



Vincotech

# 30-P2126PA100SH-L289F49Y

datasheet

flowPACK 2

1200 V / 100 A

## Topology features

- 3xHalf Bridge
- Open Emitter configuration
- Kelvin Emitter for improved switching performance
- Temperature sensor

## Component features

- Easy paralleling
- High speed switching
- Low switching losses

## Housing features

- Base isolation: Al<sub>2</sub>O<sub>3</sub>
- Convex shaped baseplate for superior thermal contact
- Cu baseplate
- Thermo-mechanical push-and-pull force relief
- Press-fit pin
- Reliable cold welding connection

## Target applications

- Elevator Drives
- Industrial Drives
- Servo Drives

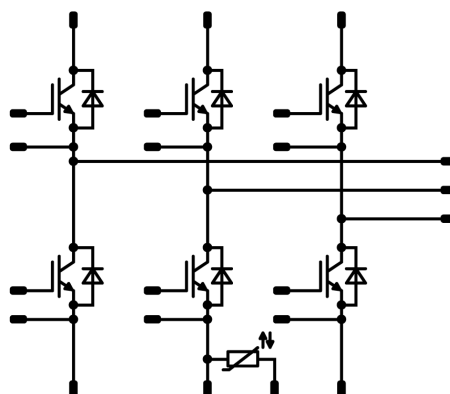
## Types

- 30-P2126PA100SH-L289F49Y

## flow 2 17 mm housing



## Schematic





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## Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
<b>Inverter Switch</b>				
Collector-emitter voltage	$V_{CES}$		1200	V
Collector current (DC current)	$I_C$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	105	A
Repetitive peak collector current	$I_{CRM}$	$t_p$ limited by $T_{jmax}$	300	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	269	W
Gate-emitter voltage	$V_{GES}$		$\pm 20$	V
Short circuit ratings	$t_{SC}$	$V_{GE} = 15\text{ V}$ , $V_{CC} = 800\text{ V}$ $T_j = 150\text{ °C}$	10	$\mu\text{s}$
Maximum junction temperature	$T_{jmax}$		175	$^{\circ}\text{C}$

## Inverter Diode

Peak repetitive reverse voltage	$V_{RRM}$		1200	V
Forward current (DC current)	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	77	A
Surge (non-repetitive) forward current	$I_{FSM}$	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	550	A
Surge current capability	$I^2t$		1513	$\text{A}^2\text{s}$
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	161	W
Maximum junction temperature	$T_{jmax}$		175	$^{\circ}\text{C}$

## Module Properties

### Thermal Properties

Storage temperature	$T_{stg}$		$-40\dots+125$	$^{\circ}\text{C}$
Operation temperature under switching condition	$T_{jop}$		$-40\dots+(T_{jmax} - 25)$	$^{\circ}\text{C}$

### Isolation Properties

Isolation voltage	$V_{isol}$	DC Test Voltage* $t_p = 2\text{ s}$	6000	V
Creepage distance			$>12,7$	mm
Clearance			$>12,7$	mm
Comparative Tracking Index	CTI		$\geq 200$	

\*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	

### Inverter Switch

#### Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0034	25	5,3	5,8	6,3	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		100	25 125 150	1,78	2,05 2,37 2,43	2,42 <sup>(1)</sup>	V
Collector-emitter cut-off current	$I_{CES}$		0	1200		25			2	µA
Gate-emitter leakage current	$I_{GES}$		20	0		25			240	nA
Internal gate resistance	$r_g$							2		Ω
Input capacitance	$C_{ies}$	$f = 1 \text{ Mhz}$	0	25		25		5540		pF
Reverse transfer capacitance	$C_{res}$							320		pF
Gate charge	$Q_g$		±15		0	25		760		nC

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						0,35		K/W
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#### Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 2 \Omega$ $R_{goff} = 2 \Omega$	±15	600	100	25 125 150		63,84 67,56 68,11		ns
Rise time	$t_r$					25 125 150		19,11 21,51 23,11		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		154,1 215,62 229,88		ns
Fall time	$t_f$					25 125 150		39,97 80,78 92,62		ns
Turn-on energy (per pulse)	$E_{on}$					25 125 150		3 4,46 5,23		mWs
Turn-off energy (per pulse)	$E_{off}$					25 125 150		4,37 7,04 7,98		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	

### Inverter Diode

#### Static

Forward voltage	$V_F$				100	25 125 150		2,3 2,38 2,31	2,52 <sup>(1)</sup> 2,47 <sup>(1)</sup>	V
Reverse leakage current	$I_R$	$V_r = 1200$ V				25 150		8800	120 17700	µA

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,59		K/W
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#### Dynamic

Peak recovery current	$I_{RM}$	$di/dt=5288$ A/µs $di/dt=4609$ A/µs $di/dt=4438$ A/µs	$\pm 15$	600	100	25 125 150		123,65 146,88 154,84		A
Reverse recovery time	$t_{rr}$					25 125 150		56,33 205,17 220,13		ns
Recovered charge	$Q_r$					25 125 150		3,77 8,88 10,46		µC
Reverse recovered energy	$E_{rec}$					25 125 150		1,26 3,47 4,06		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		6299,45 5200,7 4749,99		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	

### Thermistor

#### Static

Rated resistance	$R$					25		22		kΩ
Deviation of R100	$\Delta_{R/R}$	$R_{100} = 1484 \Omega$				100	-5		5	%
Power dissipation	$P$					25		130		mW
Power dissipation constant	$d$					25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. $\pm 1 \%$						3962		K
B-value	$B_{(25/100)}$	Tol. $\pm 1 \%$						4000		K
Vincotech Thermistor Reference									I	

<sup>(1)</sup> Value at chip level

<sup>(2)</sup> Only valid with pre-applied Vincotech thermal interface material.



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### Inverter Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

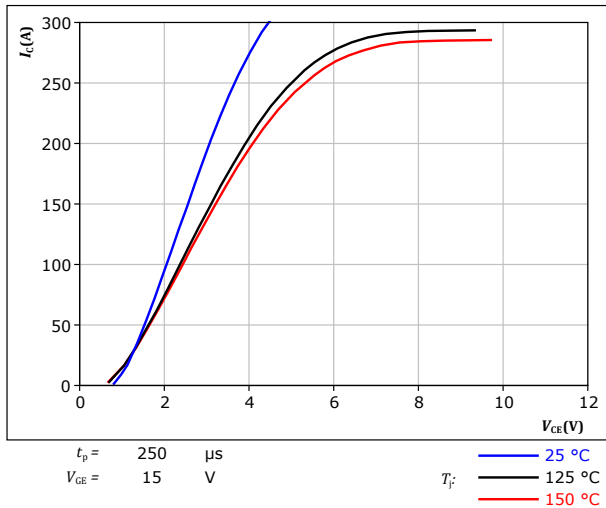


figure 2. IGBT

Typical output characteristics

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

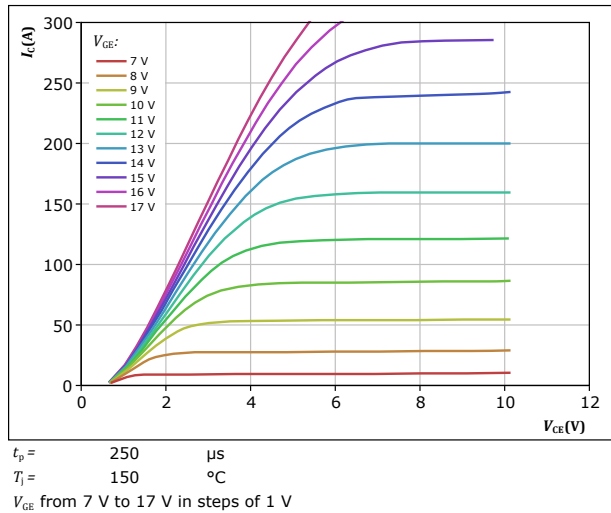


figure 3. IGBT

Typical transfer characteristics

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

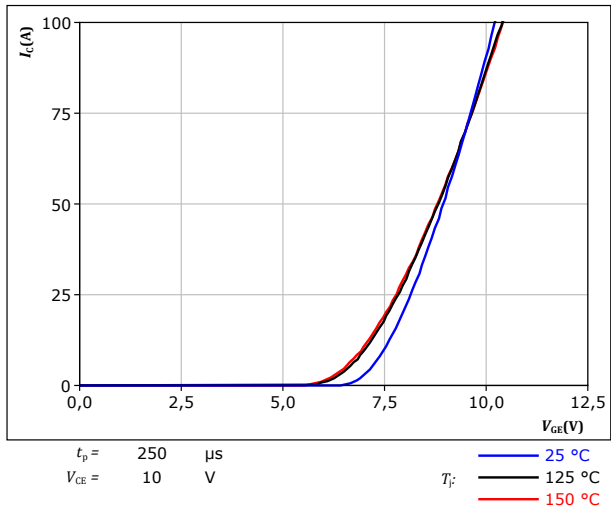
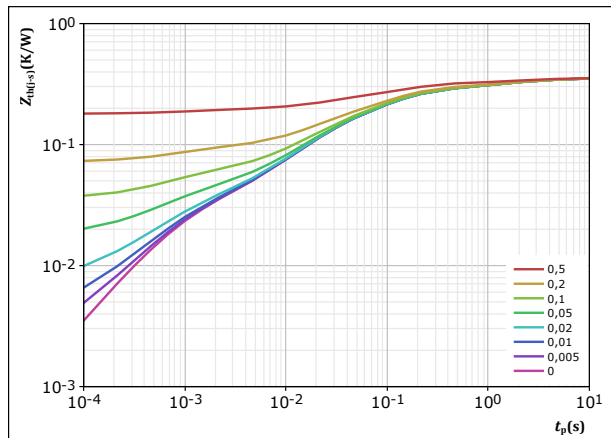


figure 4. IGBT

Transient thermal impedance as a function of pulse width

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



IGBT thermal model values	
$R$ (K/W)	$\tau$ (s)
2,42E-02	8,05E+00
6,10E-02	1,26E+00
1,61E-01	1,07E-01
8,86E-02	1,89E-02
2,38E-02	7,76E-04



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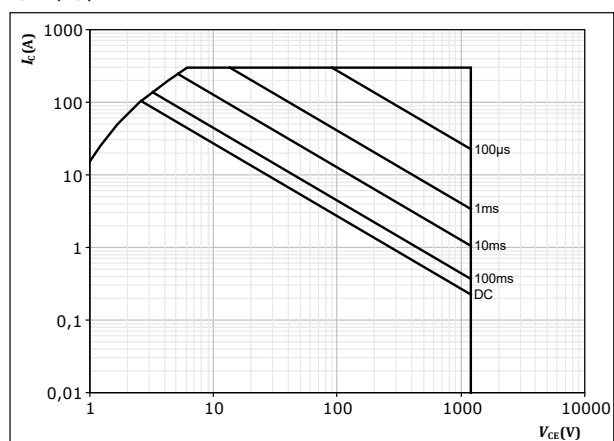
## Inverter Switch Characteristics

figure 5.

IGBT

Safe operating area

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



$D = \text{single pulse}$

$T_s = 80 \text{ } ^\circ\text{C}$   
 $V_{GE} = 15 \text{ V}$   
 $T_j = T_{jmax}$



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## Inverter Diode Characteristics

figure 6.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

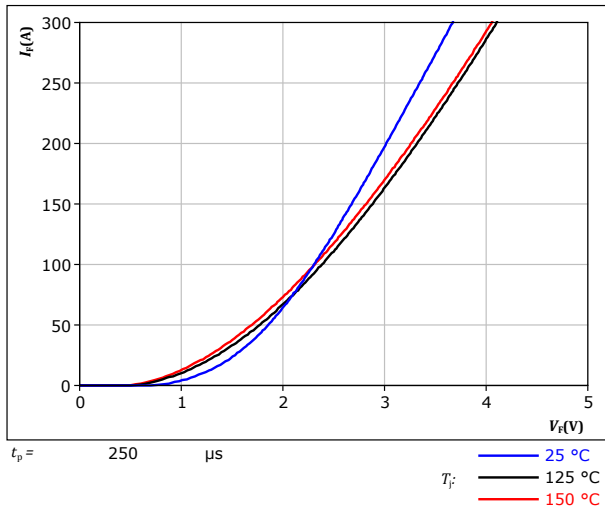
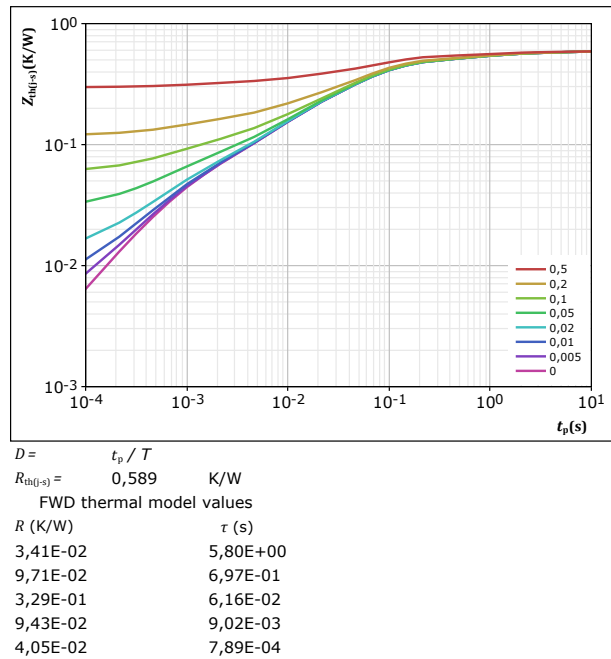


figure 7.

FWD

Transient thermal impedance as a function of pulse width

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





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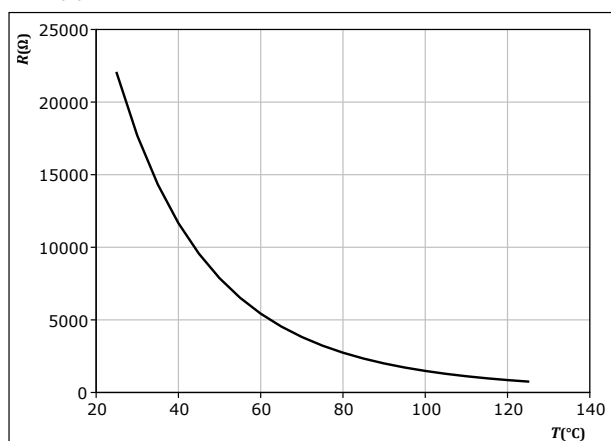
## Thermistor Characteristics

figure 8.

Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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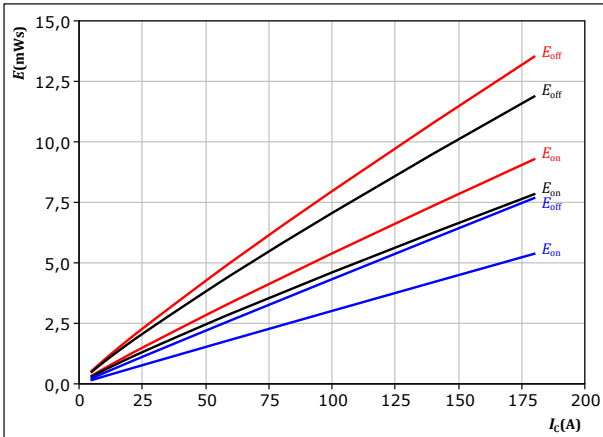
## Inverter Switching Characteristics

figure 9.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

$V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $R_{gon} = 2$   $\Omega$   
 $R_{goff} = 2$   $\Omega$

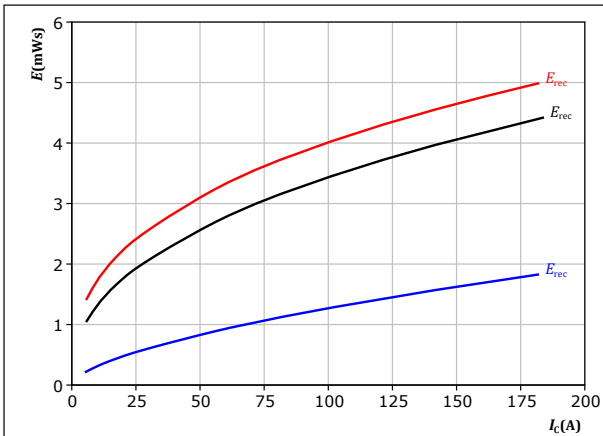
$T_j$ : 25 °C  
125 °C  
150 °C

figure 11.

FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

$V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $R_{gon} = 2$   $\Omega$

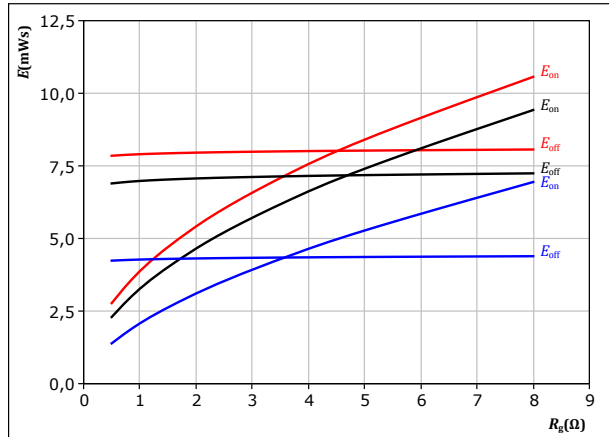
$T_j$ : 25 °C  
125 °C  
150 °C

figure 10.

IGBT

Typical switching energy losses as a function of IGBT turn on gate resistor

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $I_C = 100$  A

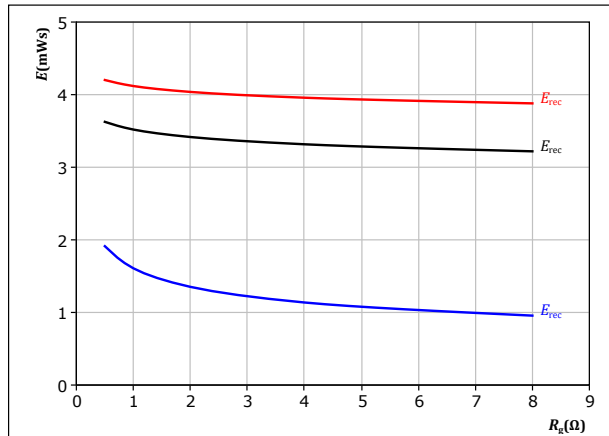
$T_j$ : 25 °C  
125 °C  
150 °C

figure 12.

FWD

Typical reverse recovered energy loss as a function of IGBT turn on gate resistor

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



With an inductive load at

$V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $I_C = 100$  A

$T_j$ : 25 °C  
125 °C  
150 °C



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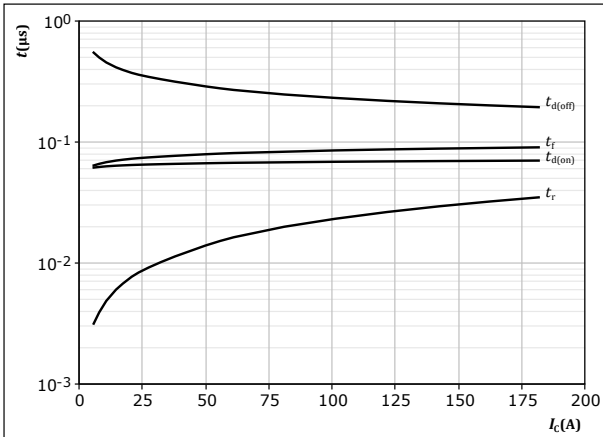
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datasheet

## Inverter Switching Characteristics

figure 13.

IGBT

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



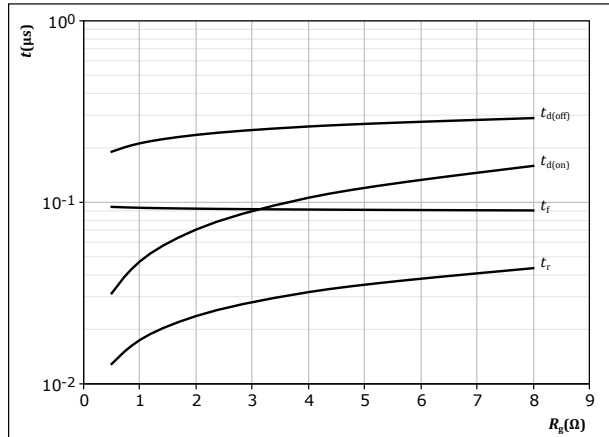
With an inductive load at

$T_j = 150$  °C  
 $V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $R_{gon} = 2$   $\Omega$   
 $R_{goff} = 2$   $\Omega$

figure 14.

IGBT

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



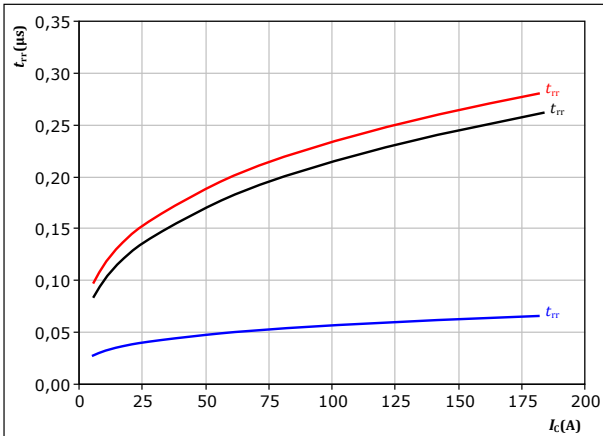
With an inductive load at

$T_j = 150$  °C  
 $V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $I_C = 100$  A

figure 15.

FWD

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



With an inductive load at

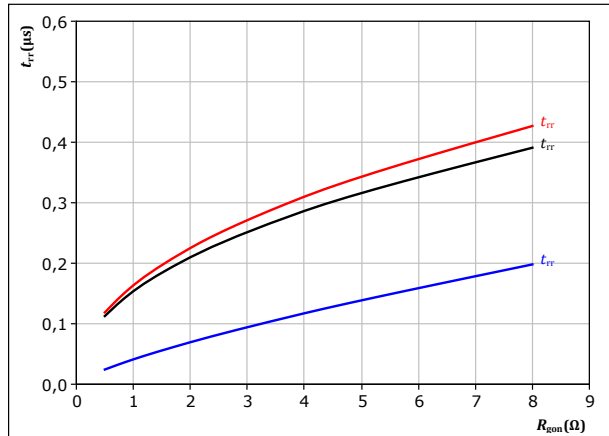
$V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $R_{gon} = 2$   $\Omega$

$T_j$ : 25 °C  
125 °C  
150 °C

figure 16.

FWD

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



With an inductive load at

$V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $I_C = 100$  A

$T_j$ : 25 °C  
125 °C  
150 °C



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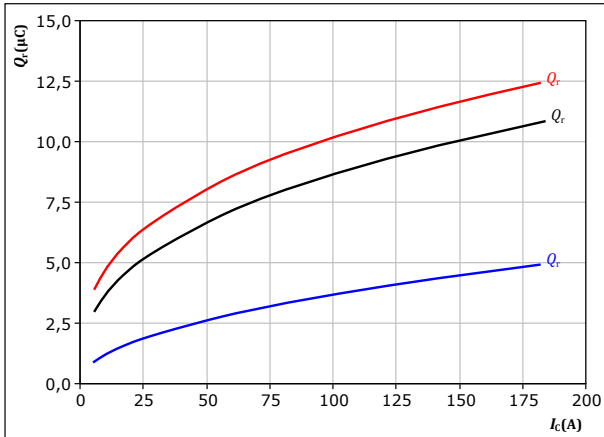
## Inverter Switching Characteristics

figure 17.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

$V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $R_{gon} = 2$  Ω

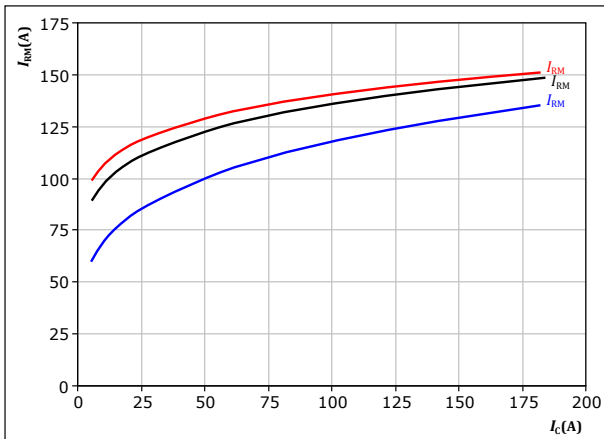
$T_j$ : 25 °C  
125 °C  
150 °C

figure 19.

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  
 $V_{GE} = \pm 15$  V  
 $R_{gon} = 2$  Ω

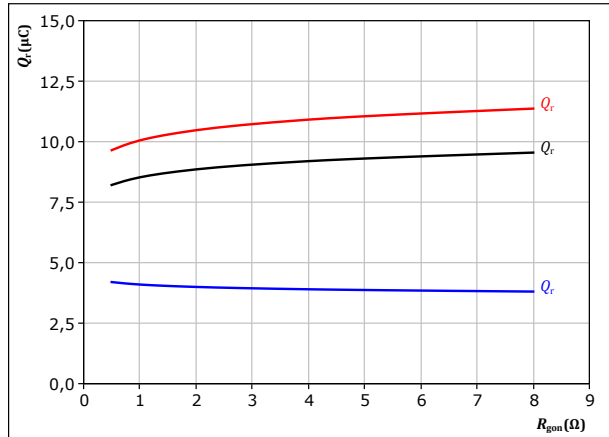
$T_j$ : 25 °C  
125 °C  
150 °C

figure 18.

FWD

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

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



With an inductive load at

$V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $I_c = 100$  A

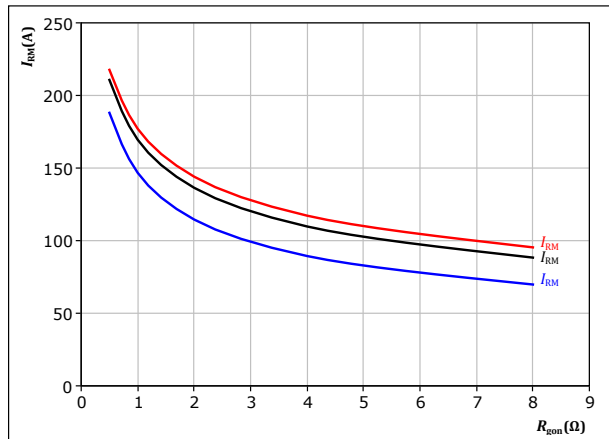
$T_j$ : 25 °C  
125 °C  
150 °C

figure 20.

FWD

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

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



With an inductive load at

$V_{CE} = 600$  V  
 $V_{GE} = \pm 15$  V  
 $I_c = 100$  A

$T_j$ : 25 °C  
125 °C  
150 °C



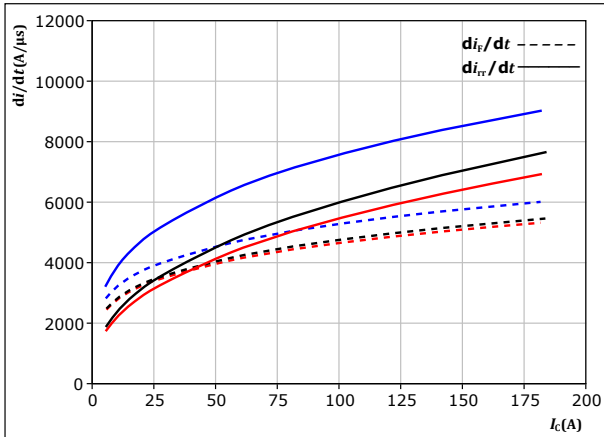
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## Inverter Switching Characteristics

figure 21. FWD

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

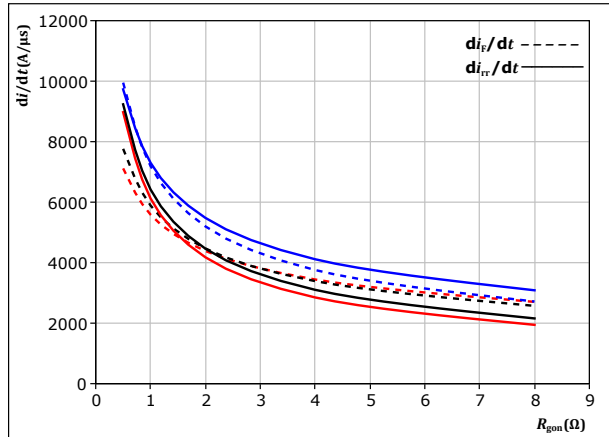


With an inductive load at

$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $R_{gon} = 2 \text{ } \Omega$   
 $T_j: 25 \text{ } ^\circ\text{C}$   
 $125 \text{ } ^\circ\text{C}$   
 $150 \text{ } ^\circ\text{C}$

figure 22. FWD

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



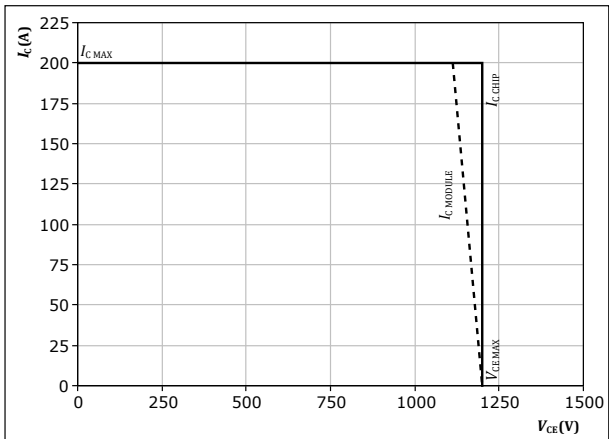
With an inductive load at

$V_{CE} = 600 \text{ V}$   
 $V_{GE} = \pm 15 \text{ V}$   
 $I_C = 100 \text{ A}$   
 $T_j: 25 \text{ } ^\circ\text{C}$   
 $125 \text{ } ^\circ\text{C}$   
 $150 \text{ } ^\circ\text{C}$

figure 23. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At  $T_j = 150 \text{ } ^\circ\text{C}$   
 $R_{gon} = 2 \text{ } \Omega$   
 $R_{goff} = 2 \text{ } \Omega$



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## Inverter Switching Definitions

figure 24. IGBT

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

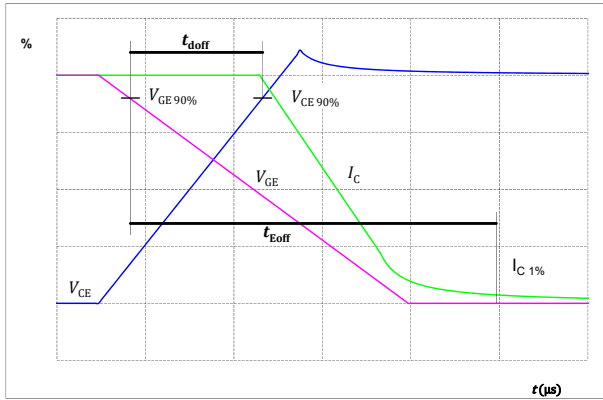


figure 25. IGBT

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

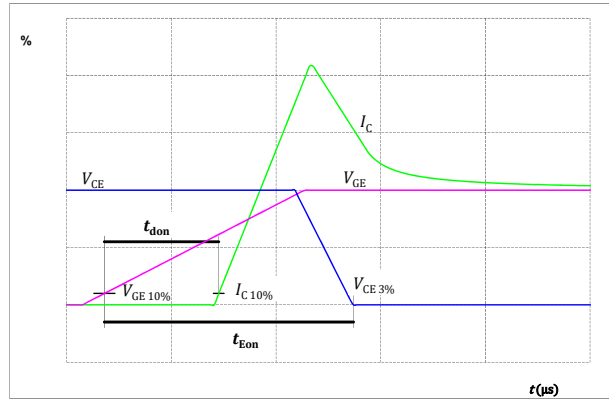


figure 26. IGBT

Turn-off Switching Waveforms & definition of  $t_f$

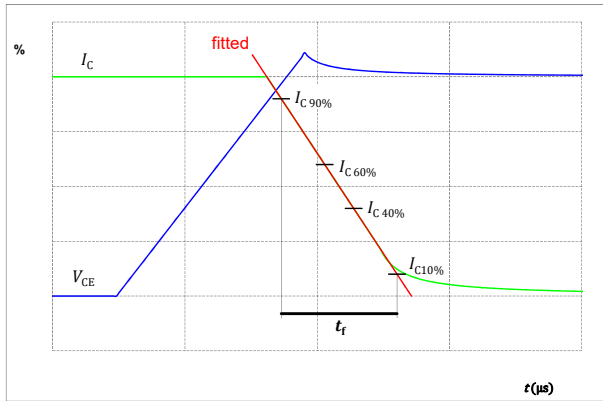
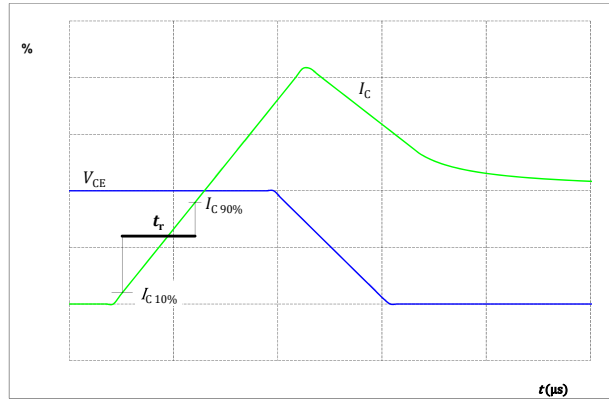


figure 27. IGBT

Turn-on Switching Waveforms & definition of  $t_r$





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## Inverter Switching Definitions

figure 28.

FWD

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

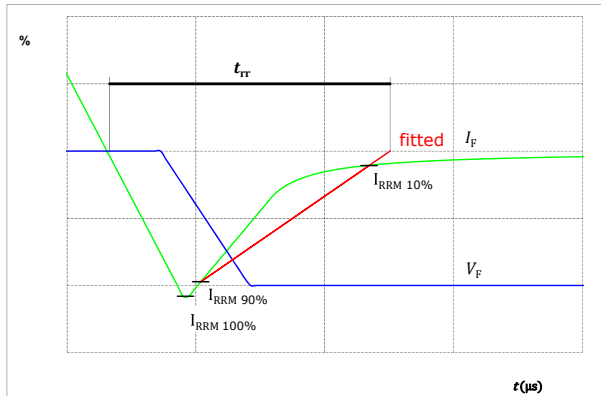
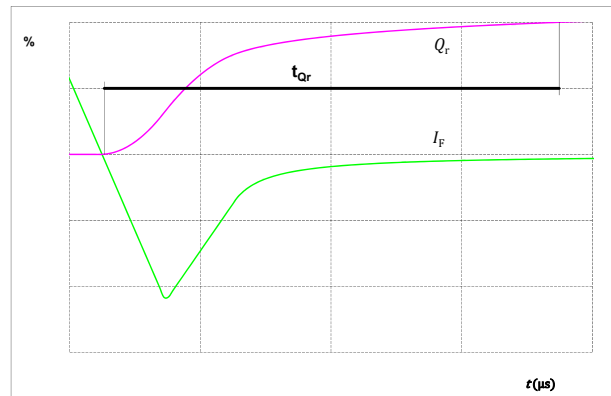


figure 29.

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
Without thermal paste	30-P2126PA100SH-L289F49Y
With thermal paste (3,4 W/mK, PSX-P7)	30-P2126PA100SH-L289F49Y-/3/

Marking						
	Text	Name	Date code	UL & VIN	Lot	Serial
		NN-NNNNNNNNNNNNNNNN- TTTTIVV	WWYY	UL VIN	LLLL	SSSS
	Datamatrix	Type&Ver	Lot number	Serial	Date code	
		TTTTTIVV	LLLL	SSSS	WWYY	

Outline							
Pin table [mm]							
Pin	X	Y	Function	26	54,5	5,4	DC-3
1	0,9	0	S11	27	57,2	0	DC-3
2	0,9	3	G11	28	65,8	0	DC+3
3	3,9	0	DC-1	29	65,8	2,7	DC+3
4	3,9	2,7	DC-1	30	68,5	0	DC+3
5	3,9	5,4	DC-1	31	68,5	2,7	DC+3
6	6,6	0	DC-1	32	64,7	36	G16
7	15,2	0	DC+1	33	61,7	36	S16
8	15,2	2,7	DC+1	34	58,7	36	PH3
9	17,9	0	DC+1	35	56	36	PH3
10	17,9	2,7	DC+1	36	53,3	36	PH3
11	26,2	0	S13	37	50,6	36	PH3
12	26,2	3	G13	38	39,4	36	G14
13	29,2	0	DC-2	39	36,4	36	S14
14	29,2	2,7	DC-2	40	33,4	36	PH2
15	29,2	5,4	DC-2	41	30,7	36	PH2
16	31,9	0	DC-2	42	28	36	PH2
17	32,2	4,05	NTC	43	25,3	36	PH2
18	40,5	0	DC+2	44	14,1	36	G12
19	40,5	2,7	DC+2	45	11,1	36	S12
20	43,2	0	DC+2	46	8,1	36	PH1
21	43,2	2,7	DC+2	47	5,4	36	PH1
22	51,5	0	S15	48	2,7	36	PH1
23	51,5	3	G15	49	0	36	PH1
24	54,5	0	DC-3				
25	54,5	2,7	DC-3				

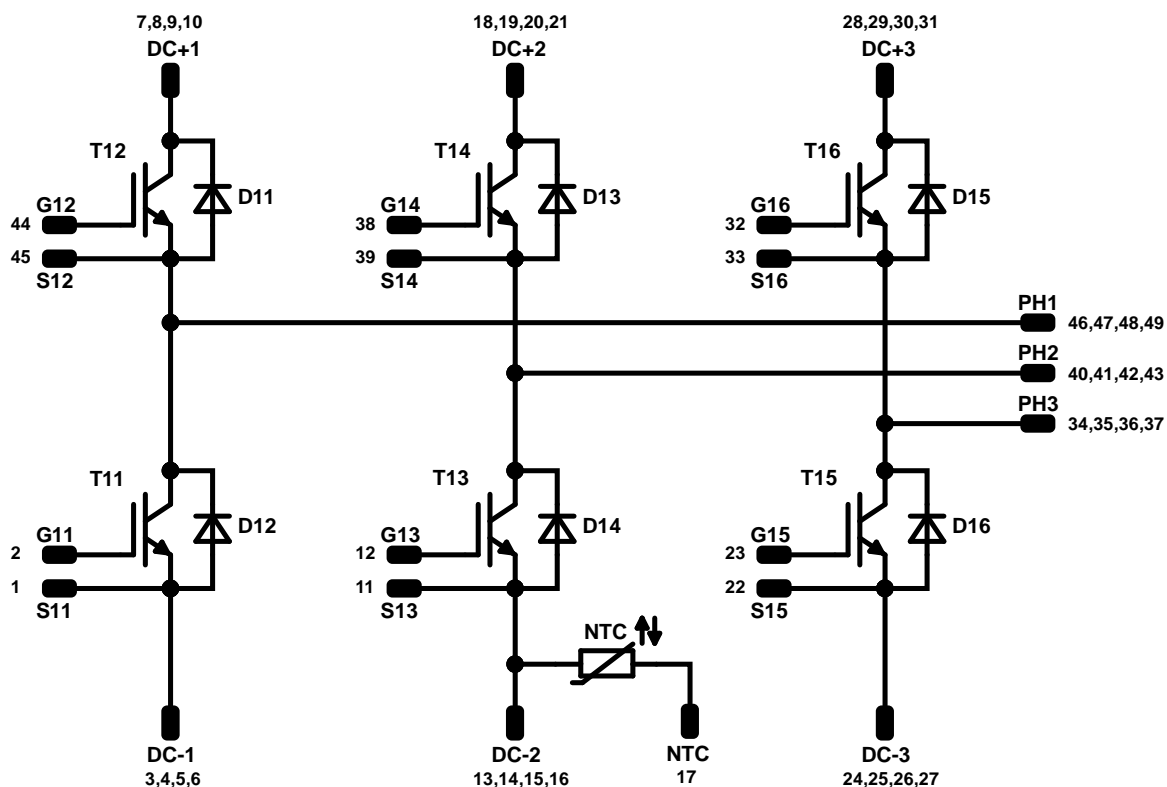


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datasheet

## Pinout




## Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	IGBT	1200 V	100 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	1200 V	100 A	Inverter Diode	
Rt	Thermistor			Thermistor	



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datasheet

Packaging instruction				
Standard packaging quantity (SPQ) 36	>SPQ	Standard	<SPQ	Sample
Handling instruction				
Handling instructions for <i>flow 2</i> packages see vincotech.com website.				
Package data				
Package data for <i>flow 2</i> 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 UL 1557 recognized under E192116 up to a junction temperature under switching condition $T_{j,sp}=175^{\circ}\text{C}$ and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website.				

Document No.:	Date:	Modification:	Pages
30-P2126PA100SH-L289F49Y-D1-14	21 Jan. 2026	Initial Release	

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