Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D T_A = +25°C
30V	2Ω @ V_{GS} = 4V	270mA
	3.2Ω @ V_{GS} = 2.5V	210mA

Description and Applications

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

- Backlighting
- DC-DC converters
- Power-management functions

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- ESD Protected Up to 2kV
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at https://www.diodes.com/products/automotive/automotive-products/.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. https://www.diodes.com/quality/product-definitions/**

Mechanical Data

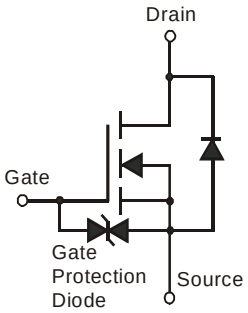
- Package: SOT523
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Alloy 42 Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminal Connections: See Diagram
- Weight: 0.002 grams (Approximate)



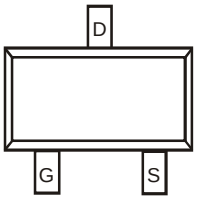
SOT523



Top View



Equivalent Circuit



Top View
Pin-Out

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN313DLT-7	SOT523	3000	Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ 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/.

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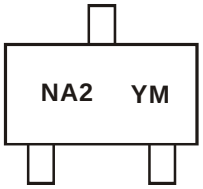
Marking Information



NA2 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: L = 2024)
M = Month (ex: 9 = September)

Date Code Key

Year	2010	…	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	X	…	L	M	N	P	R	S	T	U	V	W

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	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 5) V_{GS} = 4.0V	Steady State	T_A = +25°C T_A = +70°C	I_D	0.27 0.21	A
Continuous Drain Current (Note 6) V_{GS} = 4.0V	Steady State	T_A = +25°C T_A = +70°C	I_D	0.31 0.25	A
Continuous Drain Current (Note 6) V_{GS} = 4.0V	t ≤ 10s	T_A = +25°C T_A = +70°C	I_D	0.38 0.3	A
Continuous Drain Current (Note 5) V_{GS} = 2.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	0.21 0.15	A
Continuous Drain Current (Note 6) V_{GS} = 2.5V	t ≤ 10s	T_A = +25°C T_A = +70°C	I_D	0.29 0.22	A
Pulsed Drain Current (Note 7)			I_{DM}	1.2	A

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 5)	P_D	0.28	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	474	°C/W
Power Dissipation (Note 6)	P_D	0.36	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 6)	$R_{\theta JA}$	361	°C/W
Power Dissipation (Note 6) t ≤ 10s	P_D	0.52	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 6) t ≤ 10s	$R_{\theta JA}$	252	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
6. Device mounted on 2" x 2" FR-4 PCB with high coverage 2 oz. Copper, single sided.
7. Repetitive rating, pulse width limited by junction temperature.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current, T_J = +25°C	I_{DSS}	—	—	0.1	μA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±1.0	μA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.5	—	1.5	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	1.3	2	Ω	V_{GS} = 4V, I_D = 10mA
		—	1.6	3.2		V_{GS} = 2.5V, I_D = 1mA
Forward Transfer Admittance	$\|Y_{FS}\|$	—	93	—	mS	V_{DS} = 3V, I_D = 10mA
Diode Forward Voltage	V_{SD}	—	0.7	1.3	V	V_{GS} = 0V, I_S = 115mA
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	36.3	—	pF	V_{DS} = 5V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	7.6	—		
Reverse Transfer Capacitance	C_{rss}	—	4.7	—		
Gate Resistance	R_g	—	128	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	—	0.5	—	nC	V_{GS} = 4.5V, V_{DS} = 15V, I_D = 10mA
Gate-Source Charge	Q_{gs}	—	0.1	—		
Gate-Drain Charge	Q_{gd}	—	0.1	—		
Turn-On Delay Time	$t_{D(ON)}$	—	4.5	—	ns	V_{GS} = 4.5V, V_{DS} = 15V, R_G = 2Ω, I_D = 180mA
Turn-On Rise Time	t_R	—	2.24	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	19.2	—	ns	
Turn-Off Fall Time	t_F	—	28.2	—	ns	

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

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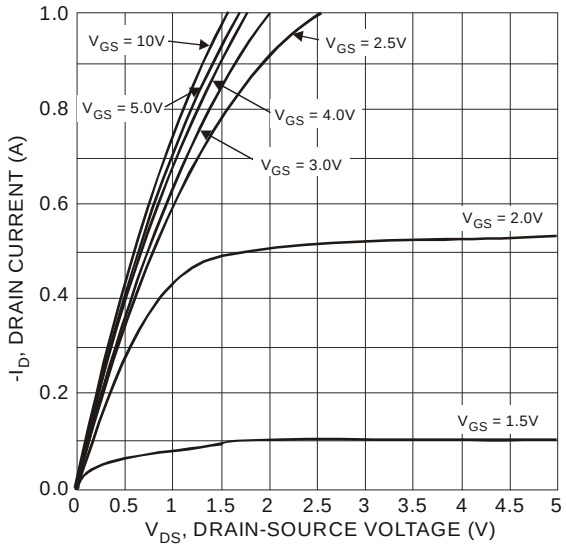

Fig. 1 Typical Output Characteristics

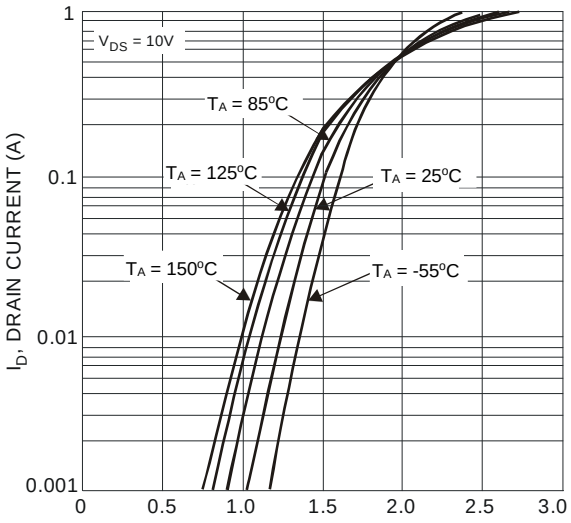

Fig. 2 Typical Transfer Characteristics

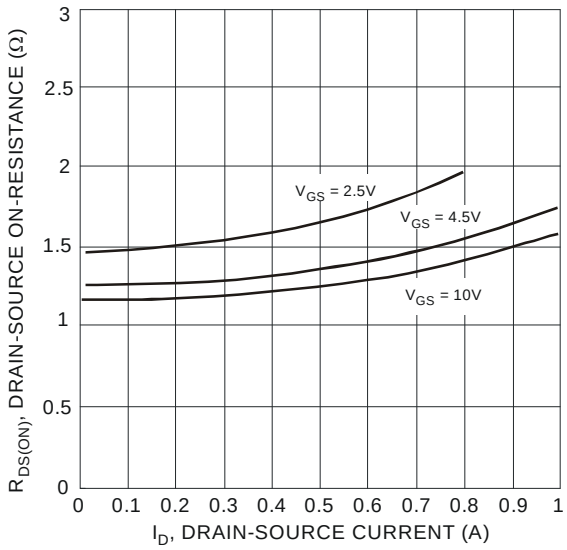

Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

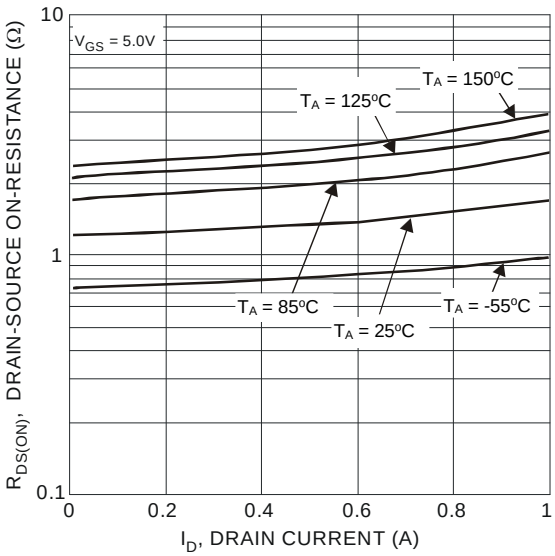

Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

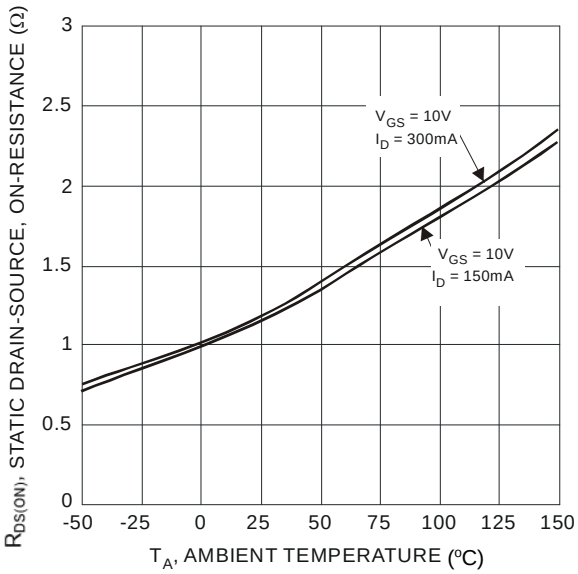

Fig. 5 On-Resistance Variation with Temperature

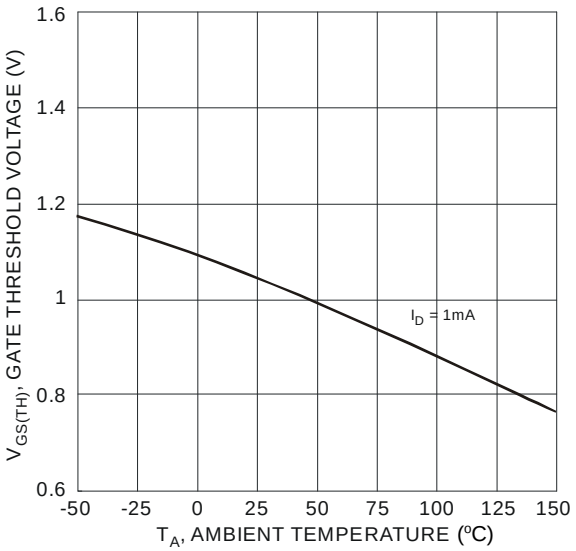

Fig. 6 Gate Threshold Variation vs. Ambient Temperature

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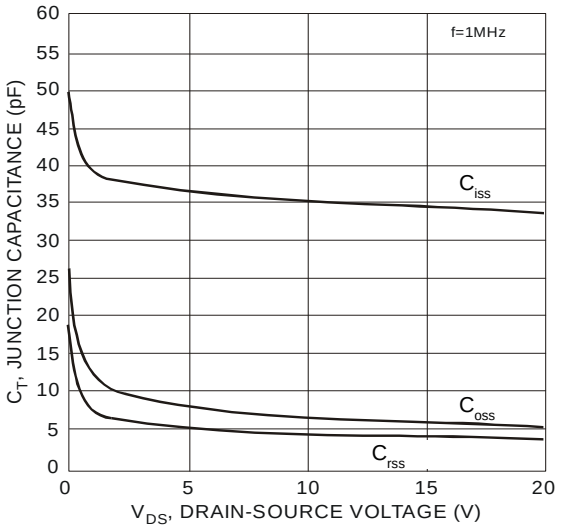

Fig. 7 Typical Junction Capacitance

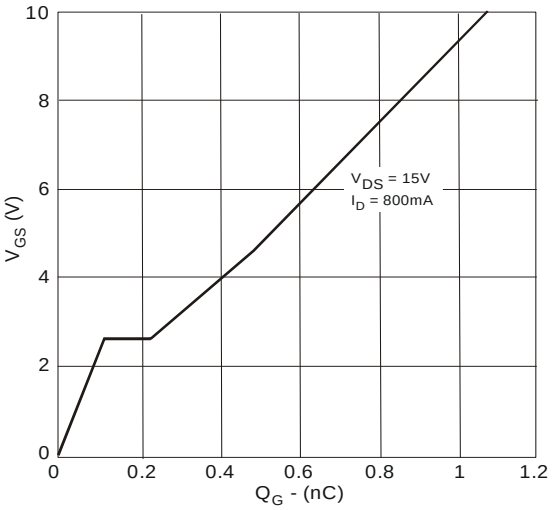

Fig. 8 Gate Charge Characteristics

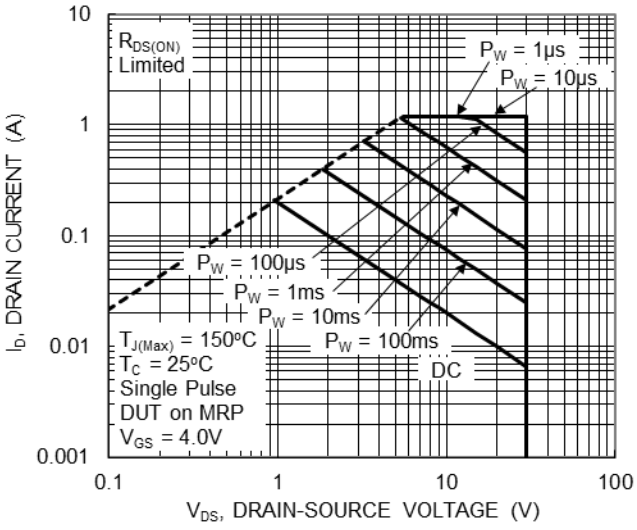

Fig. 9 SOA, Safe Operation Area

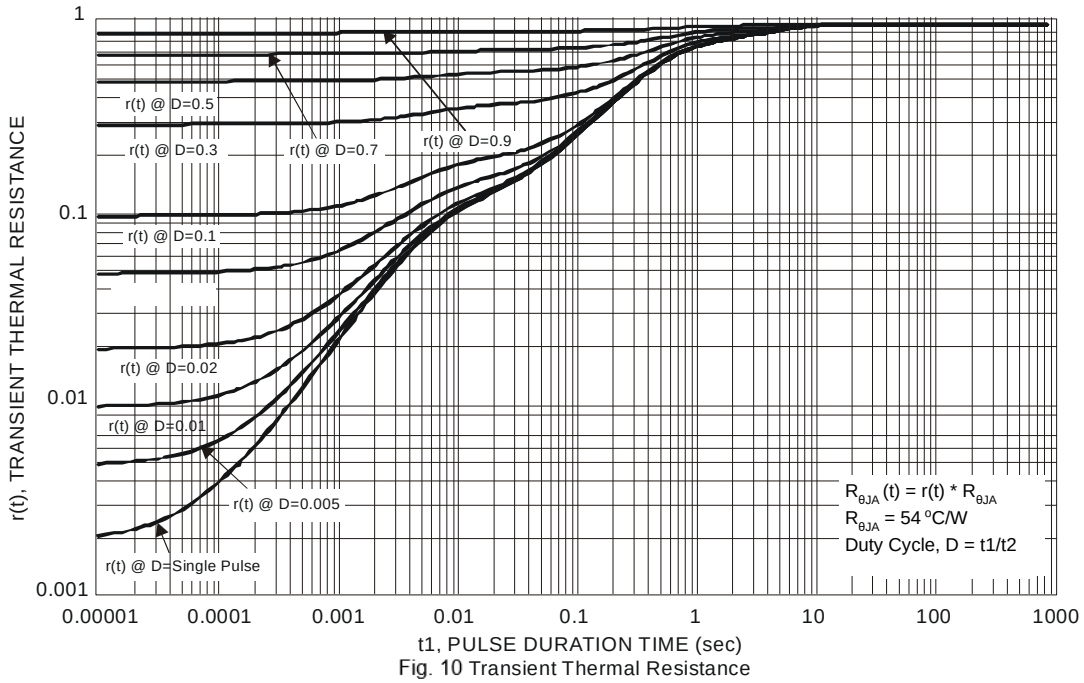

Fig. 10 Transient Thermal Resistance

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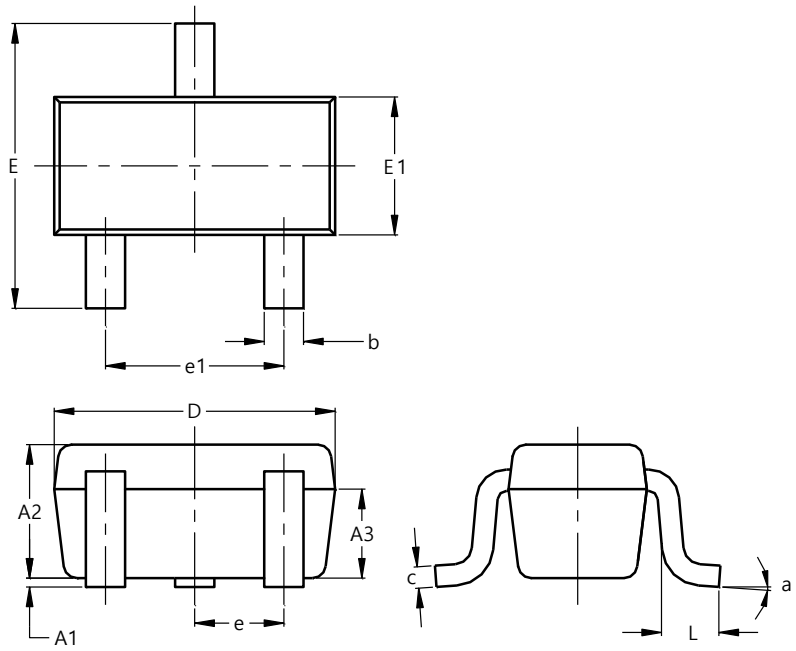
Package Outline Dimensions

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

SOT523

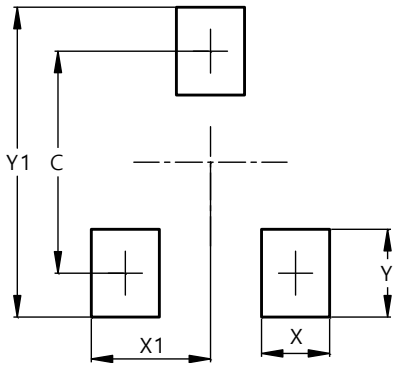


SOT523			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.60	0.80	0.75
A3	0.45	0.65	0.50
b	0.15	0.30	0.22
c	0.10	0.20	0.12
D	1.50	1.70	1.60
E	1.45	1.75	1.60
E1	0.75	0.85	0.80
e	0.50 BSC		
e1	0.90	1.10	1.00
L	0.20	0.40	0.33
a	0°	--	8°
All Dimensions in mm			

Suggested Pad Layout

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

SOT523



Dimensions	Value (in mm)
C	1.29
X	0.40
X1	0.70
Y	0.51
Y1	1.80

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