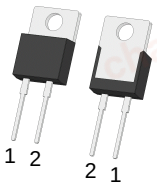
chanhvinh.com

DATA SHEET
www.onsemi.com

Silicon Carbide (SiC) Diode – EliteSiC, TO220-2, 4 A, 650 V SiC Merged PiN-Schottky (MPS) Diode

UJ3D06504TS



TO220-2
CASE 340AZ

Description

onsemi offers the 3rd generation of high performance SiC Merged-PiN-Schottky (MPS) diodes. With zero reverse recovery charge and 175 °C maximum junction temperature, these diodes are ideally suited for high frequency and high efficiency power systems with minimum cooling requirements.

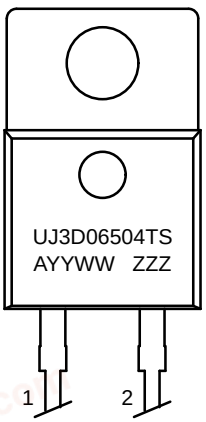
Features

- 175 °C Maximum Operating Junction Temperature
- Easy Paralleling
- Extremely Fast Switching not Dependent on Temperature
- No Reverse or Forward Recovery
- Enhanced Surge Current Capability, MPS Structure
- Excellent Thermal Performance, Ag Sintered
- 100% UIS Tested
- This Device is Pb-Free, Halogen Free and is ROHS Compliant

Typical Applications

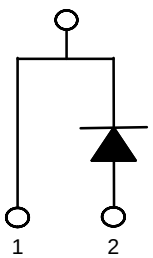
- Power Converters
- Industrial Motor Drives
- Switch-mode Power Supplies
- Power Factor Correction Modules

MARKING DIAGRAM



UJ3D06504TS	= Specific Device Code
A	= Assembly Location
YY	= Year
WW	= Work Week
ZZZ	= Lot ID

PIN CONNECTIONS



ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

© Semiconductor Components Industries, LLC, 2024

chanhvinh.com

UJ3D06504TS

MAXIMUM RATINGS

Parameter	Symbol	Test Conditions	Value	Unit
DC Blocking Voltage	V_R		650	V
Repetitive Peak Reverse Voltage, T_J = 25 °C	V_{RRM}		650	V
Surge Peak Reverse Voltage	V_{RSM}		650	V
Maximum DC Forward Current	I_F	T_C = 156 °C	4	A
Non-repetitive Forward Surge Current Sine Halfwave	I_{FSM}	T_C = 25 °C, t_p = 10 ms	29	A
		T_C = 110 °C, t_p = 10 ms	26	
Repetitive Forward Surge Current Sine Halfwave, D = 0.1	I_{FRM}	T_C = 25 °C, t_p = 10 ms	23.2	A
		T_C = 110 °C, t_p = 10 ms	13.6	
Non-repetitive Peak Forward Current	$I_{F,max}$	T_C = 25 °C, t_p = 10 μs	260	A
		T_C = 110 °C, t_p = 10 μs	260	
i^2t Value	$\int i^2dt$	T_C = 25 °C, t_p = 10 ms	4.2	A^2s
		T_C = 110 °C, t_p = 10 ms	3.4	
Power Dissipation	P_{Tot}	T_C = 25 °C	71.4	W
		T_C = 156 °C	9	
Maximum Junction Temperature	$T_{J,max}$		175	°C
Operating and Storage Temperature	T_J, T_{STG}		−55 to 175	°C
Soldering Temperatures, Wavesoldering only Allowed at Leads	T_{sold}	1.6 mm from case for 10 s	260	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

ELECTRICAL CHARACTERISTICS (T_J = +25 °C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Voltage	V_F	I_F = 4 A, T_J = 25 °C	–	1.5	1.7	V
		I_F = 4 A, T_J = 150 °C	–	1.9	2.1	
		I_F = 4 A, T_J = 175 °C	–	2.05	2.25	
Reverse Current	I_R	V_R = 650 V, T_J = 25 °C	–	0.7	25	μA
		V_R = 650 V, T_J = 175 °C	–	5	–	
Total Capacitive Charge (Note 1)	Q_C	V_R = 400 V	–	9.3	–	nC
Total Capacitance	C	V_R = 1 V, f = 1 MHz	–	118	–	pF
		V_R = 300 V, f = 1 MHz	–	16	–	
		V_R = 600 V, f = 1 MHz	–	15	–	
Capacitance Stored Energy	E_C	V_R = 400 V	–	1.4	–	μJ

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Q_C is independent on T_J, di_F/dt, and I_F as shown in the application note AND90316/D

THERMAL CHARACTERISTICS

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Thermal Resistance, Junction-Case	$R_{\theta JC}$		–	1.6	2.1	°C/W

chanhvinh.com

TYPICAL PERFORMANCE

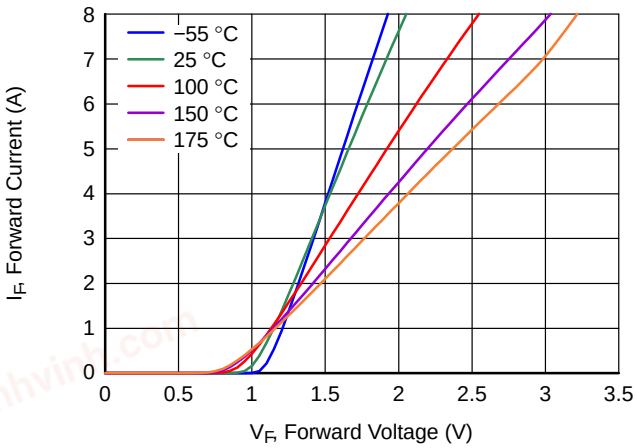


Figure 1. Typical Forward Characteristics

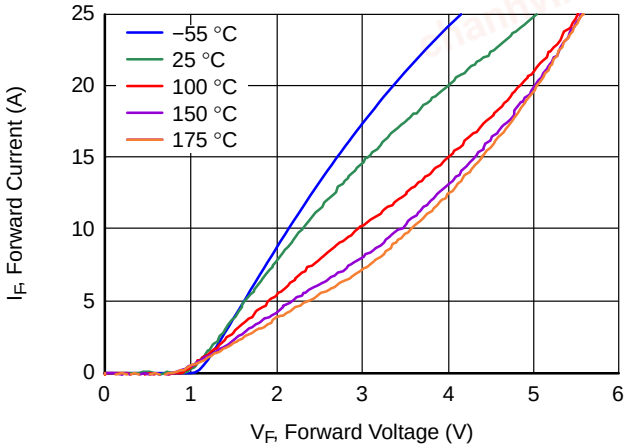


Figure 2. Typical Forward Characteristics in Surge Current

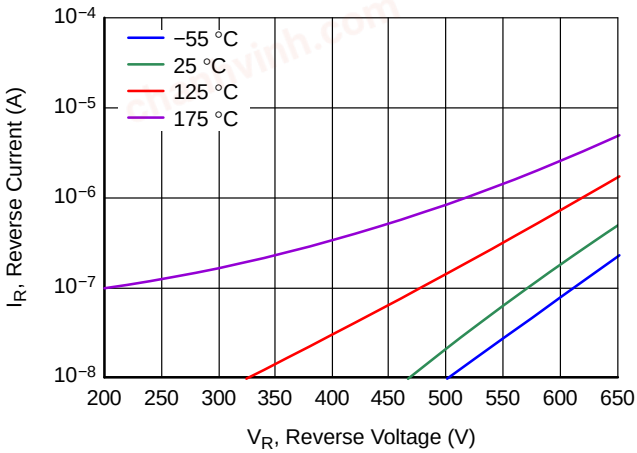


Figure 3. Typical Reverse Characteristics

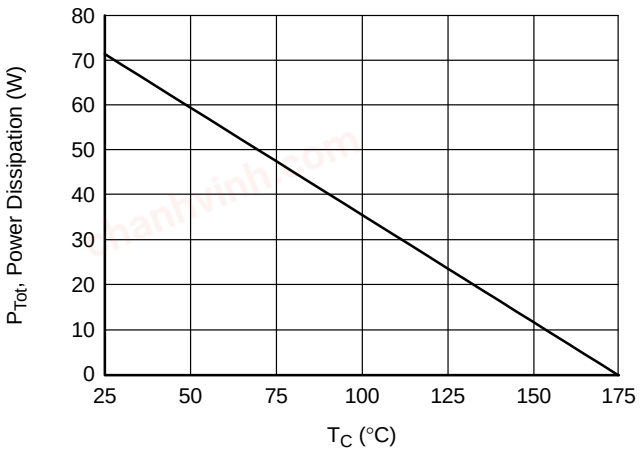


Figure 4. Power Dissipation

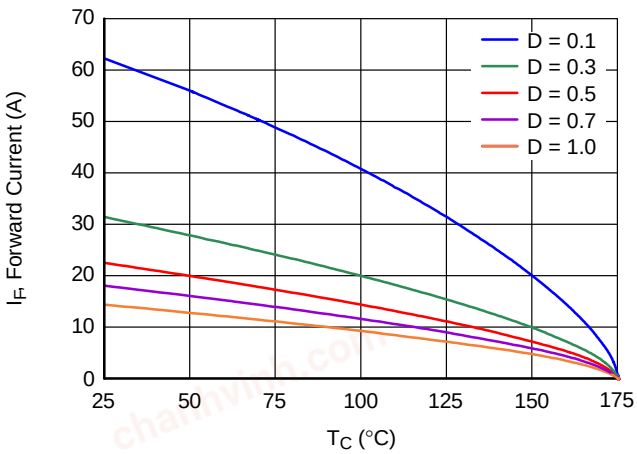


Figure 5. Diode Forward Current

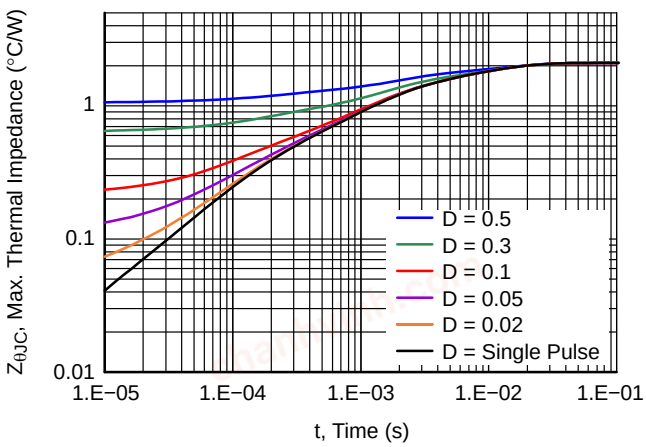


Figure 6. Maximum Transient Thermal Impedance

chanhvinh.com

TYPICAL PERFORMANCE (CONTINUED)

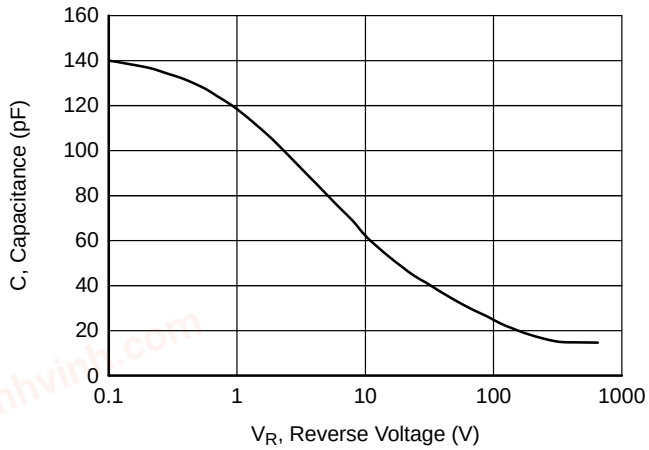


Figure 7. Capacitance vs. Reverse Voltage at 1 MHz

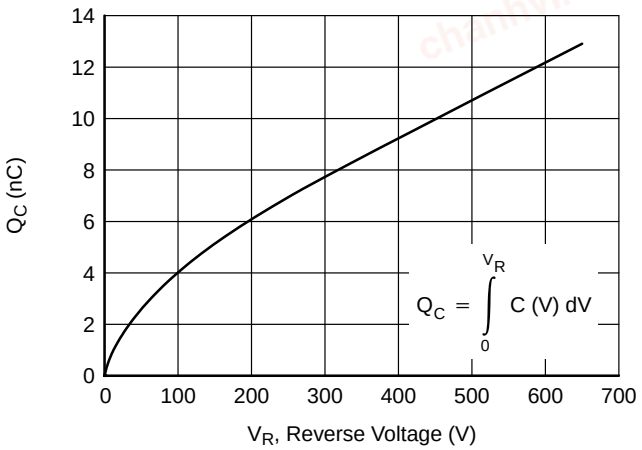


Figure 8. Typical Capacitive Charge vs. Reverse Voltage

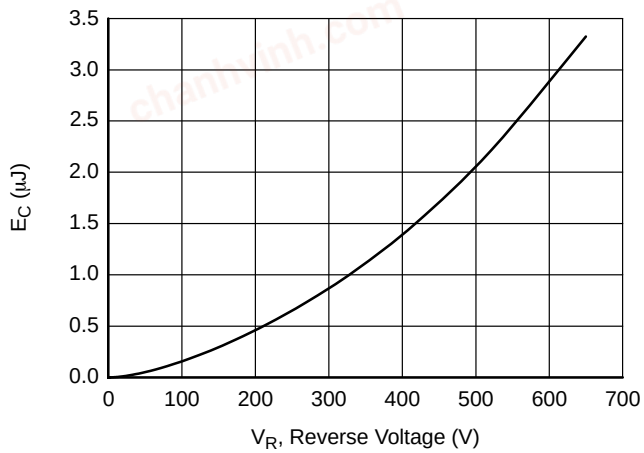


Figure 9. Typical Capacitance Stored Energy vs. Reverse Voltage

ORDERING INFORMATION

Part Number	Marking	Package	Shipping
UJ3D06504TS	UJ3D06504TS	TO220-2 (Pb-Free, Halogen Free)	1000 / Tube

chanhvinh.com

UJ3D06504TS

REVISION HISTORY

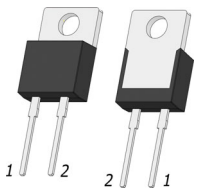
Revision	Description of Changes	Date
D	Acquired the original Qorvo JFET Division Data Sheet and updated the main document title to comply with **onsemi** standards for SiC products.	1/15/2025
4	Converted the Data Sheet to **onsemi** format.	4/30/2025

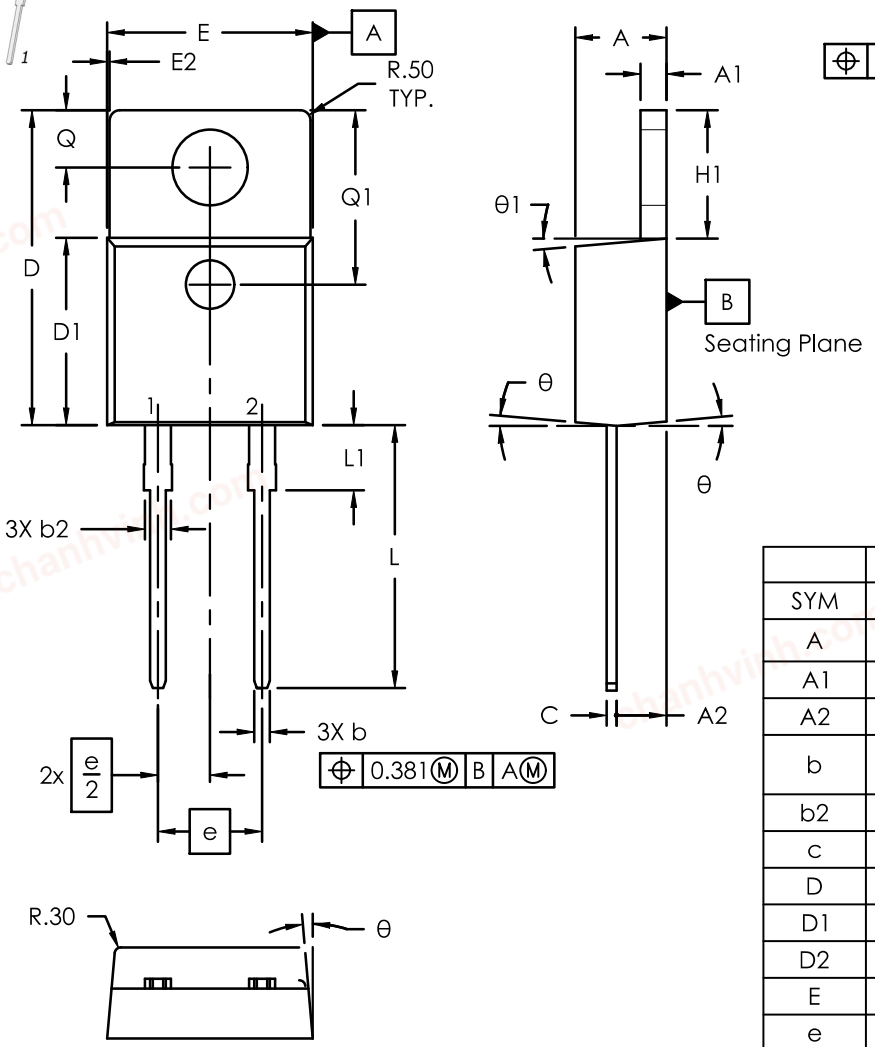
chanhvinh.com

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

TO220–2 10.16x15.37x4.19, 5.08P
CASE 340AZ
ISSUE B

DATE 23 APR 2025





	millimeters		
SYM	MIN	NOM	MAX
A	3.56	4.19	4.83
A1	0.51	0.95	1.40
A2	2.03	2.48	2.92
b	0.38	0.70	1.02
b2	1.02	1.40	1.78
c	0.36	0.56	0.76
D	14.22	15.37	16.51
D1	8.38	8.89	9.40
D2	12.19	12.66	13.13
E	9.65	10.16	10.67
e		5.08 BSC.	
E1	6.86	7.87	8.89
E2	—	—	0.76
L	12.57	13.65	14.73
L1	—	—	6.35
ØP	3.53	3.81	4.09
H1	5.84	6.35	6.86
Q	2.54	2.98	3.43
Q1	8.38	8.51	8.64
θ		5°	
θ1		5°	

NOTES:
1. Dimensioning and Tolerancing as per ASME Y14.5M, 2018.
2. Controlling Dimension : Millimeters
3. Dimensions D and E does not include Mold Flash. These dimensions are measure at the outermost extreme of the plastic body.
4. Through hole diameter value = End Hole Diameter
5. PCB through hole pattern as per IPC-2222

DOCUMENT NUMBER:	**98AON13830G**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.	
DESCRIPTION:	**TO220–2 10.16x15.37x4.19, 5.08P**		**PAGE 1 OF 2**

onsemi and onsemi are trademarks of Semiconductor Components Industries, LLC dba **onsemi** or its subsidiaries in the United States and/or other countries. **onsemi** reserves the right to make changes without further notice to any products herein. **onsemi** makes no warranty, representation or guarantee regarding the 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. **onsemi** does not convey any license under its patent rights nor the rights of others.

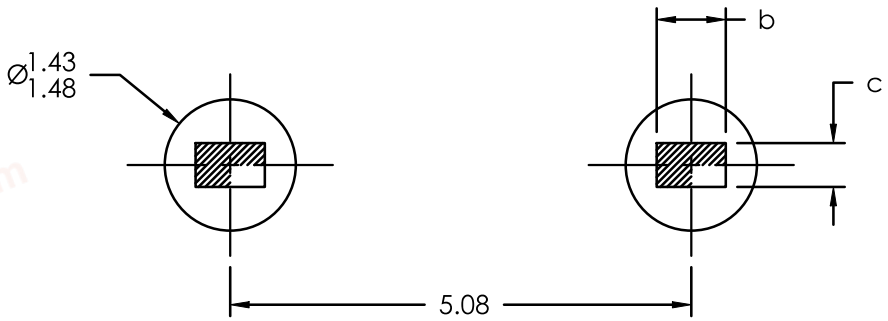
© Semiconductor Components Industries, LLC, 2025

chanhvinh.com

TO220−2 10.16x15.37x4.19, 5.08P
CASE 340AZ
ISSUE B

DATE 23 APR 2025

RECOMMENDED PCB PATTERN



NOTE: LAND PATTERN AND THROUGH HOLE DIMENSIONS SERVE ONLY AS AN INITIAL GUIDE.
END-USER PCB DESIGN RULES AND TOLERANCES SHOULD ALWAYS PREVAIL.

onsemi and onsemi are trademarks of Semiconductor Components Industries, LLC dba **onsemi** or its subsidiaries in the United States and/or other countries. **onsemi** reserves the right to make changes without further notice to any products herein. **onsemi** makes no warranty, representation or guarantee regarding the 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. **onsemi** does not convey any license under its patent rights nor the rights of others.

© Semiconductor Components Industries, LLC, 2025

chanhvinh.com

onsemi, 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** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales