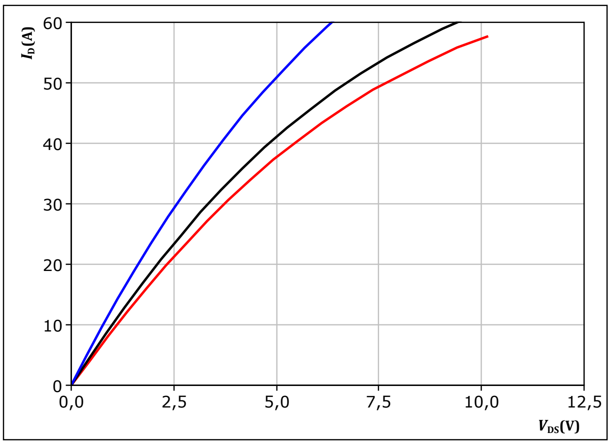
(2) Only valid with pre-applied Vincotech thermal interface material.

Half-Bridge Switch Characteristics

figure 1. MOSFET

Typical output characteristics

I_D = f(V_{DS})

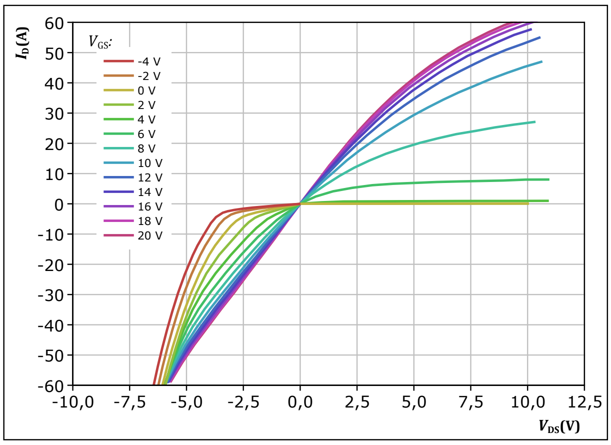


t_p = 250 µs
V_{GS} = 14 V
T_j: 25 °C, 125 °C, 150 °C

figure 2. MOSFET

Typical output characteristics

I_D = f(V_{DS})

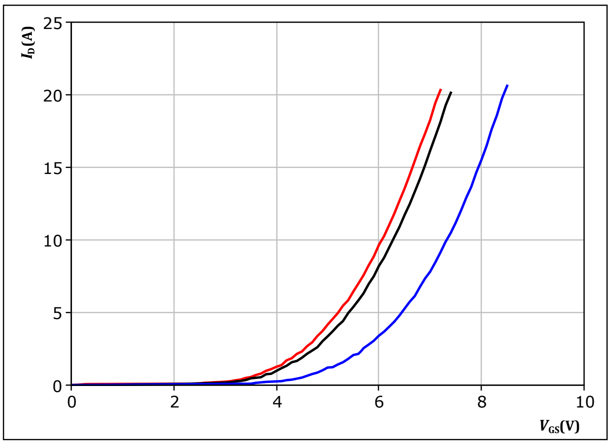


t_p = 250 µs
T_j = 150 °C
V_{GS} from -4 V to 20 V in steps of 2 V

figure 3. MOSFET

Typical transfer characteristics

I_D = f(V_{GS})

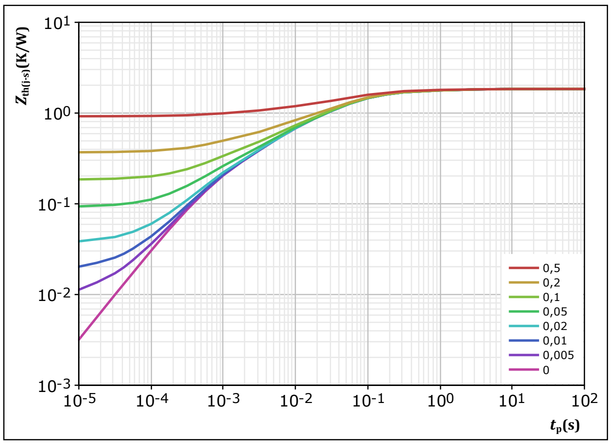


t_p = 250 µs
V_{DS} = 10 V
T_j: 25 °C, 125 °C, 150 °C

figure 4. MOSFET

Transient thermal impedance as a function of pulse width

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



D = t_p / T
$R_{th(j-s)}$ = 1,843 K/W

MOSFET thermal model values

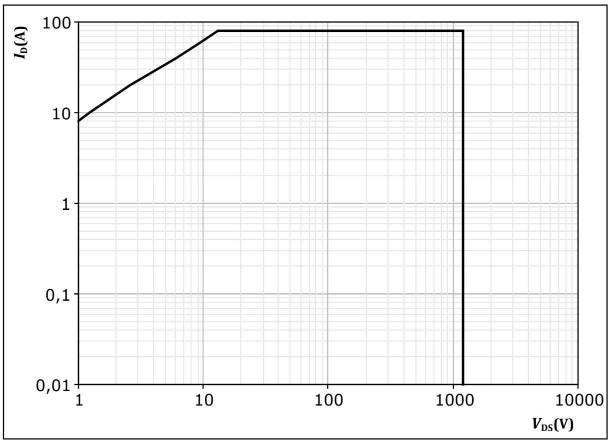
R (K/W)	τ (s)
1,10E-01	1,89E+00
4,15E-01	1,55E-01
7,53E-01	3,96E-02
4,02E-01	6,20E-03
1,64E-01	7,03E-04

Half-Bridge Switch Characteristics

figure 5.	MOSFET

Safe operating area

I_D = f(V_{DS})



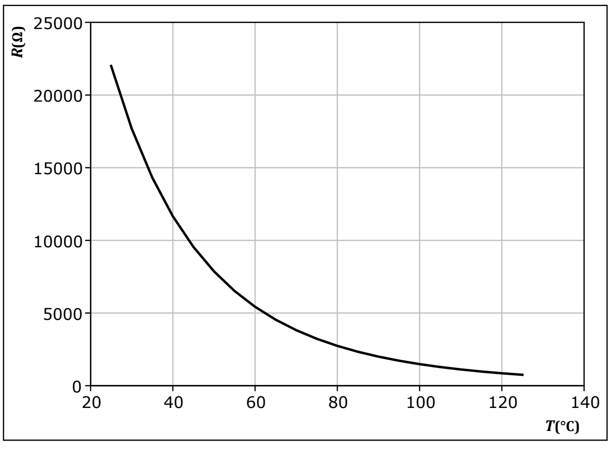
D =	single pulse	
T_s =	80	°C
V_{GS} =	14	V
T_j =	T_{jmax}	

Thermistor Characteristics

figure 6.	Thermistor

Typical NTC characteristic as function of temperature

R_T = f(T)

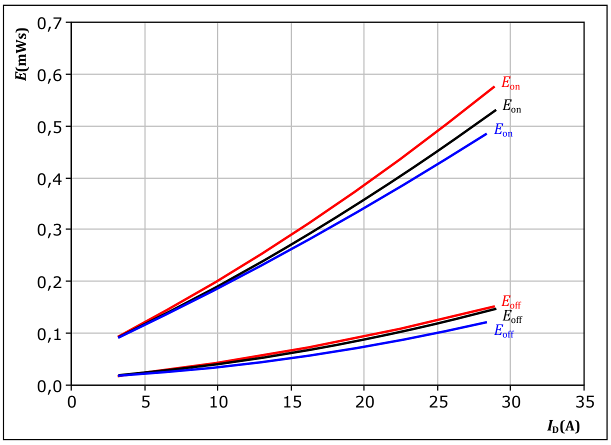


Half-Bridge Switching Characteristics

figure 7. MOSFET

Typical switching energy losses as a function of drain current

E = f(I_D)



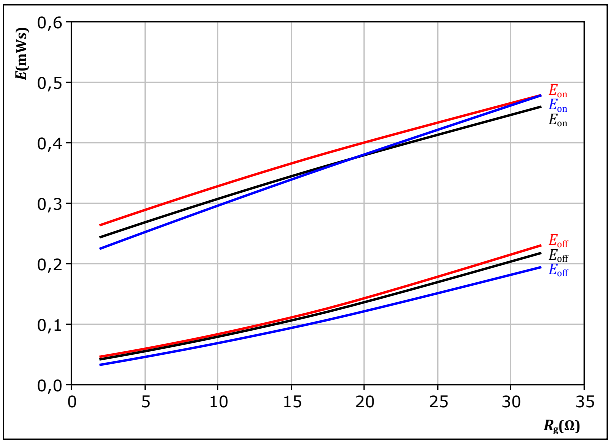
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/15	V		125 °C
R_{gon} =	8	Ω		150 °C
R_{goff} =	8	Ω		

figure 8. MOSFET

Typical switching energy losses as a function of gate resistor

E = f(R_g)



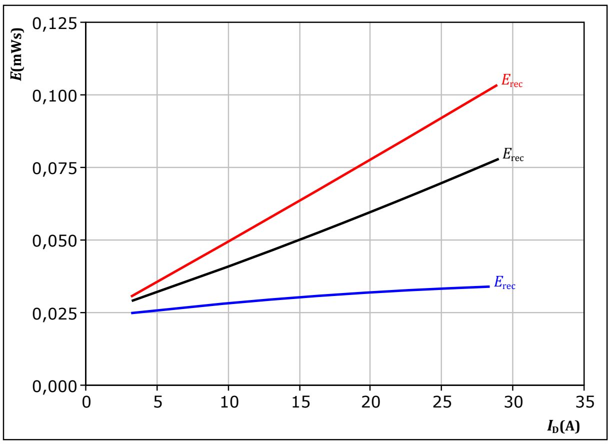
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/15	V		125 °C
I_D =	16	A		150 °C

figure 9. MOSFET

Typical reverse recovered energy loss as a function of drain current

E_{rec} = f(I_D)



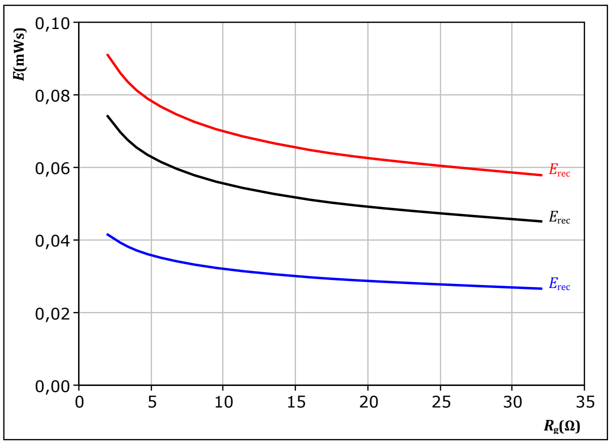
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 10. MOSFET

Typical reverse recovered energy loss as a function of gate resistor

E_{rec} = f(R_g)



With an inductive load at

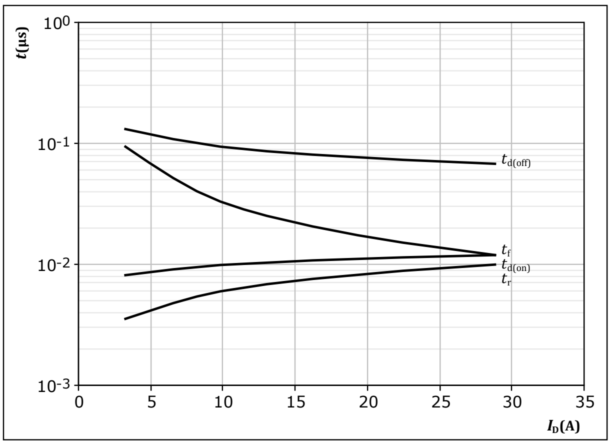
V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/15	V		125 °C
I_D =	16	A		150 °C

Half-Bridge Switching Characteristics

figure 11. **MOSFET**

Typical switching times as a function of drain current

$t = f(I_D)$



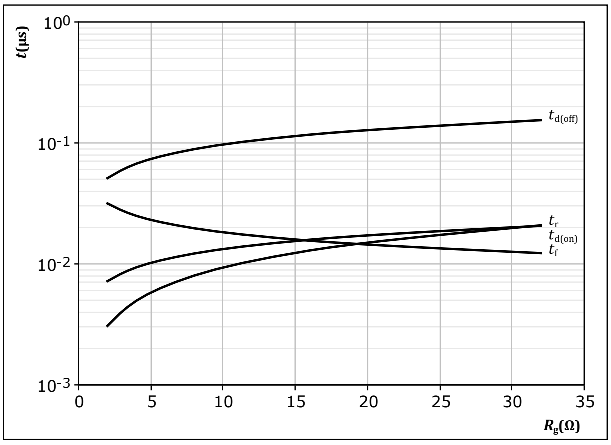
With an inductive load at

T_j =	150	°C
V_{DS} =	600	V
V_{GS} =	0/15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

figure 12. **MOSFET**

Typical switching times as a function of gate resistor

$t = f(R_g)$



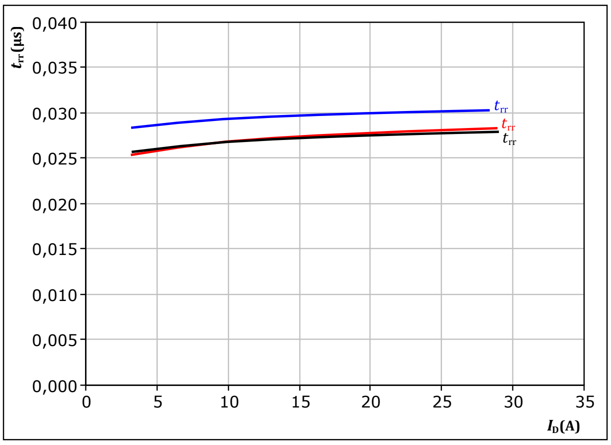
With an inductive load at

T_j =	150	°C
V_{DS} =	600	V
V_{GS} =	0/15	V
I_D =	16	A

figure 13. **MOSFET**

Typical reverse recovery time as a function of drain current

$t_{rr} = f(I_D)$



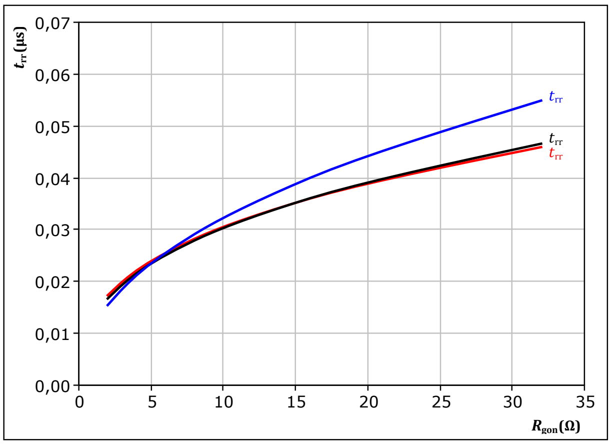
At	V_{DS} =	600	V	
	V_{GS} =	0/15	V	T_j:
	R_{gon} =	8	Ω	

25 °C
125 °C
150 °C

figure 14. **MOSFET**

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

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



At	V_{DS} =	600	V	
	V_{GS} =	0/15	V	T_j:
	I_D =	16	A	

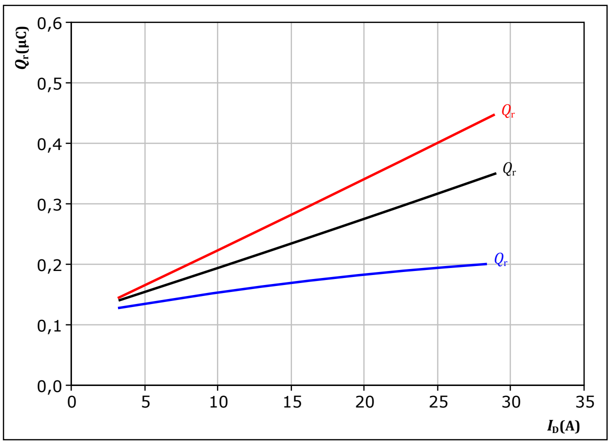
25 °C
125 °C
150 °C

Half-Bridge Switching Characteristics

figure 15. **MOSFET**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$

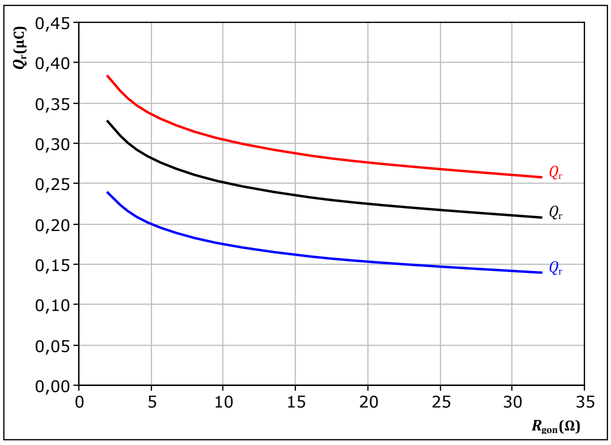


At				
V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 16. **MOSFET**

Typical recovered charge as a function of turn on gate resistor

$Q_r = f(R_{gon})$

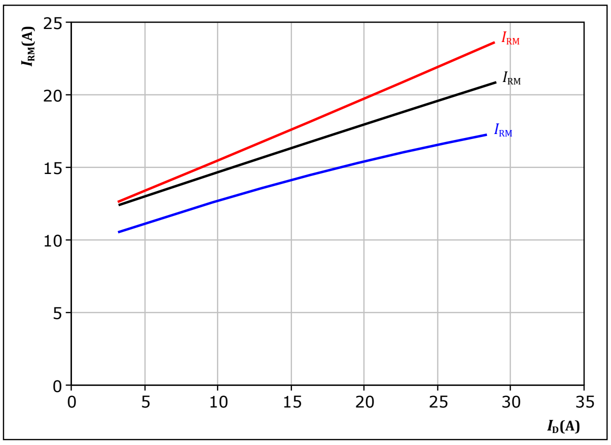


At				
V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/15	V		125 °C
I_D =	16	A		150 °C

figure 17. **MOSFET**

Typical peak reverse recovery current as a function of drain current

$I_{RM} = f(I_D)$

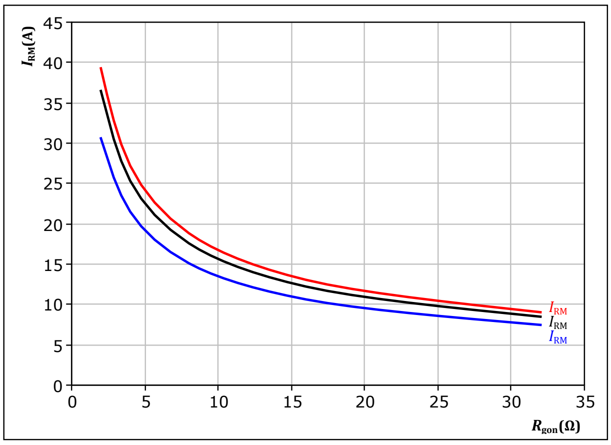


At				
V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 18. **MOSFET**

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

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



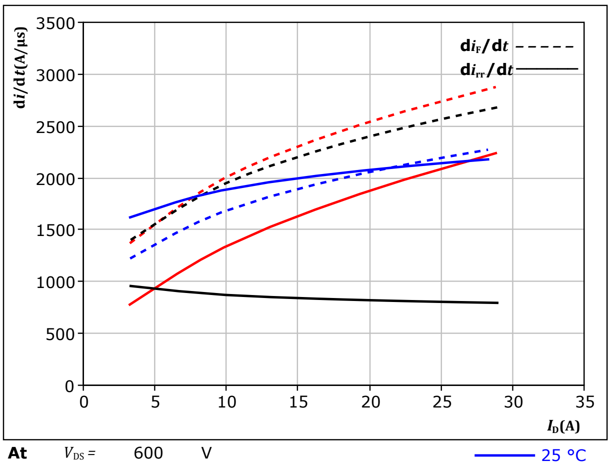
At				
V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/15	V		125 °C
I_D =	16	A		150 °C

Half-Bridge Switching Characteristics

figure 19. **MOSFET**

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

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

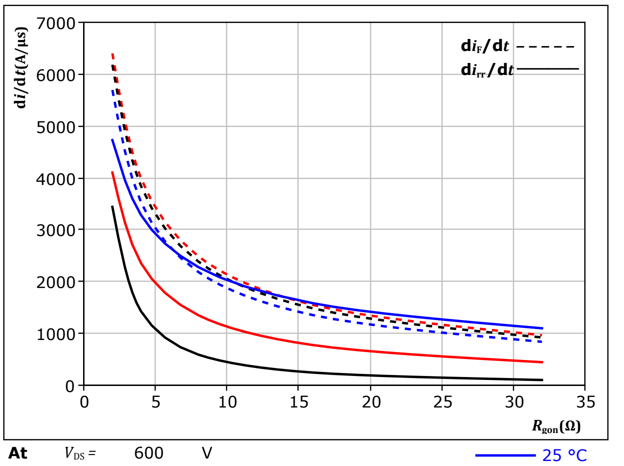


At				T_j:	
	V_{DS} =	600	V		25 °C
	V_{GS} =	0/15	V		125 °C
	R_{gon} =	8	Ω		150 °C

figure 20. **MOSFET**

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

di_F/dt, di_{rr}/dt = f(R_{gon})

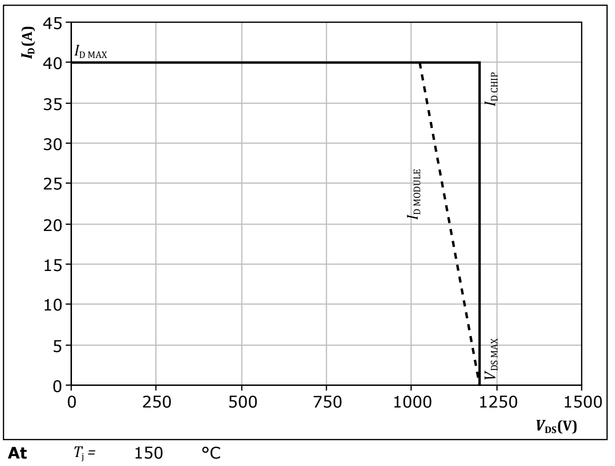


At				T_j:	
	V_{DS} =	600	V		25 °C
	V_{GS} =	0/15	V		125 °C
	I_D =	16	A		150 °C

figure 21. **MOSFET**

Reverse bias safe operating area

I_D = f(V_{DS})



At			
	T_j =	150	°C
	R_{gon} =	8	Ω
	R_{goff} =	8	Ω

Half-Bridge Switching Definitions

figure 22. MOSFET

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

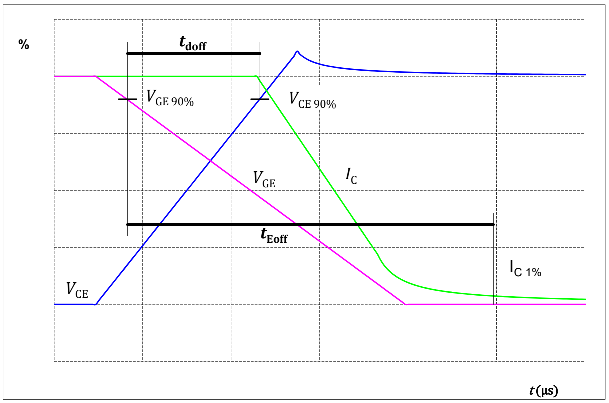


figure 23. MOSFET

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

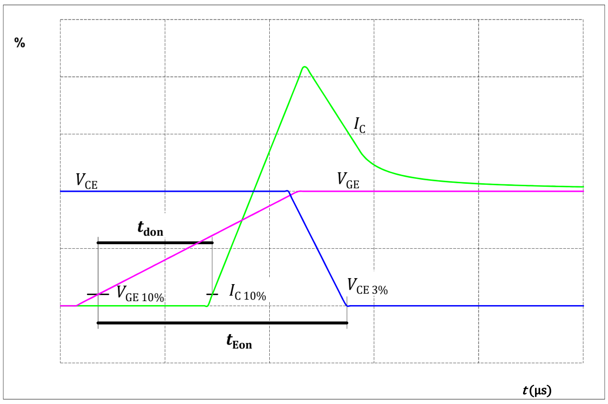


figure 24. MOSFET

Turn-off Switching Waveforms & definition of t_f

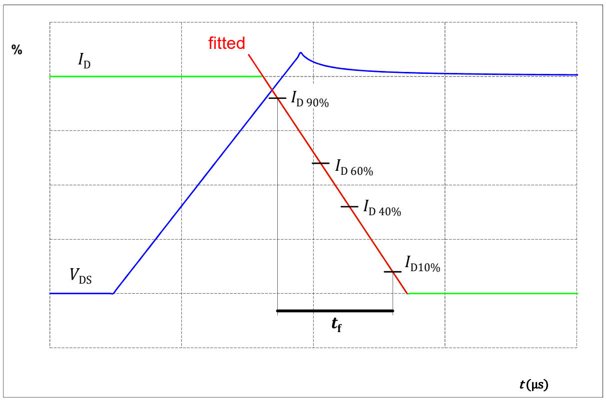
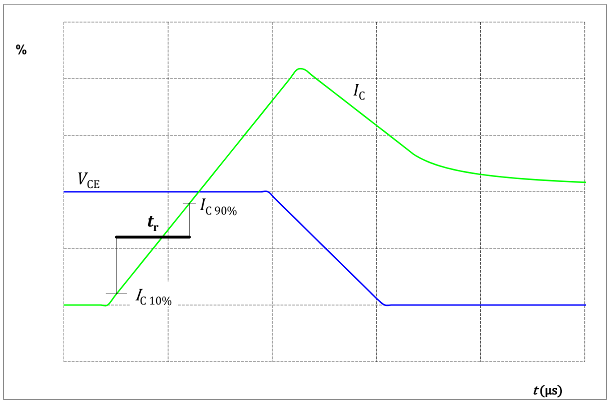


figure 25. MOSFET

Turn-on Switching Waveforms & definition of t_r



Half-Bridge Switching Definitions

figure 26. **FWD**

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

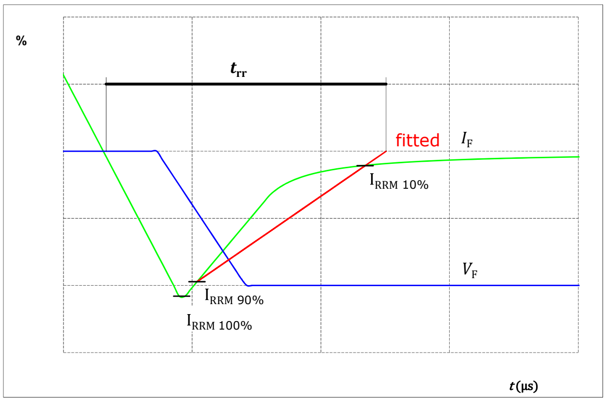


figure 27. **FWD**

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

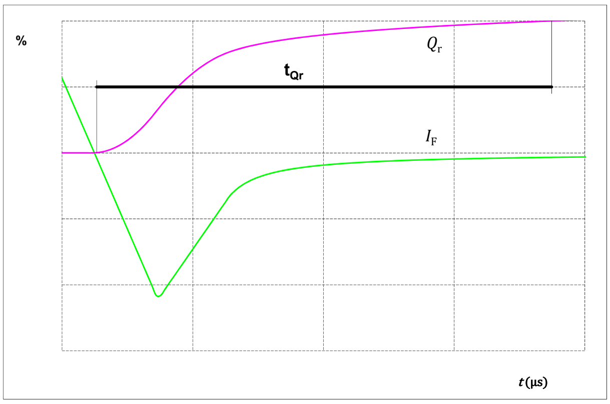
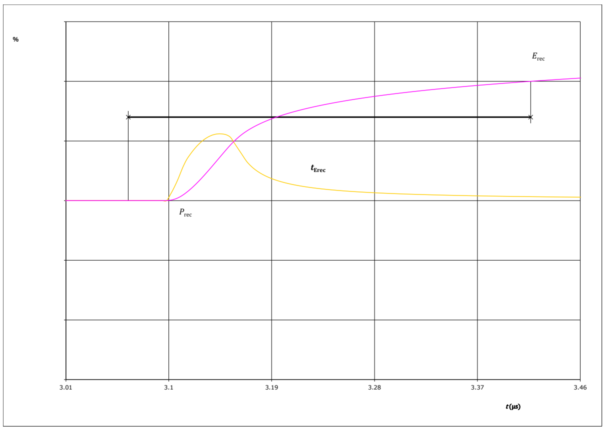


figure 28. **FWD**

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



Ordering Code

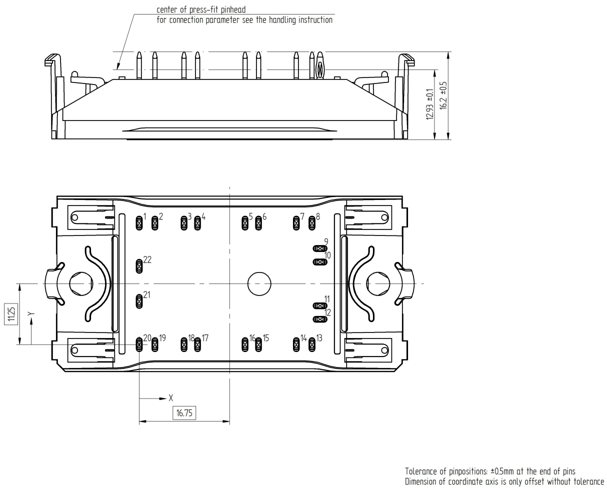
Version	Ordering Code
Without thermal paste	10-PZ124PA075ME03-L627F28Y
With thermal paste	10-PZ124PA075ME03-L627F28Y-/3/

Marking

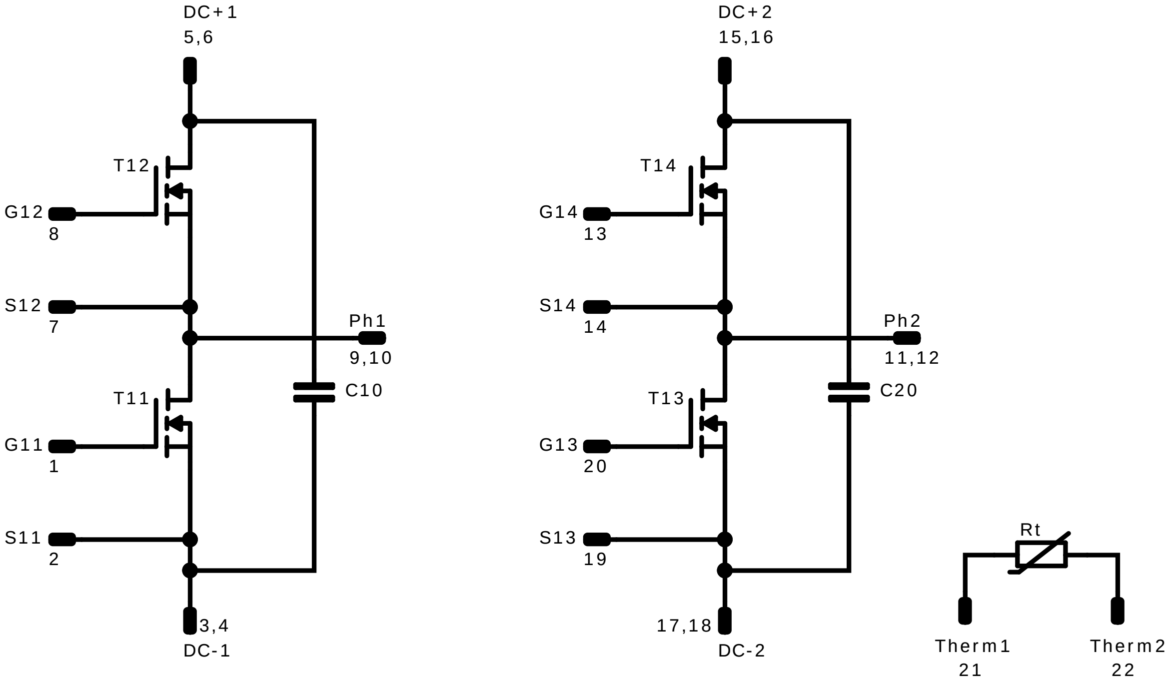
Text	Name		Date code	UL & VIN	Lot	Serial
	NN-NNNNNNNNNNNNNN-TTTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
Datamatrix	Type&Ver	Lot number	Serial	Date code		
	TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]			
Pin	X	Y	Function
1	0	22,5	G11
2	2,9	22,5	S11
3	8,3	22,5	DC-1
4	10,8	22,5	DC-1
5	19,6	22,5	DC+1
6	22,1	22,5	DC+1
7	29,1	22,5	S12
8	32	22,5	G12
9	33,5	17,8	Ph1
10	33,5	15,3	Ph1
11	33,5	7,2	Ph2
12	33,5	4,7	Ph2
13	32	0	G14
14	29,1	0	S14
15	22,1	0	DC+2
16	19,6	0	DC+2
17	10,8	0	DC-2
18	8,3	0	DC-2
19	2,9	0	S13
20	0	0	G13
21	0	8	Therm1
22	0	14,5	Therm2



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14	MOSFET	1200 V	75 mΩ	Half-Bridge Switch	
C10, C20	Capacitor	1000 V		Capacitor (DC)	
Rt	Thermistor			Thermistor	

Vincotech

10-PZ124PA075ME03-L627F28Y
datasheet

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

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

Package data
Package data for *flow* 0 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
10-PZ124PA075ME03-L627F28Y-D1-14	12 Nov. 2020		