A tomoti e Po wer MOSFET Mod le

NXV10V125DT1

Features

- 3 Phase MOSFET Module
- Electrically Isolated DBC Substrate for Low Thermal Resistance
- Temperature Sensing
- Compact Design for Low Total Module Resistance
- Module Serialization for Full Traceability
- AQG324 Qualified and PPAP Capable
- Pb−free, RoHS and UL94V−0 Compliant

Typical Applications

- 48 V E−Compressor and Other 48 V Auxiliaries

Benefits

- Enable Design of Small, Efficient and Reliable System for Reduced Vehicle Fuel Consumption and CO

© Semiconductor Components Industries, LLC, 2023

ORDERING INFORMATION

Device	Package	Packing Method	Shipping
NXV10V125DT1	APM21−CGA	Tube	44 Units / Box

Pin Configuration

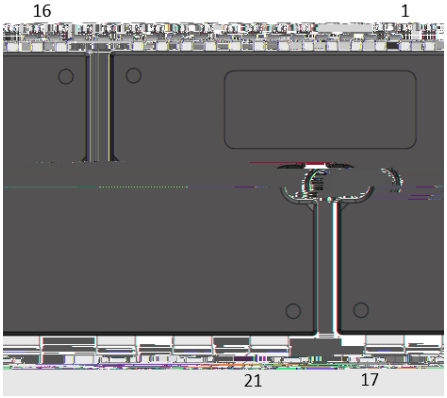


Figure 1. Pin Configuration

PIN DESCRIPTION

Pin Number	Pin Name	Description
1	NTC+	NTC Thermistor Terminal 1
2	NTC−	NTC Thermistor Terminal 2
3	Sense Q6	Source of Q6
4	G3	Gate of Q3, high side Phase W MOSFET
5	Sense Q3	Source of Q3
6	G6	Gate of Q6, low side Phase W MOSFET
7	Sense Q5	Source of Q5
8	G2	Gate of Q2, high side Phase V MOSFET
9	Sense Q2	Source of Q2
10	G5	Gate of Q5, low side Phase V MOSFET
11	G4	Gate of Q4, low side Phase U MOSFET
12	Sense Q4	Source of Q4
13	Sense Q1	Source of Q1
14	G1	Gate of Q1, high side Phase U MOSFET
15	Vbat Sense	Common pins for Sense of Vbat
16	Vbat Sense	Common pins for Sense of Vbat, one of pin 15 or 16 can be used for Sense of Vbat
17	B+	Battery voltage power lead
18	GND	Battery return power lead
19	U	Phase U (Phase 1)
20	V	Phase V (Phase 2)
21	W	Phase W (Phase 3)

Share Feedback
Your Opinion Matters

Block Diagram

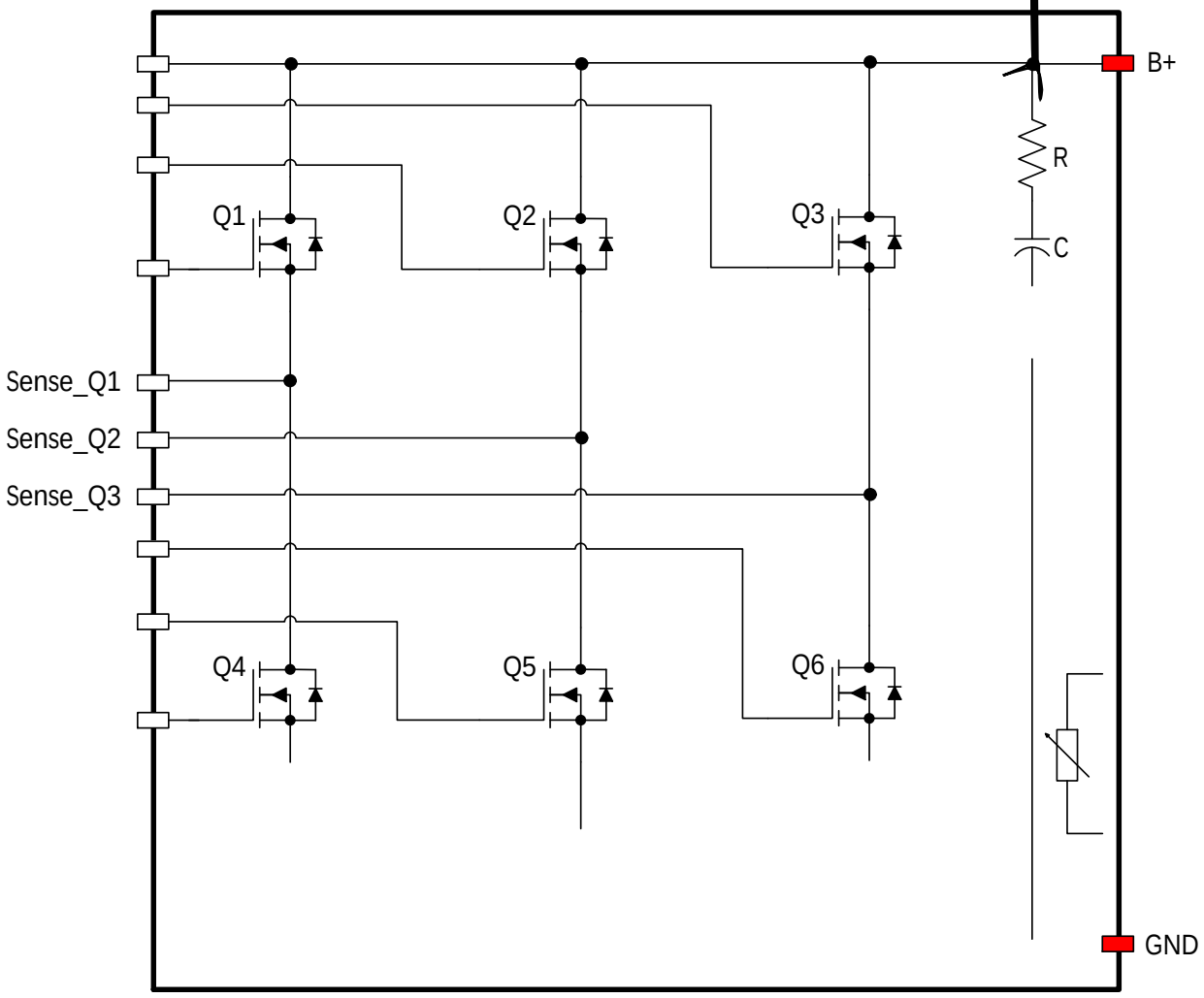


Figure 2. Schematic

THERMAL CHARACTERISTICS

Symbol	Parameter	Min	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction−to−Case (Note 1)	−	0.63	0.85	°C/W

1. Test method compliant with MIL−STD−883−1012.1

ISOLATION VOLTAGE

Symbol	Parameter	Min	Typ	Max	Unit
−	Leakage @Isolation Voltage, V_{AC} = 3 kV, 1 second	−	−	250	

RESISTANCE MEASUREMENT METHODS

FETs	+ Force Pin#	Force Pin#	+ Sense Pin#	Sense Pin#
MOSFET $R_{DS(ON)}$ Q1	B+	Phase 1	Vbat	Sense Q1
MOSFET $R_{DS(ON)}$ Q2	B+	Phase 2	Vbat	Sense Q2
MOSFET $R_{DS(ON)}$ Q3	B+	Phase 3	Vbat	Sense Q3
MOSFET $R_{DS(ON)}$ Q4	Phase 1	GND	Sense Q1	Sense Q4
MOSFET $R_{DS(ON)}$ Q5	Phase 2	GND	Sense Q2	Sense Q5
MOSFET $R_{DS(ON)}$ Q6	Phase 3	GND	Sense Q3	Sense Q6
Module $R_{DS(ON)}$ Q1	B+	Phase 1	B+	Phase 1
Module $R_{DS(ON)}$ Q2	B+	Phase 2	B+	Phase 2
Module $R_{DS(ON)}$ Q3	B+	Phase 3	B+	Phase 3
Module $R_{DS(ON)}$ Q4	Phase 1	GND	Phase 1	GND
Module $R_{DS(ON)}$ Q5	Phase 2	GND	Phase 2	GND
Module $R_{DS(ON)}$ Q6	Phase 3	GND	Phase 3	GND

ELECTRICAL CHARACTERISTICS (T_J = 25°C; unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance (Note 5)	V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz	–	6970	–	pF
C_{oss}	Output Capacitance (Note 5)		–	3950	–	pF
C_{rss}	Reverse Transfer Capacitance (Note 5)		–	29	–	pF
R_g	Gate Resistance	f = 1 MHz	–	0.4	–	Ω
$Q_{g(tot)}$	Total Gate Charge	V_{GS} = 0 to 10 V, V_{DD} = 80 V, I_D = 80 A	–	101	–	nC
Q_{gs}	Gate to Source Gate Charge		–	34	–	nC
Q_{gd}	Gate to Drain “Miller” Charge		–	19	–	nC
SWITCHING CHARACTERISTICS						
$t_{d(on)}$	Turn−On Delay Time	V_{DD} = 50 V, I_D = 80 A, V_{GS} = 10 V, R_{GEN} = 6 Ω	–	46	–	ns
t_r	Rise Time		–	26	–	ns
$t_{d(off)}$	Turn−Off Delay Time		–	52	–	ns
t_f	Fall Time		–	15	–	ns

5. Reference typical characteristics of discrete FDBL86062−F085.

COMPONENTS

Components	Specification	Quantity	Size
MOSFET	100 V, bare die used in FDBL86062_F085	6	6.60 x 3.68 mm
RESISTOR	2.2 Ω	1	2.0 x 1.25 mm
CAPACITOR	100 V, 0.047 μF	2	1.6 x 0.8 mm
NTC Thermistor	100 kΩ	1	1.6 x 0.8 mm

Share Feedback
Your Opinion Matters

TYPICAL CHARACTERISTICS

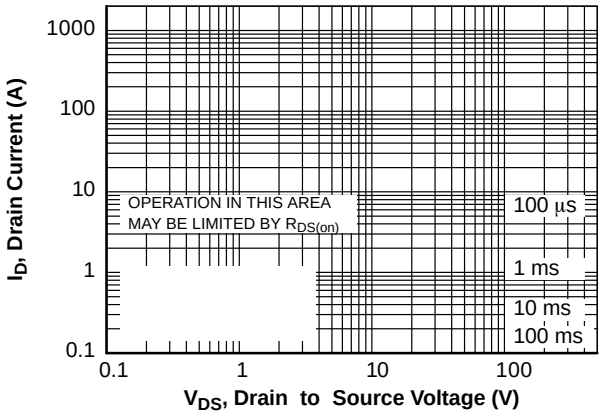


Figure 3. Safe Operation Area

Share Feedback
Your Opinion Matters

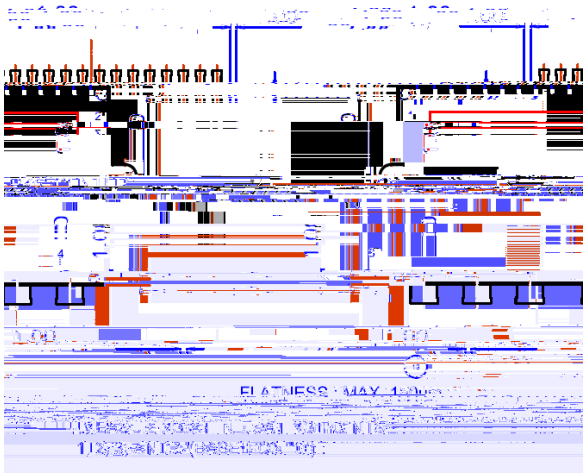


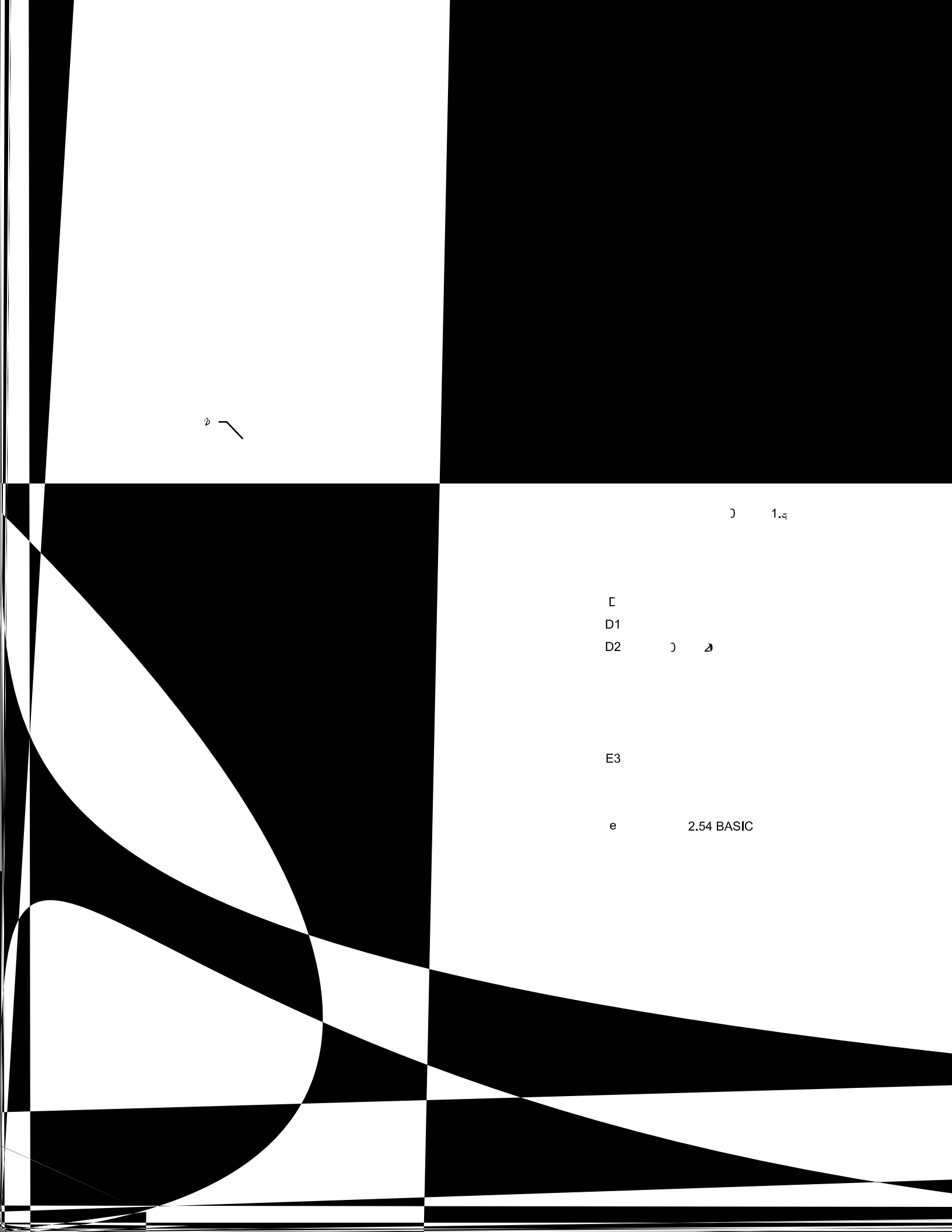
Figure 12. Flatness Measurement Position

MECHANICAL CHARACTERISTICS AND RATINGS

Parameter	Test Conditions	Min	Typ	Max	Unit
Device Flatness	Refer to Figure 12	0	–	150	μm
Mounting Torque	Mounting screw: M3, recommended 0.7 Nm	0.4	–	1.4 (Note 6)	Nm
Weight		–	21.2	–	g

6. Max Torque rating can be different by the type of screw, such as the screw head diameter, use or without use of Washer. In case of special screw mounting method is applied, contact to **onsemi** for the proper information of mounding condition.

Share Feedback
Your Opinion Matters



onsemi, , and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba “**onsemi**” or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**’s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided “as−is” and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi**