COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

Product Summary

Device	BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_A = +25°C
Q1 N-Channel	30V	30mΩ @ V_{GS} = 10V	5.3A
		42mΩ @ V_{GS} = 4.5V	4.5A
Q2 P-Channel	-30V	70mΩ @ V_{GS} = -10V	-3.4A
		100mΩ @ V_{GS} = -4.5V	-2.9A

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **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 contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Description and Applications

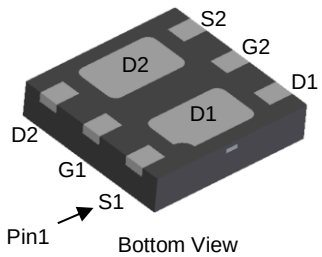
This MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- Body control electronics
- Power management functions
- DC-DC converters

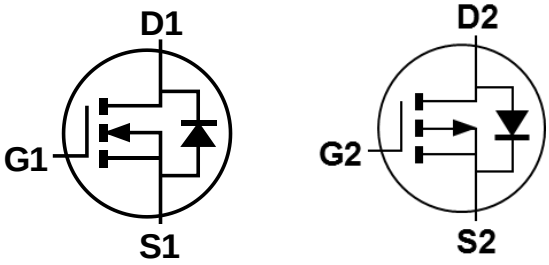
Mechanical Data

- Package: U-DFN2020-6
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish NiPdAu Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e4
- Terminals Connections: See Diagram Below
- Weight: 0.0065 grams (Approximate)

U-DFN2020-6 (Type B)



Bottom View



Internal Schematic

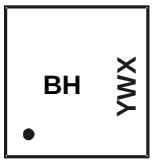
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMC3032LFDB-7	U-DFN2020-6 (Type B)	3,000	Tape & Reel
DMC3032LFDB-13	U-DFN2020-6 (Type B)	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/.

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Marking Information



BH = Product Type Marking Code
YWX = Date Code Marking
Y = Year (ex: 2 = 2022)
W = Week (ex: a = Week 27; z Represents Week 52 and 53)
X = Internal Code (ex: U = Monday)

Date Code Key

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	1	2	3	4	5	6	7	8	9	0	1	2

Week	1-26	27-52	53
Code	A-Z	a-z	z

Internal Code	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Code	T	U	V	W	X	Y	Z

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Q1 N-CHANNEL	Q2 P-CHANNEL	Unit
Drain-Source Voltage			V_{DSS}	30	-30	V
Gate-Source Voltage			V_{GSS}	±20	±20	V
Continuous Drain Current (Note 5) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +75°C	I_D	5.3 4.2	-3.4 -2.7	A
Maximum Continuous Body Diode Forward Current (Note 5)			I_S	1.6	-1.2	A
Pulsed Body Diode Forward Current (370µs Pulse, Duty Cycle = 1%)			I_{SM}	20	-20	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	20	-20	A
Avalanche Current (Note 6) L = 0.1mH			I_{AS}	12	-14	A
Avalanche Energy (Note 6) L = 0.1mH			E_{AS}	10	10	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 7)		P_D	0.8	W
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	$R_{\theta JA}$	149	°C/W
Total Power Dissipation (Note 5)		P_D	1.28	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	98	°C/W
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 1inch square copper plate.
6. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
7. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

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Electrical Characteristics Q1 N-CHANNEL (@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}	—	—	1.0	μA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.0	—	2.0	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	— —	24 30	30 42	mΩ	V_{GS} = 10V, I_D = 5.8A V_{GS} = 4.5V, I_D = 4.8A
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	500	—	pF	V_{DS} = 15V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	52	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	44	—	pF	
Gate Resistance	R_g	—	2.3	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	5.0	—	nC	V_{DS} = 15V, I_D = 5.8A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	10.6	—	nC	
Gate-Source Charge	Q_{gs}	—	1.3	—	nC	
Gate-Drain Charge	Q_{gd}	—	1.8	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	2.2	—	ns	V_{DD} = 15V, V_{GS} = 10V R_L = 2.6Ω, R_G = 3Ω
Turn-On Rise Time	t_R	—	2.6	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	9.7	—	ns	
Turn-Off Fall Time	t_F	—	2.0	—	ns	

Electrical Characteristics Q2 P-CHANNEL (@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}	—	—	-1.0	μA	V_{DS} = -30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.0	—	-2.1	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	— —	53 75	70 100	mΩ	V_{GS} = -10V, I_D = -3.8A V_{GS} = -4.5V, I_D = -3.0A
Diode Forward Voltage	V_{SD}	—	-0.8	-1.2	V	V_{GS} = 0V, I_S = -2.7A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	336	—	pF	V_{DS} = -25V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	70	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	49	—	pF	
Gate Resistance	R_g	—	4.6	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = -4.5V)	Q_g	—	4.0	—	nC	V_{DS} = -15V, I_D = -3.8A
Total Gate Charge (V_{GS} = -10V)	Q_g	—	7.8	—	nC	
Gate-Source Charge	Q_{gs}	—	1.0	—	nC	
Gate-Drain Charge	Q_{gd}	—	2.5	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	6.0	—	ns	V_{DD} = -15V, V_{GS} = -10V I_D = -1A, R_G = 6Ω
Turn-On Rise Time	t_R	—	5.0	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	17.6	—	ns	
Turn-Off Fall Time	t_F	—	9.5	—	ns	

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

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Q1 N-CHANNEL

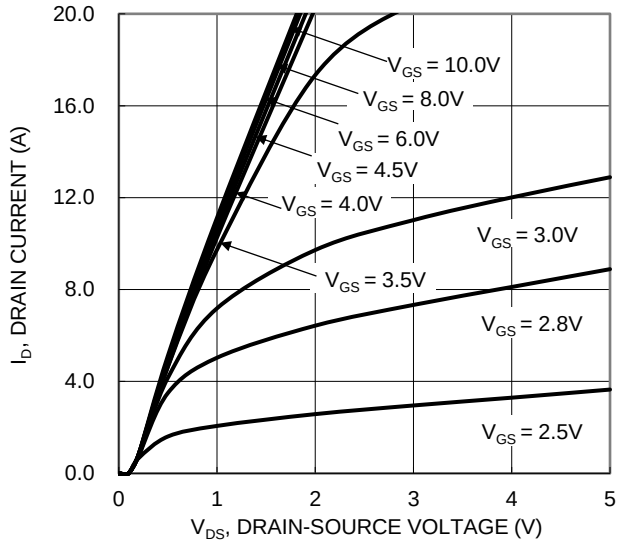


Figure 1. Typical Output Characteristic

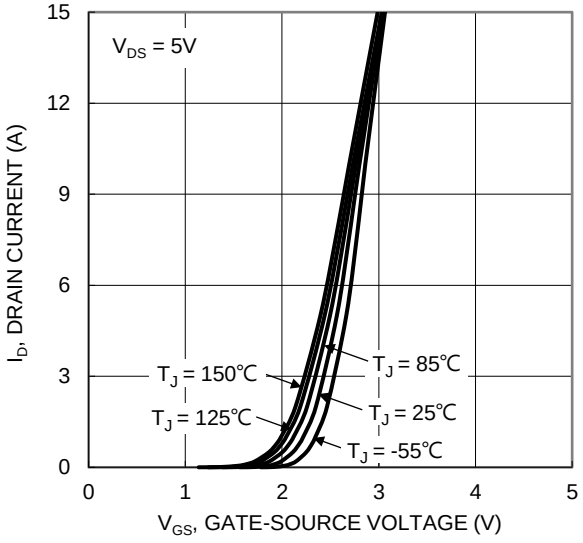


Figure 2. Typical Transfer Characteristic

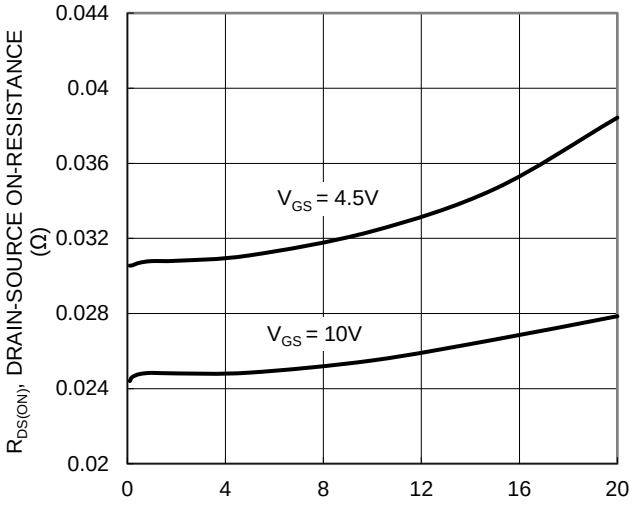


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

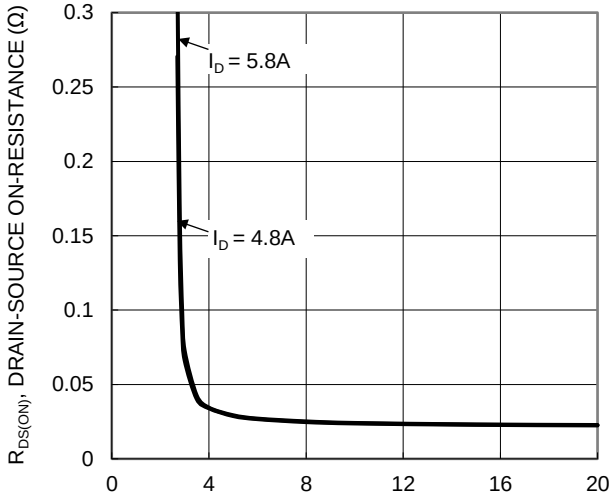


Figure 4. Typical Transfer Characteristic

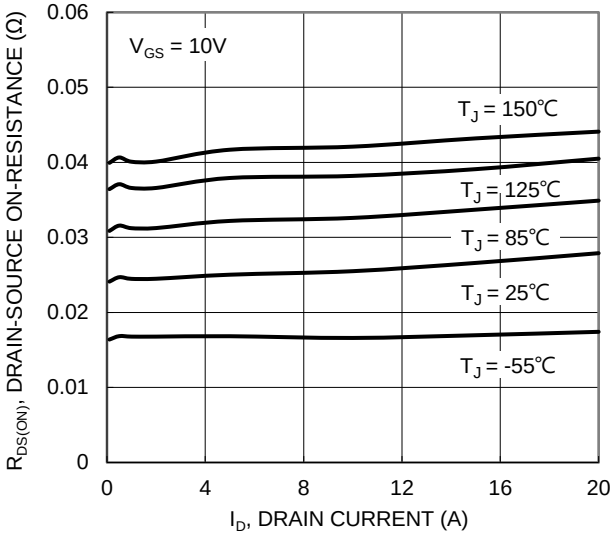


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

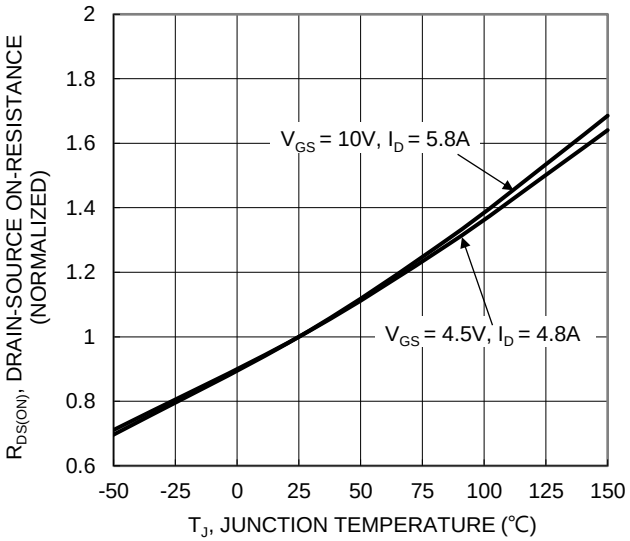


Figure 6. On-Resistance Variation with Junction Temperature

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Q1 N-CHANNEL (continued)

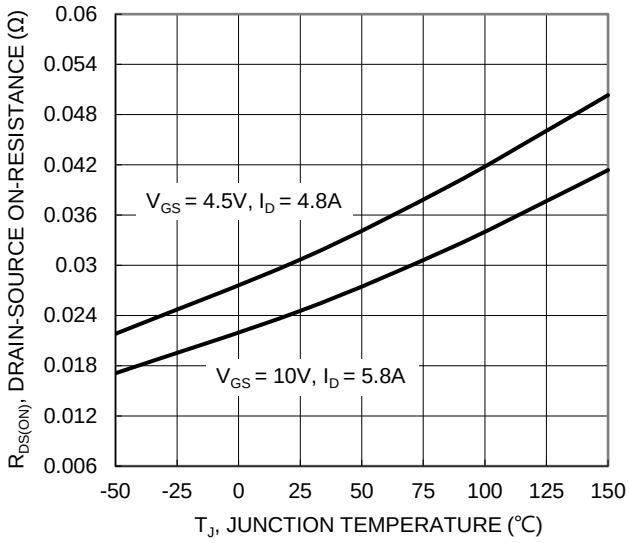


Figure 7. On-Resistance Variation with Temperature

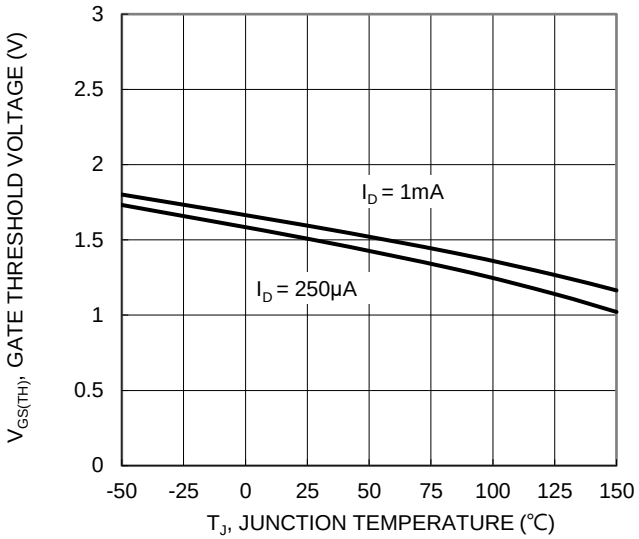


Figure 8. Gate Threshold Variation vs. Temperature

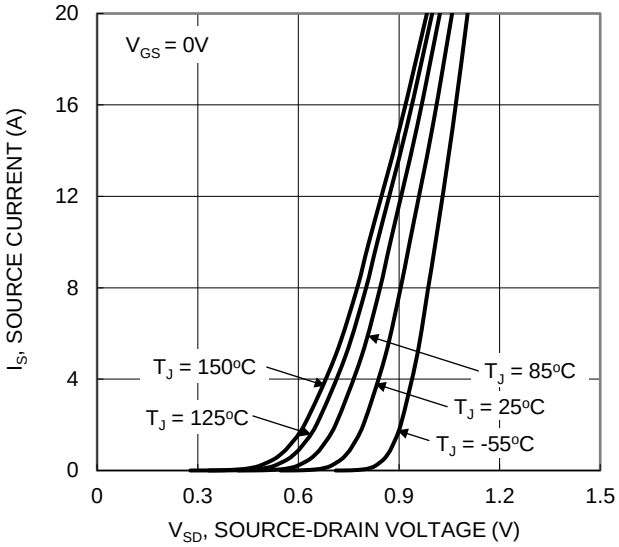


Figure 9. Diode Forward Voltage vs. Current

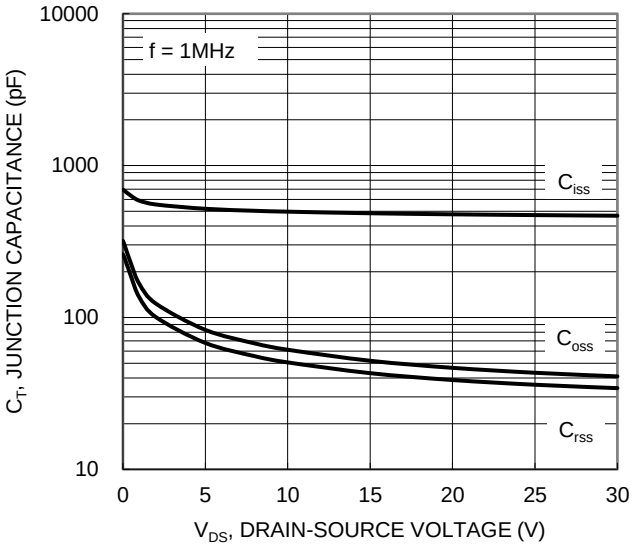


Figure 10. Typical Junction Capacitance

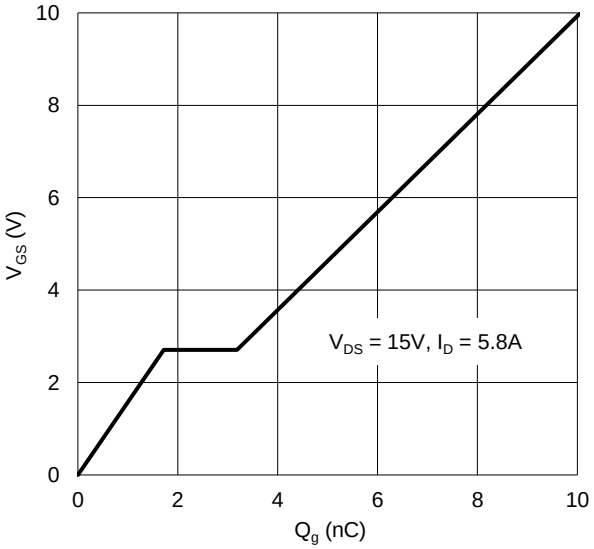


Figure 11. Gate Charge

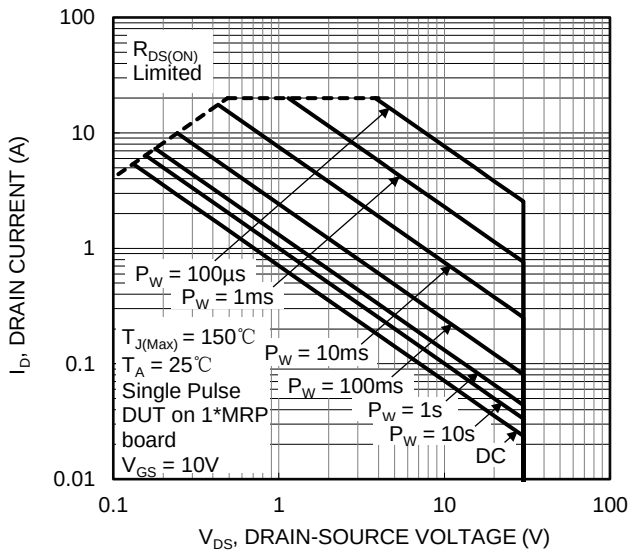


Figure 12. SOA, Safe Operation Area

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Q1 N-CHANNEL (continued)

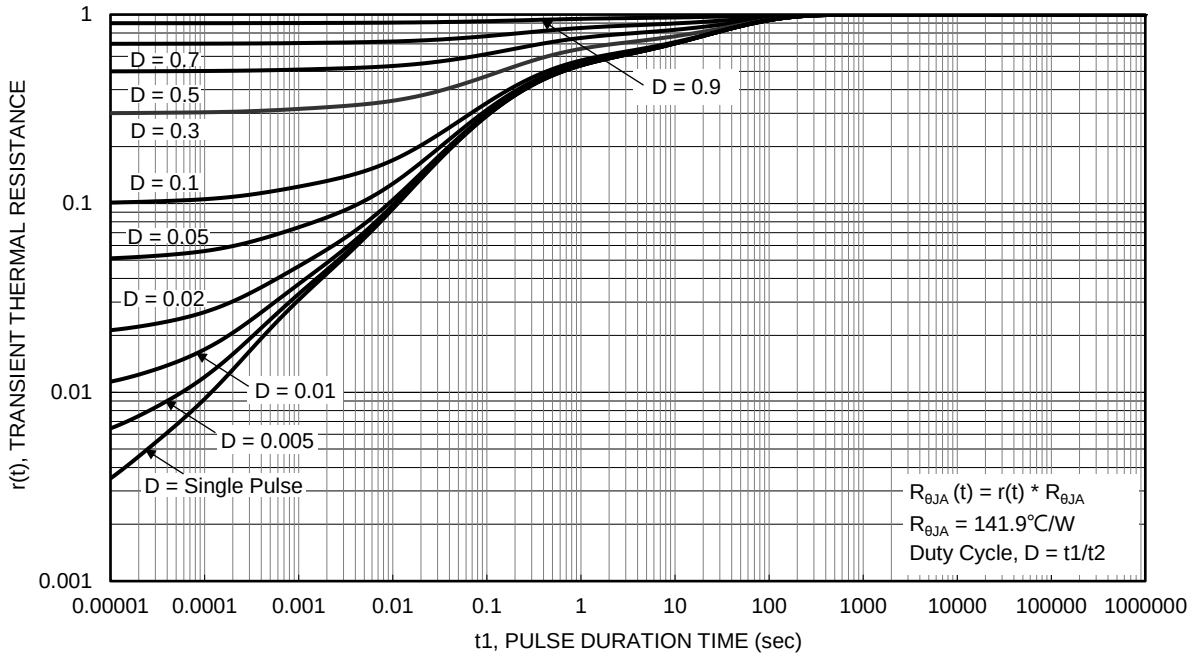


Figure 13. Transient Thermal Resistance

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Q2 P-CHANNEL

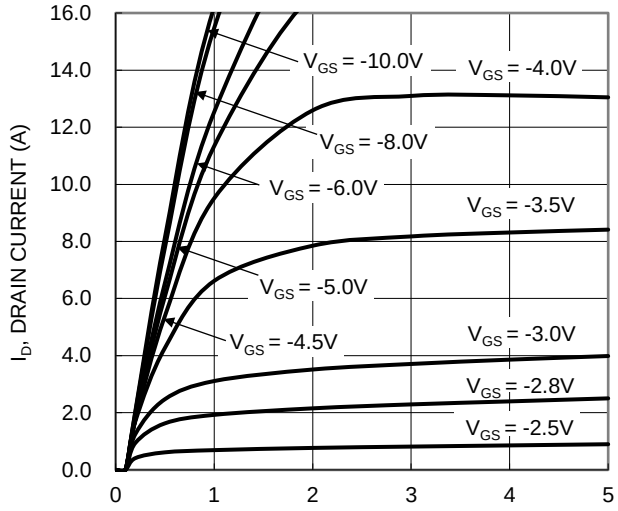


Figure 14. Typical Output Characteristic

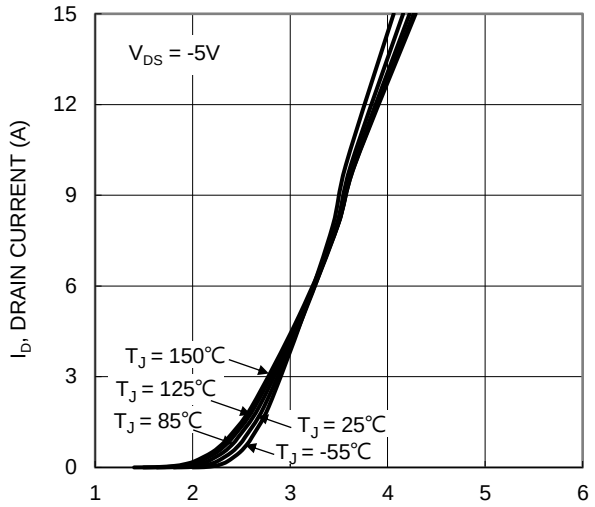


Figure 15. Typical Transfer Characteristic

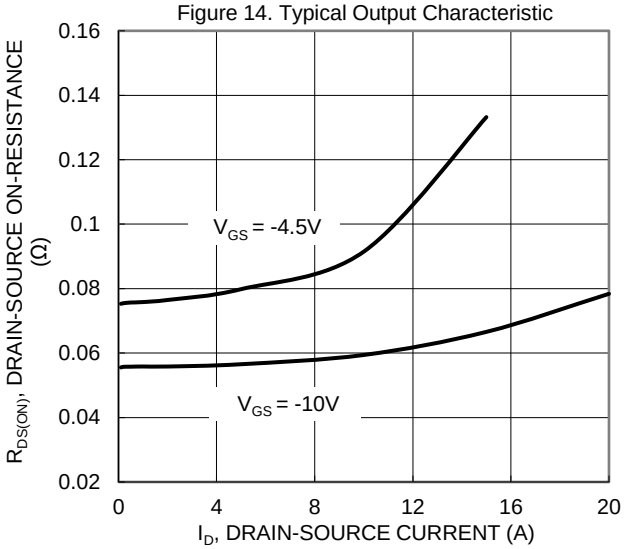


Figure 16. Typical On-Resistance vs. Drain Current and Gate Voltage

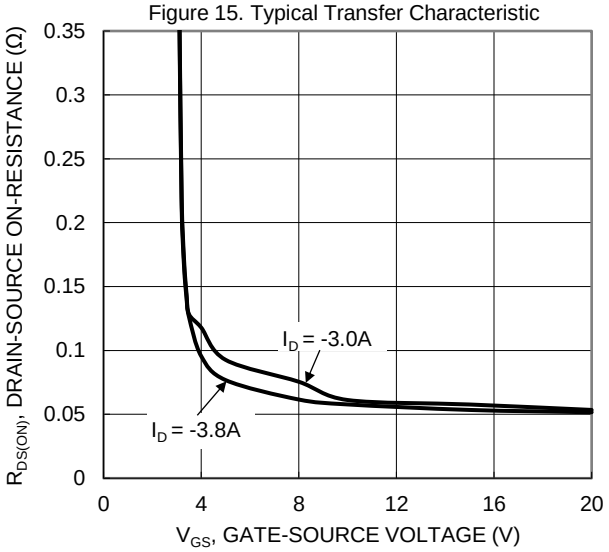


Figure 17. Typical Transfer Characteristic

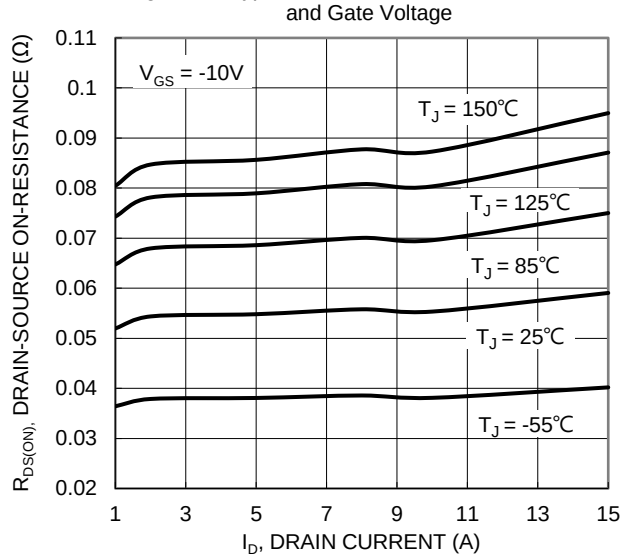


Figure 18. Typical On-Resistance vs. Drain Current and Temperature

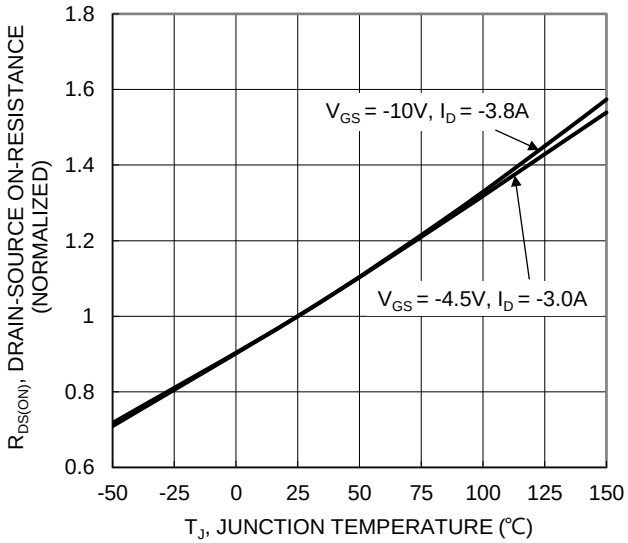


Figure 19. On-Resistance Variation with Junction Temperature

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Q2 P-CHANNEL (continued)

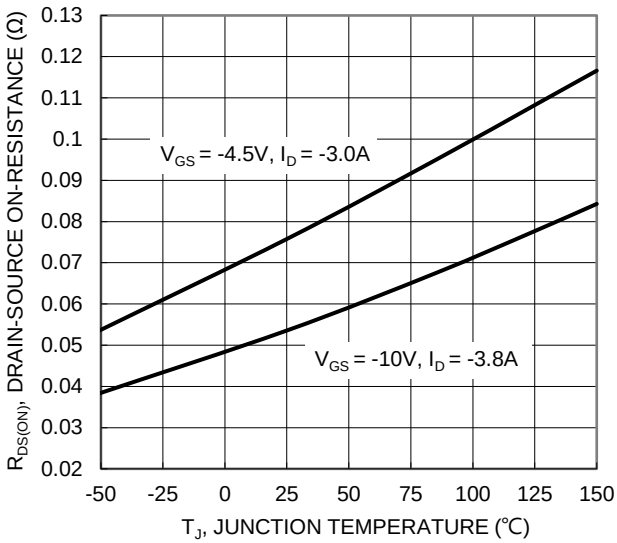


Figure 20. On-Resistance Variation with Temperature

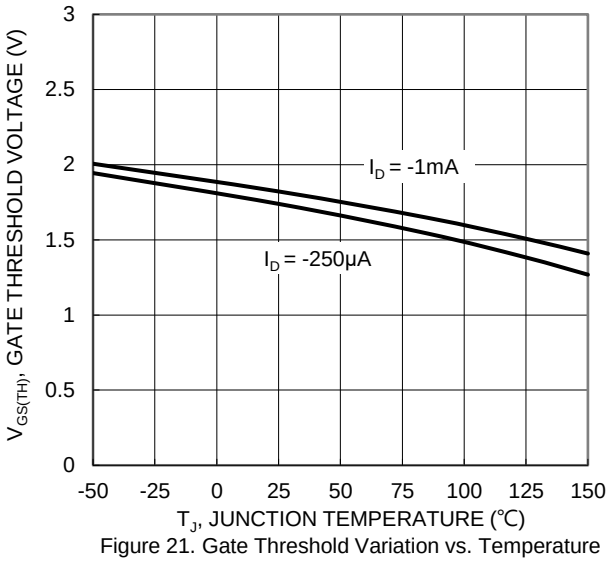


Figure 21. Gate Threshold Variation vs. Temperature

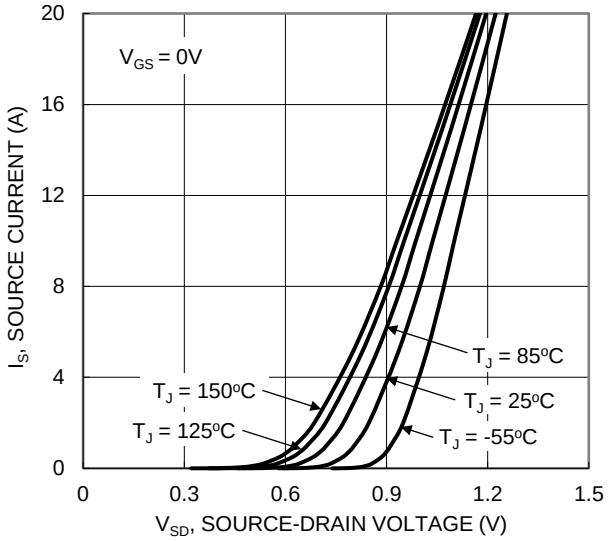


Figure 22. Diode Forward Voltage vs. Current

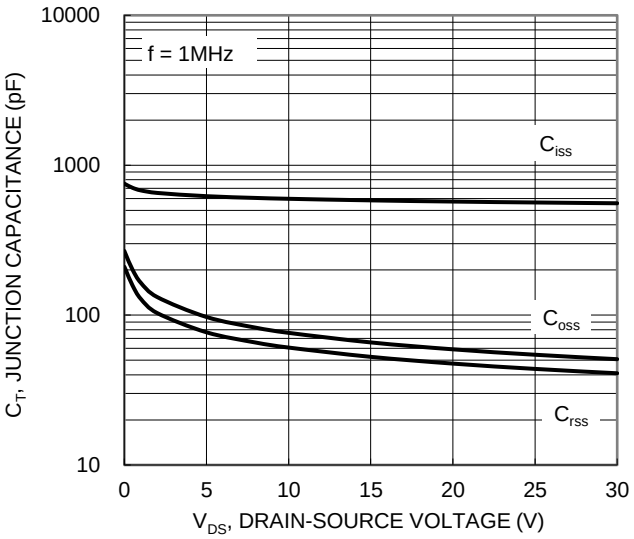


Figure 23. Typical Junction Capacitance

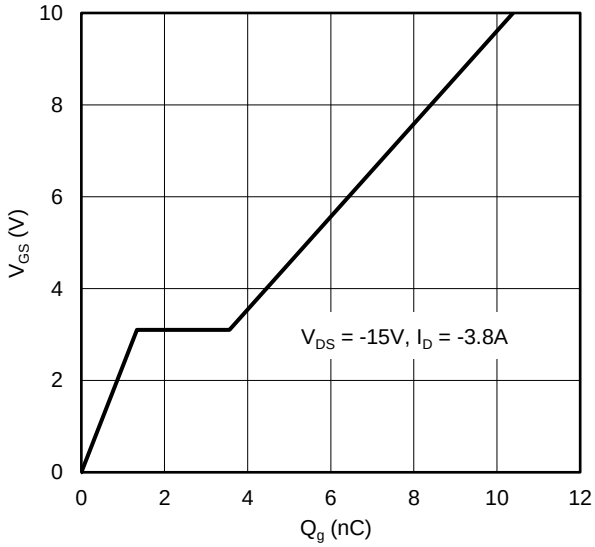


Figure 24. Gate Charge

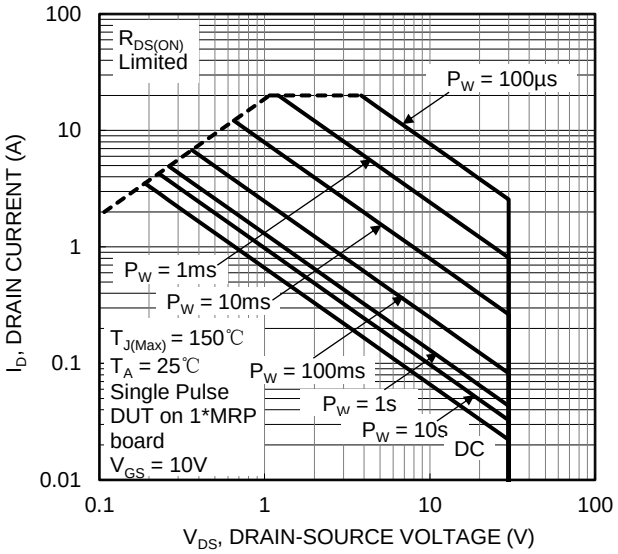


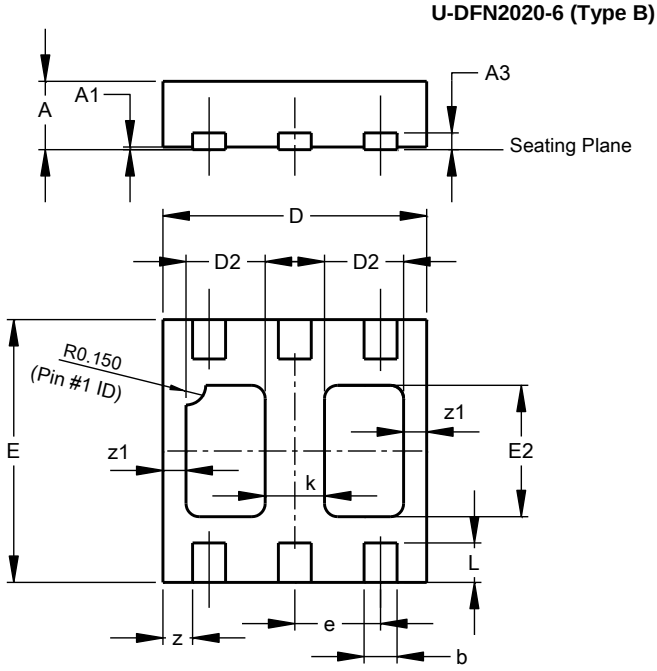
Figure 25. SOA, Safe Operation Area

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Package Outline Dimensions

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

U-DFN2020-6 (Type B)

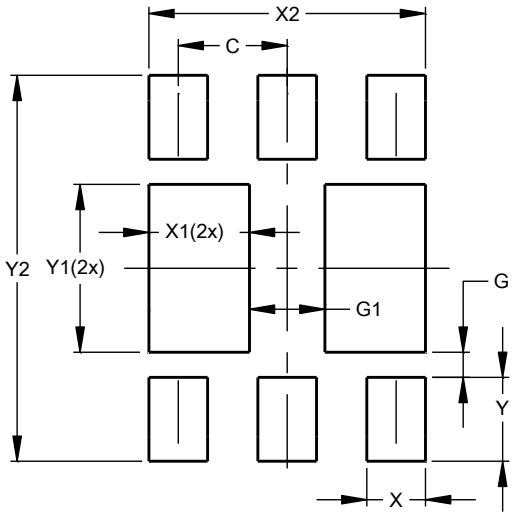


U-DFN2020-6 Type B			
Dim	**Min**	**Max**	**Typ**
A	0.545	0.605	0.575
A1	0.00	0.05	0.02
A3	-	-	0.13
b	0.20	0.30	0.25
D	1.95	2.075	2.00
D2	0.50	0.70	0.60
e	-	-	0.65
E	1.95	2.075	2.00
E2	0.90	1.10	1.00
k	-	-	0.45
L	0.25	0.35	0.30
z	-	-	0.225
z1	-	-	0.175
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN2020-6 (Type B)



Dimensions	Value (in mm)
C	0.650
G	0.150
G1	0.450
X	0.350
X1	0.600
X2	1.650
Y	0.500
Y1	1.000
Y2	2.300

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