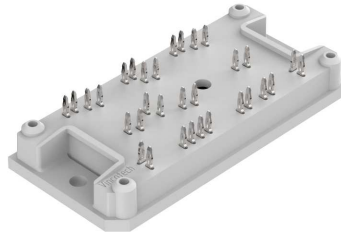
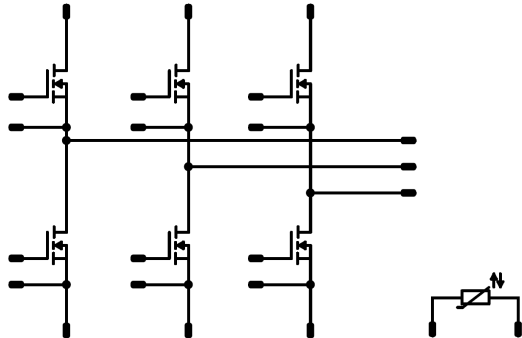




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10-PY126PA040MR-L226F28Y

datasheet

flowPACK 1		1200 V / 40 mΩ
Features • 3x half-bridge • Thermistor	flow 1 12 mm housing 	
Target applications • Power Supply	Schematic 	
Types • 10-PY126PA040MR-L226F28Y		

Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
Inverter Switch				
Drain-source voltage	V_{DS}		1200	V
Drain current	I_D	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	28	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	137	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	61	W
Gate-source voltage	V_{GS}		-4/22	V
Maximum Junction Temperature	T_{jmax}		175	°C



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10-PY126PA040MR-L226F28Y
datasheet

Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
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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
		AC Voltage $t_p = 1\text{ min}$	2500	V
Creepage distance			min. 12,7	mm
Clearance			11,89	mm
Comparative Tracking Index	CTI		> 200	

*100 % tested in production



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Characteristic Values

Parameter	Symbol	Conditions					Value			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	

Inverter Switch

Static

Drain-source on-state resistance	$r_{DS(on)}$		18		20	25 125 150		39 52 60	50	mΩ
Gate-source threshold voltage	$V_{GS(th)}$			10	0,01	25	2,7		5,6	V
Gate to Source Leakage Current	I_{GSS}		-4/22	0		25			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1200		25			10	μA
Internal gate resistance	r_g							7		Ω
Gate charge	Q_g	18	600	20	25			107		nC
Gate to source charge	Q_{GS}							22		
Gate to drain charge	Q_{GD}							41		
Short-circuit input capacitance	C_{iss}	$f = 1\text{MHz}$	0	800	25			1337		pF
Short-circuit output capacitance	C_{oss}							76		
Reverse transfer capacitance	C_{rss}							27		

Reverse Diode Static

Diode forward voltage	V_{SD}		0		20	25		3,2		V
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Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{\text{paste}} = 3,4 \text{ W/mK}$ (PSX)						1,55		K/W
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10-PY126PA040MR-L226F28Y

datasheet

Characteristic Values

Parameter	Symbol	Conditions					Value			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	

Inverter Switch

Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{goff} = 4 \Omega$ $R_{gon} = 4 \Omega$	16/-4	700	32	25 125 150		18 18 17		ns
Rise time	t_r					25 125 150		7 8 7		
Turn-off delay time	$t_{d(off)}$					25 125 150		57 65 66		
Fall time	t_f					25 125 150		9 10 9		
Turn-on energy (per pulse)	E_{on}	$Q_{iFWD} = 0,5 \mu C$ $Q_{iFWD} = 0,5 \mu C$ $Q_{iFWD} = 0,7 \mu C$	16/-4	700	32	25 125 150		0,619 0,649 0,698		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,197 0,219 0,222		
Peak recovery current	I_{RRM}	$di/dt = 4760 A/\mu s$ $di/dt = 4654 A/\mu s$ $di/dt = 5136 A/\mu s$	16/-4	700	32	25 125 150		38 37 45		A
Reverse recovery time	t_{rr}					25 125 150		19 21 23		ns
Recovered charge	Q_r					25 125 150		0,464 0,546 0,655		μC
Reverse recovered energy	E_{rec}					25 125 150		0,096 0,131 0,152		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		4997 8656 8100		A/ μs

Thermistor

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



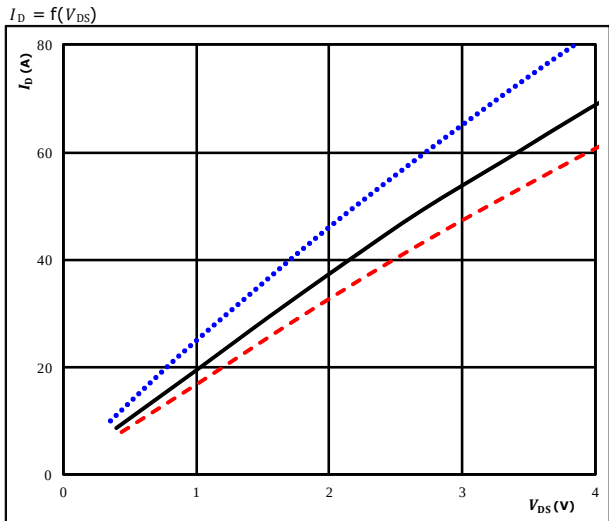
Vincotech

10-PY126PA040MR-L226F28Y datasheet

Inverter Switch Characteristics

figure 1. MOSFET

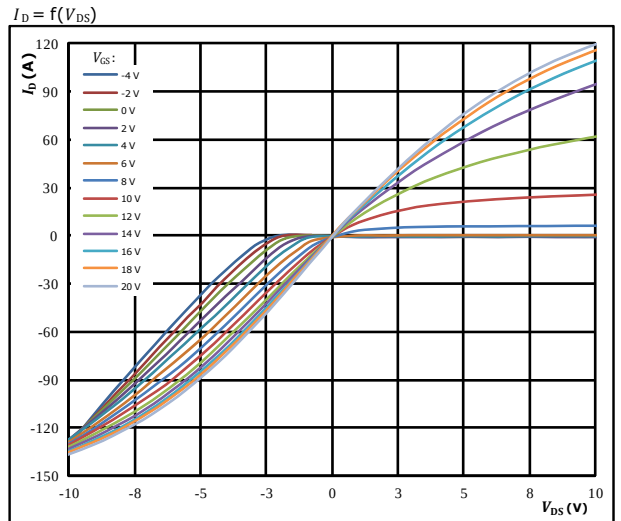
Typical output characteristics



$t_p = 250 \mu s$
 $V_{GS} = 18 V$
 $T_j: 25^\circ C$ (dotted blue)
 $125^\circ C$ (solid black)
 $150^\circ C$ (dashed red)

figure 2. MOSFET

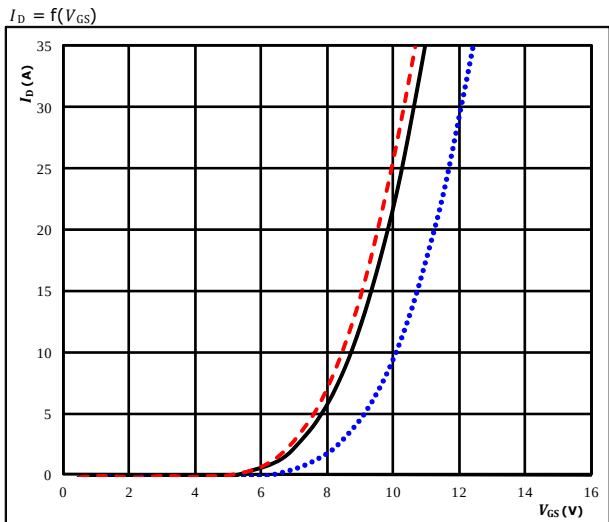
Typical output characteristics



$t_p = 250 \mu s$
 $T_j = 150^\circ C$
 V_{GS} from -4 V to 20 V in steps of 2 V

figure 3. MOSFET

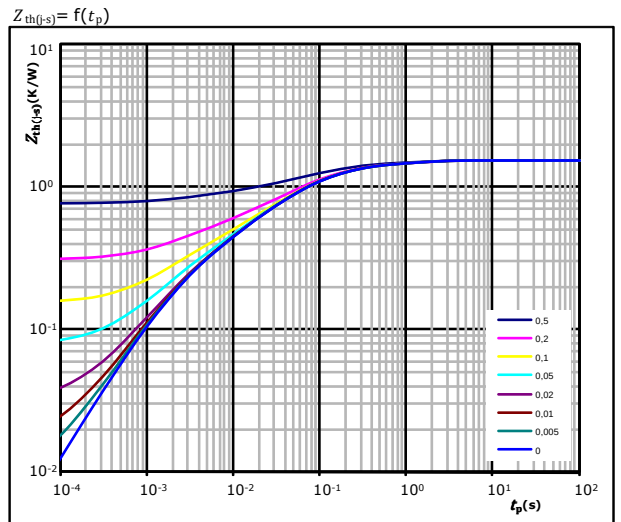
Typical transfer characteristics



$t_p = 100 \mu s$
 $V_{DS} = 10 V$
 $T_j: 25^\circ C$ (dotted blue)
 $125^\circ C$ (solid black)
 $150^\circ C$ (dashed red)

figure 4. MOSFET

Transient thermal impedance as a function of pulse width



$D = t_p / T$
 $R_{th(j-s)} = 1,55 K/W$
MOSFET thermal model values

R (K/W)	τ (s)
1,78E-01	1,04E+00
4,55E-01	1,44E-01
5,31E-01	4,34E-02
2,36E-01	8,88E-03
1,48E-01	1,76E-03

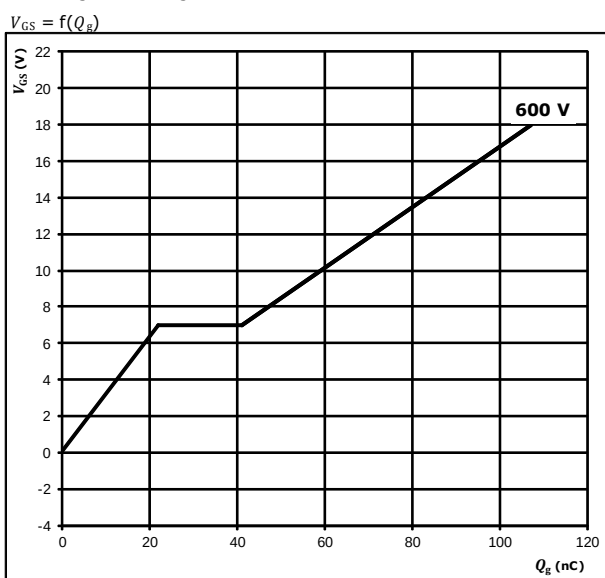


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Inverter Switch Characteristics

figure 5. MOSFET

Gate voltage vs Gate charge



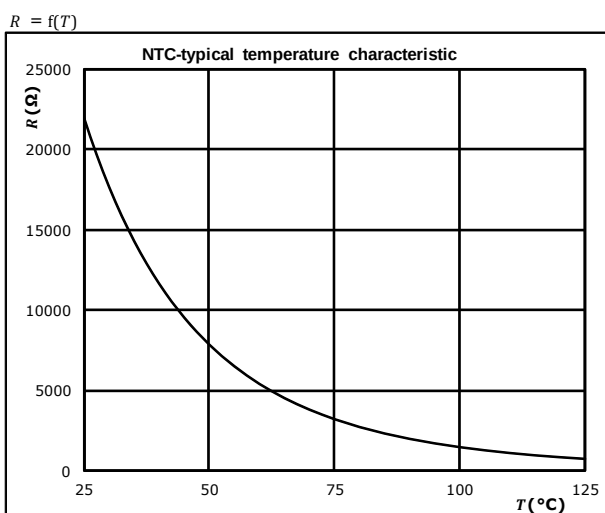
At

$I_c = 20$ A

Thermistor Characteristics

figure 1. Thermistor

Typical NTC characteristic as a function of temperature





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Inverter Switching Characteristics

figure 1. MOSFET

Typical switching energy losses as a function of drain current

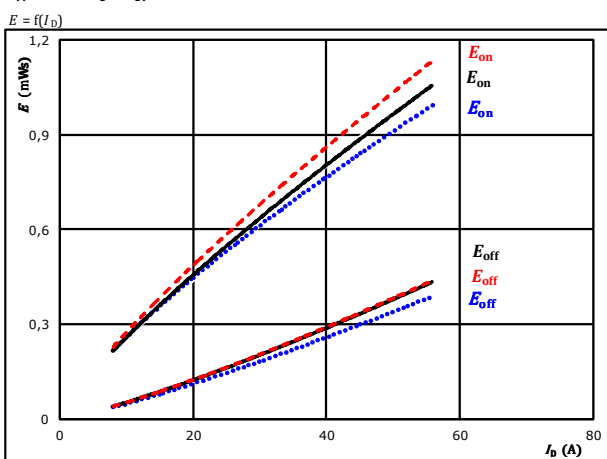


figure 2. MOSFET

Typical switching energy losses as a function of gate resistor

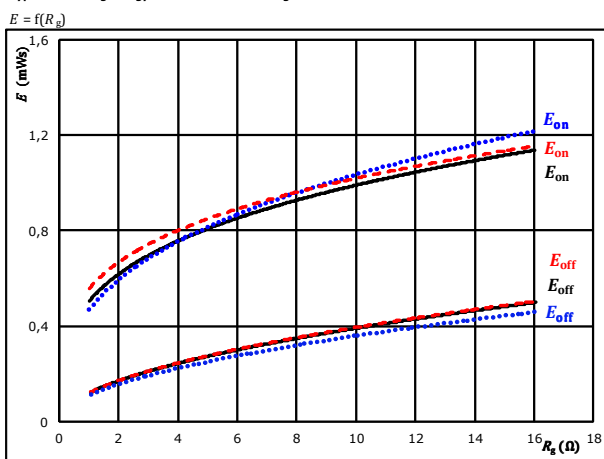


figure 3. FWD

Typical reverse recovered energy loss as a function of drain current

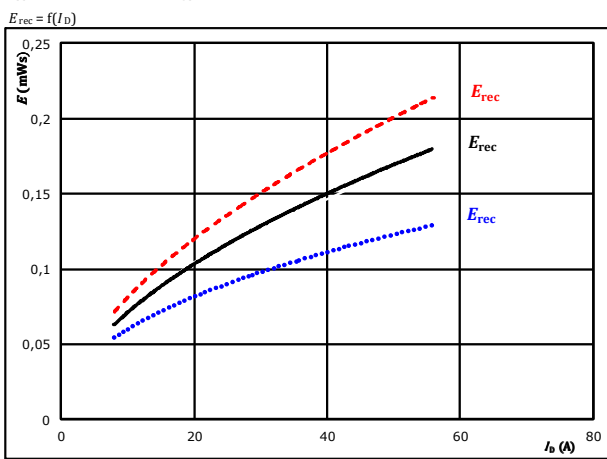
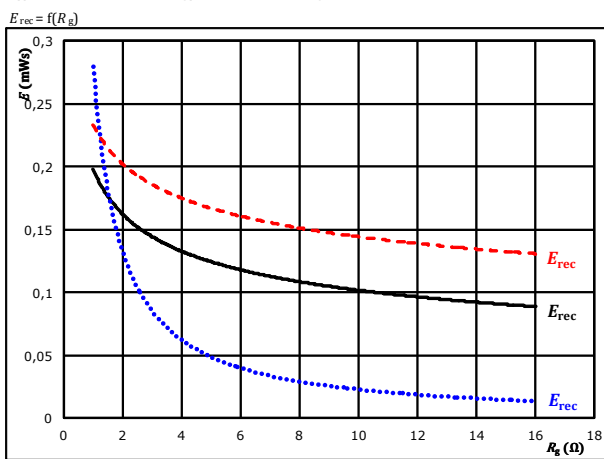


figure 4. FWD

Typical reverse recovered energy loss as a function of gate resistor





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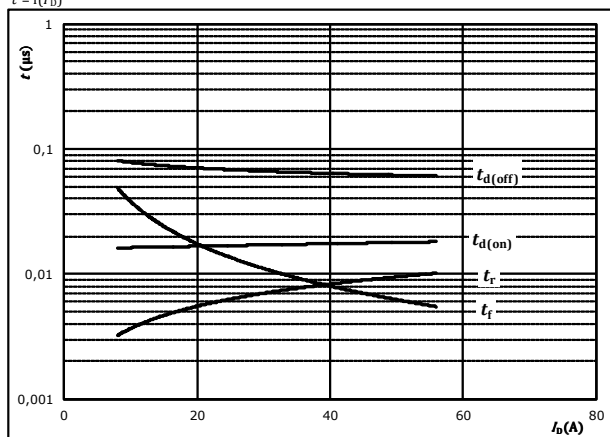
10-PY126PA040MR-L226F28Y datasheet

Inverter Switching Characteristics

figure 5. MOSFET

Typical switching times as a function of drain current

$$t = f(I_D)$$



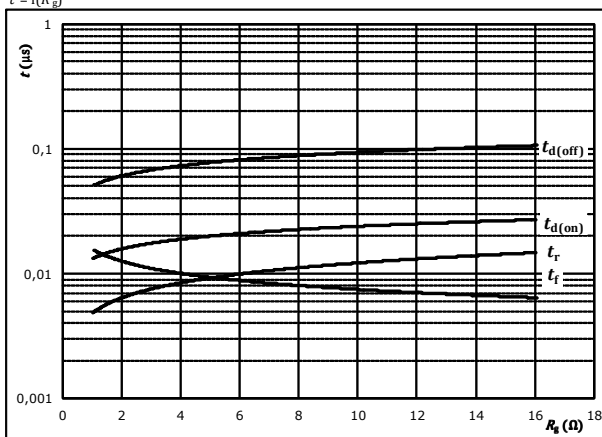
With an inductive load at

$T_J = 150$ °C
 $V_{DS} = 700$ V
 $V_{GS} = 16/-4$ V
 $R_{gon} = 4$ Ω
 $R_{goff} = 4$ Ω

figure 6. MOSFET

Typical switching times as a function of gate resistor

$$t = f(R_g)$$



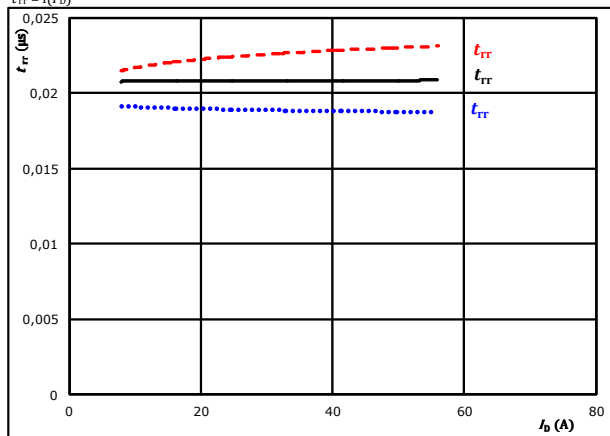
With an inductive load at

$T_J = 150$ °C
 $V_{DS} = 700$ V
 $V_{GS} = 16/-4$ V
 $I_D = 32$ A

figure 7. FWD

Typical reverse recovery time as a function of drain current

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

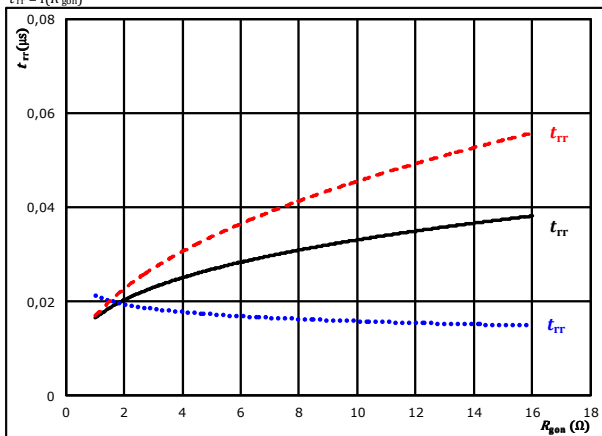


At $V_{DS} = 700$ V
 $V_{GS} = 16/-4$ V
 $R_{gon} = 4$ Ω
 $T_J: 25$ °C
 125 °C
 150 °C - - - - -

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
 $V_{GS} = 16/-4$ V
 $I_D = 32$ A
 $T_J: 25$ °C
 125 °C
 150 °C - - - - -



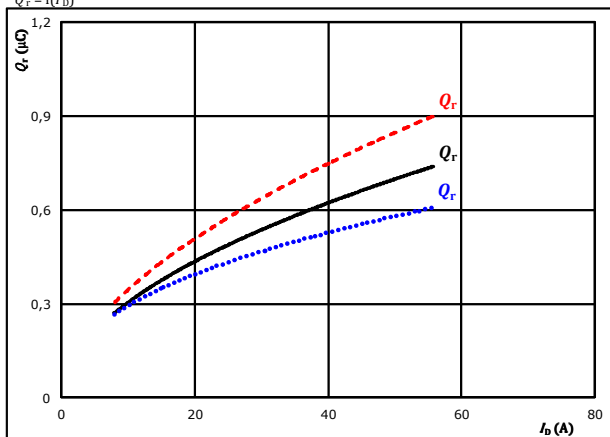
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Inverter Switching Characteristics

figure 9. FWD

Typical recovered charge as a function of drain current

$$Q_r = f(I_D)$$

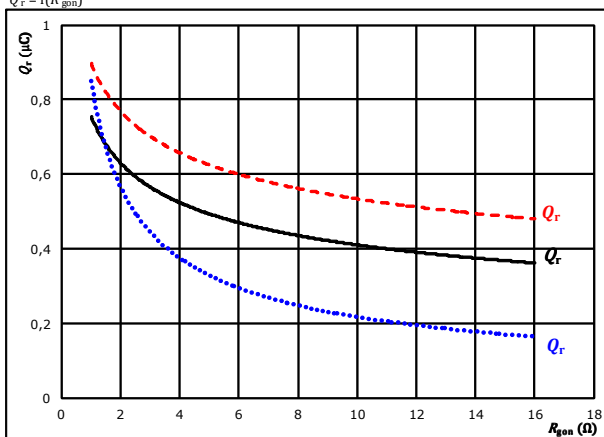


At $V_{DS} = 700$ V
 $V_{GS} = 16/-4$ V
 $R_{gon} = 4$ Ω
 T_j : 25 °C (dotted blue)
125 °C (solid black)
150 °C (dashed red)

figure 10. FWD

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

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

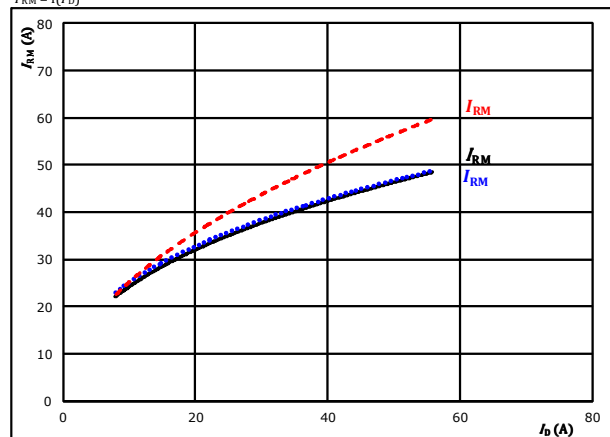


At $V_{DS} = 700$ V
 $V_{GS} = 16/-4$ V
 $I_D = 32$ A
 T_j : 25 °C (dotted blue)
125 °C (solid black)
150 °C (dashed red)

figure 11. FWD

Typical peak reverse recovery current as a function of drain current

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

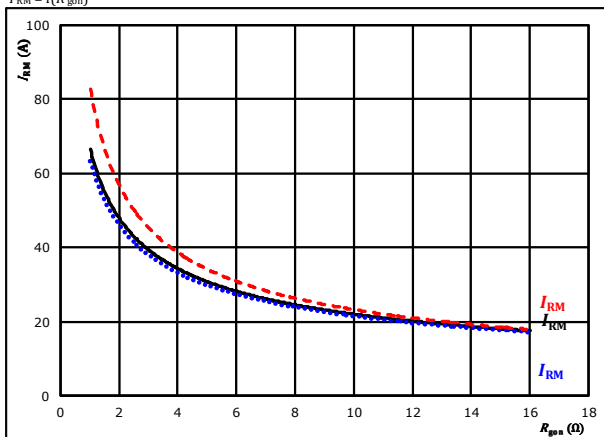


At $V_{DS} = 700$ V
 $V_{GS} = 16/-4$ V
 $R_{gon} = 4$ Ω
 T_j : 25 °C (dotted blue)
125 °C (solid black)
150 °C (dashed red)

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
 $V_{GS} = 16/-4$ V
 $I_D = 32$ A
 T_j : 25 °C (dotted blue)
125 °C (solid black)
150 °C (dashed red)



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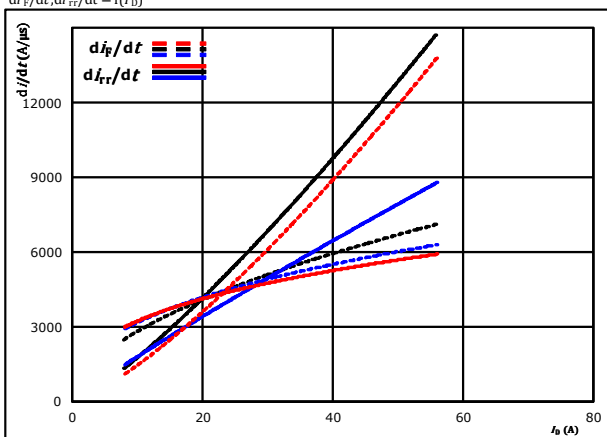
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Switching Characteristics

figure 13. FWD

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

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

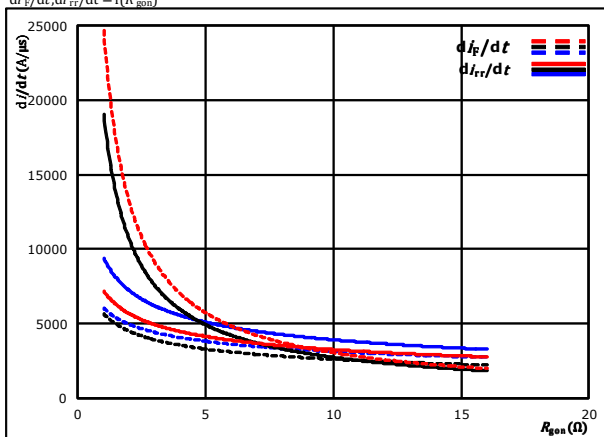


At $V_{DS} = 700$ V
 $V_{GS} = 16/-4$ V
 $R_{gon} = 4$ Ω
 T_J : 25 °C (dotted blue)
 125 °C (solid black)
 150 °C (dashed red)

figure 14. FWD

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

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

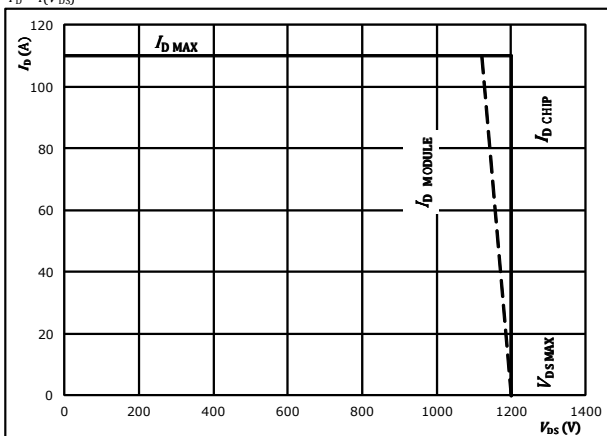


At $V_{DS} = 700$ V
 $V_{GS} = 16/-4$ V
 $I_D = 32$ A
 T_J : 25 °C (dotted blue)
 125 °C (solid black)
 150 °C (dashed red)

figure 15. MOSFET

Reverse bias safe operating area

$$I_D = f(V_{DS})$$



At $T_J = 125$ °C
 $R_{gon} = 4$ Ω
 $R_{goff} = 4$ Ω



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datasheet

Inverter Switching Definitions

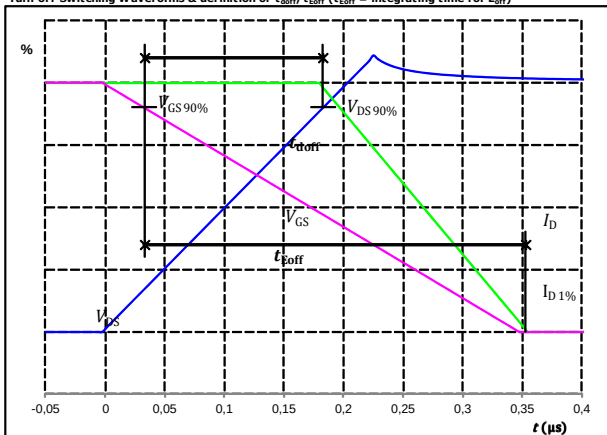
General conditions

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

figure 1.

MOSFET

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

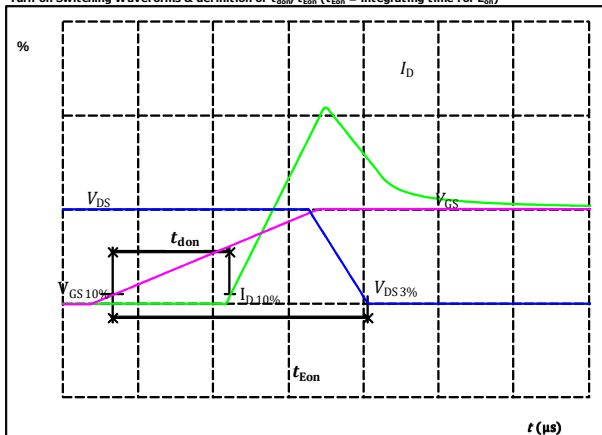


$V_{GS}(0\%)$	=	-6	V
$V_{GS}(100\%)$	=	16	V
$V_{DS}(100\%)$	=	700	V
$I_D(100\%)$	=	32	A
t_{doff}	=	0,065	μs

figure 2.

MOSFET

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

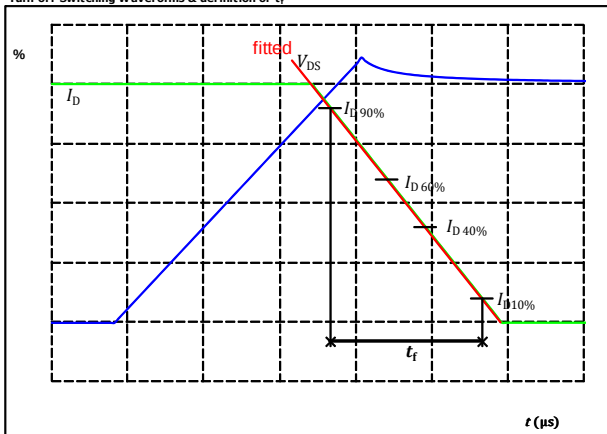


$V_{GS}(0\%)$	=	-6	V
$V_{GS}(100\%)$	=	16	V
$V_{DS}(100\%)$	=	700	V
$I_D(100\%)$	=	32	A
t_{don}	=	0,018	μs

figure 3.

MOSFET

Turn-off Switching Waveforms & definition of t_f

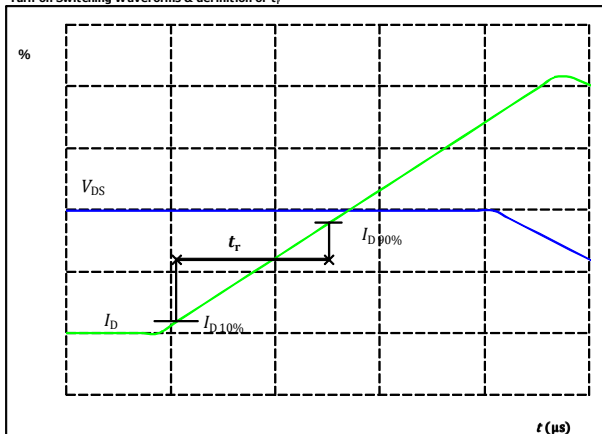


$V_{DS}(100\%)$	=	700	V
$I_D(100\%)$	=	32	A
t_f	=	0,010	μs

figure 4.

MOSFET

Turn-on Switching Waveforms & definition of t_r



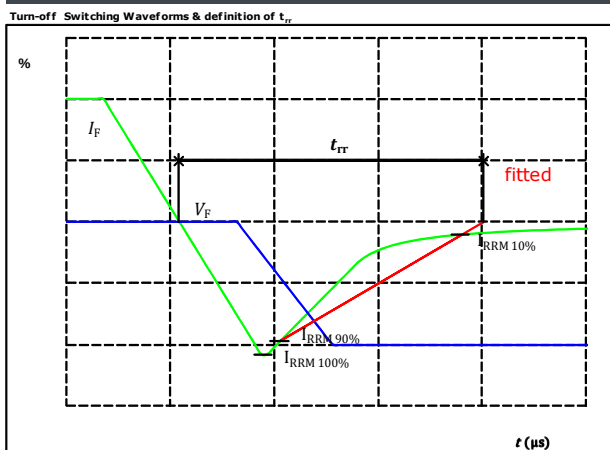
$V_{DS}(100\%)$	=	700	V
$I_D(100\%)$	=	32	A
t_r	=	0,008	μs



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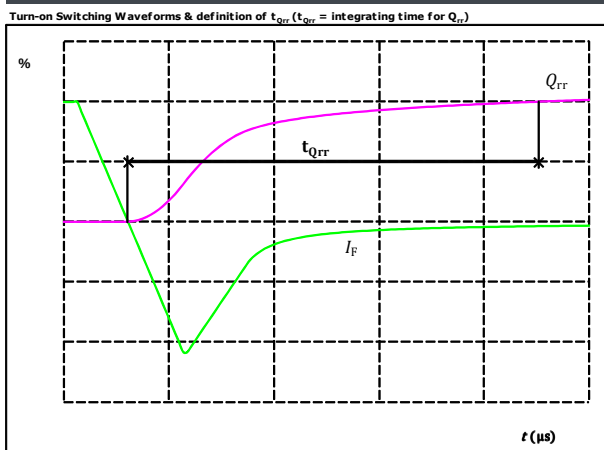
Inverter Switching Definitions

figure 7. FWD



$V_F(100\%) =$	700	V
$I_F(100\%) =$	32	A
$I_{RRM}(100\%) =$	37	A
$t_{rr} =$	0,021	μs

figure 8. FWD



$I_F(100\%) =$	32	A
$Q_{rr}(100\%) =$	0,55	μC

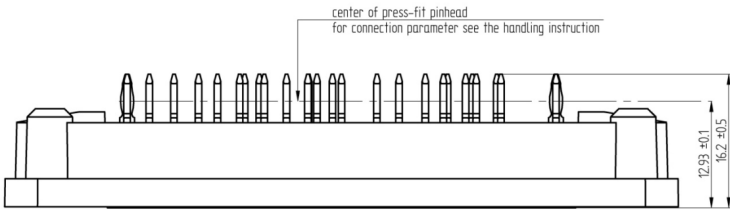
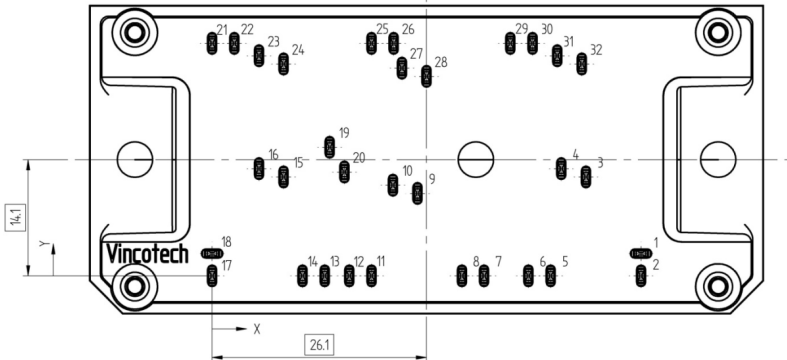


10-PY126PA040MR-L226F28Y

datasheet

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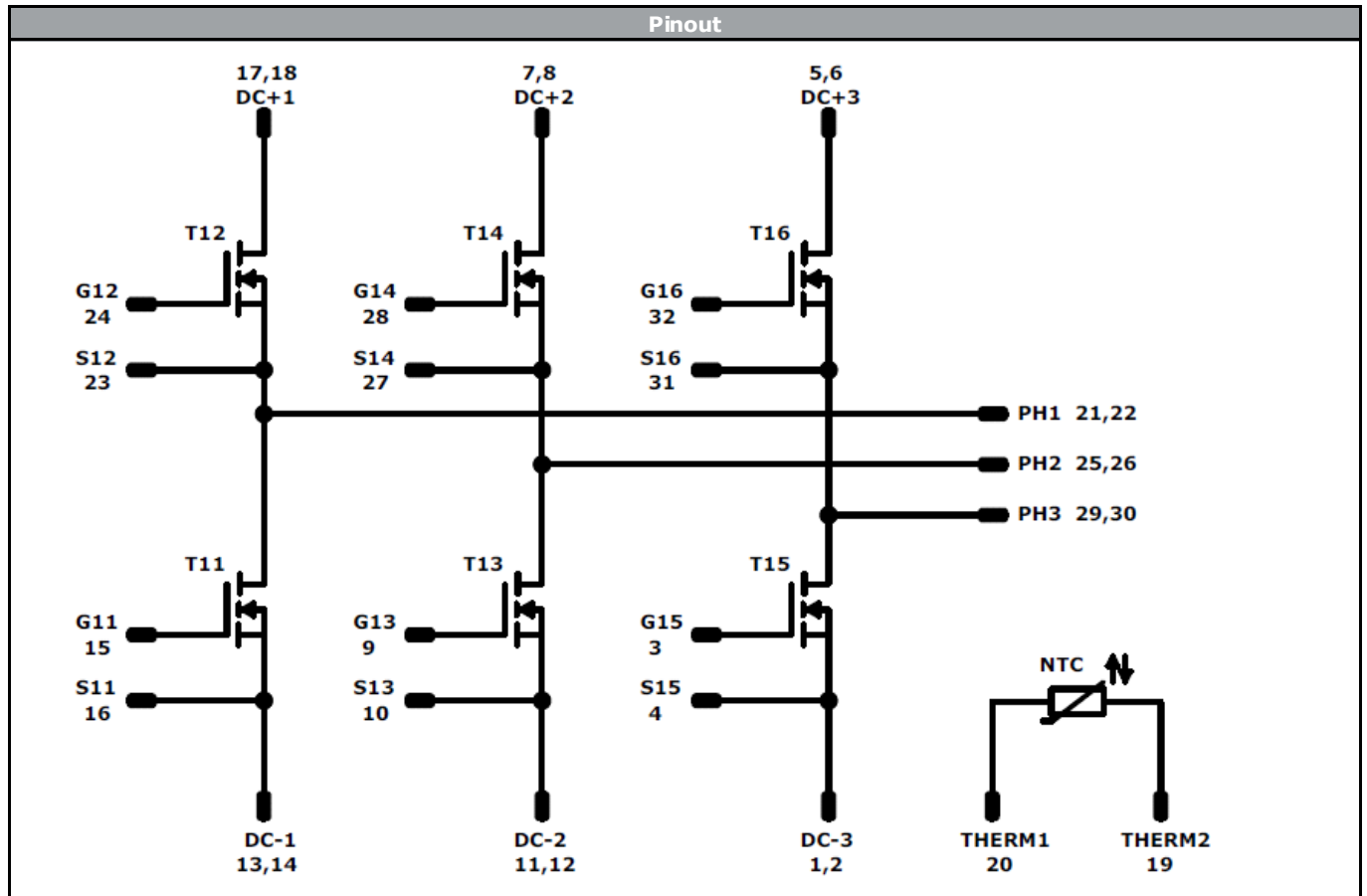
Ordering Code & Marking								
Version				Ordering Code				
without thermal paste 12 mm housing with press-fit pins				10-PY126PA040MR-L226F28Y				
with thermal paste 12 mm housing with press-fit pins				10-PY126PA040MR-L226F28Y-/3/				
NN-NNNNNNNNNNNNNN TTTTTTVV WWYY UL VIN LLLLL SSSS 		Text	Name		Date code	UL & VIN	Lot	Serial
			NN-NNNNNNNNNNNNNN-TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
		Datamatrix	Type&Ver	Lot number	Serial	Date code		
TTTTTTTVV	LLLLL		SSSS	WWYY				

Pin table				Outline	
Pin	X	Y	Functions		
1	52,2	2,7	DC-3		
2	52,2	0	DC-3		
3	45,5	12	G15		
4	42,5	13	S15		
5	41,2	0	DC+3		
6	38,5	0	DC+3		
7	33,1	0	DC+2		
8	30,4	0	DC+2		
9	25	10	G13		
10	22	11	S13		
11	19,4	0	DC-2		
12	16,7	0	DC-2		
13	13,7	0	DC-1		
14	11	0	DC-1		
15	8,7	12	G11		
16	5,7	13	S11		
17	0	0	DC+1		
18	0	2,7	DC+1		
19	14,3	15,6	THERM2		
20	16,1	12,6	THERM1		
21	0	28,2	PH1		
22	2,7	28,2	PH1		
23	5,7	26,7	S12		
24	8,7	25,7	G12		
25	19,4	28,2	PH2		
26	22,1	28,2	PH2		
27	23,1	25,2	S14		
28	26,1	24,2	G14		
29	36,3	28,2	PH3		
30	39	28,2	PH3		
31	42	26,7	S16		
32	45	25,7	G16		

Tolerance of pinpositions: ±0.5mm at the end of pins
Dimension of coordinate axis is only offset without tolerance



Vincotech



Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	MOSFET	1200 V	40 mΩ	Inverter Switch	
NTC	Thermistor			Thermistor	



Vincotech

10-PY126PA040MR-L226F28Y
datasheet

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

Handling instruction
Handling instructions for <i>flow 1</i> packages see vincotech.com website.

Package data
Package data for <i>flow 1</i> packages see 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-PY126PA040MR-L226F28Y-D2-14	07 Aug. 2018	Product features has been updated	1

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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.