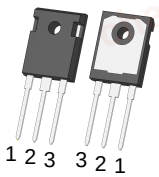
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DATA SHEET
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Silicon Carbide (SiC) Diode – EliteSiC, TO247-3, 20 A, 650 V SiC Merged PiN-Schottky (MPS) Diode

UJ3D06520KSD



TO247-3
CASE 340AK

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.

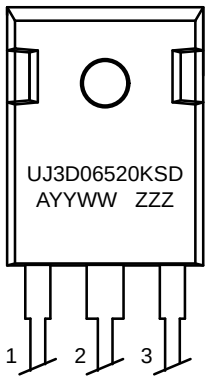
Features

- 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

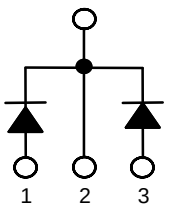
- Power Converters
- Industrial Motor Drives
- Switching-mode Power Supplies
- Power Factor Correction Modules

MARKING DIAGRAM



UJ3D06520KSD	= 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.

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UJ3D06520KSD

MAXIMUM RATINGS

Parameter	Symbol	Test Conditions	Value (Leg/Device)	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 = 152 °C	10/20	A
Non-repetitive Forward Surge Current Sine Halfwave	I_{FSM}	T_C = 25 °C, t_p = 10 ms	70/140	A
		T_C = 110 °C, t_p = 10 ms	60/120	
Repetitive Forward Surge Current Sine Halfwave, D = 0.1	I_{FRM}	T_C = 25 °C, t_p = 10 ms	45.9/91.8	A
		T_C = 110 °C, t_p = 10 ms	28.7/57.4	
Non-repetitive Peak Forward Current	$I_{F, max}$	T_C = 25 °C, t_p = 10 μs	455/910	A
		T_C = 110 °C, t_p = 10 μs	455/910	
i^2t Value	$\int i^2dt$	T_C = 25 °C, t_p = 10 ms	24.5/98	A^2s
		T_C = 110 °C, t_p = 10 ms	18/72	
Power Dissipation	P_{tot}	T_C = 25 °C	136.4/272.8	W
		T_C = 152 °C	20.9/41.8	
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	Value (Leg/Device)			Unit
			Min	Typ	Max	
Forward Voltage	V_F	I_F = 10 A/20 A, T_J = 25 °C	−	1.5	1.7	V
		I_F = 10 A/20 A, T_J = 150 °C	−	1.68	2	
		I_F = 10 A/20 A, T_J = 175 °C	−	1.75	2.1	
Reverse Current	I_R	V_R = 650 V, T_J = 25 °C	−	10/20	60/120	μA
		V_R = 650 V, T_J = 175 °C	−	150/300	−	
Total Capacitive Charge (Note 1)	Q_C	V_R = 400 V	−	23/46	−	nC
Total Capacitance	C	V_R = 1 V, f = 1 MHz	−	327/654	−	pF
		V_R = 300 V, f = 1 MHz	−	38/76	−	
		V_R = 600 V, f = 1 MHz	−	34/68	−	
Capacitance Stored Energy	E_C	V_R = 400 V	−	3.4/6.8	−	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	Value (Leg/Device)			Unit
			Min	Typ	Max	
Thermal Resistance	$R_{\theta JC}$		−	0.82/0.41	1.1/0.55	°C/W

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TYPICAL PERFORMANCE

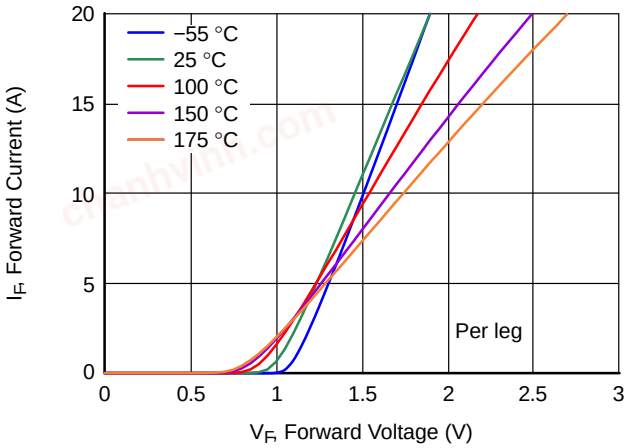


Figure 1. Typical Forward Characteristics per Leg

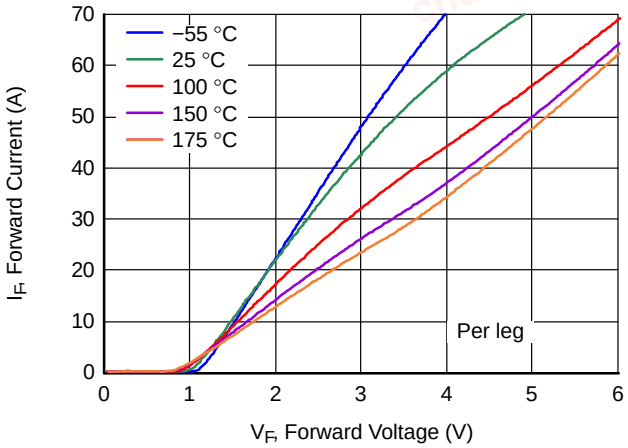


Figure 2. Typical Forward Characteristics in Surge Current per Leg

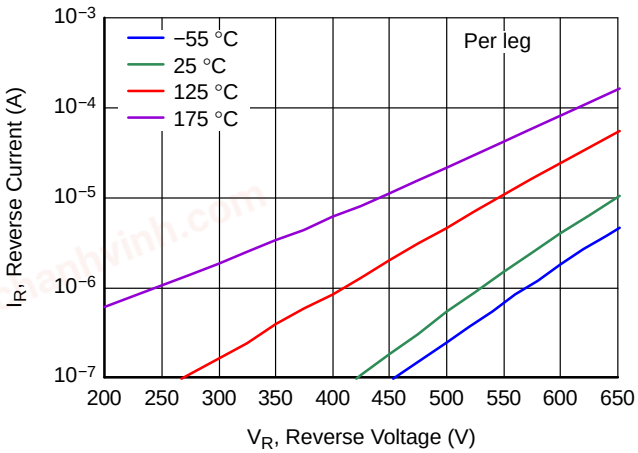


Figure 3. Typical Reverse Characteristics per Leg

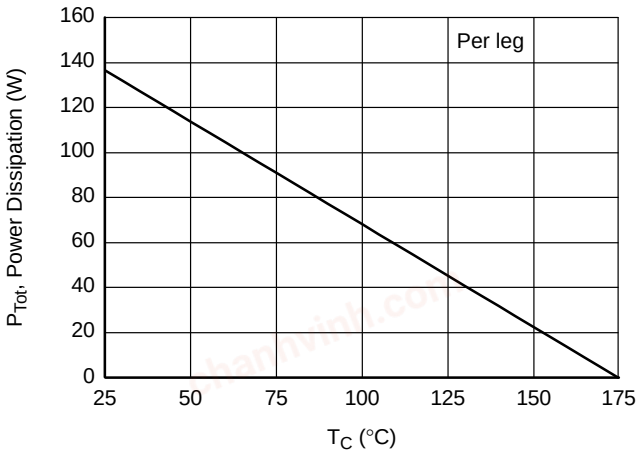


Figure 4. Power Dissipation per Leg

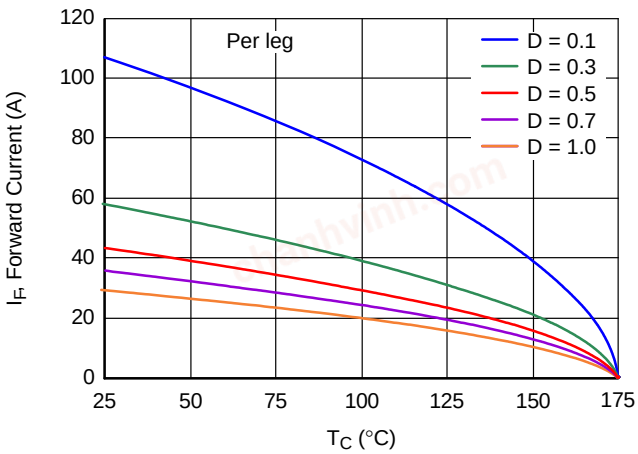


Figure 5. Diode Forward Current per Leg

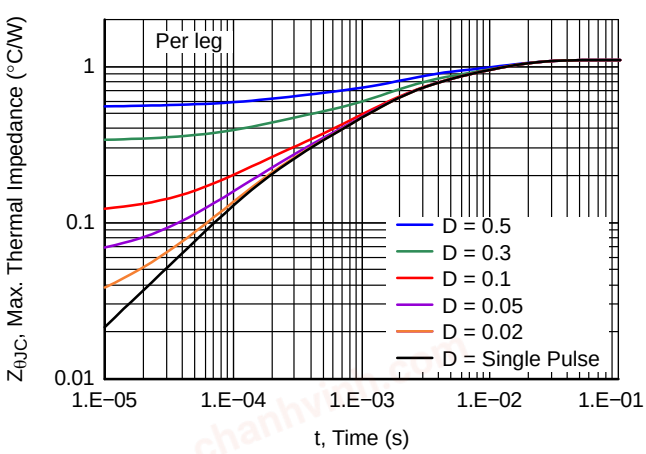


Figure 6. Maximum Transient Thermal Impedance per Leg

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TYPICAL PERFORMANCE (CONTINUED)

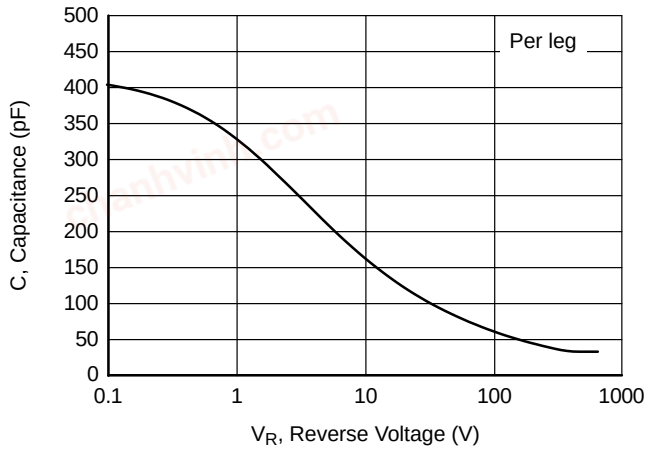


Figure 7. Capacitance per Leg vs. Reverse Voltage at 1 MHz

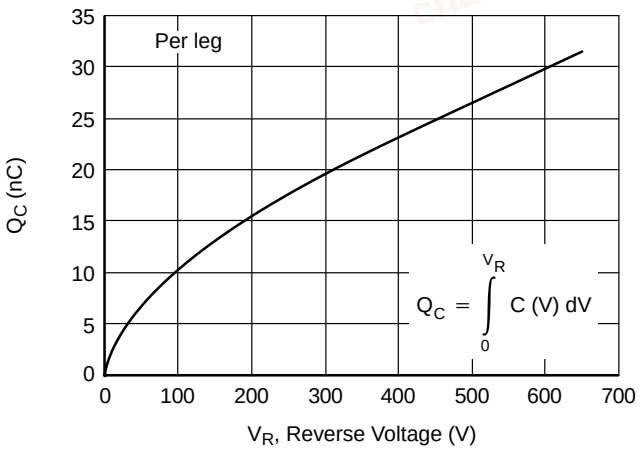


Figure 8. Typical Capacitive Charge per Leg vs. Reverse Voltage

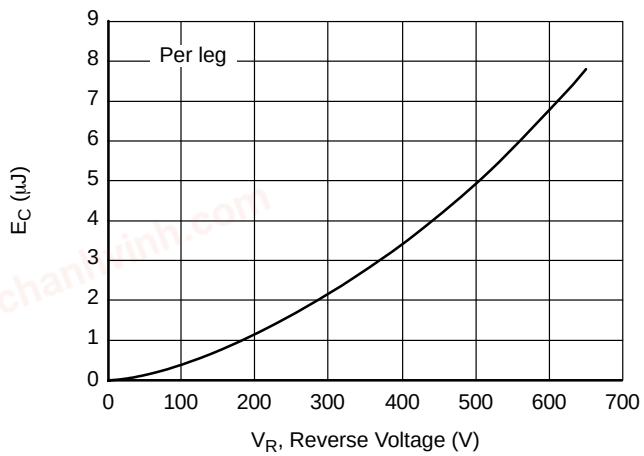


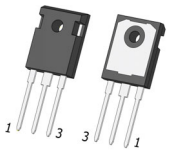
Figure 9. Typical Capacitance Stored Energy per Leg vs. Reverse Voltage

ORDERING INFORMATION

Part Number	Marking	Package	Shipping
UJ3D06520KSD	UJ3D06520KSD	TO247-3 (Pb-Free, Halogen Free)	600 / Tube

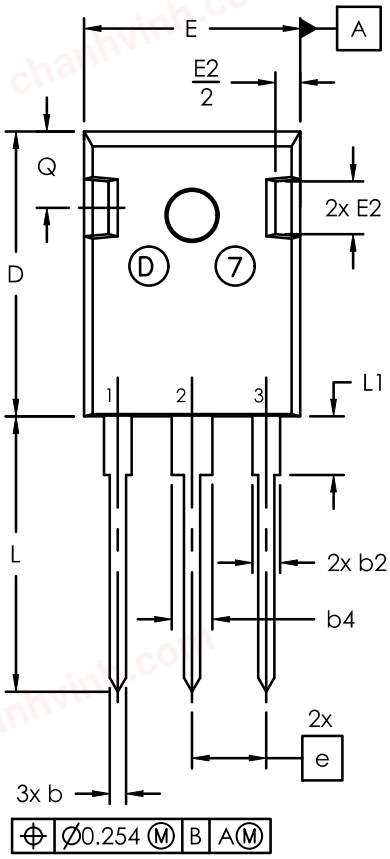
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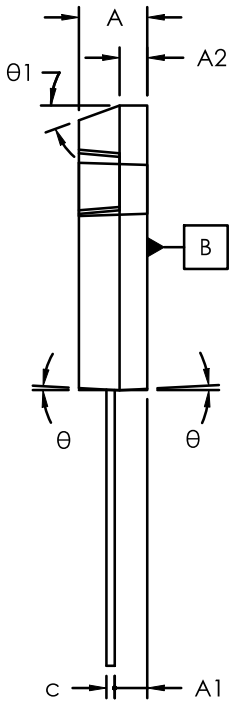
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

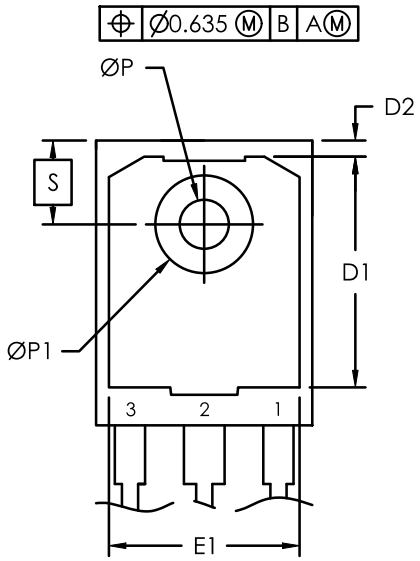


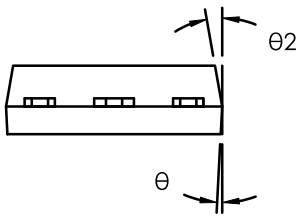
TO247−3 15.90x20.96x5.03, 5.44P
CASE 340AK
ISSUE B

DATE 14 APR 2025









SYM	millimeters		
	MIN	NOM	MAX
A	4.70	5.03	5.31
A1	2.21	2.40	2.59
A2	1.50	2.03	2.49
b	0.99	1.20	1.40
b2	1.65	2.03	2.39
b4	2.59	3.00	3.43
c	0.38	0.60	0.89
D	20.70	20.96	21.46
D1	13.08	—	—
D2	0.51	1.19	1.35
E	15.49	15.90	16.26
e	5.44 BSC		
E1	13.00	13.30	13.60
E2	3.43	3.89	5.20
L	19.62	20.27	20.32
L1	—	—	4.50
ØP	3.40	3.60	3.80
ØP1	7.06	7.19	7.39
Q	5.38	5.62	6.20
S	6.15 BSC		
θ	3°		
θ1	20°		
θ2	10°		

NOTE:
1. Dimensioning and tolerancing as per ASME Y14.5 - 2018
2. Controlling dimension : millimeters
3. Package Outline in compliance with JEDEC standard var. AD.
4. Dimensions D & E does not include mold flash.
5. ØP to have max draft angle of 1.7° to the top with max. hole diameter of 3.91mm.

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DESCRIPTION:	**TO247−3 15.90x20.96x5.03, 5.44P**	**PAGE 1 OF 1**

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