

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_A = +25^\circ\text{C}$
-12V	18m Ω @ $V_{GS} = -4.5\text{V}$	-7.6 A

Description

This new generation MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

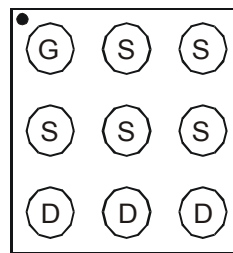
- Battery Management
- Load Switch
- Battery Protection

Features

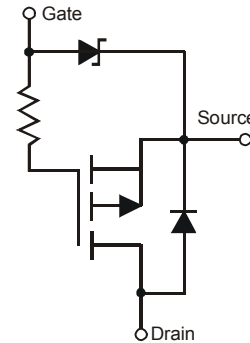
- Low Q_g & Q_{gd}
- Small Footprint 1.5-mm \times 1.5-mm
- Gate ESD Protection 3kV
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

- Case: U-WLB1515-9
- Terminal Connections: See Diagram Below



Top-View
Pin Configuration



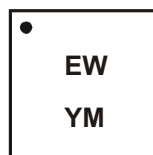
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP1018UCB9-7	U-WLB1515-9	3000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

Marking Information



EW = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: Z = 2012)
 M = Month (ex: 9 = September)

Date Code Key

Year	2012	2013	2014	2015	2016	2017	2018
Code	Z	A	B	C	D	E	F

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V_{DSS}	-12	V
Gate-Source Voltage	V_{GSS}	-6	V
Continuous Drain Current (Note 5) $V_{GS} = -4.5\text{V}$	I_D	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	A
		-7.6 -6.0	
Continuous Drain Current (Note 6) $V_{GS} = -4.5\text{V}$	I_D	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	A
		-5.5 -4.3	
Pulsed Drain Current (Pulse duration $10\mu\text{s}$, duty cycle $\leq 1\%$)	I_{DM}	-60	A

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	1.0	W
Total Power Dissipation (Note 6)	P_D	1.8	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	126.8	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	69	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-12	-	-	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current @ $T_C = +25^\circ\text{C}$	I_{DSS}	-	-	-1	μA	$V_{DS} = -9.6\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	-	-	-100	nA	$V_{GS} = -6\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.4	-0.8	-1.3	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	12	18	m Ω	$V_{GS} = -4.5\text{V}, I_D = -2\text{A}$
			15	22		$V_{GS} = -2.5\text{V}, I_D = -2\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	-	5.5	-	S	$V_{DS} = -6\text{V}, I_D = -2\text{A}$
Diode Forward Voltage (Note 6)	V_{SD}	-	-0.7	-1	V	$V_{GS} = 0\text{V}, I_S = -2\text{A}$
Reverse Recovery Charge	Q_{rr}	-	30.2	-	nC	$V_{dd} = -5\text{V}, I_F = -2\text{A}, di/dt = 200\text{A}/\mu\text{s}$
Reverse Recovery Time	t_{rr}	-	71.4	-	ns	
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	-	457	-	pF	$V_{DS} = -6\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	-	272	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	120	-	pF	
Series Gate Resistance	R_G	-	21.23	-	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge (4.5V)	Q_g	-	4.9	-	nC	$V_{GS} = -4.5\text{V}, V_{DS} = -6\text{V}, I_D = -2\text{A}$
Gate-Source Charge	Q_{gs}	-	0.6	-	nC	
Gate-Drain Charge	Q_{gd}	-	1.1	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	4.45	-	ns	$V_{DD} = -6\text{V}, V_{GS} = -4.5\text{V}, I_{DS} = -2\text{A}, R_G = 2\Omega,$
Turn-On Rise Time	t_r	-	12.0	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	100	-	ns	
Turn-Off Fall Time	t_f	-	93	-	ns	

- Notes:
- Device mounted on FR-4 PCB with minimum recommended pad layout.
 - Device mounted on FR4 material with 1-inch² (6.45-cm²), 2-oz. (0.071-mm thick) Cu
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

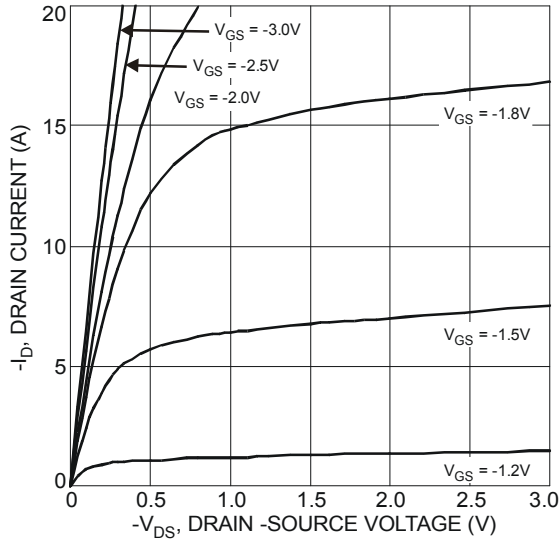


Figure 1 Typical Output Characteristics

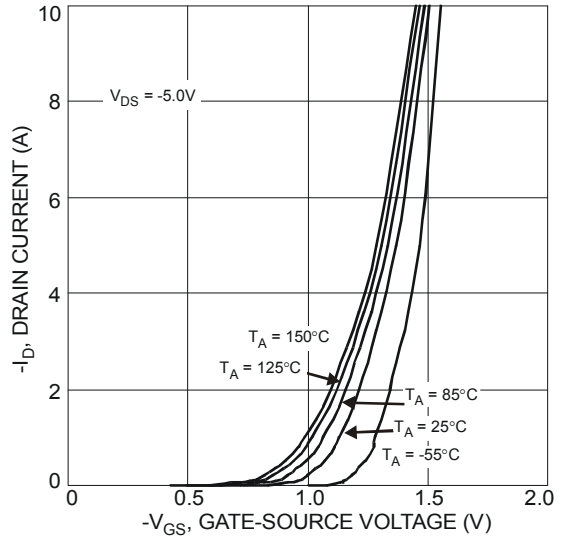


Figure 2 Typical Transfer Characteristics

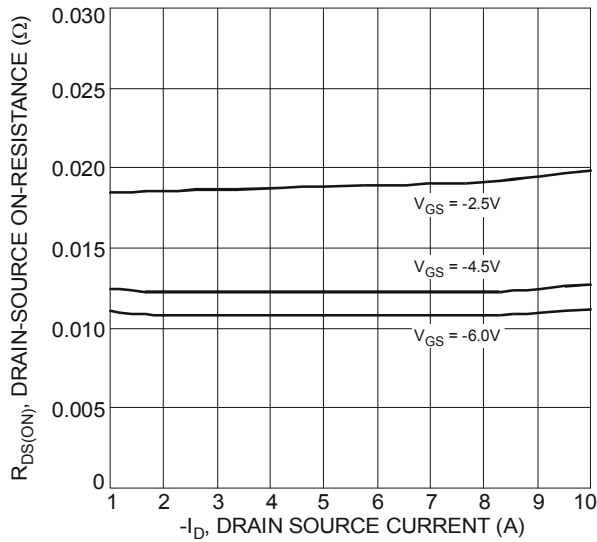


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

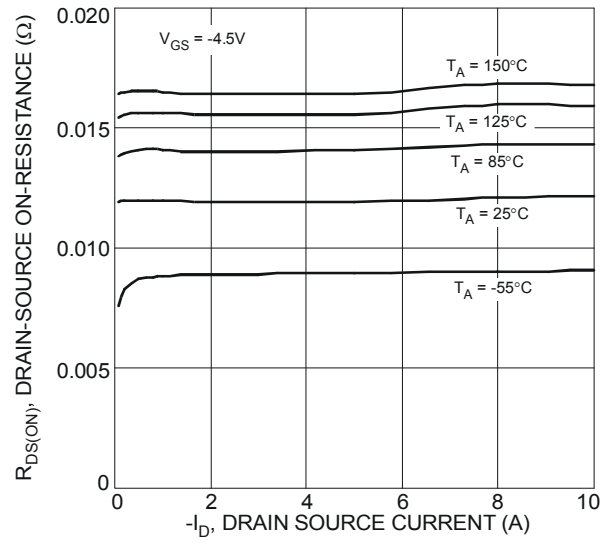


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

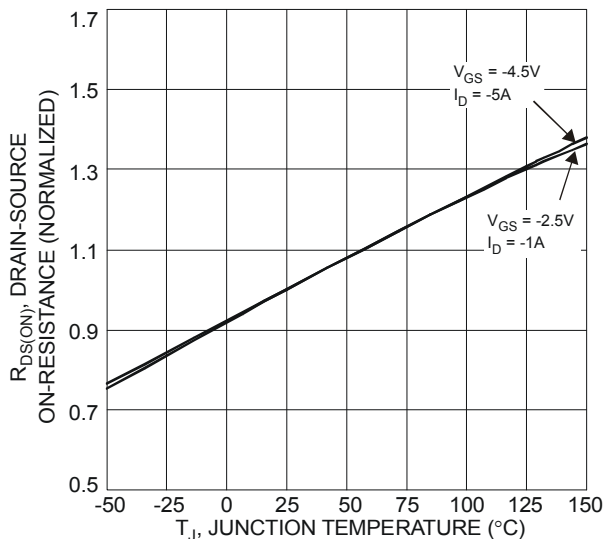


Figure 5 On-Resistance Variation with Temperature

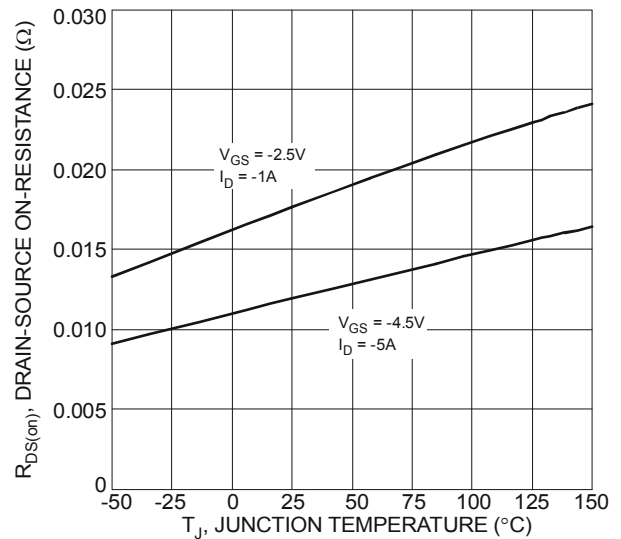


Figure 6 On-Resistance Variation with Temperature

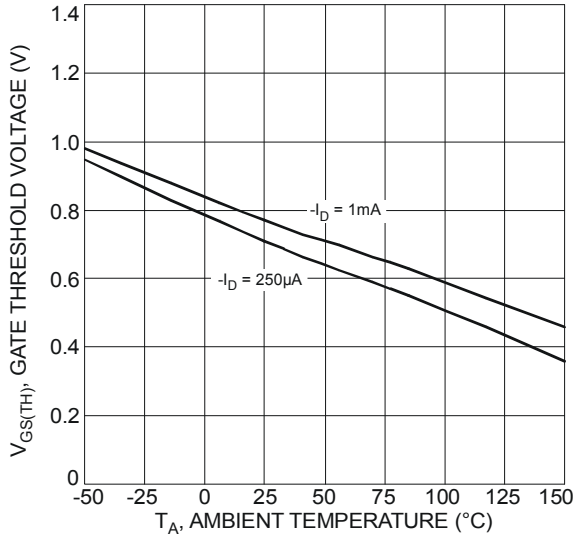


Figure 7 Gate Threshold Variation vs. Ambient Temperature

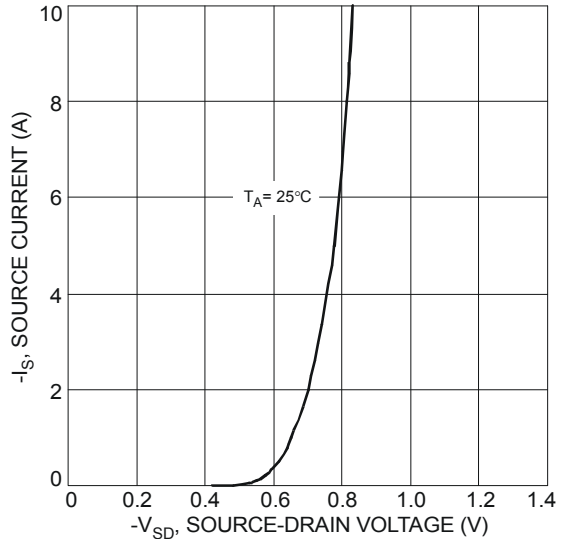


Figure 8 Diode Forward Voltage vs. Current

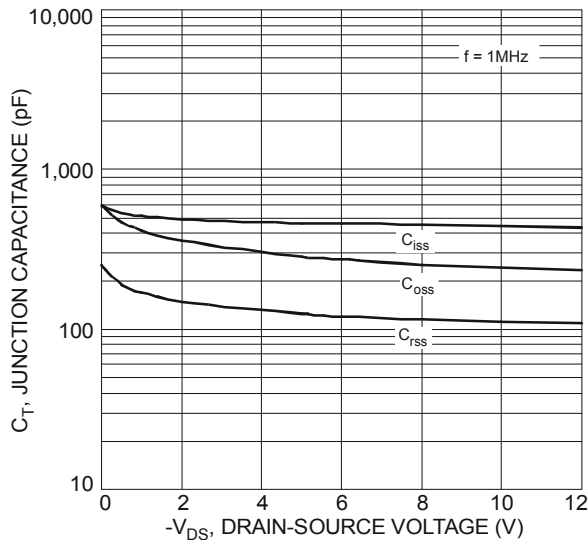


Figure 9 Typical Junction Capacitance

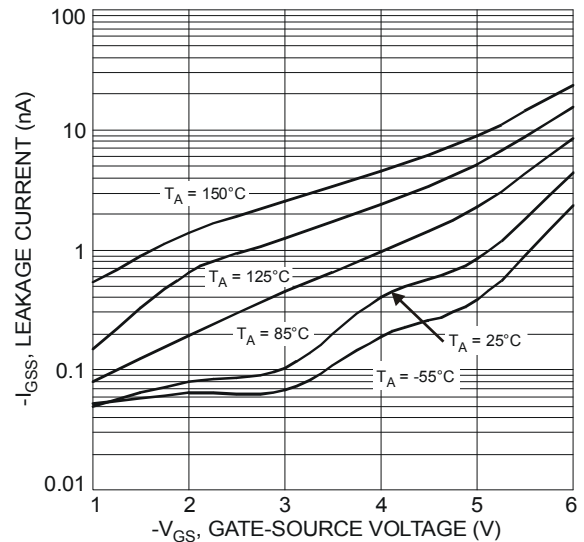


Figure 10 Typical Gate-Source Leakage Current vs. Voltage

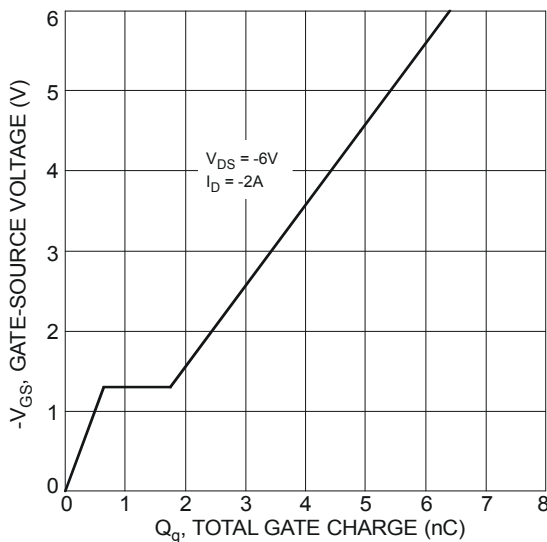


Figure 11 Gate-Charge Characteristics

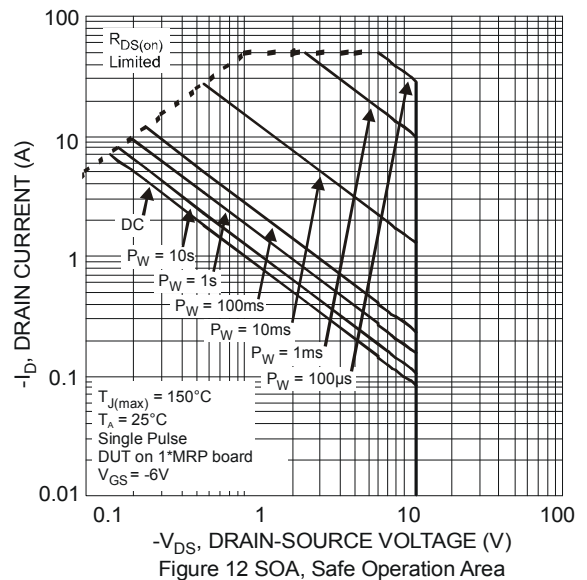


Figure 12 SOA, Safe Operation Area

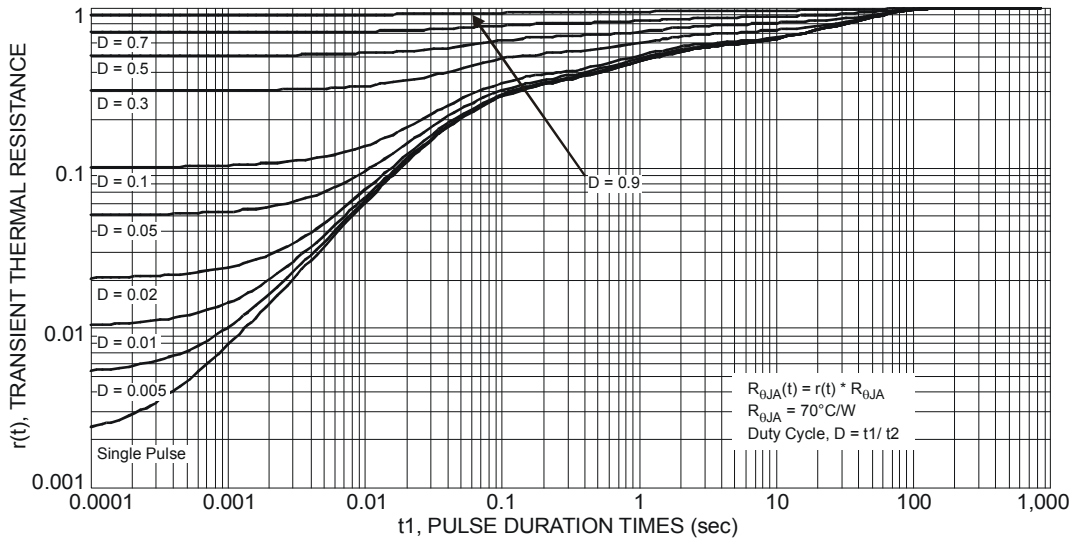
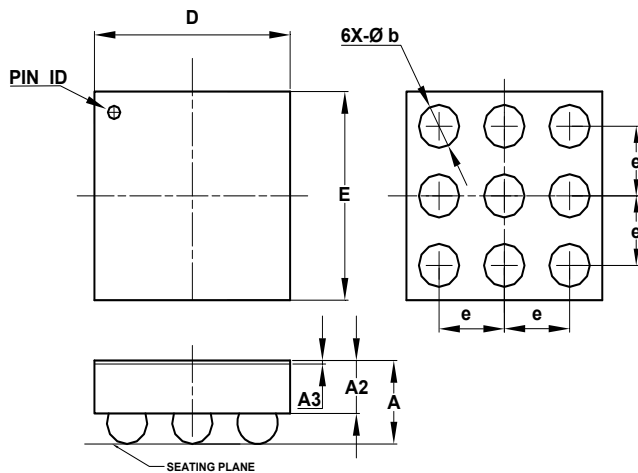


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

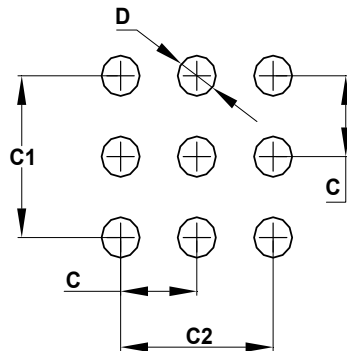


U-WLB1515-9			
Dim	Min	Max	Typ
A	-	0.62	-
A2	-	0.36	0.36
A3	0.020	0.030	0.025
b	0.27	0.37	0.32
D	1.47	1.51	1.49
E	1.47	1.51	1.49
e	-	-	0.50

All Dimensions in mm

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
C	0.50
C1	1.00
C2	1.00
D	0.25

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