

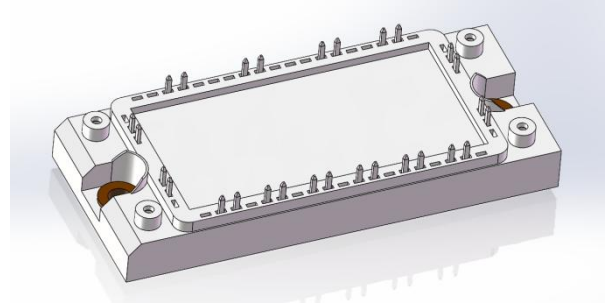
JLFF50B120RN2E7SN

LN2 PACK module with NCE Gen.7 Trench/Fieldstop IGBT and Emitter Controlled diode and NTC



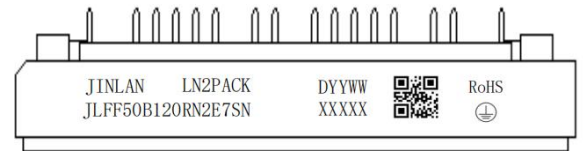
Features

- Low $V_{CE(sat)}$ Trench IGBT technology
- 10 μ s short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Overload operation up to 175 $^{\circ}$ C
- Low inductance case
- Copper Base Plate
- Integrated NTC temperature sensor



LN2 Pack

MARKING DIAGRAM



Typical Applications

- Motor Drives
- Inverter
- UPS

JINLAN

= Company Name

JLFF50B120RN2E7SN

= Specific Device Code

DYYWW

= Year and Work Week Code

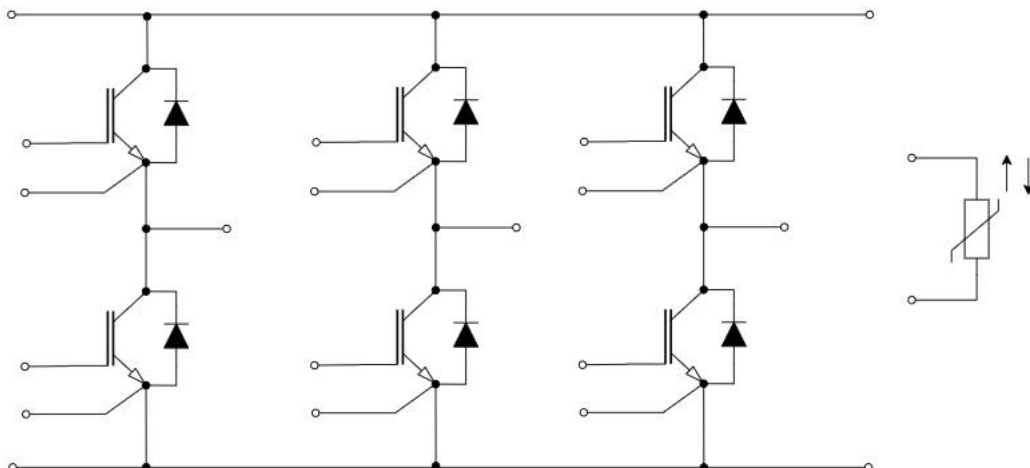
XXXXX

= Serial Number

QR code

= Custom Assembly

Description





Package Insulation coordination

Parameter	Symbol	Note or test condition	Values	Unit
Isolation test voltage	V_{ISOL}	RMS, f=50Hz, t=60s	2.5	kV
Internal isolation		basic insulation(class 1, IEC 61140)	Al_2O_3	
Creepage distance	d_{creep}	terminal to heatsink	10.0	mm
Clearance	d_{clear}	terminal to heatsink	7.5	mm
Comparative tracking index (electrical)	CTI		>200	
RTI Elec.	RTI	housing	140	°C

Package Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Stray Inductance	LCE		--	19	--	nH
Module Lead Resistance, Terminal to Chip	$R_{CC'+EE'}$	$T_c=25^{\circ}C$, per switch	--	1.80	--	mΩ
Storage Temperature Range	T_{STG}		-40		125	°C
Mounting Torque, Screw M5	M	M5, Screw	3		6	N.m
Weight	G		--	180	--	g



IGBT, Inverter

Absolute Maximum Ratings (T_C = 25°C unless otherwise noted)

Symbol	Description	Value	Unit
V _{CES}	Collector-Emitter Voltage	1200	V
V _{GES}	Gate-Emitter Voltage	±30	V
I _C	Collector Current @ T _C =25°C	100	A
	Collector Current @ T _C =80°C	50	A
I _{CM}	Pulsed Collector Current, t _p =1S	150	A
P _{tot}	Total power dissipation, T _C = 25°C, T _{vj max} = 150°C	256.7	W

Characteristics (T_C = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition		Min	Typ	Max	Unit
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C =50A, V _{GE} =15V	T _{vj} =25°C	--	1.40	2.25	V
			T _{vj} = 150°C	--	1.60	--	
V _{GE(th)}	Gate Threshold Voltage	I _C =1mA,V _{CE} =V _{GE}		5.0	--	7.0	V
I _{CES}	Collector-Emitter Leakage Current	V _{GE} =0V,V _{CE} =1200V		--	--	1	mA
I _{GES}	Gate-Emitter Leakage Current	V _{GE} =30V,V _{CE} =0V		--	--	100	nA
R _{Gint}	Internal Gate Resistance	f=1MHz		--	1.41	--	Ω
C _{ies}	Input Capacitance	V _{CE} =25V,V _{GE} =0V, f=1MHz		--	7.41	--	nF
C _{oes}	Out Capacitance			--	0.284	--	nF
C _{res}	Reverse Transfer			--	0.048	--	nF
Q _G	Gate Charge	V _{GE} = ± 15 V		--	0.237	--	μC
t _{d(on)}	Turn-On Delay Time	T _J = 25°C V _{CE} =600V, I _C =50A V _{GE} = ± 15V, R _{Gon} =15Ω, R _{Goff} =15Ω Inductive Load		--	0.07	--	μs
t _r	Rise Time			--	0.04	--	
t _{d(off)}	Turn-off Delay Time			--	0.38	--	
t _f	Fall Time			--	0.12	--	
E _{on}	Turn-On Switching Loss per Pulse			--	5.86	--	mJ
E _{off}	Turn Off Switching Loss per Pulse			--	1.86	--	
t _{d(on)}	Turn-On Delay Time	T _J = 150°C V _{CE} =600V, I _C =50A V _{GE} = ± 15V, R _{Gon} =15Ω, R _{Goff} =15Ω Inductive Load		--	0.10	--	μs
t _r	Rise Time			--	0.05	--	
t _{d(off)}	Turn-off Delay Time			--	0.39	--	
t _f	Fall Time			--	0.19	--	
E _{on}	Turn-on Switching Loss per Pulse			--	10.26	--	mJ
E _{off}	Turn Off Switching Loss per Pulse			--	4.66	--	
I _{SC}	SC Data	V _{GE} =15V,V _{CC} ≤800V, t _{SC} ≤10us,T _J ≤150°C		--	230	--	A
R _{thJC}	Thermal resistance	Junction-to-Case (per IGBT)		--	0.434	--	K/W
T _{vj op}		Temperature under switching conditions		-40		175 ¹⁾	°C

¹⁾T_{vj op} > 150°C is only allowed for operation at overload conditions.



Diode, Inverter

Absolute Maximum Ratings (T_C = 25°C unless otherwise noted)

Symbol	Description	Value	Unit
V _{RRM}	Repetitive Peak Reverse Voltage	1200	V
I _F	Diode Continuous Forward Current	50	A
I _{FM}	Diode Maximum Forward Current t _p =1ms	150	A

Characteristics (T_C=25°C unless otherwise noted)

Symbol	Parameter	Note or Test Condition	Min	Typ	Max	Unit
V _F	Diode Forward Voltage	I _F = 50A, V _{GE} = 0 V				
		T _J = 25°C	--	1.50	2.30	V
		T _J = 150°C	--	1.40	--	
Q _{rr}	Reverse Recovery Charge	T _J = 25°C V _{CE} = 600V, I _C = 50A V _{GE} = ±15V, R _{Gon} = 15Ω, R _{Goff} = 15Ω Inductive Load	--	9.37	--	μC
I _{RRM}	Peak Reverse Recovery Current		--	35.11	--	A
E _{REC}	Reverse Recovery Energy		--	3.35	--	mJ
Q _{rr}	Reverse Recovery Charge	T _J = 150°C V _{CE} = 600V, I _C = 50A V _{GE} = ±15V, R _{Gon} = 15Ω, R _{Goff} = 15Ω Inductive Load	--	21.32	--	μC
I _{RRM}	Peak Reverse Recovery Current		--	36.15	--	A
E _{REC}	Reverse Recovery Energy		--	7.63	--	mJ
R _{thJC}	Thermal Resistance – Chip-to-Case		--	0.726	--	K/W
T _{vj op}		Temperature under switching conditions	-40		175 ²⁾	°C

²⁾T_{vj op} > 150°C is only allowed for operation at overload conditions.

NTC Characteristics (T_C = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
R ₂₅	Rated Resistance		--	5.0	--	kΩ
ΔR/R	Deviation of R100	T _C =100 °C, R ₁₀₀ =493.3Ω	-5	--	5	%
P ₂₅	Power Dissipation		--	--	20.0	mW
B _{25/50}	B-value	R ₂ =R ₂₅ exp[B _{25/50} (1/T ₂ - 1/(298.15K))]	--	3375	--	K
B _{25/80}	B-value	R ₂ =R ₂₅ exp[B _{25/80} (1/T ₂ - 1/(298.15K))]	--	3411	--	K
B _{25/100}	B-value	R ₂ =R ₂₅ exp[B _{25/100} (1/T ₂ - 1/(298.15K))]	--	3433	--	K

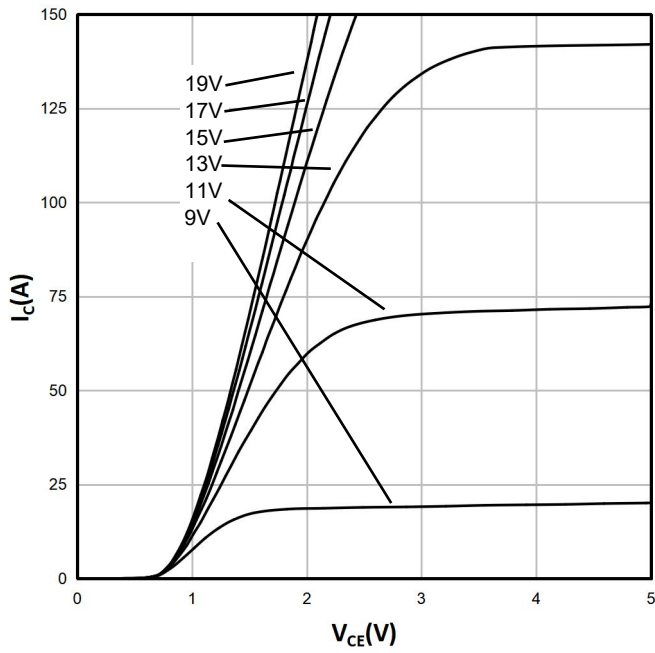
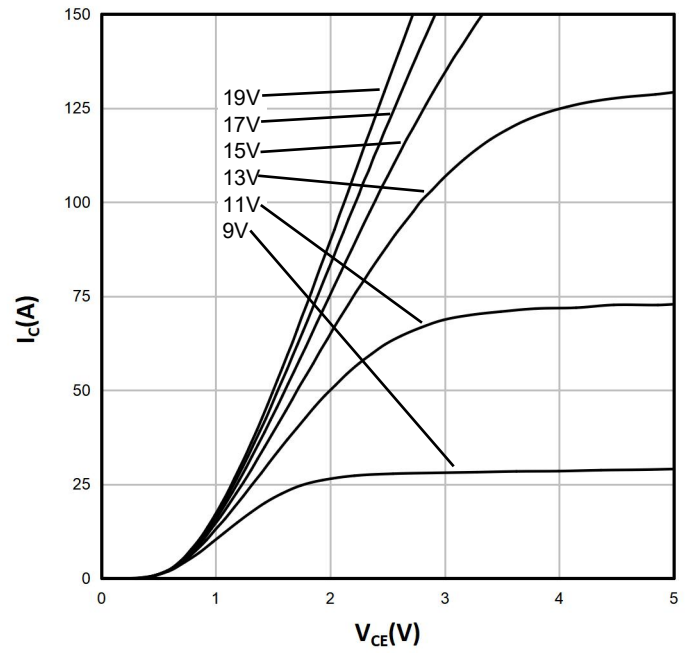
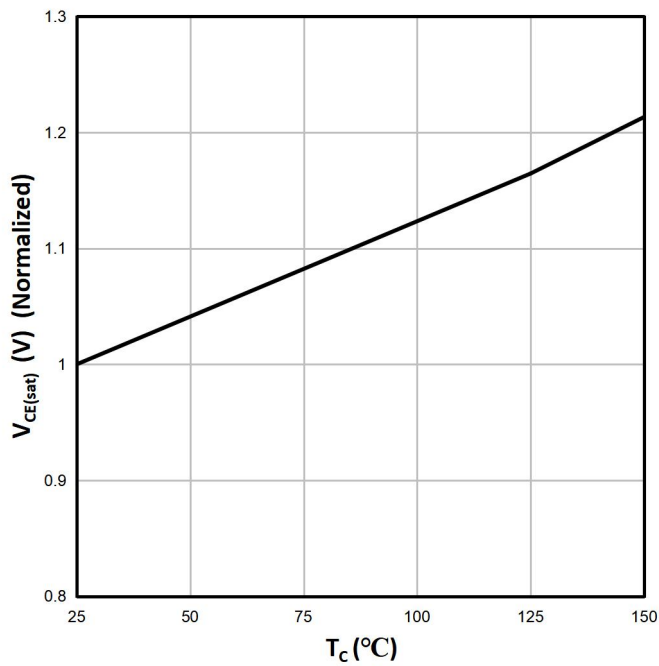
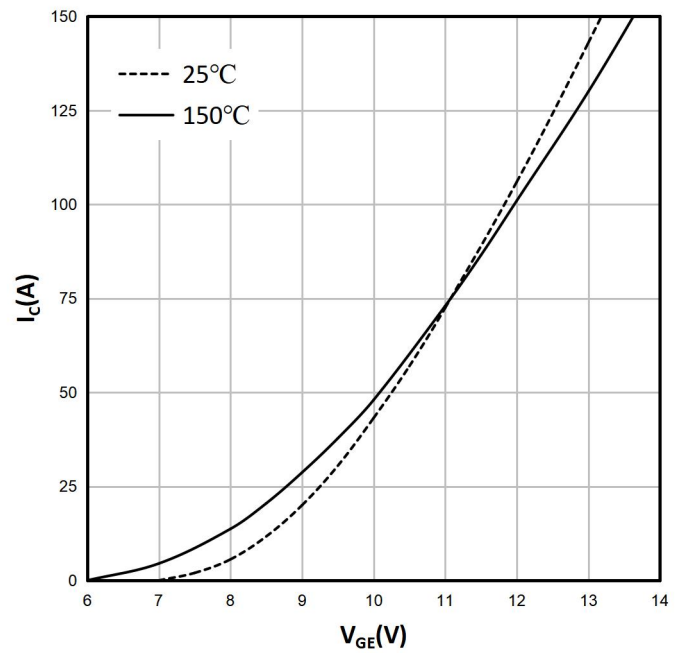
Figure1.output characteristic IGBT(typical)
 $T_{vj}=25^{\circ}\text{C}$

Figure2.output characteristic IGBT(typical)
 $T_{vj}=150^{\circ}\text{C}$

Figure3. $V_{CE(sat)}$ vs. Temperature

Figure4.transfer characteristic IGBT(typical)
 $V_{CE}=20\text{V}$


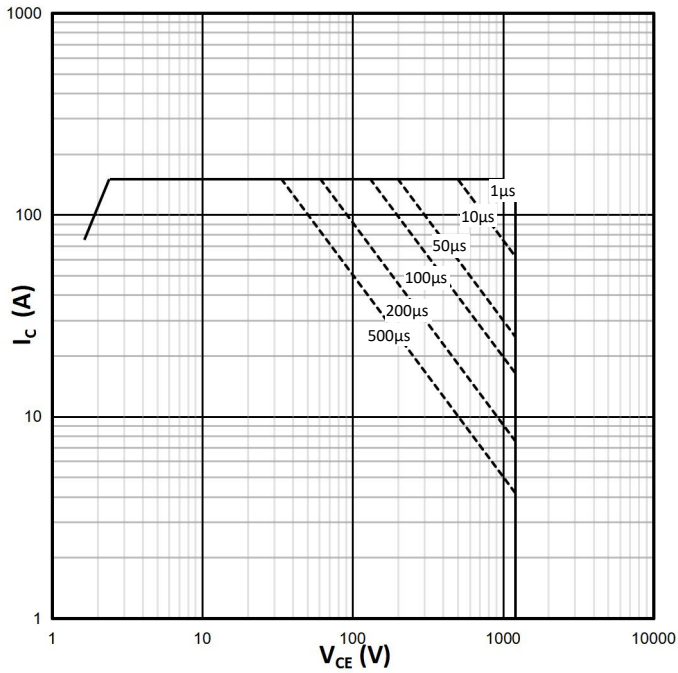
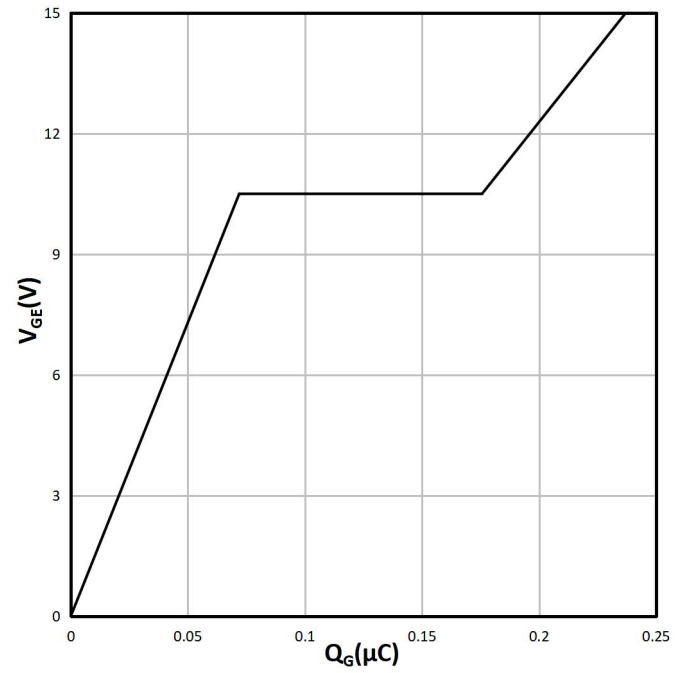
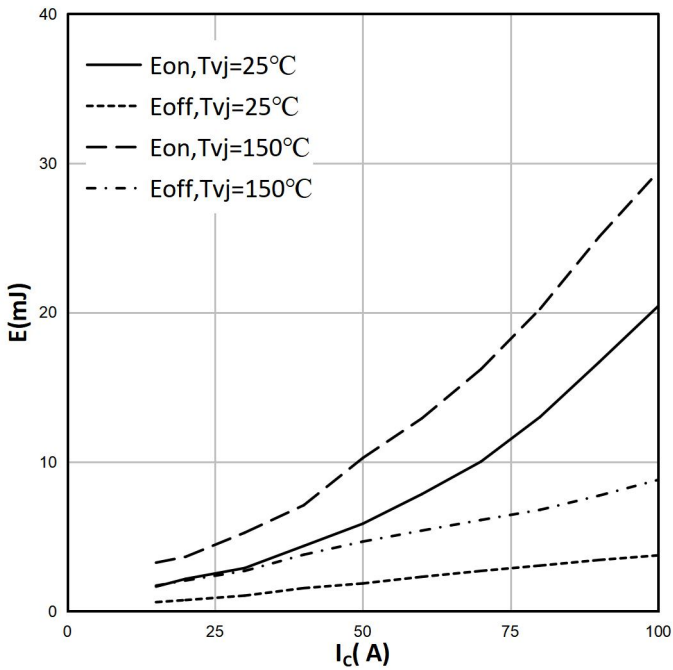
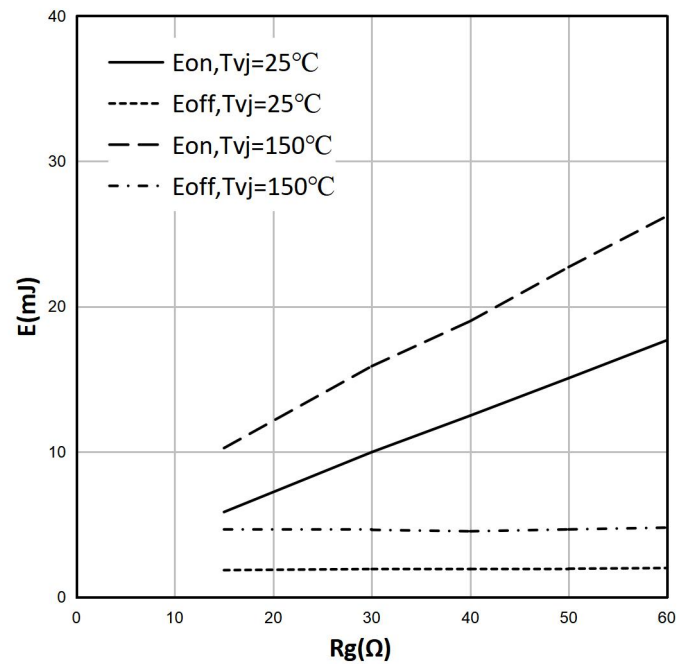
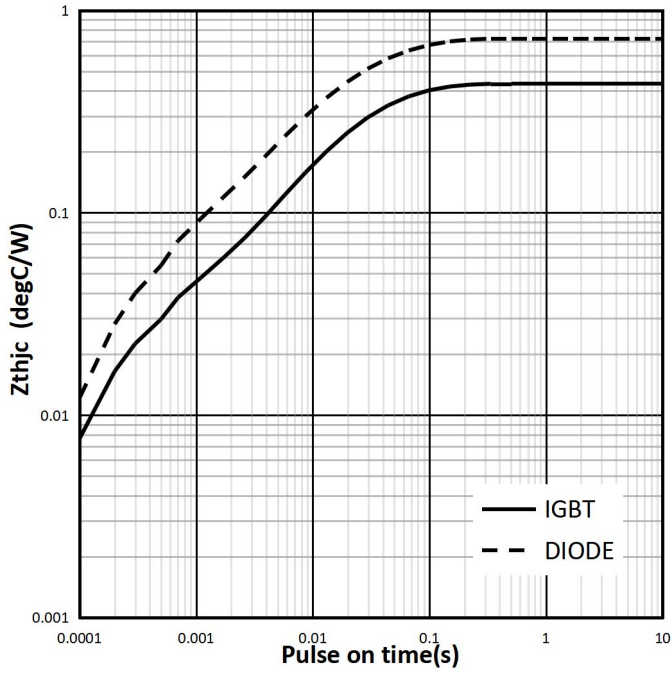
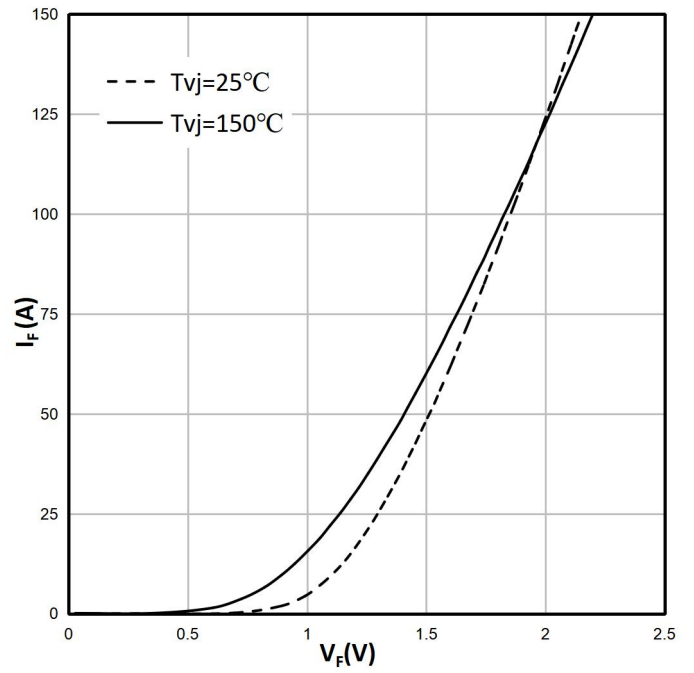
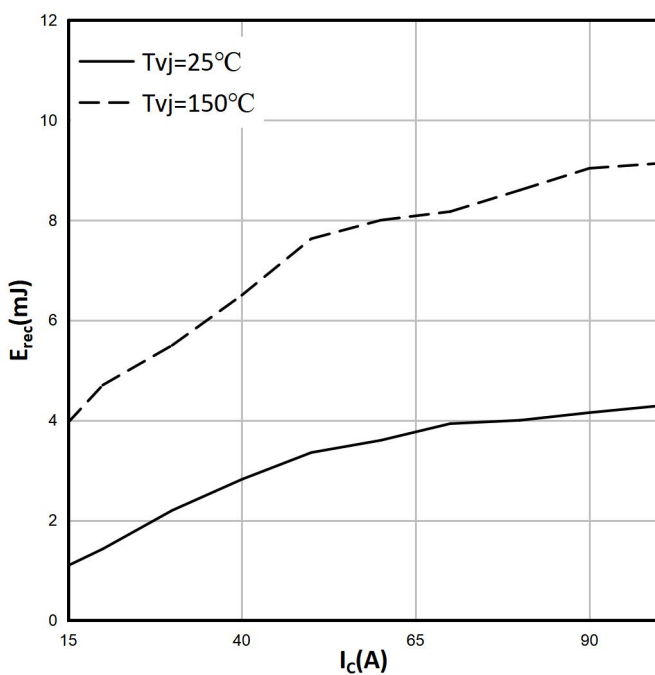
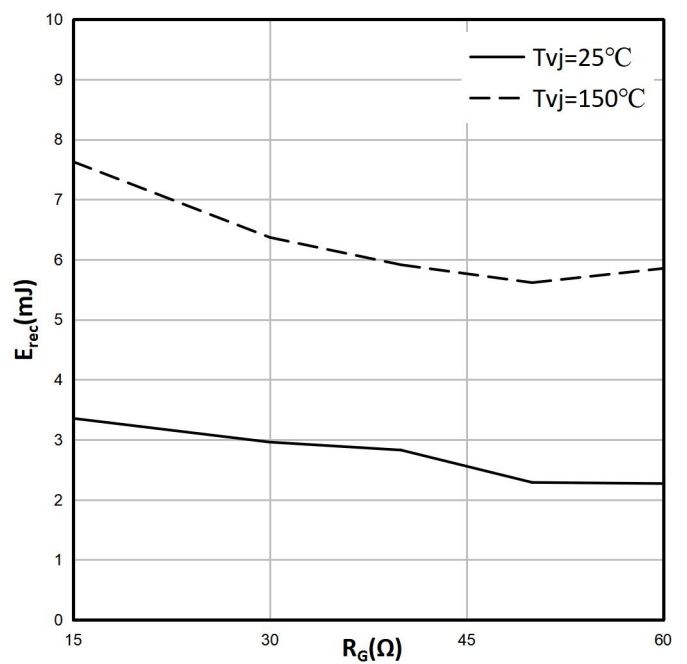
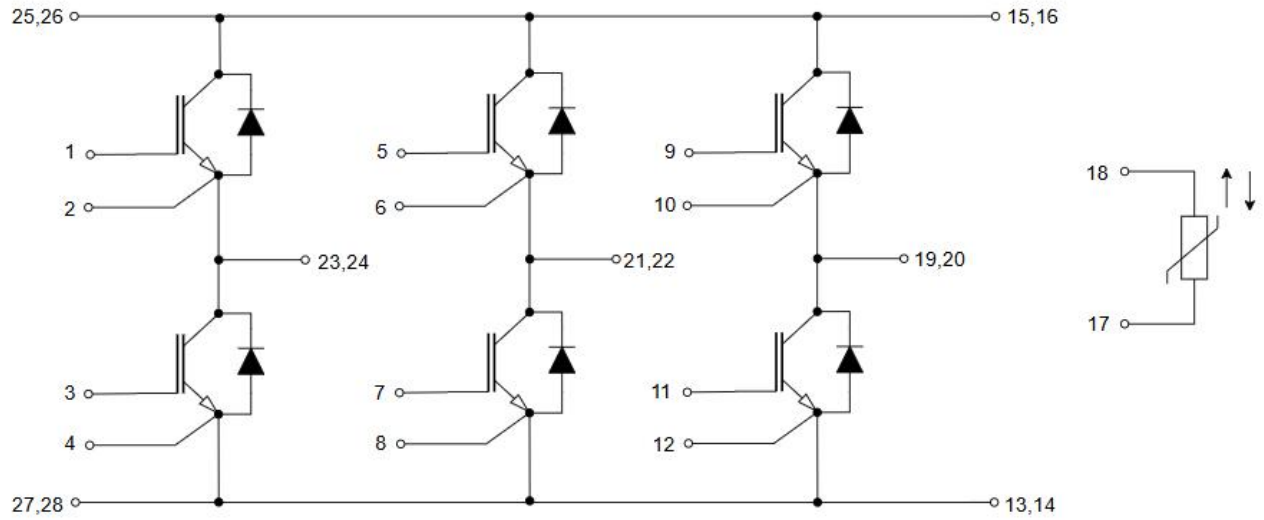
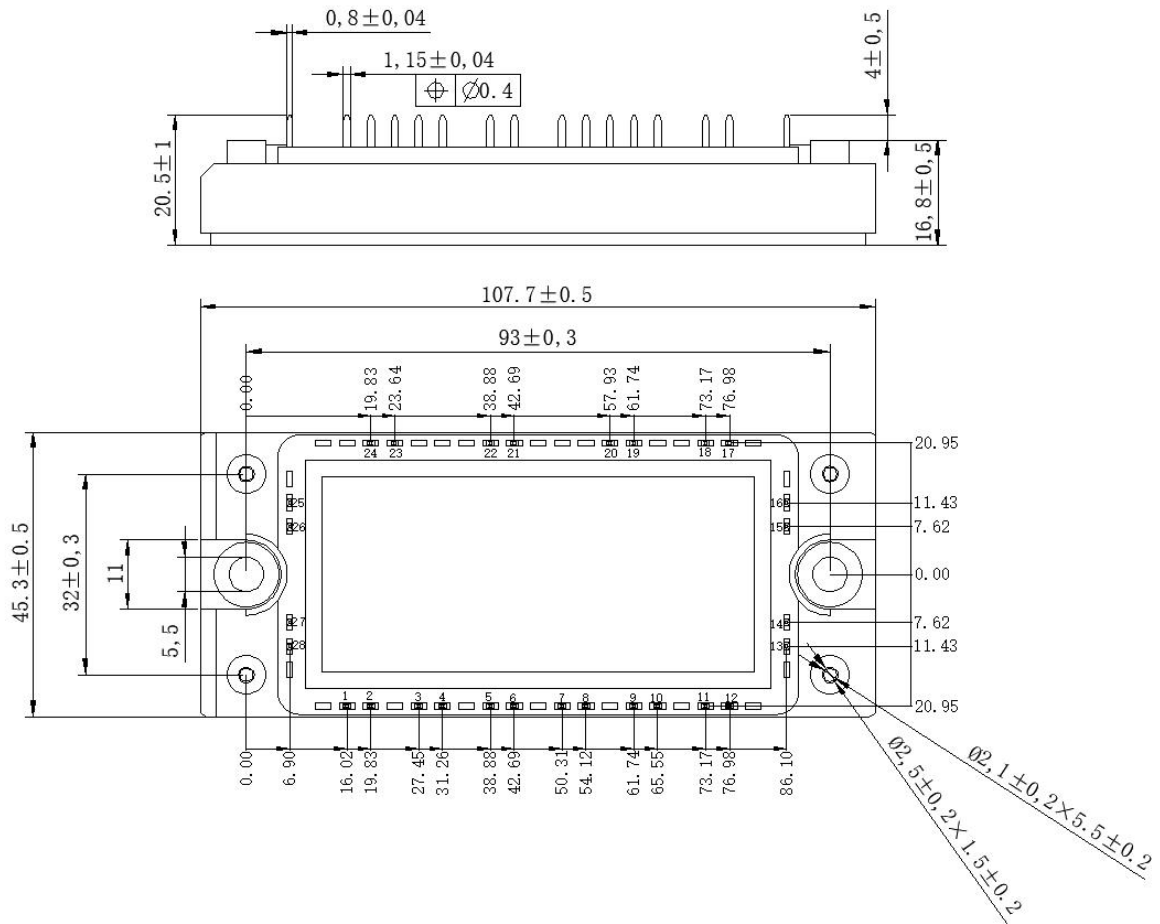
Figure5. FBSOA IGBT(typical)
 $D=0$, $T_c=25^{\circ}\text{C}$, $T_j\leq 175^{\circ}\text{C}$, $V_{ge}=15\text{V}$

Figure6. Gate Charge Waveform
 $V_{cc}=600\text{V}$, $I_c=75\text{A}$, $V_{ge}=15\text{V}$

Figure7. switching losses IGBT(typical)
 $V_{cc}=600\text{V}$, $R_{Gon}=15\Omega$, $R_{Goff}=15\Omega$, $V_{ge}=\pm 15\text{V}$

Figure 8. switching losses IGBT, Inverter (typical)
 $V_{cc}=600\text{V}$, $I_c=50\text{A}$, $V_{ge}=\pm 15\text{V}$


Figure9. transient thermal impedance

Figure10. forward characteristic of Diode(typical)
 $V_{GE}=0V$

Figure11.Reverse Recovery Energy Loss vs. IC
 $V_{cc}=600V, R_{Gon}=15\Omega, R_{Goff}=15\Omega, V_{ge}=\pm 15V$

Figure12.Reverse Recovery Energy Loss vs.RG (Diode)
 $V_{cc}=600V, I_c=50A, V_{ge}=\pm 15V$


CIRCUIT DIAGRAM



PACKAGE DIMENSION





REVISION HISTORY

Document version	Date of release	Description of changes
Rev.00	2025-05-06	Preview



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