20V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	Max $R_{DS(on)}$ (Note 6)	Max I_D T_A = 25°C
-20V	60mΩ @ V_{GS} = -4.5V	-4.23A
	90mΩ @ V_{GS} = -2.5V	-3.49A
	113mΩ @ V_{GS} = -1.8V	-3.11A

Features

- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed
- **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**

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.

Mechanical Data

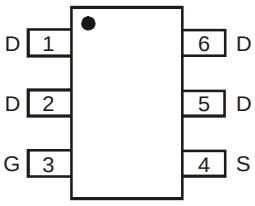
- Case: TSOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.0013 grams (approximate)

Applications

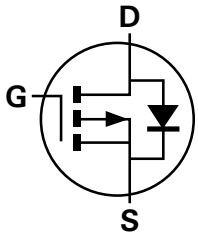
- DC-DC Converters
- Motor Control
- Power management functions
- Analog Switch

TSOT26

Top View



Top View
Pin-Out



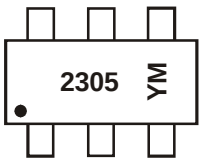
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMP2305UVT-7	2305	7	8	3,000
DMP2305UVT-13	2305	13	8	10,000

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 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 http://www.diodes.com.

Marking Information



2305 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: Y = 2011)
M = Month (ex: 9 = September)

Date Code Key

Year	2011	2012	2013	2014	2015	2016	2017
Code	Y	Z	A	B	C	D	E

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°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-20	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 6) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-4.23 -2.98	A
Continuous Drain Current (Note 6) V_{GS} = -2.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-3.49 -2.79	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	-4.23	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I_{DM}	-16	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation	(Note 5)	P_D	1.25	W
	(Note 6)		1.64	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	100	°C/W
	(Note 6)		76	
Thermal Resistance, Junction to Case	(Note 6)	$R_{\theta JC}$	14	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

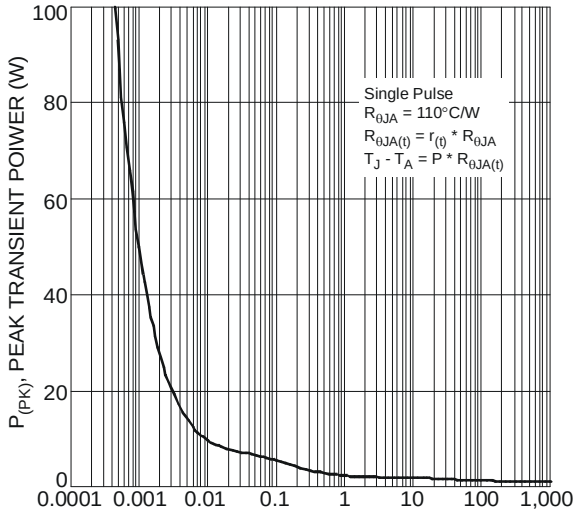


Figure 1 Single Pulse Maximum Power Dissipation

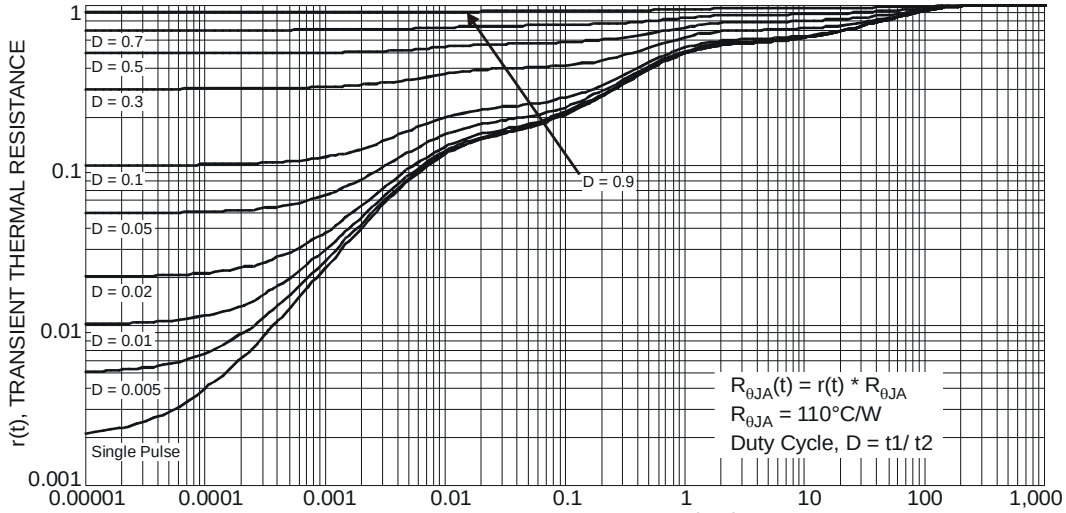


Figure 2 Transient Thermal Resistance

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	V_{GS} = 0V, I_D = -250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	V_{DS} = -20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	—	-0.9	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	45	60	mΩ	V_{GS} = -4.5V, I_D = -4.2A
		—	60	90		V_{GS} = -2.5V, I_D = -3.4A
		—	87	113		V_{GS} = -1.8V, I_D = -2.0A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	9	—	S	V_{DS} = -5V, I_D = -4A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	727	—	pF	V_{DS} = -20V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	69	—		
Reverse Transfer Capacitance	C_{rss}	—	64	—		
Gate Resistance	R_G	—	23	—	Ω	V_{GS} = 0V, V_{DS} = 0V, f = 1.0MHz
Total Gate Charge	Q_g	—	7.6	—	nC	V_{GS} = -4.5V, V_{DS} = -4V, I_D = -3.5A
Gate-Source Charge	Q_{gs}	—	1.4	—		
Gate-Drain Charge	Q_{gd}	—	1.2	—		
Turn-On Delay Time	$t_{D(on)}$	—	14.0	—	ns	V_{DS} = -4V, V_{GS} = -4.5V, R_L = 4Ω, R_G = 6Ω, I_D = -1A
Turn-On Rise Time	t_r	—	13.0	—		
Turn-Off Delay Time	$t_{D(off)}$	—	53.8	—		
Turn-Off Fall Time	t_f	—	23.2	—		

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

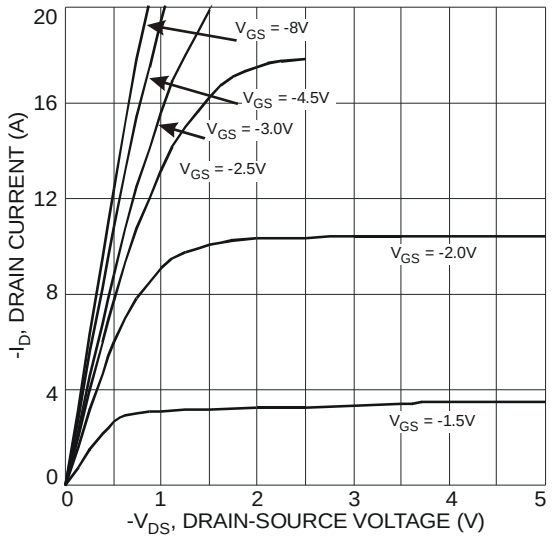


Figure 3 Typical Output Characteristic

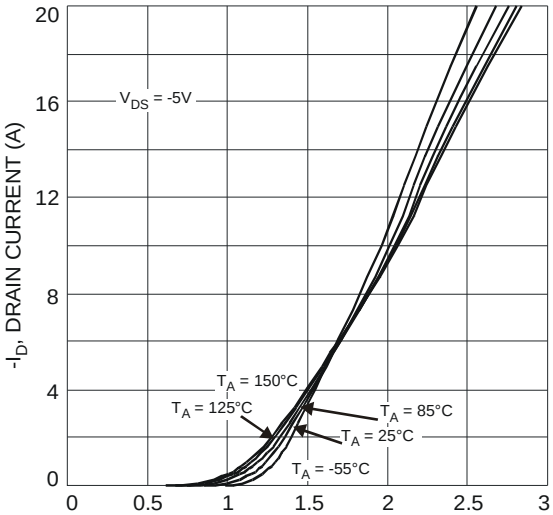


Figure 4 Typical Transfer Characteristic

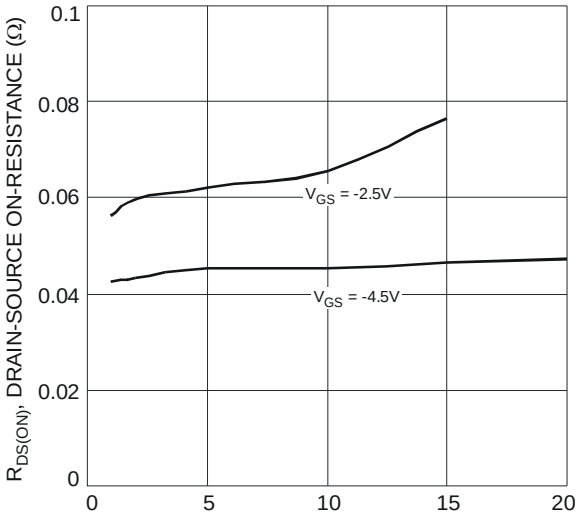


Figure 5 Typical On-Resistance
vs. Drain Current and Gate Voltage

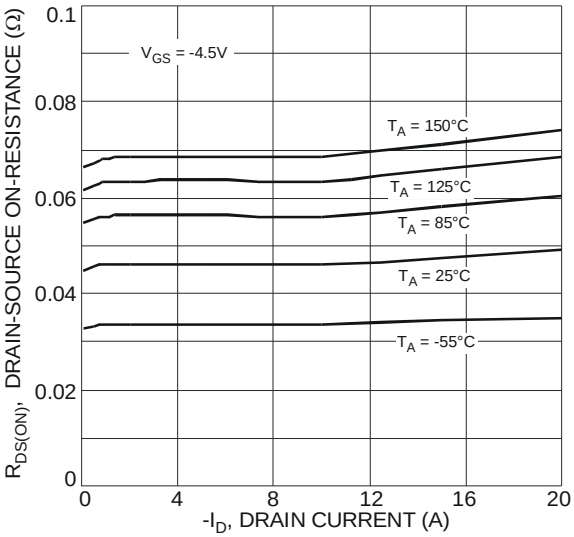


Figure 6 Typical On-Resistance
vs. Drain Current and Temperature

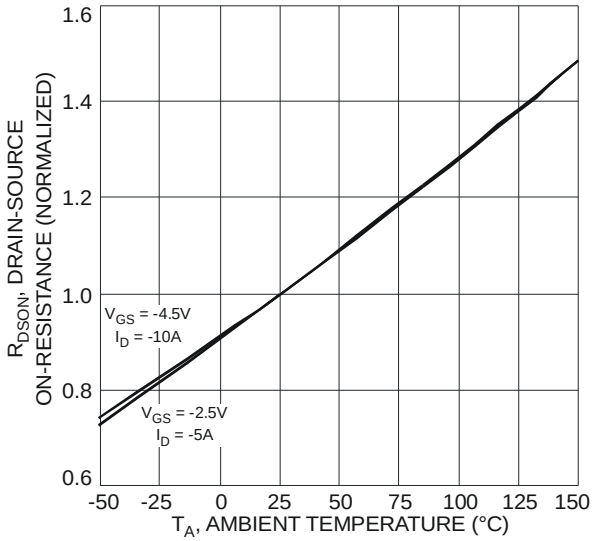


Figure 7 On-Resistance Variation with Temperature

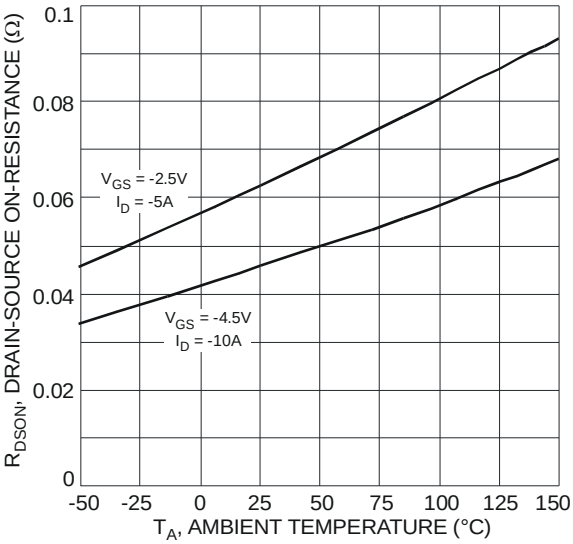


Figure 8 On-Resistance Variation with Temperature

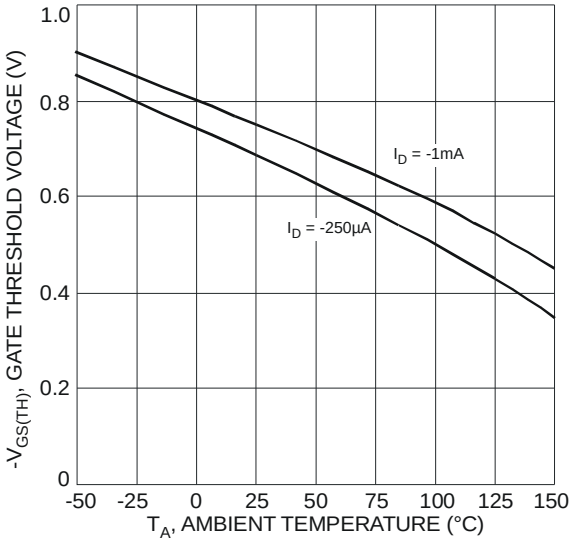


Figure 9 Gate Threshold Variation vs. Ambient Temperature

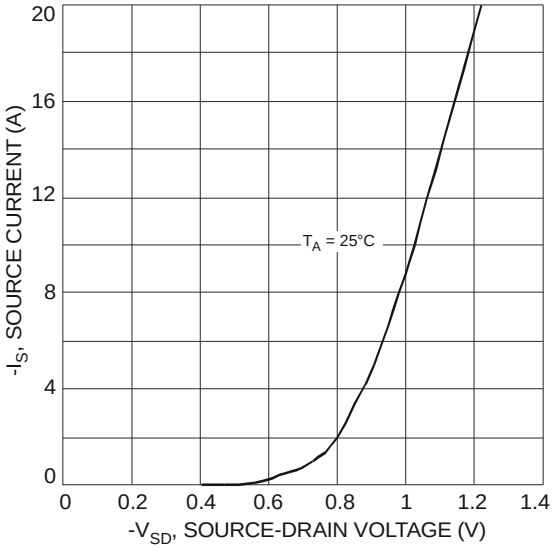


Figure 10 Diode Forward Voltage vs. Current

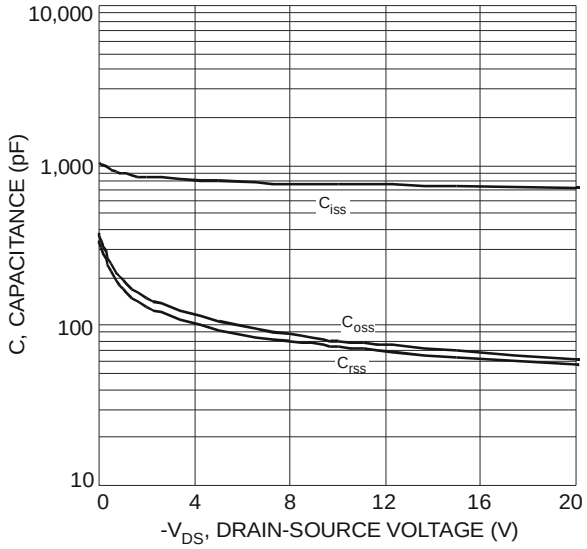


Figure 11 Typical Total Capacitance

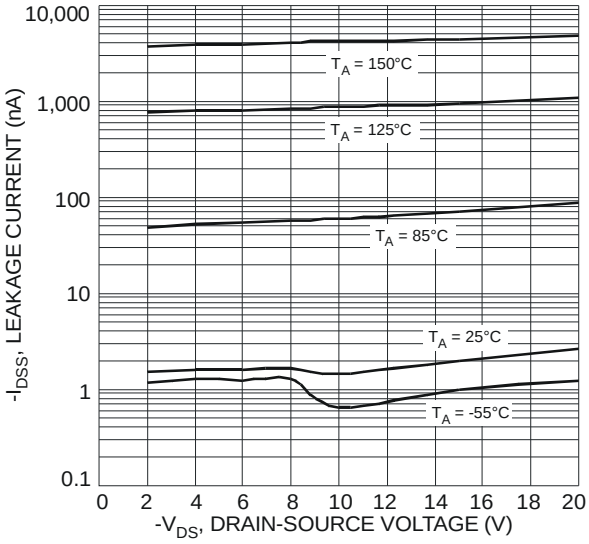
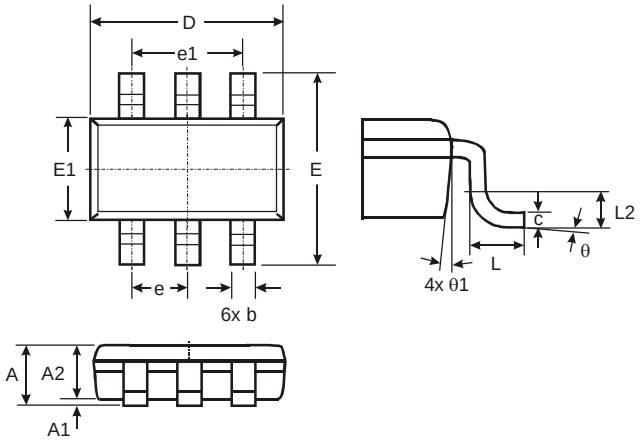


Figure 12 Typical Leakage Current vs. Drain-Source Voltage

Package Outline Dimensions

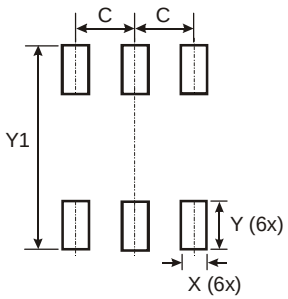
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



TSOT26			
Dim	**Min**	**Max**	**Typ**
A	–	1.00	–
A1	0.01	0.10	–
A2	0.84	0.90	–
D	–	–	2.90
E	–	–	2.80
E1	–	–	1.60
b	0.30	0.45	–
c	0.12	0.20	–
e	–	–	0.95
e1	–	–	1.90
L	0.30	0.50	
L2	–	–	0.25
θ	0°	8°	4°
θ1	4°	12°	–
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	0.950
X	0.700
Y	1.000
Y1	3.199

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