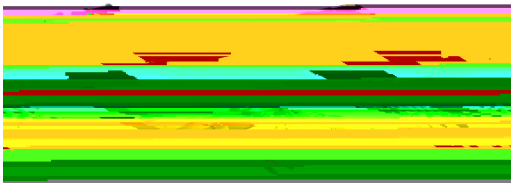
Automotive 750 V, 600 A Dual Side Cooling Half-Bridge Power Module

VE-Trac™ Dual Gen II NVG600A75L4DSC2



AHPM15−CEA
CASE MODHS

Product Description

The NVG600A75L4DSC2 is part of a family of power modules with dual side cooling and compact footprints for Hybrid (HEV) and Electric Vehicle (EV) traction inverter application.

The module consists of two narrow mesa Field Stop (FS4) IGBTs in a half−bridge configuration. The chipset utilizes the new narrow mesa IGBT technology in providing high current density and robust short circuit protection with higher blocking voltage to deliver outstanding performance in EV traction applications.

Liquid cooling heatsink reference design, loss models and CAD models are available to support customers in inverter designs.

Features

- Dual−Side Cooling
- Integrated Chip Level Temperature and Current Sensor
- $T_{vj\ max}$ = 175°C for Continuous Operation
- Low−Stray Inductance
- Low Conduction and Switching Losses
- Automotive Grade
- 4.2 kV Isolated DBC Substrate
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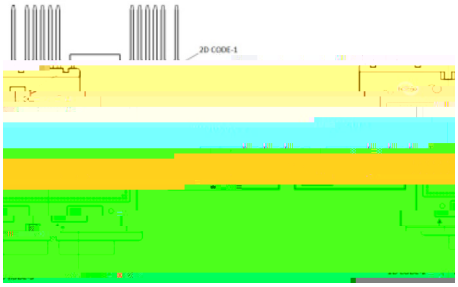
High Power DC−DC Boost Converter

MARKING DIAGRAM



ZZZ = Assembly Lot Code
AT = Assembly & Test Location
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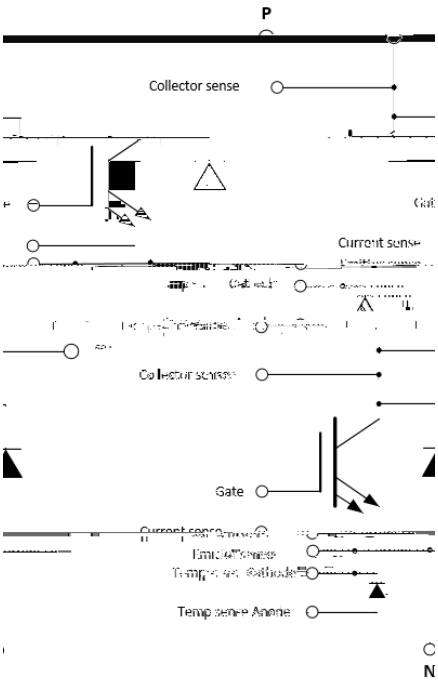
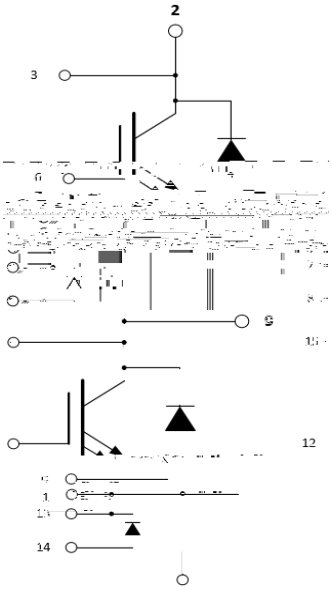


ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

PIN DESCRIPTION

Pin #	Pin	Pin Function Description	Pin Arrangement
1	N	Low Side Emitter	
2	P	High Side Collector	
3	H/S COLLECTOR SENSE	High Side Collector Sense	
4	H/S CURRENT SENSE	High Side Current Sense	
5	H/S EMITTER SENSE	High Side Emitter Sense	
6	H/S GATE	High Side Gate	
7	H/S TEMP SENSE (CATHODE)		

ABSOLUTE MAXIMUM RATINGS (T_{VJ} = 25°C, unless otherwise specified)

Symbol	Parameter	Rating	Unit
IGBT			
V_{CES}	Collector to Emitter Voltage	750	V
V_{GES}	Gate to Emitter Voltage	±20	V
I_{CN}	Implemented Collector Current	600	A
$I_{C\ nom}$	Continuous DC Collector Current, Tvjmax = 175°C, T_F = 65°C, Ref. Heatsink	500	A
I_{CRM}	Pulsed Collector Current @ VGE = 15 V, tp = 1 ms	1200	A
DIODE			
V_{RRM}	Repetitive Peak Reverse Voltage	750	V
I_{FN}	Implemented Forward Current	600	A
I_F	Continuous Forward Current, Tvjmax = 175°C, T_F = 65°C, Ref. Heatsink	400	A
I_{FRM}	Repetitive Peak Forward Current, t_p = 1 ms	1200	A

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CHARACTERISTICS OF INVERSE DIODE (Tvj = 25°C, unless otherwise specified)

Parameters		Conditions		Min	Typ	Max	unit
V_F	Diode Forward Voltage	V_{GE} = 0 V, I_C = 400 A,	T_{vj} = 25°C	−	1.34	1.47	V
			T_{vj} = 150°C	−	1.30	−	
			T_{vj} = 175°C	−	1.29	−	
		V_{GE} = 0 V, I_C = 600 A,	T_{vj} = 25°C	−	1.48		
			T_{vj} = 150°C	−	1.47	−	
			T_{vj} = 175°C	−	1.46	−	
E_{rr}	Reverse Recovery Energy	V_R = 400 V, I_F = 400 A, R_{GON} = 3.9 Ω, −di/dt = 3.61 A/ns (175°C) V_{GE} = −8 V	T_{vj} = 25°C	−	1.05	−	mJ
			T_{vj} = 150°C	−	4.93	−	
			T_{vj} = 175°C	−	5.90	−	
Q_{RR}	Recovered Charge	V_R = 400 V, I_F = 400 A, R_{GON} = 3.9 Ω, −di/dt = 3.61 A/ns (175°C) V_{GE} = −8 V	T_{vj} = 25°C	−	11.60	−	μC
			T_{vj} = 150°C	−	25.72	−	
			T_{vj} = 150°C	−	29.28	−	
Irr	Peak Reverse Recovery Current	V_R = 400 V, I_F = 400 A, R_{GON} = 3.9 Ω, −di/dt = 3.61 A/ns (175°C) V_{GE} = −8 V	T_{vj} = 25°C	−	241	−	A
			T_{vj} = 150°C	−	294	−	
			T_{vj} = 175°C	−	304	−	

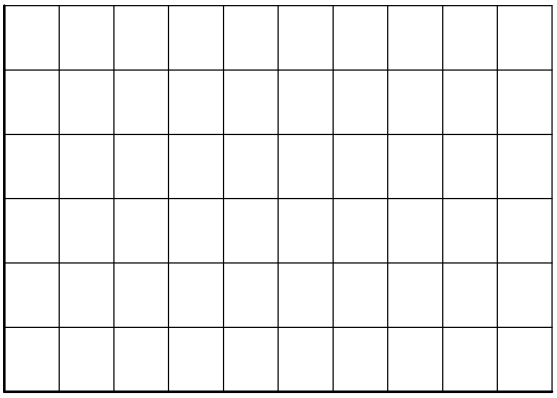
SENSOR CHARACTERISTICS (Tvj = 25°C, unless otherwise specified)

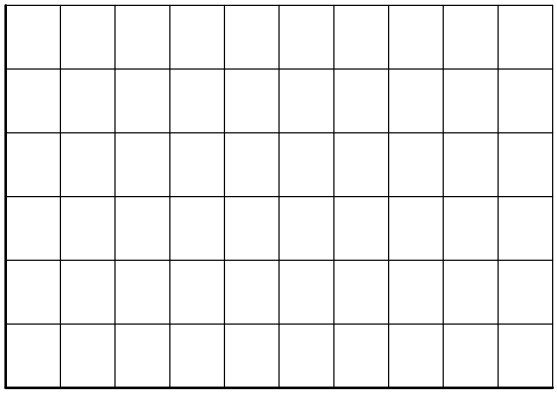
Parameters		Conditions		Min	Typ	Max	unit
T_{sense}	Temperature Sense	I_F = 1 mA,	T_{vj} =25°C	−	2.5	−	V
			T_{vj} = 150°C	−	1.7	−	
			T_{vj} = 175°C	−	1.5	−	
I_{sense}	Current Sense	R_{shunt} = 10 Ω,	I_C = 1200 A	−	416	−	mV
			I_C = 600 A	−	223	−	
			I_C = 100 A	−	50	−	

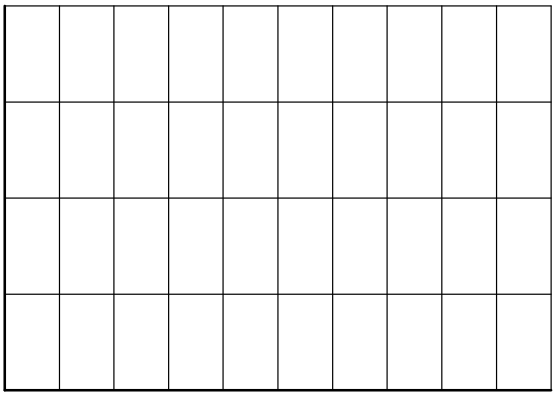
ORDERING INFORMATION

Part Number	Package	Shipping
NVG600A75L4DSC2	AHPM15−CEA Module Case MODHS (Pb−Free)	18 Units / 3x Tub

TYPICAL CHARACTERISTICS







VE−Trac™ Dual Gen II NVG600A75L4DSC2

AHPM15 55x55
CASE MODHS
ISSUE B

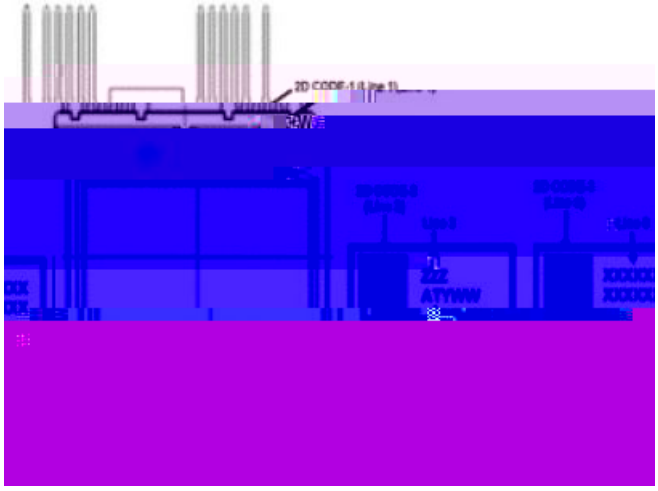
DATE 06 MAY 2022

4. DIMENSIONS b,b1,b2 .

AHPM15 55x55
CASE MODHS
ISSUE B

DATE 06 MAY 2022

GENERIC
MARKING DIAGRAM*



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*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

DOCUMENT NUMBER:	**98AON32090H**	Electronic versions are uncontrolled except when
DESCRIPTION:		