Vincotech

10-PY096PA035ME-L224F18Y
datasheet

***flow* PACK 1** **900 V / 70 A**

Features

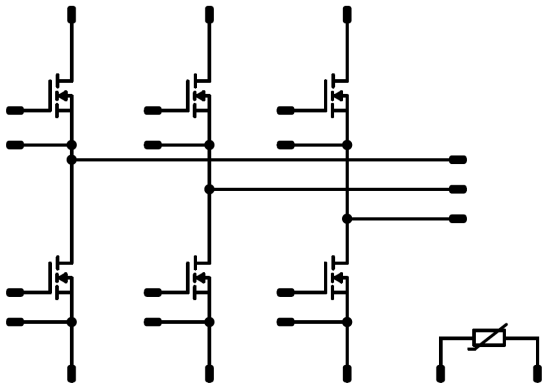
- Wolfspeed(Cree)™ Silicon Carbide Power MOSFET, C3M™ MOSFET Technology
- Sixpack with three separated legs
- Solderless Press-fit Mounting Technology

flow 1 12 mm housing

Target applications

- Power Supply

Schematic



Types

- 10-PY096PA035ME-L224F18Y

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
Inverter Switch				
Drain-source voltage	V_{DSS}		900	V
Drain current	I_D	$T_j = T_{jmax}$ T_S = 80 °C	42	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	180	A
Avalanche energy, single pulse	E_{AS}	I_D = 22 A V_{DD} = 50 V	110	mJ
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_S = 80 °C	85	W
Gate-source voltage	V_{GSS}	Dynamic*	-8/+19	V
Maximum Junction Temperature	T_{jmax}		175	°C

* See figure 8. at page 14

Maximum Ratings

T_j = 25 °C, unless otherwise specified

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

*100 % tested in production

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	$r_{DS(on)}$		10		76	25 125 150		35 43 47	39	mΩ
Gate-source threshold voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}$			0,01	25	1,7	2,4	3,5	V
Gate to Source Leakage Current	I_{GSS}		-8/+19	0		25			500	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	900		25			200	µA
Internal gate resistance	r_g							2,35		Ω
Gate charge	Q_g							61		
Gate to source charge	Q_{GS}		-4/15	400	40	25		15		nC
Gate to drain charge	Q_{GD}							24		
Short-circuit input capacitance	C_{iss}							1320		
Short-circuit output capacitance	C_{oss}	f= 1 MHz	0	600		25		120		pF
Reverse transfer capacitance	C_{rss}							8		
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						1,12		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$					25 125 150		13 13 14		
Rise time	t_r	R_{goff} = 4 Ω R_{gon} = 4 Ω				25 125 150		5 5 5		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		43 43 43		
Fall time	t_f		+15/-5	600	40	25 125 150		11 12 11		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 0,5 µC Q_{rFWD} = 0,9 µC Q_{rFWD} = 0,8 µC				25 125 150		0,459 0,447 0,471		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,082 0,055 0,048		

Characteristic Values

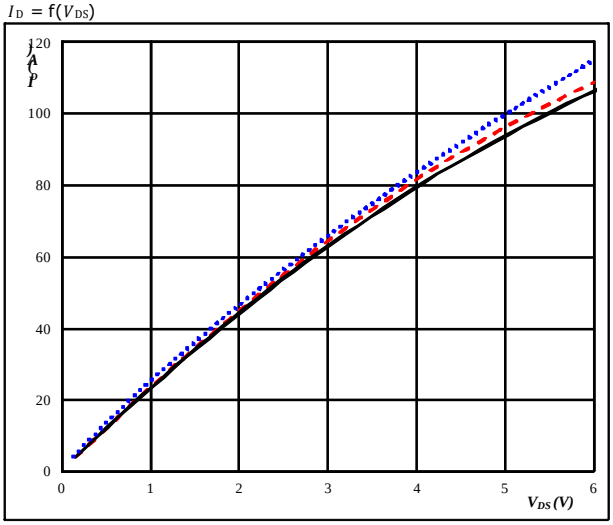
Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	
Inverter Switch										
Dynamic										
Peak recovery current	I_{RRM}	di/dt = 7344 A/µs di/dt = 7855 A/µs di/dt = 8439 A/µs	+15/-5	600	40	25 125 150		54 58 63		A
Reverse recovery time	t_{rr}					25 125 150		15 15 15		ns
Recovered charge	Q_r					25 125 150		0,455 0,875 0,825		µC
Reverse recovered energy	E_{rec}					25 125 150		0,028 0,196 0,106		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		11049 13683 15876		A/µs
Thermistor										
Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P					25		5		mW
Power dissipation constant						25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %				25		3962		K
B-value	$B_{(25/100)}$	Tol. ±1 %				25		4000		K
Vincotech NTC Reference									I	

Inverter Switch Characteristics

figure 1. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$

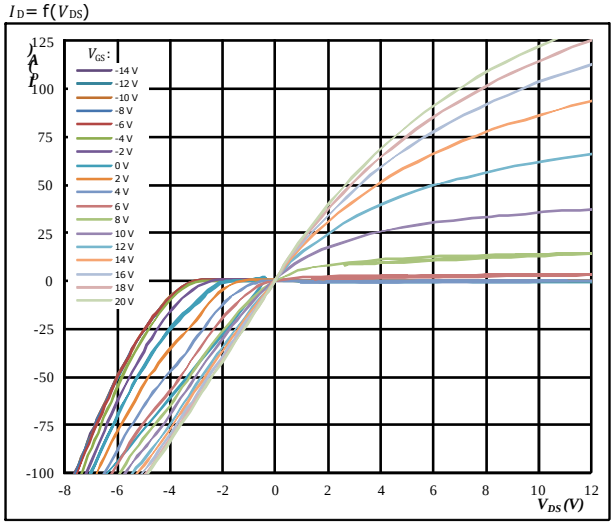


t_p =	250	µs		25 °C	
V_{GS}=	15	V	T_j:	125 °C	
				150 °C	

figure 2. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$

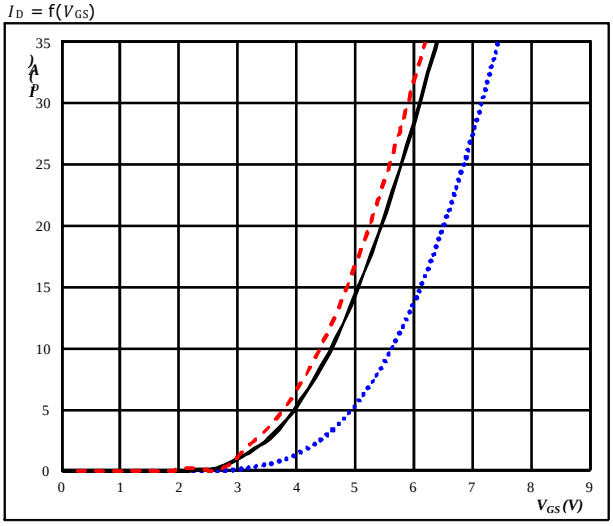


t_p =	250	µs
T_j =	150	°C

figure 3. **MOSFET**

Typical transfer characteristics

$I_D = f(V_{GS})$

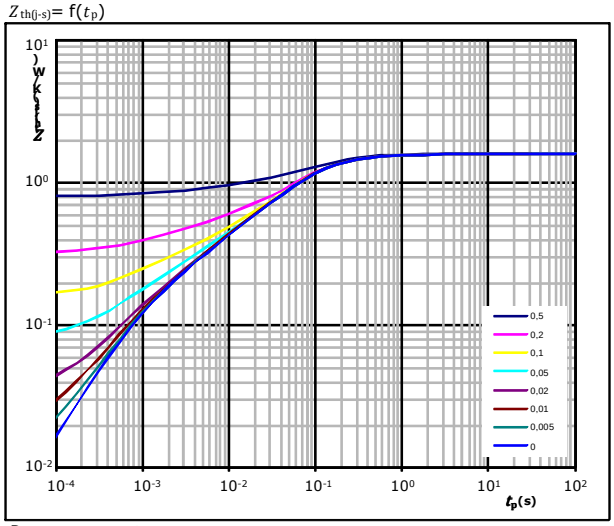


t_p =	100	µs		25 °C	
V_{DS} =	10	V	T_j:	125 °C	
				150 °C	

figure 4. **MOSFET**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	1,12	K/W

MOSFET thermal model values

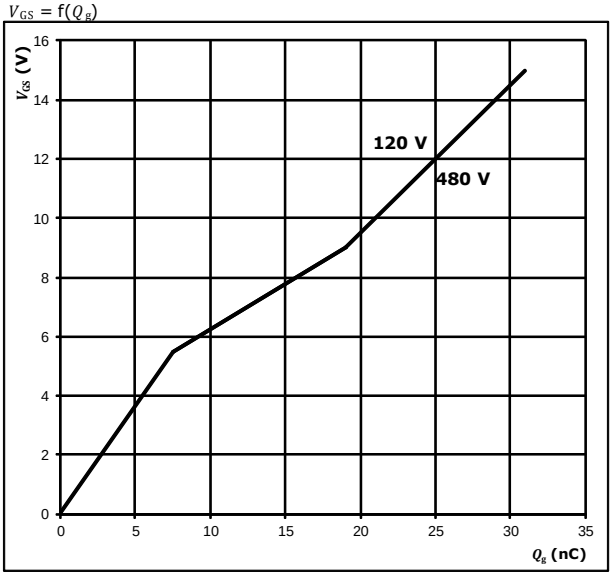
R (K/W)	τ (s)
6,72E-02	2,72E+00
1,48E-01	4,14E-01
8,68E-01	8,33E-02
2,53E-01	2,89E-02
1,69E-01	5,15E-03
1,06E-01	9,10E-04

Inverter Switch Characteristics

figure 5. **MOSFET**

Gate voltage vs Gate charge

$V_{GS} = f(Q_g)$



At

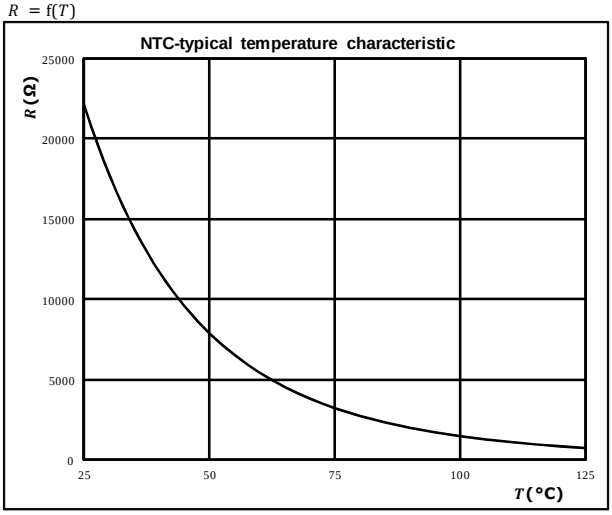
I_D=	40	A	V_{DS}=	400	V
T_j =	25	°C	I_{GS}=	200	mA

Thermistor Characteristics

figure 1. **Thermistor**

Typical NTC characteristic as a function of temperature

$R = f(T)$

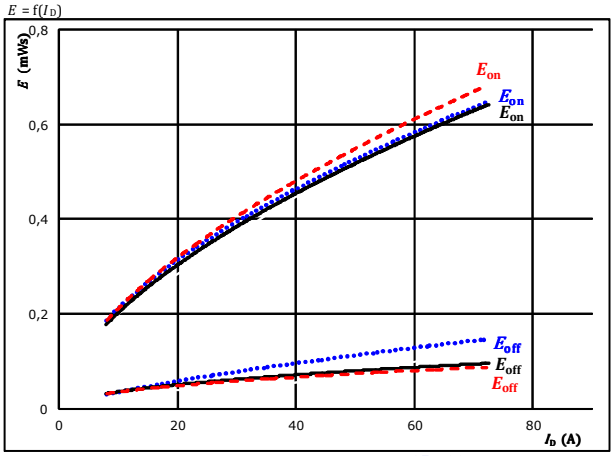


Inverter Switching Characteristics

figure 1. MOSFET

Typical switching energy losses as a function of drain current

$E = f(I_D)$



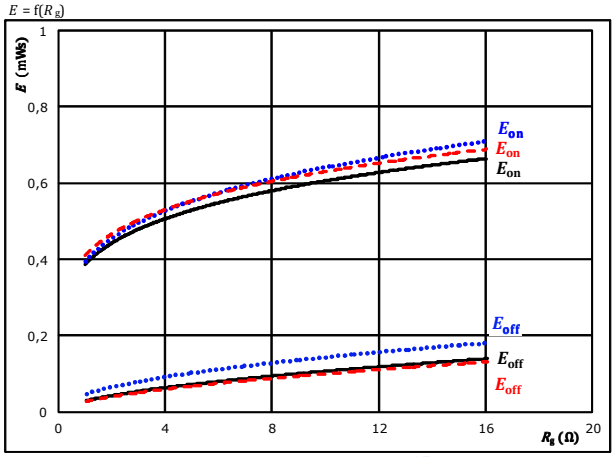
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C	·····
V_{GS} =	+15/-5	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

$E = f(R_g)$



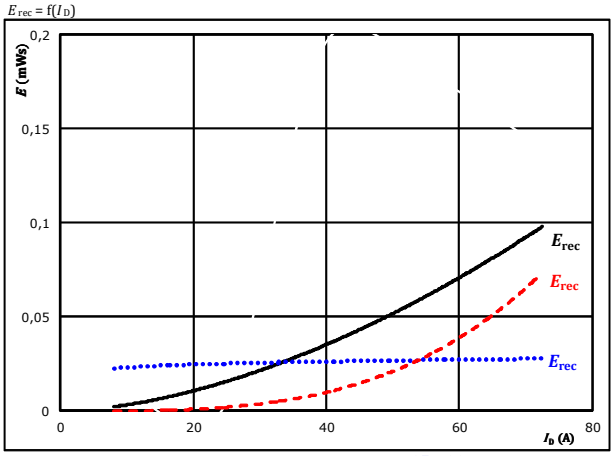
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C	·····
V_{GS} =	+15/-5	V		125 °C	———
I_D =	40	A		150 °C	- - -

figure 3. FWD

Typical reverse recovered energy loss as a function of drain current

$E_{rec} = f(I_D)$



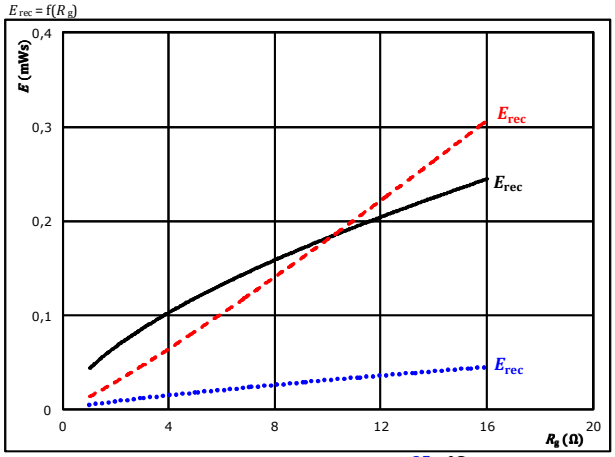
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C	·····
V_{GS} =	+15/-5	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

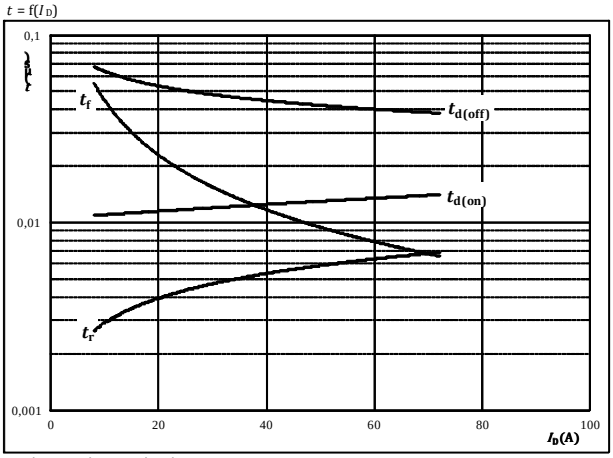
V_{DS} =	600	V	T_j:	25 °C	·····
V_{GS} =	+15/-5	V		125 °C	———
I_D =	40	A		150 °C	- - -

Inverter Switching Characteristics

figure 5. **MOSFET**

Typical switching times as a function of drain current

$t = f(I_D)$



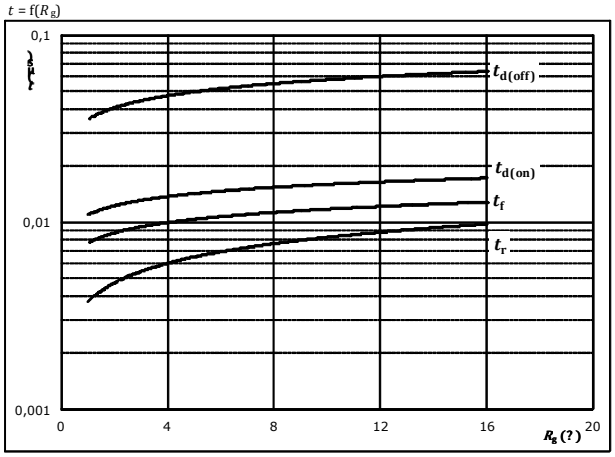
With an inductive load at

T_j =	150	°C
V_{DS} =	600	V
V_{GS} =	+15/-5	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 6. **MOSFET**

Typical switching times as a function of gate resistor

$t = f(R_g)$



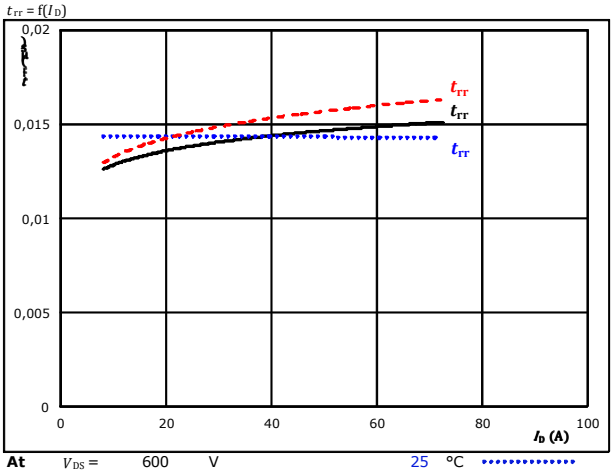
With an inductive load at

T_j =	150	°C
V_{DS} =	600	V
V_{GS} =	+15/-5	V
I_D =	40	A

figure 7. **FWD**

Typical reverse recovery time as a function of drain current

$t_{rr} = f(I_D)$

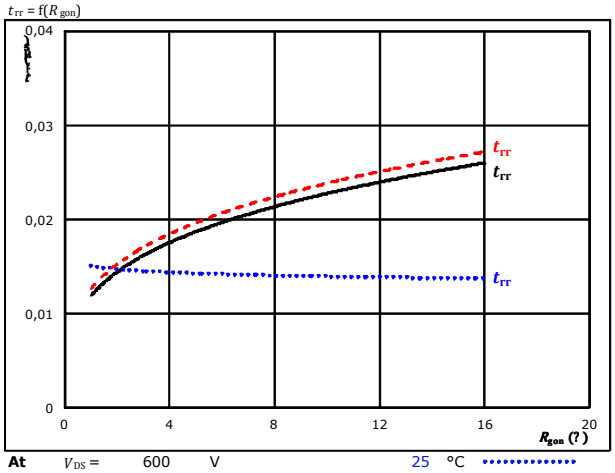


At	V_{DS} =	600	V		25 °C
	V_{GS} =	+15/-5	V	T_j:	125 °C
	R_{gon} =	4	Ω		150 °C

figure 8. **FWD**

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

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



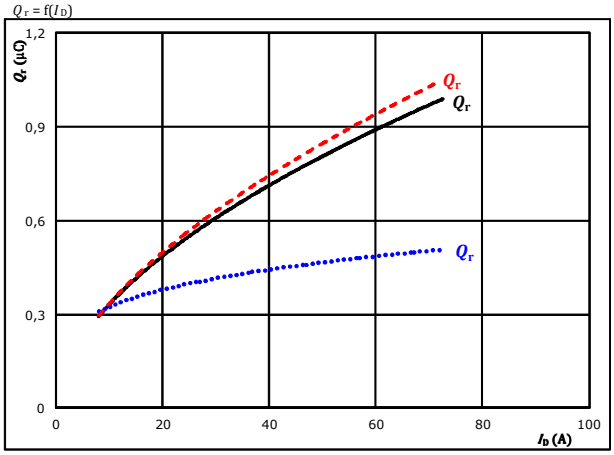
At	V_{DS} =	600	V		25 °C
	V_{GS} =	+15/-5	V	T_j:	125 °C
	I_D =	40	A		150 °C

Inverter Switching Characteristics

figure 9. **FWD**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$

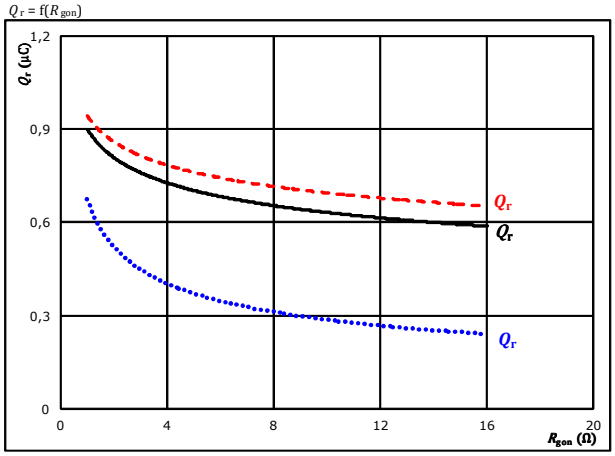


At	V_{DS} =	600	V		25 °C	
	V_{GS} =	+15/-5	V	T_j:	125 °C	
	R_{gon} =	4	Ω		150 °C	

figure 10. **FWD**

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

$Q_r = f(R_{gon})$

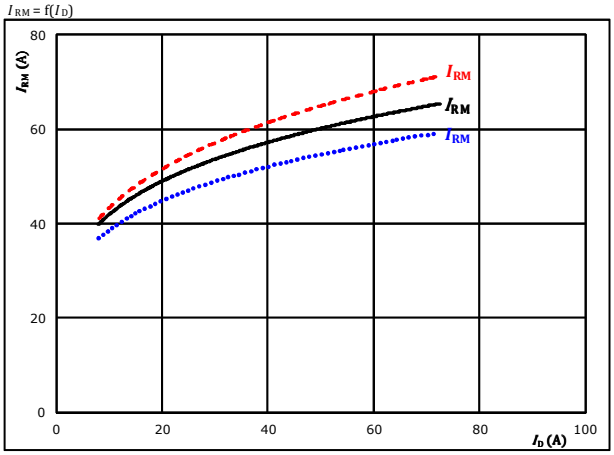


At	V_{DS} =	600	V		25 °C	
	V_{GS} =	+15/-5	V	T_j:	125 °C	
	I_D =	40	A		150 °C	

figure 11. **FWD**

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

$I_{RM} = f(I_D)$

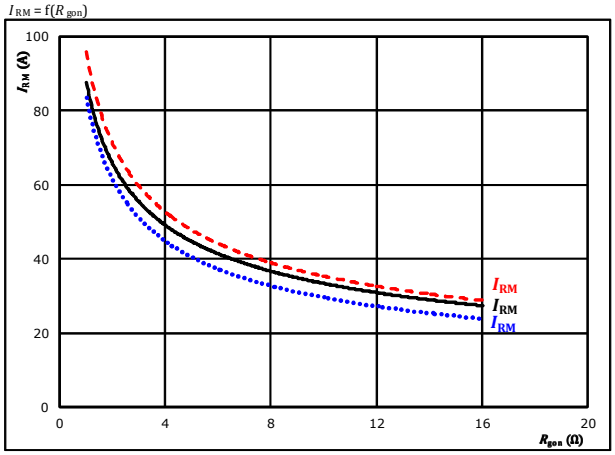


At	V_{DS} =	600	V		25 °C	
	V_{GS} =	+15/-5	V	T_j:	125 °C	
	R_{gon} =	4	Ω		150 °C	

figure 12. **FWD**

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

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



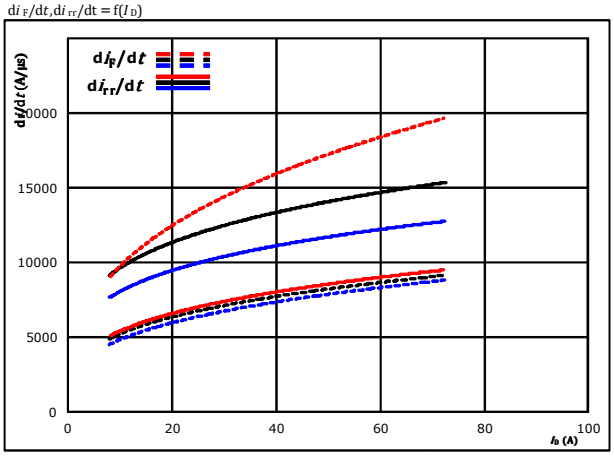
At	V_{DS} =	600	V		25 °C	
	V_{GS} =	+15/-5	V	T_j:	125 °C	
	I_D =	40	A		150 °C	

Inverter Switching Characteristics

figure 13. **FWD**

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

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

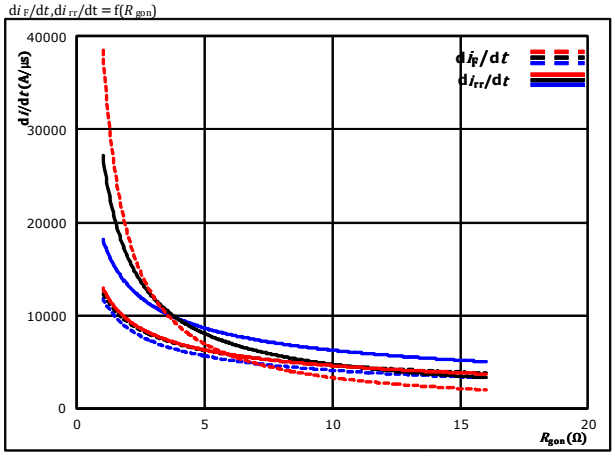


At					
V_{DS} =	600	V	T_j:	25 °C	
V_{GS} =	+15/-5	V		125 °C	
R_{gon} =	4	Ω		150 °C	

figure 14. **FWD**

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

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

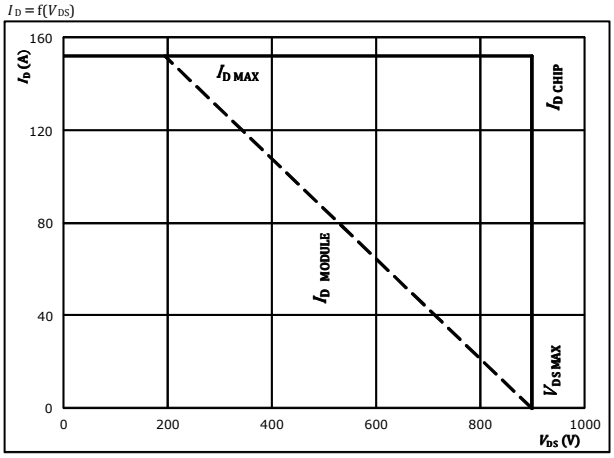


At					
V_{DS} =	600	V	T_j:	25 °C	
V_{GS} =	+15/-5	V		125 °C	
I_D =	40	A		150 °C	

figure 15. **MOSFET**

Reverse bias safe operating area

$I_D = f(V_{DS})$



At

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

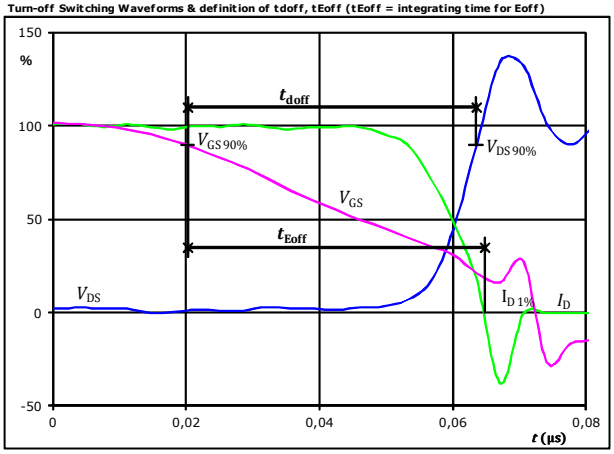
Inverter Switching Characteristics

General conditions

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

figure 1. MOSFET

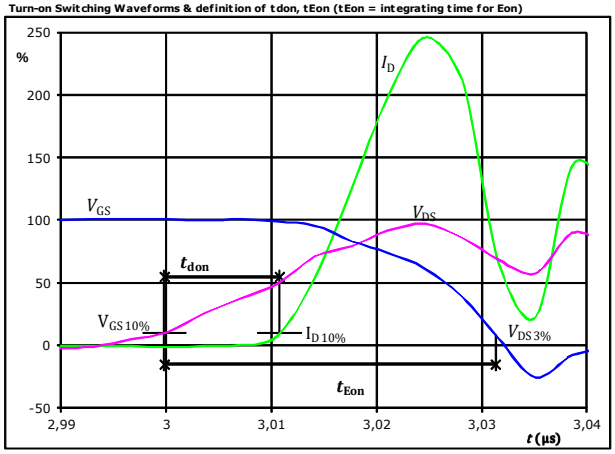
Turn-off Switching Waveforms & definition of tdoff, tEoff (tEoff = integrating time for Eoff)



$V_{GS}(0\%)$ =	0	V
$V_{GS}(100\%)$ =	20	V
$V_{DS}(100\%)$ =	600	V
$I_D(100\%)$ =	40	A
t_{doff} =	0,043	µs
t_{Eoff} =	0,045	µs

figure 2. MOSFET

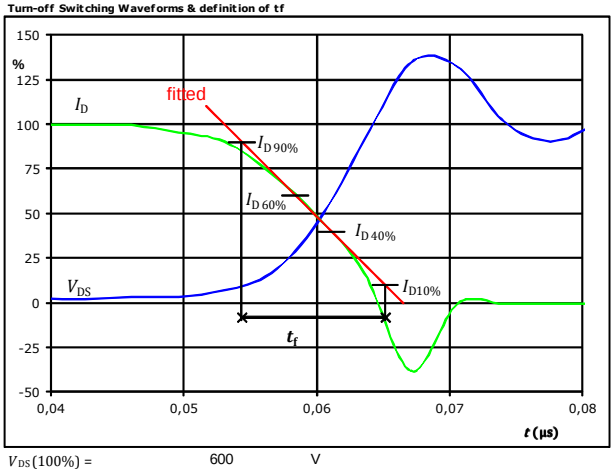
Turn-on Switching Waveforms & definition of tdon, tEon (tEon = integrating time for Eon)



$V_{GS}(0\%)$ =	0	V
$V_{GS}(100\%)$ =	20	V
$V_{DS}(100\%)$ =	600	V
$I_D(100\%)$ =	40	A
t_{don} =	0,013	µs
t_{Eon} =	0,031	µs

figure 3. MOSFET

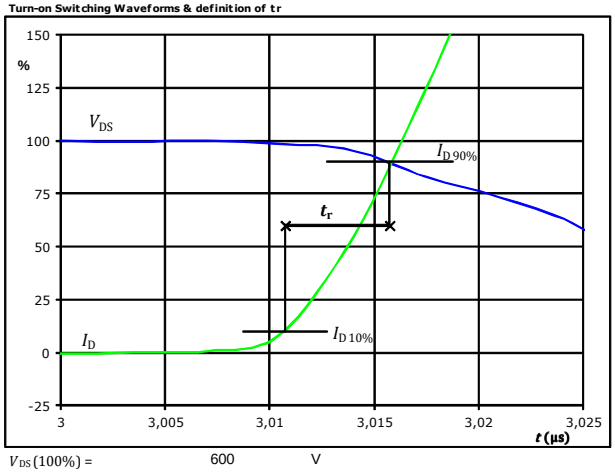
Turn-off Switching Waveforms & definition of tf



$V_{DS}(100\%)$ =	600	V
$I_D(100\%)$ =	40	A
t_f =	0,012	µs

figure 4. MOSFET

Turn-on Switching Waveforms & definition of tr

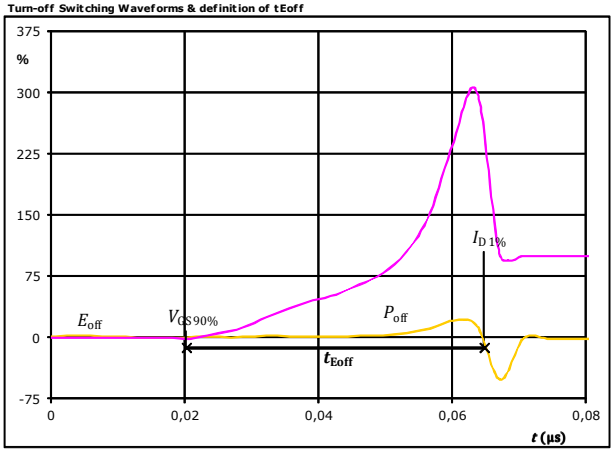


$V_{DS}(100\%)$ =	600	V
$I_D(100\%)$ =	40	A
t_r =	0,005	µs

Inverter Switching Characteristics

figure 5. **MOSFET**

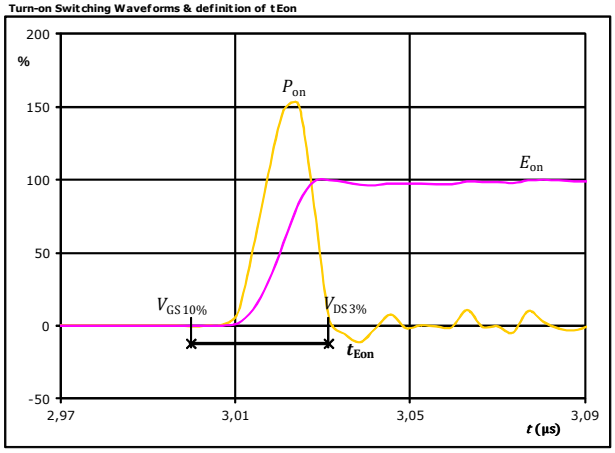
Turn-off Switching Waveforms & definition of tEoff



$P_{off}(100\%)$ =	23,94	kW
$E_{off}(100\%)$ =	0,06	mJ
t_{Eoff} =	0,04	µs

figure 6. **MOSFET**

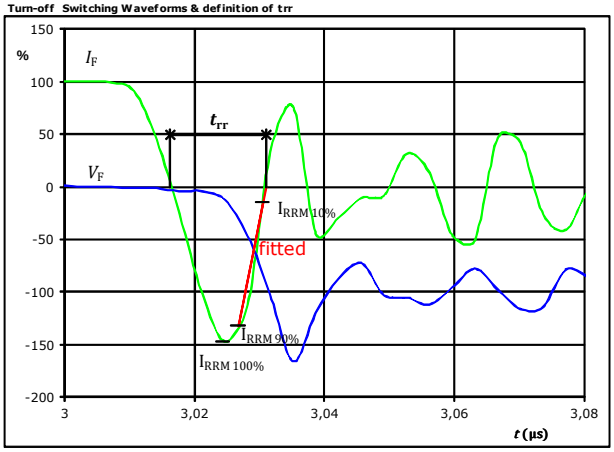
Turn-on Switching Waveforms & definition of tEon



$P_{on}(100\%)$ =	23,94	kW
$E_{on}(100\%)$ =	0,45	mJ
t_{Eon} =	0,03	µs

figure 7. **FWD**

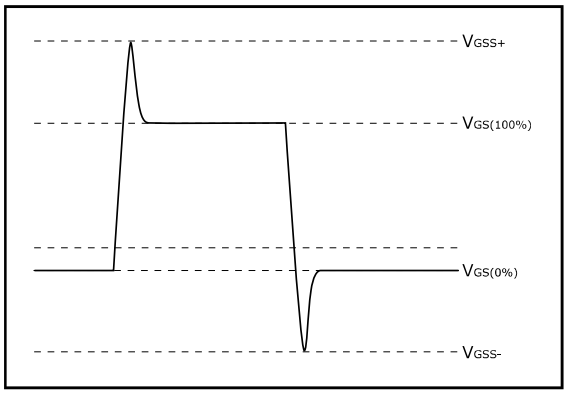
Turn-off Switching Waveforms & definition of trr



$V_F(100\%)$ =	600	V
$I_F(100\%)$ =	40	A
$I_{RRM}(100\%)$ =	-58	A
t_{rr} =	0,015	µs

Inverter Switching Characteristics

figure 8.
Gate maximum operating boundaries



V_{GS}+ =	19 V
$V_{GS}(100\%)$ =	15 V
$V_{GS}(0\%)$ =	-4 V
V_{GS}- =	-8 V

Vincotech

Ordering Code & Marking

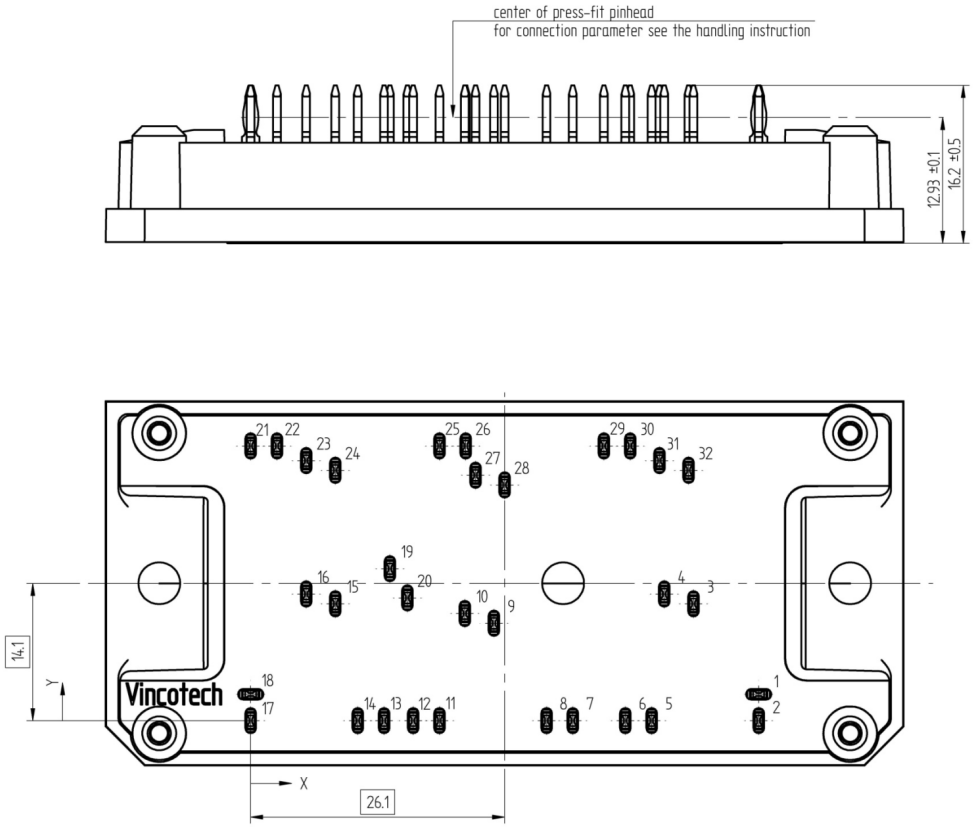
Version	Ordering Code
without thermal paste	10-PY096PA035ME-L224F18Y
with thermal paste	10-PY096PA035ME-L224F18Y-/3/

NN-NNNNNNNNNNNNNN
TTTTTTVV WWYY UL
VIN LLLLL SSSS

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

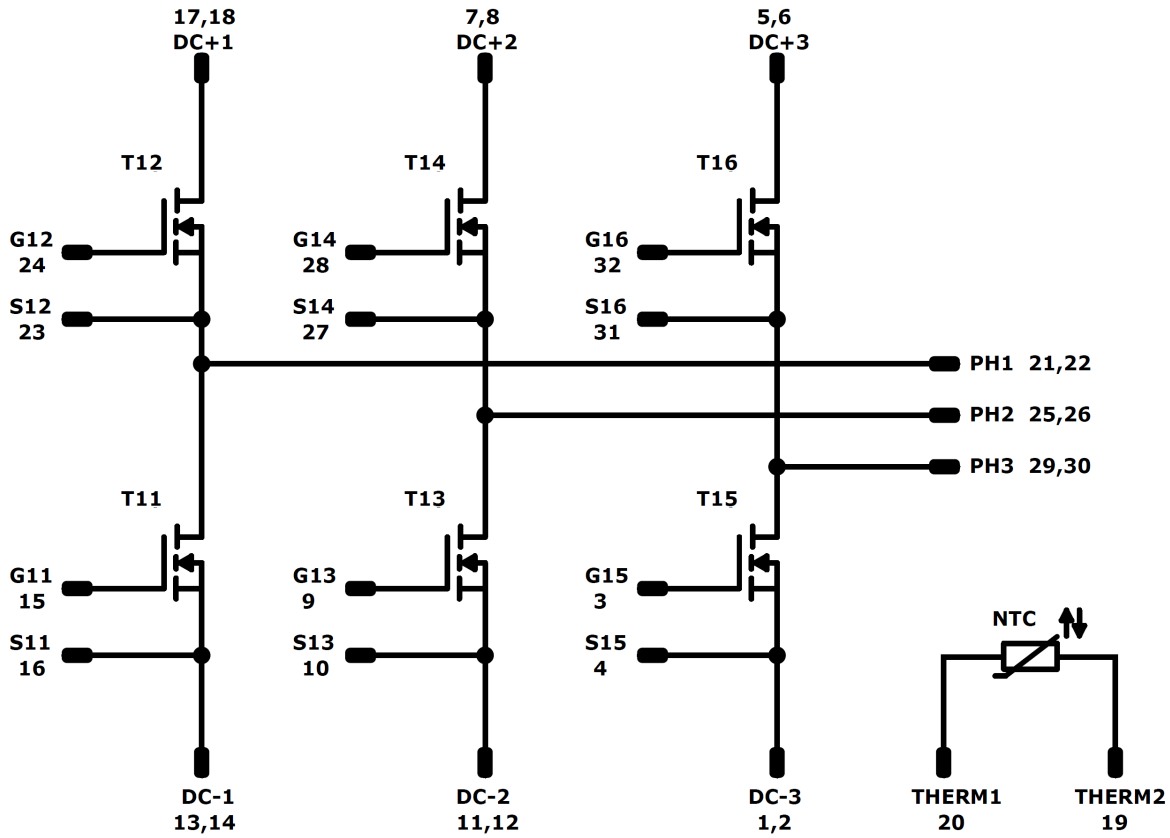
Outline

Pin table			
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

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11 , T12 , T13 , T14 , T15 , T16	MOSFET	900 V	39 mΩ	Inverter Switch	
NTC	NTC			Thermistor	

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

Handling instruction
Handling instructions for *flow* 1 packages see vincotech.com website.

Package data
Package data for *flow* 1 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-PY096PA035ME-L224F18Y-D1-14	13 Jul. 2017		

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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