

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
20V	0.48Ω @ V _{GS} = 5V	1.33A
	0.7Ω @ V _{GS} = 2.5V	1.2A

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

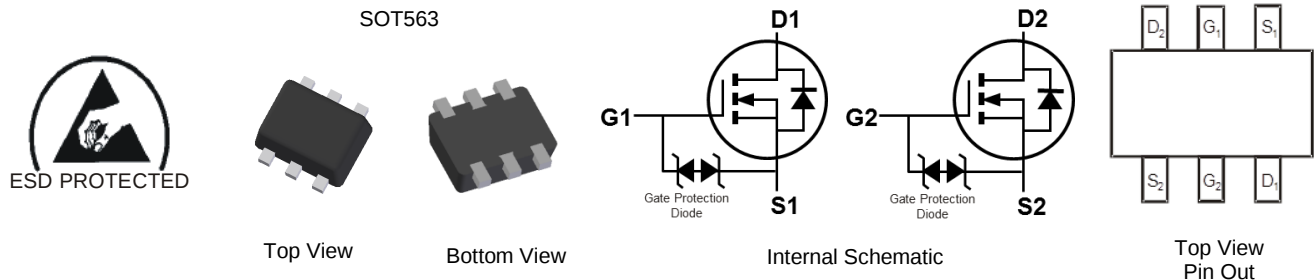
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Load Switch

Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected Gate**
- **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-Q101, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative.**
- <https://www.diodes.com/quality/product-definitions/>

Mechanical Data

- Case: SOT563
- 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 – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.003 grams (Approximate)

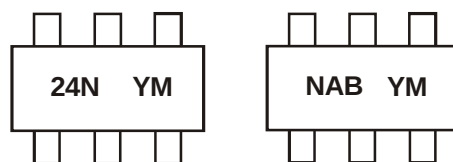


Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2400UV-7	SOT563	3,000/Tape & Reel
DMN2400UV-13	SOT563	10,000/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/>.

Marking Information



24N and NAB = Marking Code
YM = Date Code Marking
Y = Year (ex: G = 2019)
M = Month (ex: 9 = September)

Date Code Key

Year	2009	~	2019	2020	2021	2022	2023
Code	W	~	G	H	I	J	K

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}	20	V
Gate-Source Voltage			V _{GSS}	±12	V
Continuous Drain Current (Note 5)	Steady State	T _A = +25°C	I _D	1.33	A
		T _A = +85°C		0.84	
Pulsed Drain Current			I _{DM}	3	A

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	530	mW
Thermal Resistance, Junction to Ambient	R _{θJA}	233.8	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV _{DSS}	20	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	100	nA	V _{DS} = 20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±1.0	μA	V _{GS} = ±4.5V, V _{DS} = 0V
		—	—	±50		V _{GS} = ±10V, V _{DS} = 0V
ON CHARACTERISTICS (Note 6)						
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)}	—	0.3	0.48	Ω	V _{GS} = 5.0V, I _D = 200mA
		—	0.35	0.5		V _{GS} = 4.5V, I _D = 600mA
		—	0.45	0.7		V _{GS} = 2.5V, I _D = 500mA
		—	0.55	0.9		V _{GS} = 1.8V, I _D = 350mA
		—	0.65	1.5		V _{GS} = 1.5V, I _D = 50mA
Forward Transfer Admittance	Y _{fs}	—	1.4	—	S	V _{DS} = 10V, I _D = 400mA
Diode Forward Voltage (Note 6)	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 150mA, f = 1.0MHz
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C _{iss}	—	36.0	—	pF	V _{DS} =16V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	5.7	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	4.2	—	pF	
Gate Resistance	R _g	—	68	—	Ω	V _{DS} = 0V, V _{GS} = 0V
Total Gate Charge	Q _g	—	0.5	—	nC	V _{GS} =4.5V, V _{DS} = 10V, I _D =250mA
Gate-Source Charge	Q _{gs}	—	0.07	—	nC	
Gate-Drain Charge	Q _{gd}	—	0.1	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	4.06	—	ns	V _{DD} = 10V, V _{GS} = 4.5V, R _L = 47Ω, R _G = 10Ω, I _D = 200mA
Turn-On Rise Time	t _R	—	7.28	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	13.74	—	ns	
Turn-Off Fall Time	t _F	—	10.54	—	ns	

- Notes:
- Device soldered onto FR-4 PCB, minimum recommended soldering pad dimensions (25.4mm x 25.4mm x 1.6mm, 2oz Cu pad: 0.18mm² x 6).
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

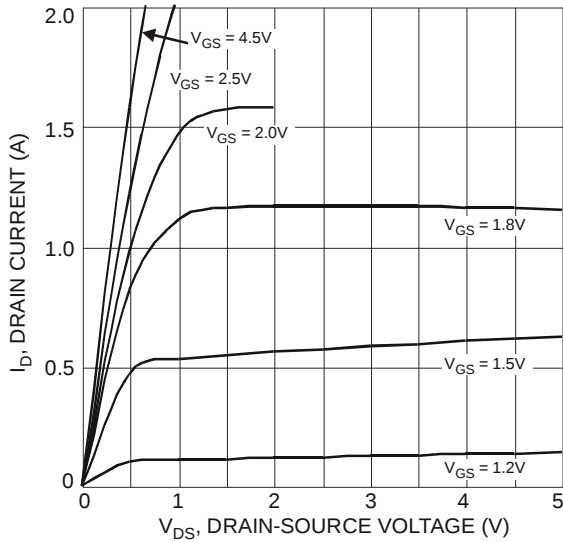


Fig. 1 Typical Output Characteristics

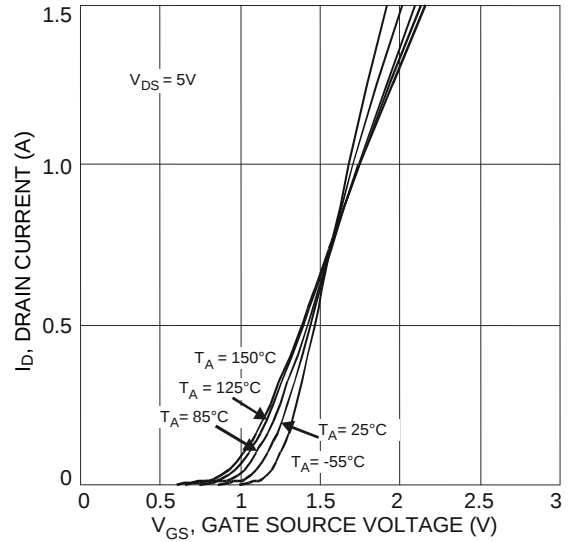


Fig. 2 Typical Transfer Characteristics

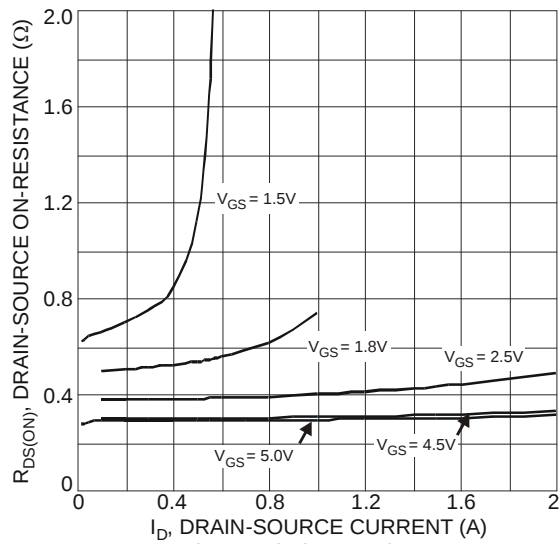


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

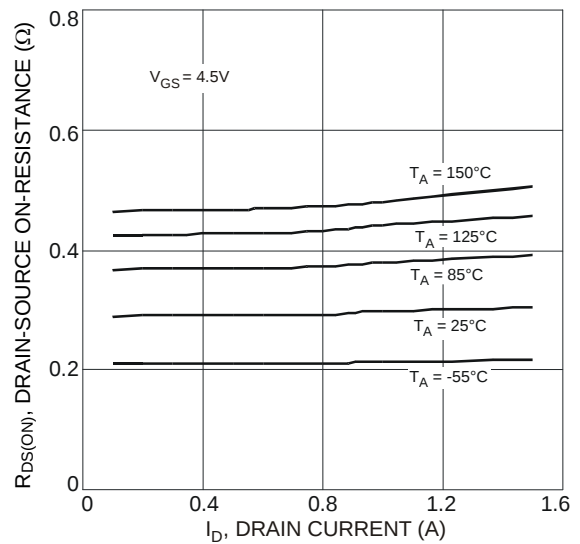


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

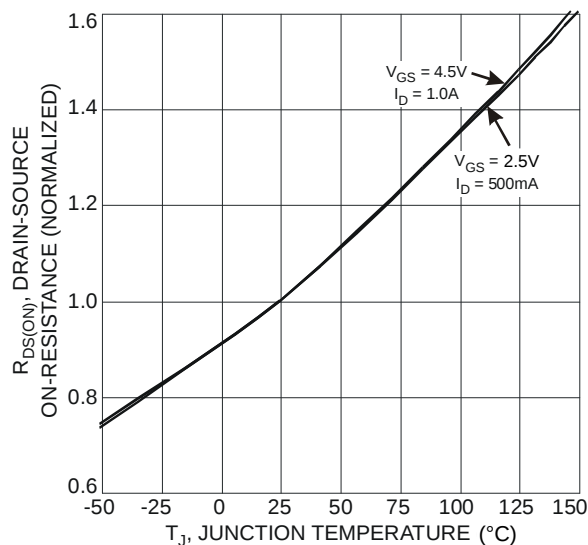


Fig. 5 On-Resistance Variation with Temperature

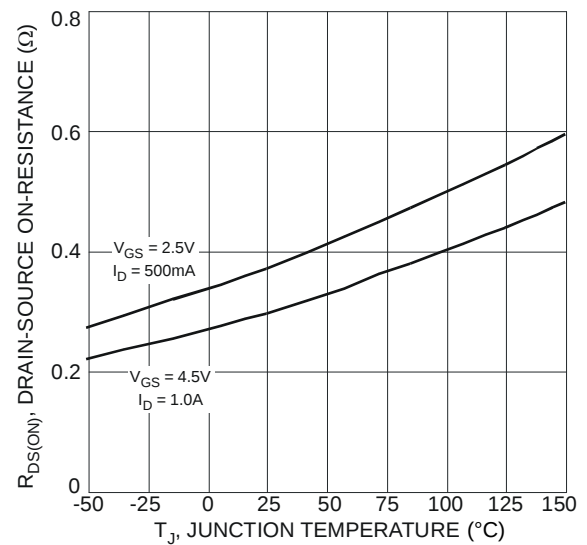


Fig. 6 On-Resistance Variation with Temperature

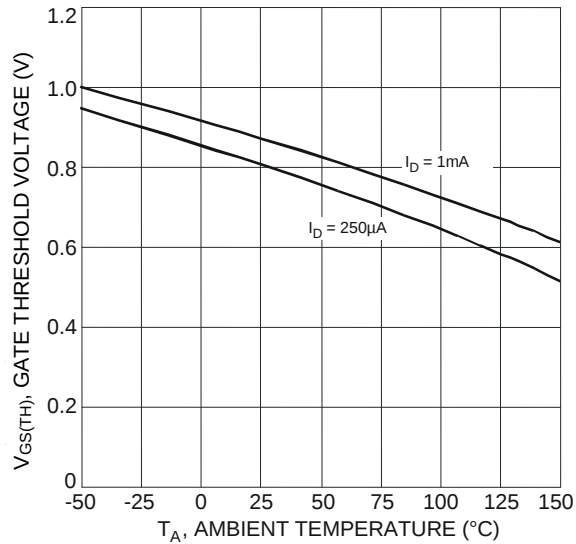


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

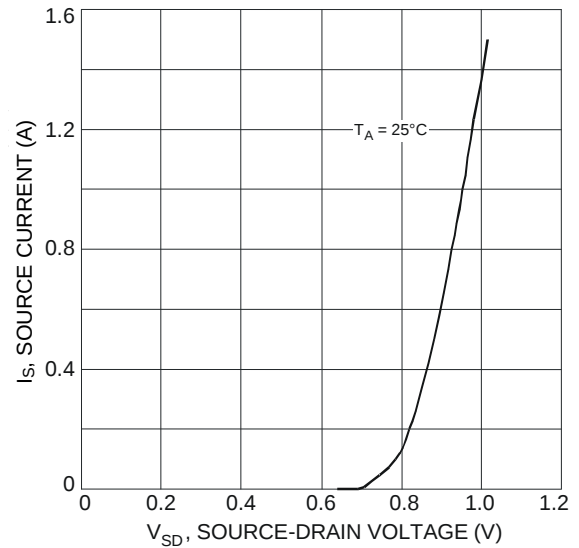


Fig. 8 Diode Forward Voltage vs. Current

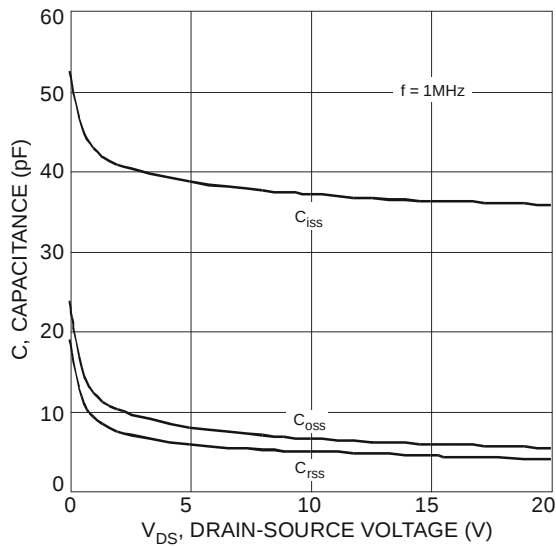


Fig. 9 Typical Capacitance

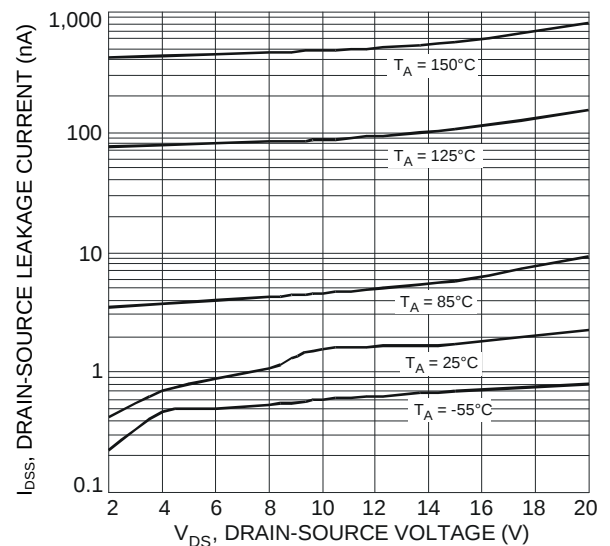


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

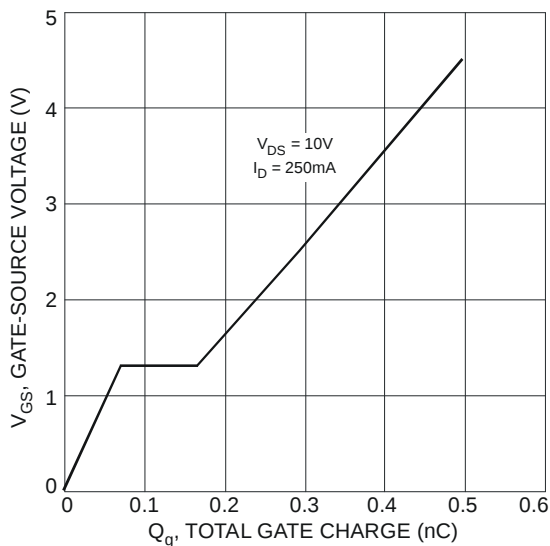


Fig. 11 Gate-Charge Characteristics

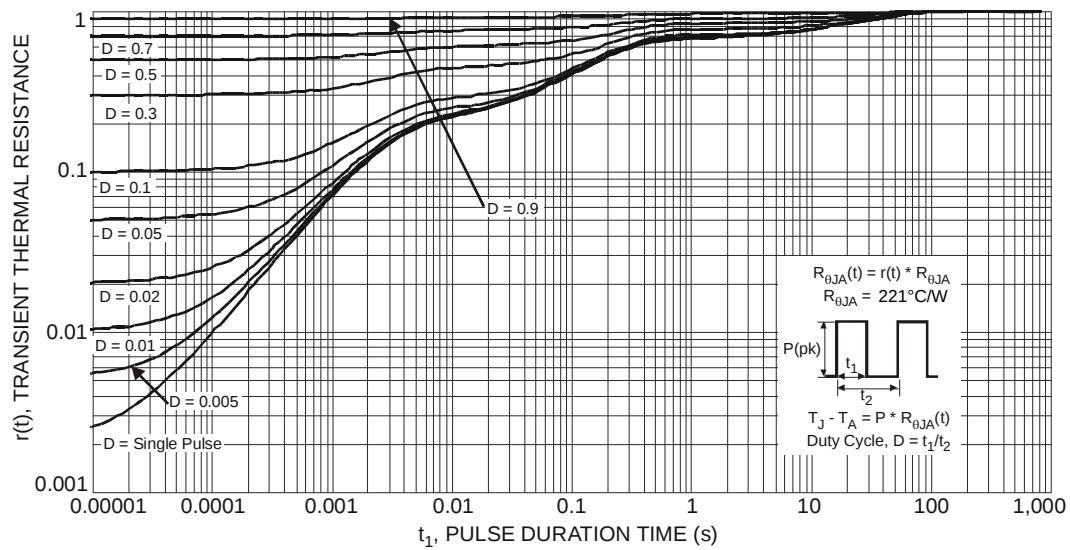
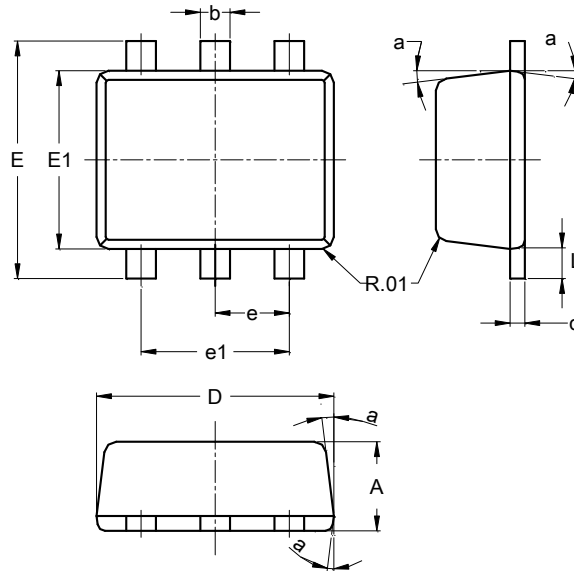


Fig. 12 Transient Thermal Response

Package Outline Dimensions

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

SOT563

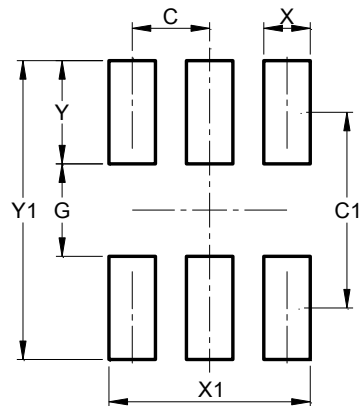


SOT563			
Dim	Min	Max	Typ
A	0.55	0.60	0.60
b	0.15	0.30	0.20
c	0.10	0.18	0.11
D	1.50	1.70	1.60
E	1.55	1.70	1.60
E1	1.10	1.25	1.20
e	--	--	0.50
e1	0.90	1.10	1.00
L	0.10	0.30	0.20
a	8°	9°	7°
All Dimensions in mm			

Suggested Pad Layout

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

SOT563



Dimensions	Value (in mm)
C	0.500
C1	1.270
G	0.600
X	0.300
X1	1.300
Y	0.670
Y1	1.940

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