

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
30V	3Ω @ V _{GS} = 4.5V	250mA
	5Ω @ V _{GS} = 4.0V	200mA
	7Ω @ V _{GS} = 2.5V	100mA

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- ESD Protected
- **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**
- **PPAP Capable (Note 4)**

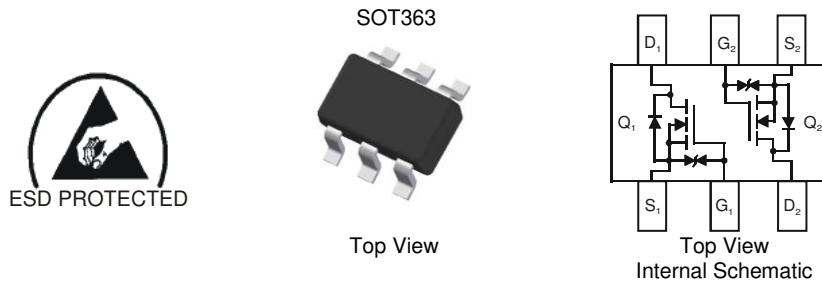
Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Motor Control
- DC-DC Converters
- Backlighting

Mechanical Data

- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Alloy 42 Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.006 grams (Approximate)

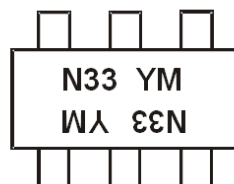


Ordering Information (Note 5)

Part Number	Case	Packaging
DMN33D8LDWQ-7	SOT363	3,000/Tape & Reel
DMN33D8LDWQ-13	SOT363	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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



N33 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: G = 2019)
 M = Month (ex: 9 = September)

Date Code Key

Year	2019	2020	2021	2022	2023	2024	2025
Code	G	H	I	J	K	L	M

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 6) V _{GS} = 4.5V	Steady State	T _A = +25°C	250	mA
		T _A = +70°C	200	
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	0.5	A	
Pulsed Drain Current (10µs Pulse, Duty Cycle=1%)	I _{DM}	0.8	A	

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

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 6)	P _D	T _A = +25°C	0.35	W
		T _A = +70°C	0.22	
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	360	°C/W	
Thermal Resistance, Junction to Case	R _{θJC}	126		
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 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	30	—	—	V	V _{GS} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	µA	@T _C = +25°C, V _{DS} = 30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	µA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	0.8	—	1.5	V	V _{DS} = 3V, I _D = 100µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	—	2.4	Ω	V _{GS} = 10V, I _D = 250mA
		—	—	3.0		V _{GS} = 4.5V, I _D = 250mA
		—	—	5.0		V _{GS} = 4.0V, I _D = 10mA
		—	—	7.0		V _{GS} = 2.5V, I _D = 5mA
Diode Forward Voltage	V _{SD}	—	—	1.2	V	V _{GS} = 0V, I _S = 115mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iSS}	—	48	—	pF	V _{DS} = 5V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oSS}	—	11	—	pF	
Reverse Transfer Capacitance	C _{rSS}	—	8	—	pF	
Gate Resistance	R _g	—	57	—	Ω	f=1MHz, V _{GS} =0V, V _{DS} =0V
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	0.55	—	nC	V _{DS} = 10V, I _D = 250mA
Total Gate Charge (V _{GS} = 10V)	Q _g	—	1.23	—	nC	
Gate-Source Charge	Q _{gs}	—	0.14	—	nC	
Gate-Drain Charge	Q _{gd}	—	0.14	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	2.9	—	ns	V _{DD} = 30V, V _{GS} = 10V, R _G = 25Ω, I _D = 200mA
Turn-On Rise Time	t _R	—	2.6	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	18.2	—	ns	
Turn-Off Fall Time	t _F	—	13.6	—	ns	

- Notes: 6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

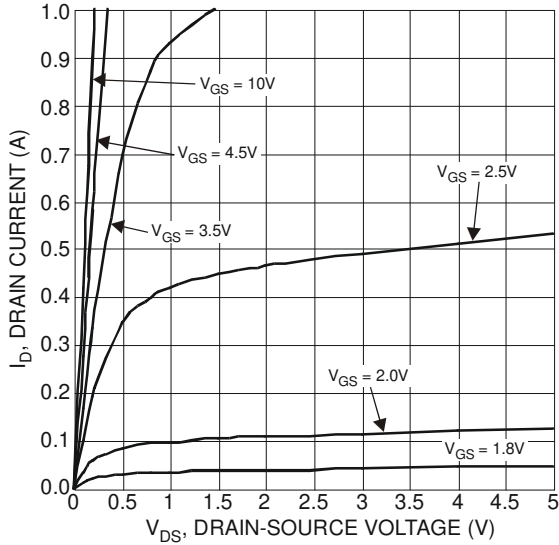


Figure 1 Typical Output Characteristics

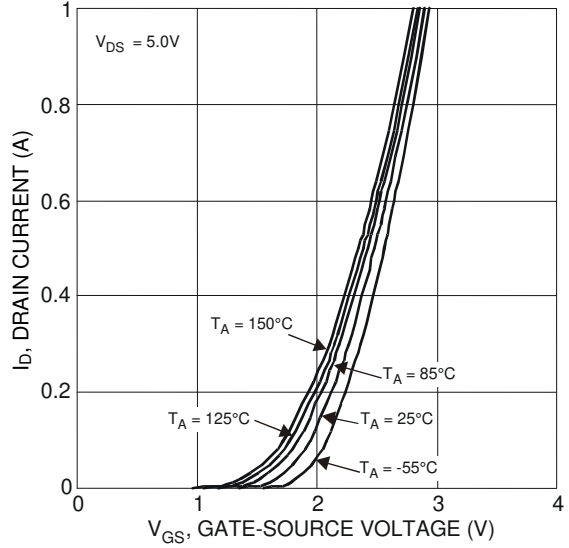


Figure 2 Typical Transfer Characteristics

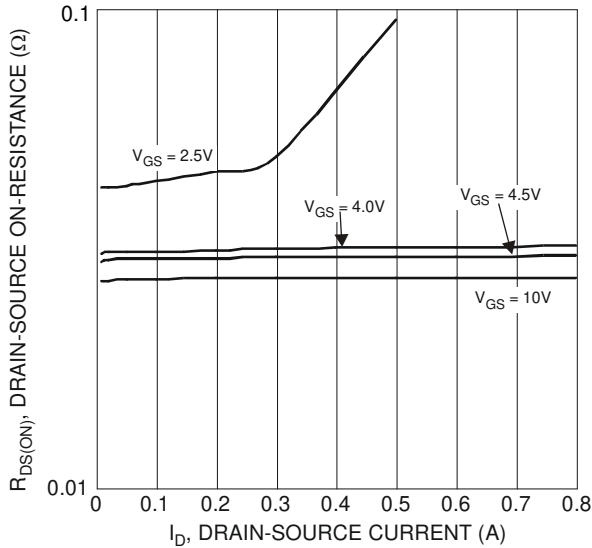


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

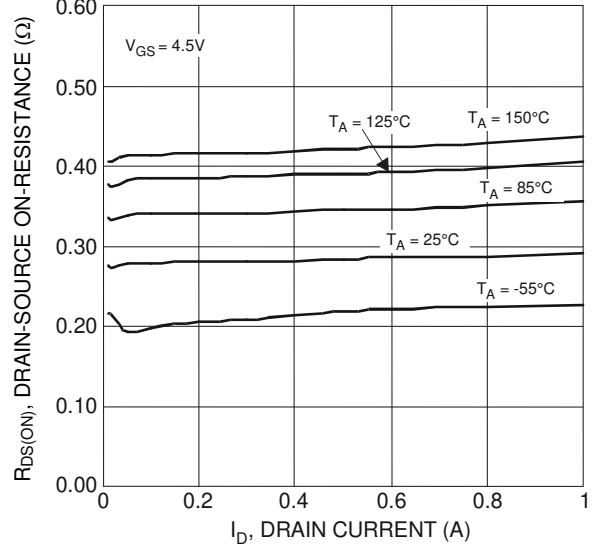


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

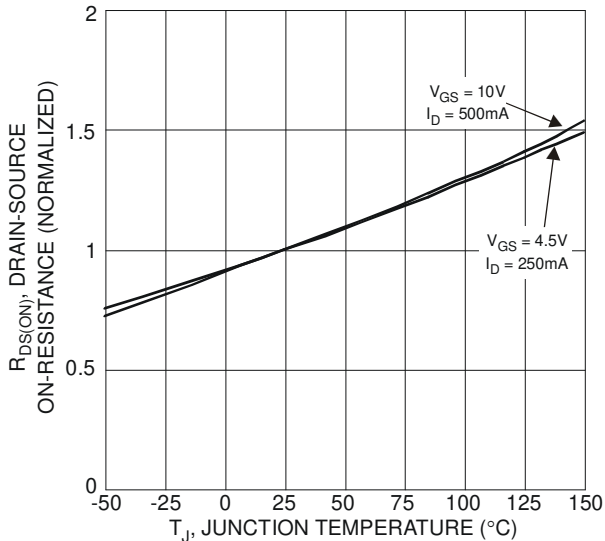


Figure 5 On-Resistance Variation with Temperature

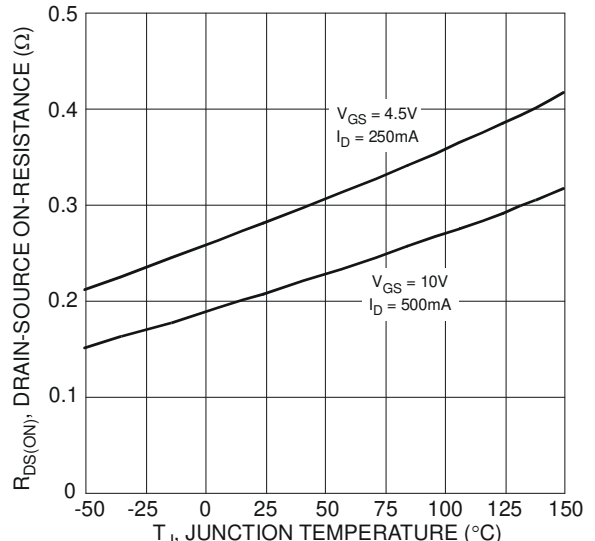


Figure 6 On-Resistance Variation with Temperature

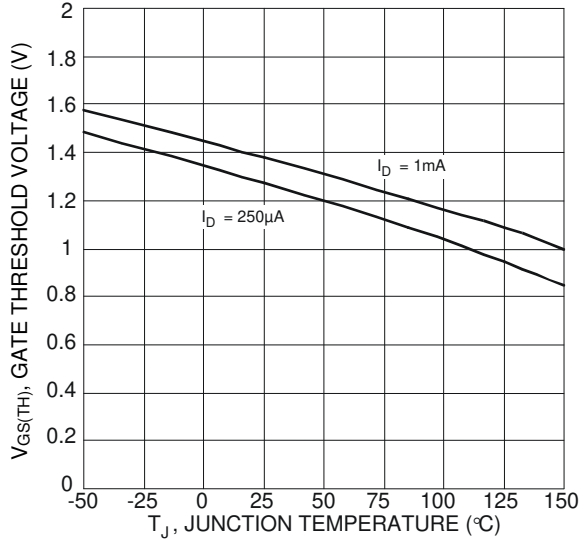


Figure 7 Gate Threshold Variation vs. Junction Temperature

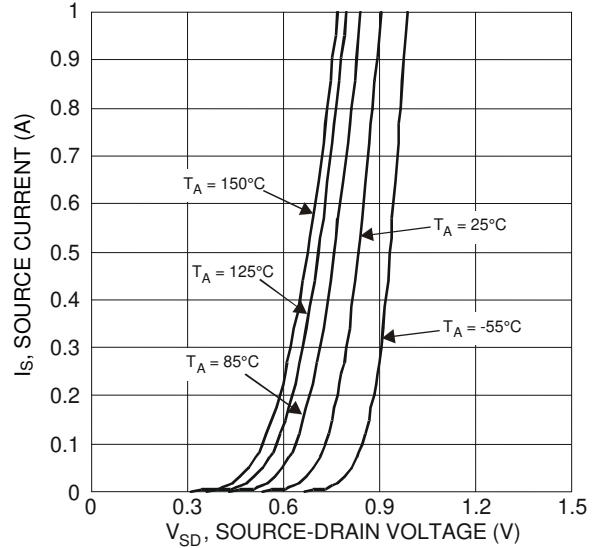


Figure 8 Diode Forward Voltage vs. Current

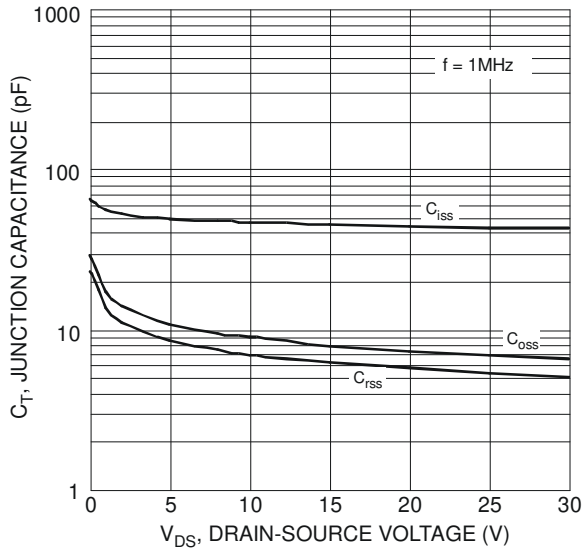


Figure 9 Typical Junction Capacitance

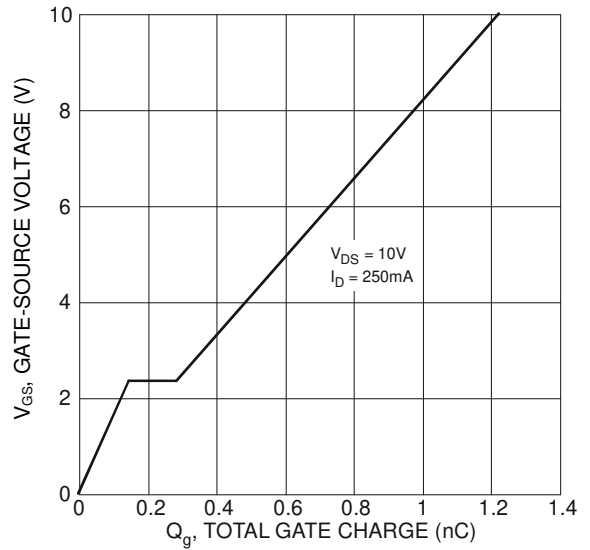


Figure 10 Gate Charge

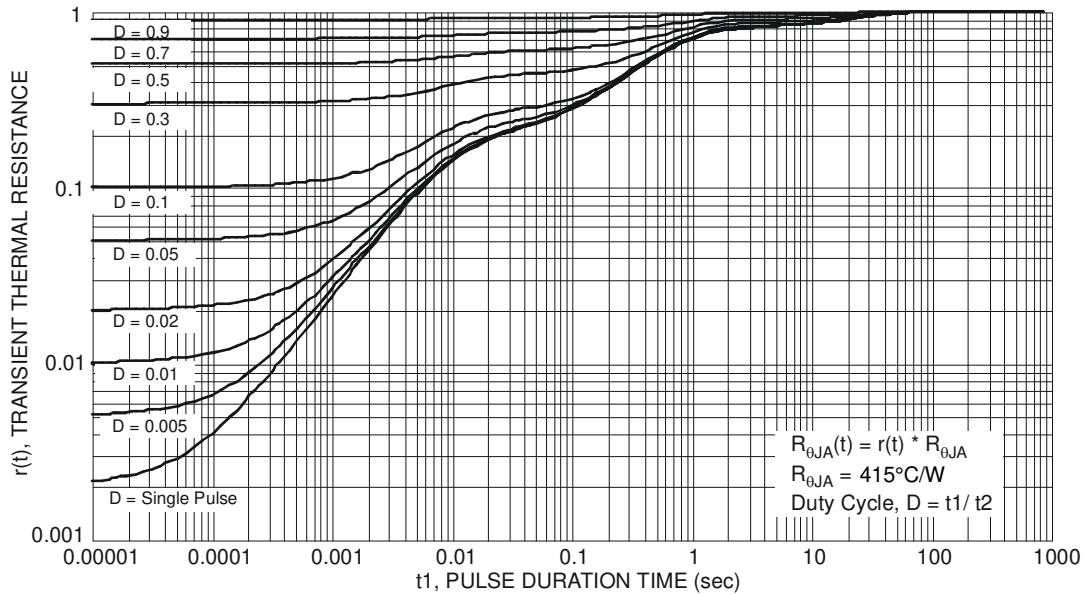
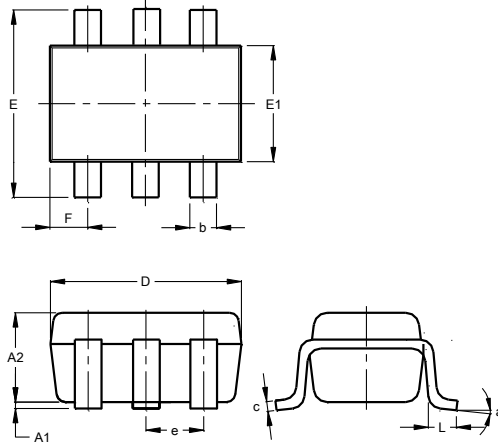


Figure 11 Transient Thermal Resistance

Package Outline Dimensions

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

SOT363

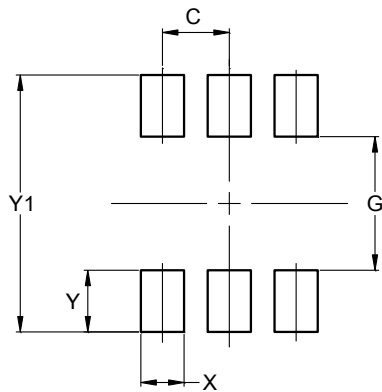


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT363



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

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