

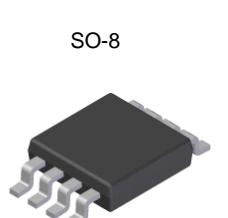
Product Summary

BV _{DSS}	R _{D(S)} Max	I _D Max T _A = +25°C
-20V	38mΩ @ V _{GS} = -4.5V	-6.5A
	56mΩ @ V _{GS} = -2.5V	-5.0A

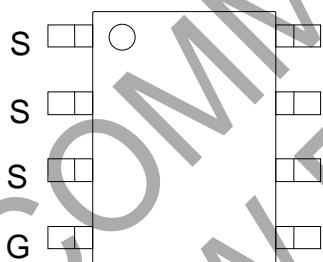
Description and Applications

This MOSFET is designed to minimize the on-state resistance (R_{D(S)}) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

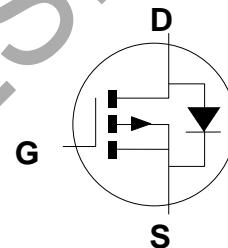
- Backlighting
- Power Management Functions
- DC-DC Converters



Top View



Top View
Pin-Out



Equivalent Circuit

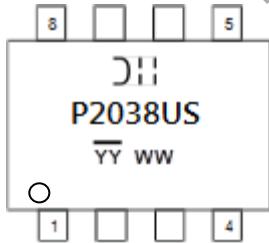
Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2038USS-13	SO-8	2500/Tape & Reel

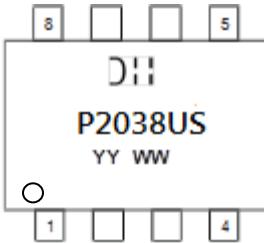
Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. 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.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



Chengdu A/T Site



Shanghai A/T Site

DII = Manufacturer's Marking
P2038US = Product Type Marking Code
YYWW = Date Code Marking
YY or YY = Year (ex: 17 = 2017)
WW = Week (01 to 53)
YY = Date Code Marking for SAT (Shanghai Assembly/ Test site)
YY = Date Code Marking for CAT (Chengdu Assembly/ Test site)

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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	-20	V
Gate-Source Voltage		V_{GSS}	± 8	V
Drain Current (Note 6)	Steady State $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-6.5 -5.2	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)		I_{DM}	-25	A
Maximum Continuous Body Diode Forward Current (Note 6)		I_S	2	A
Avalanche Current (Note 7) L=0.3mH		I_{AS}	13.2	A
Avalanche Energy (Note 7) L=0.3mH		E_{AS}	26	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P_D	2.5	W
Thermal Resistance, Junction to Ambient (Note 6)	R_{JJA}	50	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	$V_{DS} = -16\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GS}	—	—	± 100	nA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.4	—	-1.1	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	24	38	$\text{m}\Omega$	$V_{GS} = -4.5\text{V}, I_D = -5\text{A}$
		—	33	56		$V_{GS} = -2.5\text{V}, I_D = -4.3\text{A}$
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	$V_{GS} = 0\text{V}, I_S = -2.1\text{A}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	1496	—	pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	130	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	116	—	pF	
Total Gate Charge	Q_g	—	14.4	—	nC	$V_{DS} = -10\text{V}, V_{GS} = -4.5\text{V}$ $I_D = -4.5\text{A}$
Gate-Source Charge	Q_{gs}	—	2.6	—		
Gate-Drain Charge	Q_{gd}	—	2.7	—		
Turn-On Delay Time	$t_{D(ON)}$	—	13.7	—	ns	$V_{DD} = -10\text{V}, V_{GS} = -4.5\text{V},$ $R_g = 6\Omega, R_L = 10\Omega, I_D = -1\text{A}$
Turn-On Rise Time	t_R	—	14.0	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	79.1	—		
Turn-Off Fall Time	t_F	—	35.5	—		

Notes:

5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
7. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

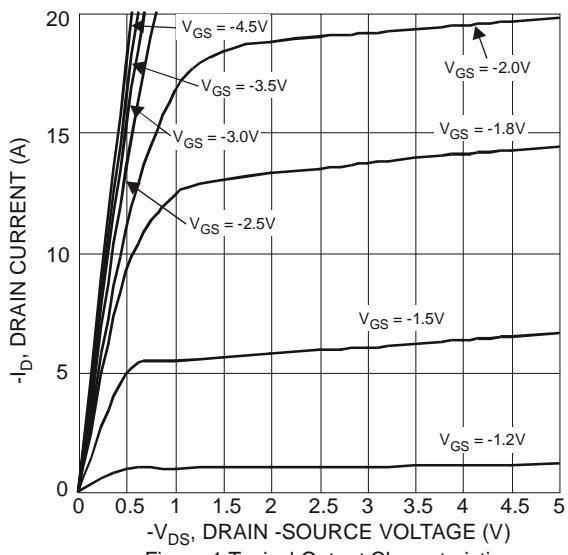


Figure 1 Typical Output Characteristics

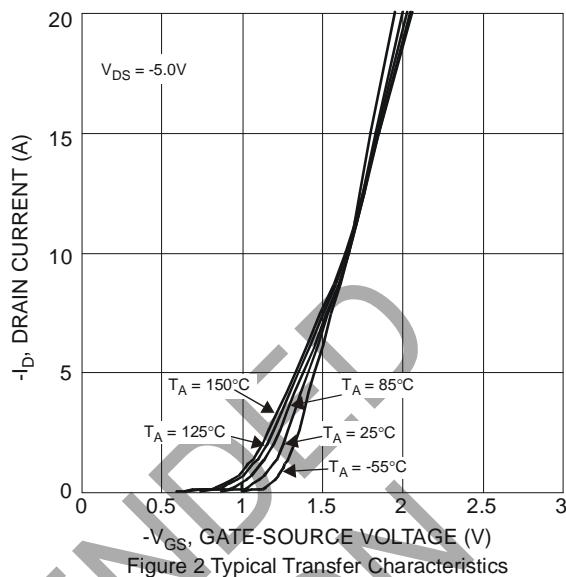


Figure 2 Typical Transfer Characteristics

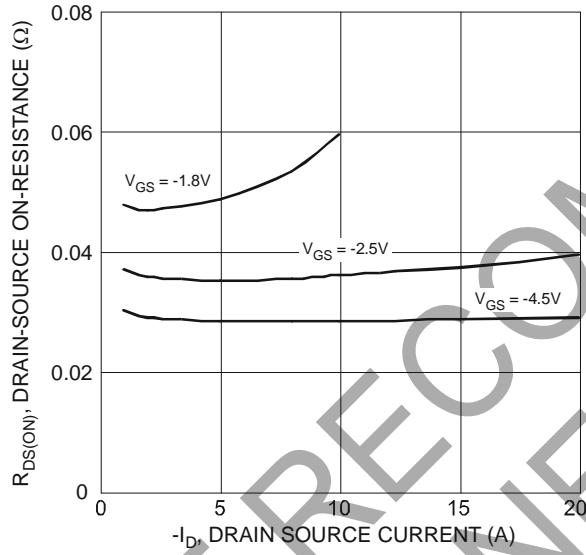


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

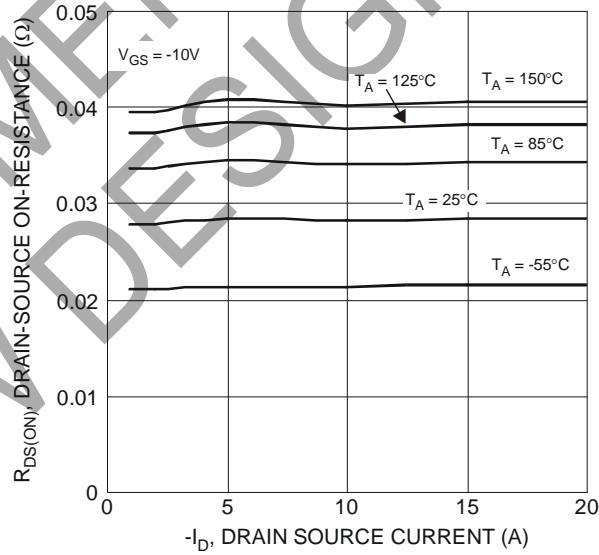


Figure 4 Typical On-Resistance vs.
Drain Current and Temperature

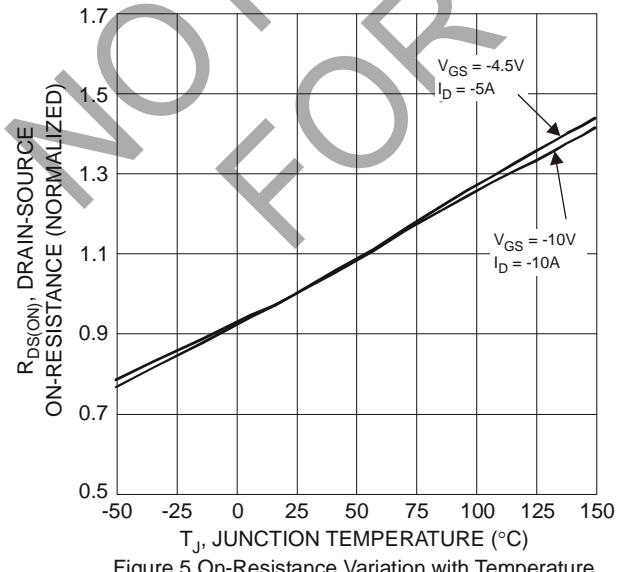


Figure 5 On-Resistance Variation with Temperature

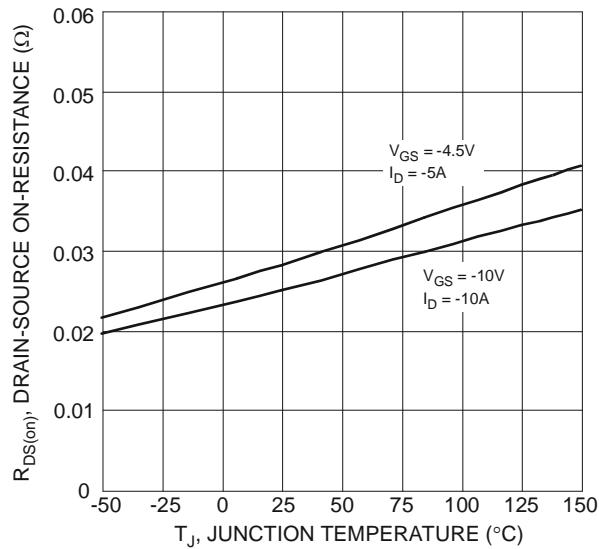
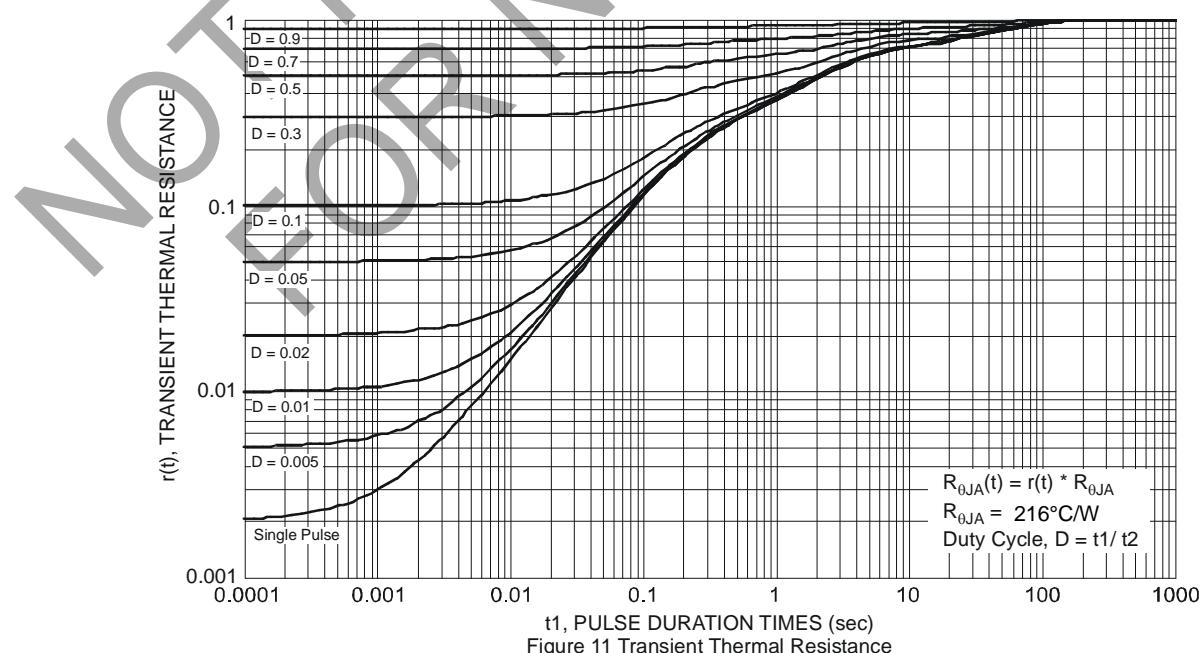
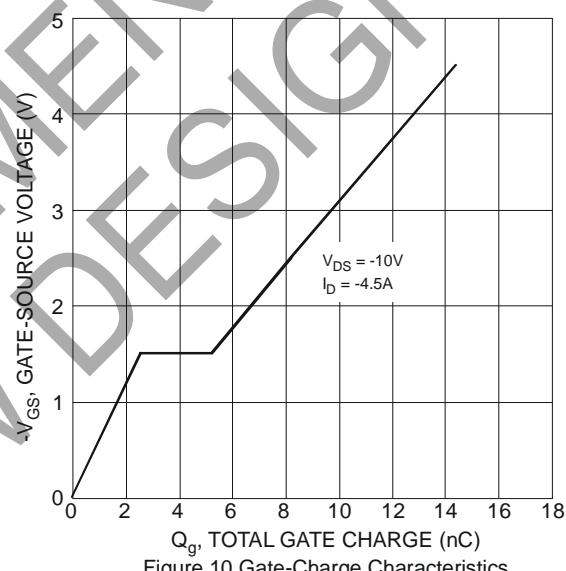
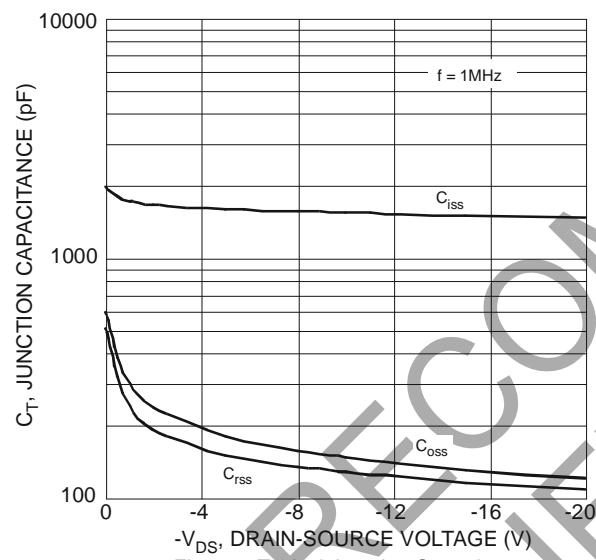
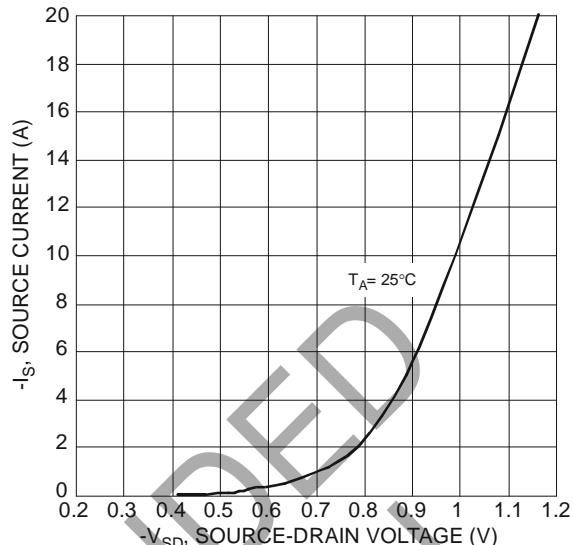
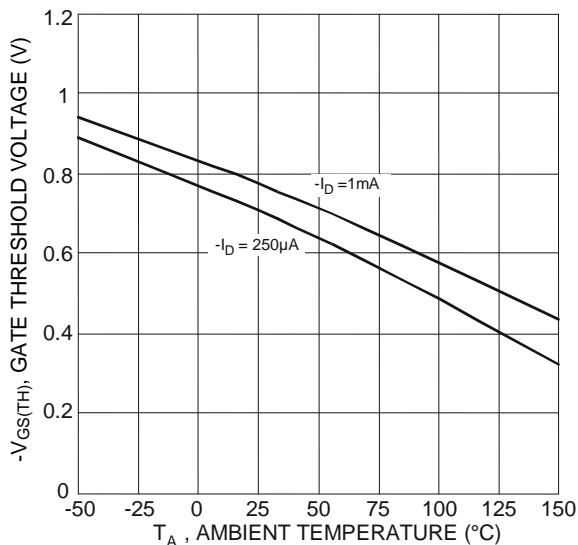


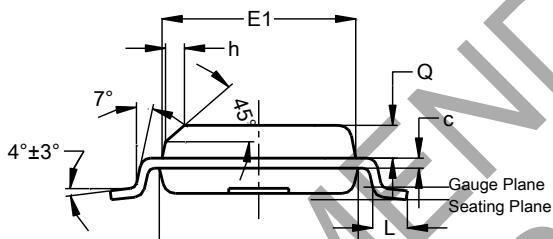
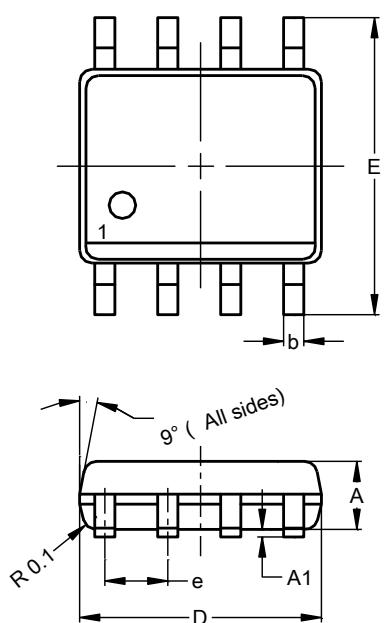
Figure 6 On-Resistance Variation with Temperature



Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SO-8

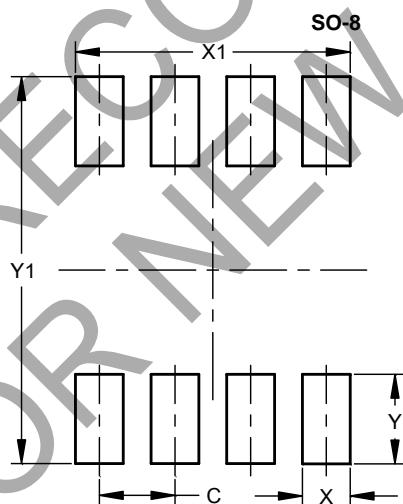


SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	--	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65

All Dimensions in mm

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.



Dimensions	Value (in mm)
C	1.27
X	0.802
X1	4.612
Y	1.505
Y1	6.50

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