

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON) \max}$	$I_D$ $T_A = +25^\circ\text{C}$
-20V	65mΩ @ $V_{GS} = -4.5\text{V}$	-4.2A
	100mΩ @ $V_{GS} = -2.5\text{V}$	-3.4A

## Description

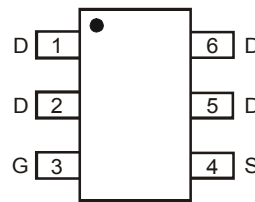
This MOSFET has been designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

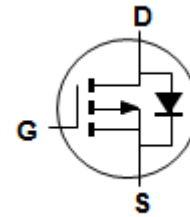
- Backlighting
- Power Management Functions
- DC-DC Converters
- Motor Control



Top View



Top View  
Pin-Out



Internal Schematic

## Features

- Low On-Resistance
- Low Input Capacitance
- 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**

## Mechanical Data

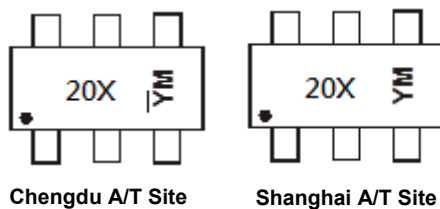
- Case: TSOT26
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – MatteTin annealed over Copper leadframe.  
Solderable per MIL-STD-202, Method 208 E3
- Weight: 0.0013 grams (approximate)

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2033UVT-7	TSOT26	3000/Tape & Reel
DMP2033UVT -13	TSOT26	10000/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](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 <http://www.diodes.com/products/packages.html>.

## Marking Information



Chengdu A/T Site

Shanghai A/T Site

20X = Product Type Marking Code  
 YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)  
 $\overline{Y}M$  = Date Code Marking for CAT (Chengdu Assembly/ Test site)  
 Y or  $\overline{Y}$  = Year (ex: A = 2013)  
 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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	-20	V
Gate-Source Voltage			V <sub>GSS</sub>	±8	V
Continuous Drain Current (Note 6)	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	-4.2	A
		T <sub>A</sub> = +70°C		-3.4	
Pulsed Drain Current (Note 6)			I <sub>DM</sub>	-10	A

**Thermal Characteristics**

Characteristic			Symbol	Value	Units
Total Power Dissipation (Note 5)			P <sub>D</sub>	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)		Steady State	R <sub>θJA</sub>	100	°C/W
Total Power Dissipation (Note 6)			P <sub>D</sub>	1.7	W
Thermal Resistance, Junction to Ambient (Note 6)		Steady State	R <sub>θJA</sub>	74	°C/W
Operating and Storage Temperature Range			T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1.0	μA	T <sub>J</sub> = +25°C, V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-0.5	—	-0.9	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	—	45	65	mΩ	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4.2A
			57	100		
			80	200		
Forward Transfer Admittance	Y <sub>fs</sub>	—	9	—	S	V <sub>DS</sub> = -5V, I <sub>D</sub> = -4A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	845	—	pF	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	72	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	63	—	pF	
<b>SWITCHING CHARACTERISTICS (Note 8)</b>						
Total Gate Charge	Q <sub>g</sub>	—	10.4	—	nC	V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -4V, I <sub>D</sub> = -3.5A
Gate-Source Charge	Q <sub>gs</sub>	—	1.5	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	1.9	—	nC	
Turn-On Delay Time	t <sub>D(on)</sub>	—	6.5	—	ns	V <sub>DS</sub> = -4V, V <sub>GS</sub> = -4.5V, R <sub>G</sub> = 6Ω, I <sub>D</sub> = -1A
Turn-On Rise Time	t <sub>r</sub>	—	13.4	—	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	—	51.5	—	ns	
Turn-Off Fall Time	t <sub>f</sub>	—	21.8	—	ns	

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

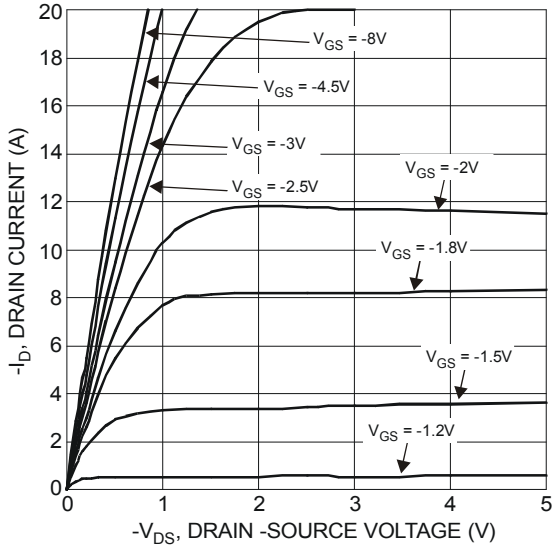


Figure 1 Typical Output Characteristics

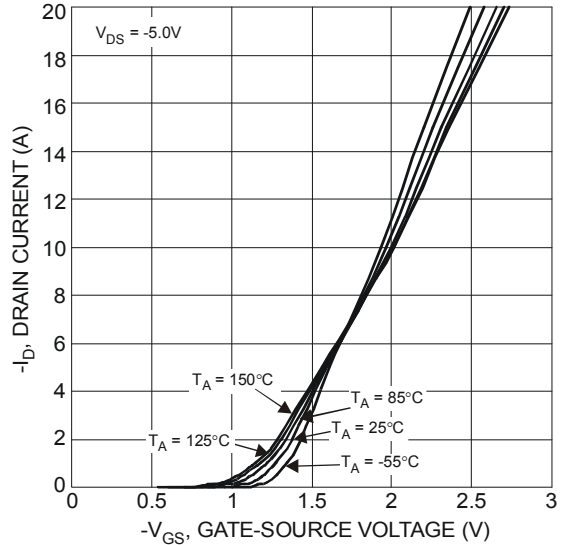


Figure 2 Typical Transfer Characteristics

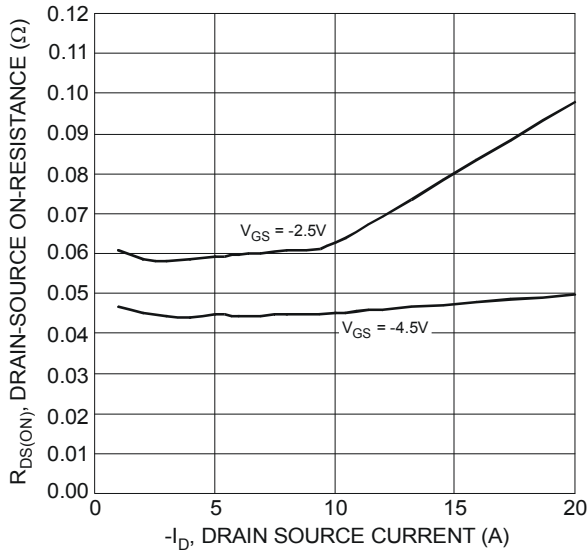


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

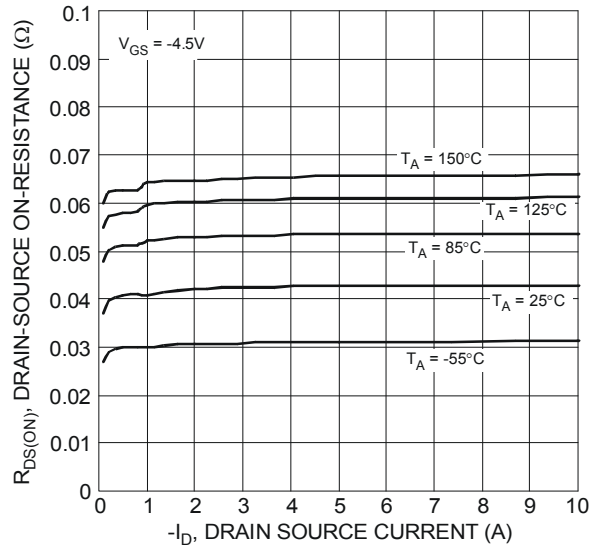


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

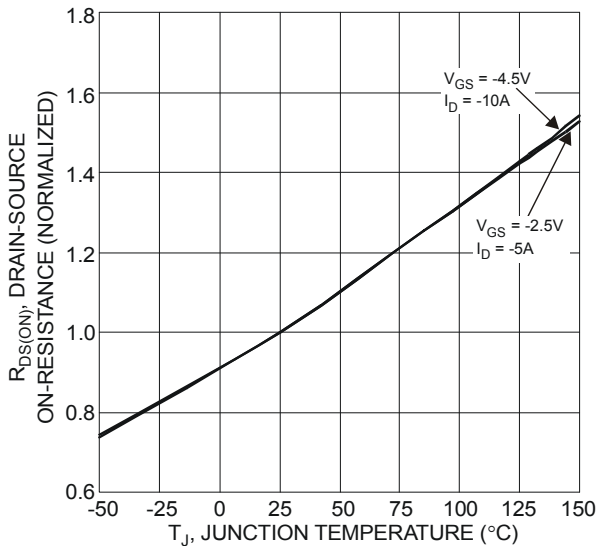


Figure 5 On-Resistance Variation with Temperature

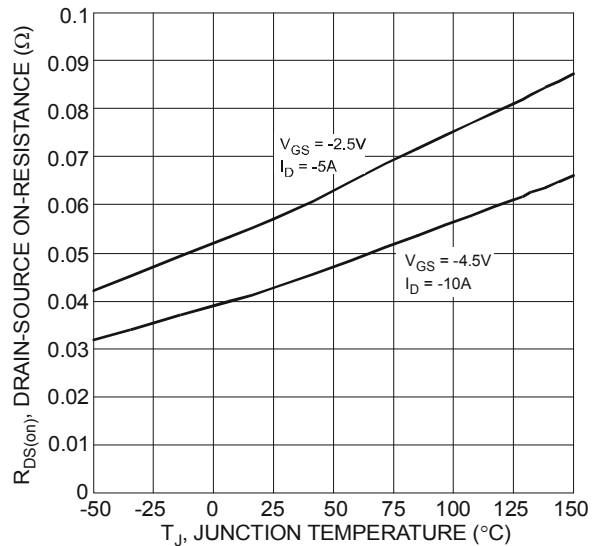


Figure 6 On-Resistance Variation with Temperature

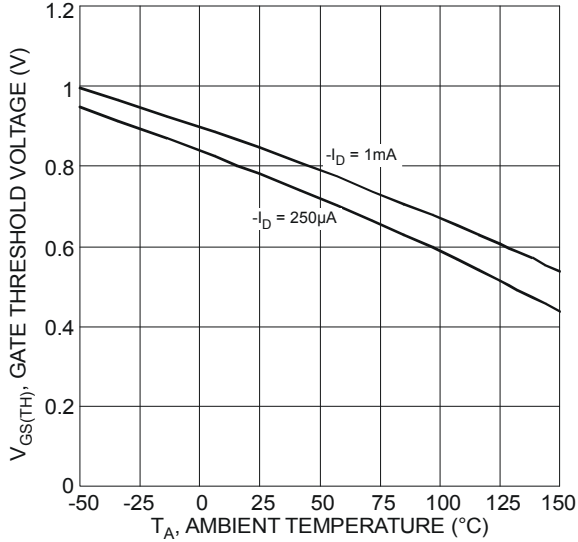


Figure 7 Gate Threshold Variation vs. Ambient Temperature

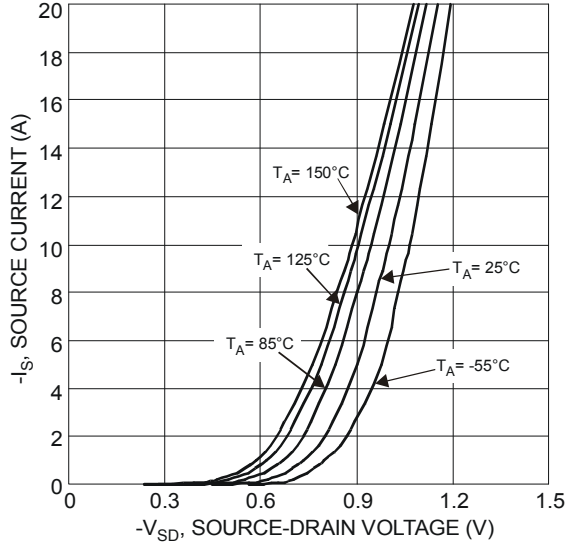


Figure 8 Diode Forward Voltage vs. Current

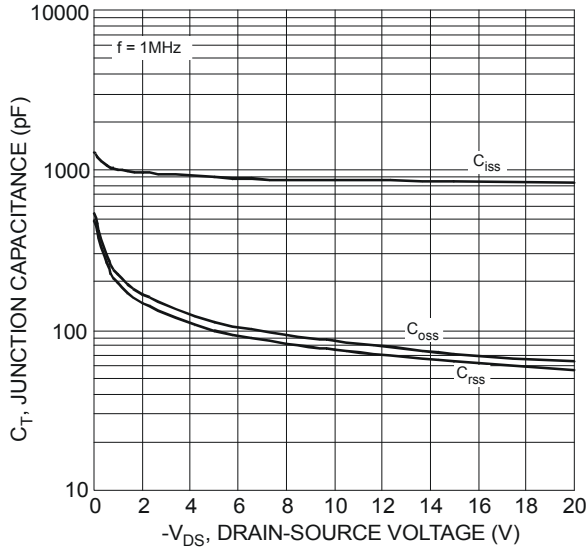


Figure 9 Typical Junction Capacitance

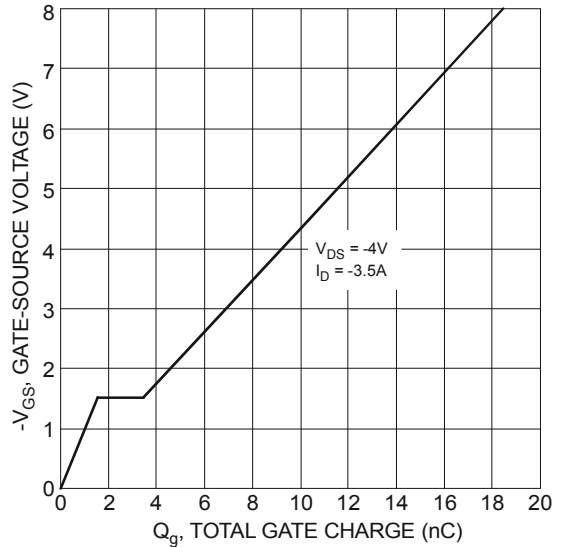
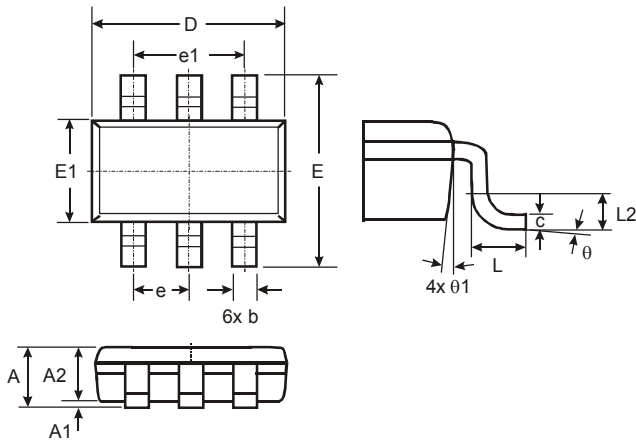


Figure 10 Gate-Charge Characteristics

**Package Outline Dimensions**

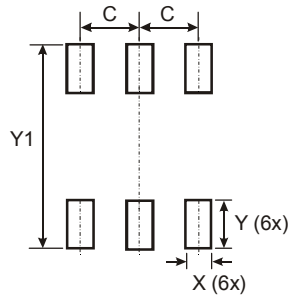
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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°	-
<b>All Dimensions in mm</b>			

## Suggested Pad Layout

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



Dimensions	Value (in mm)
<b>C</b>	0.950
<b>X</b>	0.700
<b>Y</b>	1.000
<b>Y1</b>	3.199

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#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.