NEW PRODUCT

DMC6070LND

COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET
POWERDI®

Product Summary

Device	$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max $T_A = +25°C$
Q1	60V	85mΩ @ V_{GS} = 10V	3.1A
		120mΩ @ V_{GS} = 4.5V	2.7A
Q2	-60V	150mΩ @ V_{GS} = -10V	-2.4A
		250mΩ @ V_{GS} = -4.5V	-1.8A

Description

This new generation 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.

Applications

- Power Management Functions
- Analog Switch

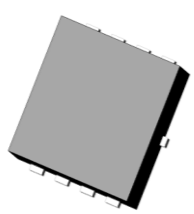
Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Complementary Pair MOSFET
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**

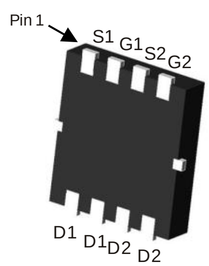
Mechanical Data

- Case: POWERDI®3333-8
- Case 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 Copper Leadframe; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.072 grams (Approximate)

POWERDI3333-8

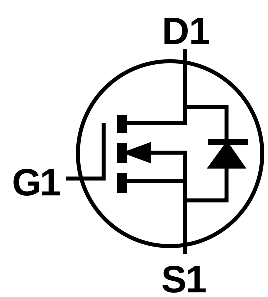


Top View

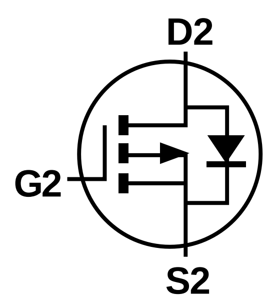


Bottom View

Equivalent Circuit



N-Channel MOSFET



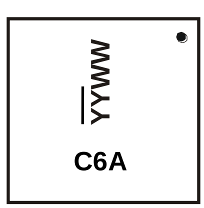
P-Channel MOSFET

Ordering Information (Note 4)

Part Number	Case	Packaging
DMC6070LND-7	POWERDI3333-8	2,000/Tape & Reel
DMC6070LND-13	POWERDI3333-8	3,000/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 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



C6A = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 15 for 2015)
WW = Week Code (01 to 53)

POWERDI is a registered trademark of Diodes Incorporated.

NEW PRODUCT

Maximum Ratings Q1 N-CHANNEL (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 5) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	3.1 2.5	A
	t<10s	T_A = +25°C T_A = +70°C	I_D	3.9 3.1	A
Maximum Body Diode Forward Current (Note 5)			I_S	2	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	15	A

Maximum Ratings Q2 P-CHANNEL (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-60	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 5) V_{GS} = -10V	Steady State	T_A = +25°C T_A = +70°C	I_D	-2.4 -1.9	A
	t<10s	T_A = +25°C T_A = +70°C	I_D	-2.9 -2.3	A
Maximum Body Diode Forward Current (Note 5)			I_S	-2	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	-12	A

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	1.4	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	$R_{\theta JA}$	91	°C/W
	t<10s		60	
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	32	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Note: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.

NEW PRODUCT

Electrical Characteristics Q1 N-CHANNEL (@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}	60	–	–	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	–	–	1	μA	V_{DS} = 60V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	–	–	±100	nA	V_{GS} = ±16V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	–	3	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	–	60	85	mΩ	V_{GS} = 10V, I_D = 1.5A
			72	120		V_{GS} = 4.5V, I_D = 0.5A
Forward Transfer Admittance	$\|Y_{fs}\|$	–	3.7	–	S	V_{DS} = 5V, I_D = 1.5A
Diode Forward Voltage	V_{SD}	–	0.7	1.2	V	V_{GS} = 0V, I_S = 3A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	–	731	–	pF	V_{DS} = 20V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	–	34	–	pF	
Reverse Transfer Capacitance	C_{rss}	–	23	–	pF	
Gate Resistance	R_g	–	1.3	–	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 10V)	Q_g	–	11.5	–	nC	V_{DS} = 30V, I_D = 3A
Total Gate Charge (V_{GS} = 4.5V)	Q_g	–	5.2	–	nC	
Gate-Source Charge	Q_{gs}	–	2.1	–	nC	
Gate-Drain Charge	Q_{gd}	–	1.5	–	nC	
Turn-On Delay Time	$t_{D(ON)}$	–	9.6	–	ns	V_{GS} = 10V, V_{DS} = 30V, R_G = 50Ω, R_L = 20Ω
Turn-On Rise Time	t_R	–	11	–	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	–	61	–	ns	
Turn-Off Fall Time	t_F	–	21	–	ns	

Notes: 6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to production testing.

NEW PRODUCT

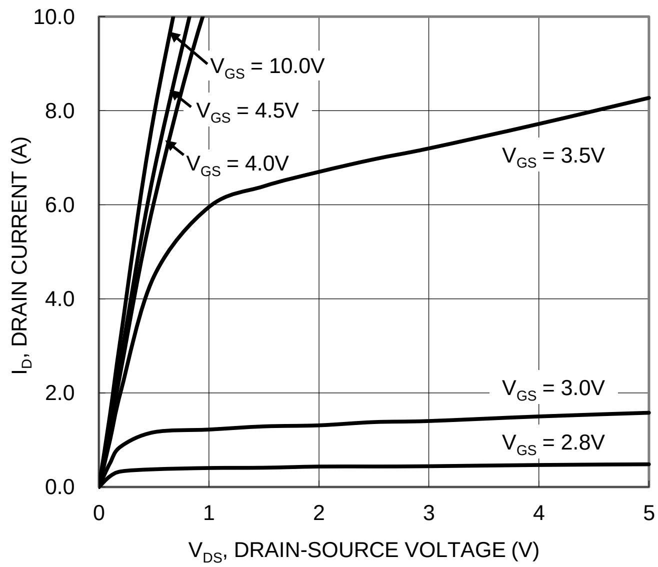


Figure 1. Typical Output Characteristic

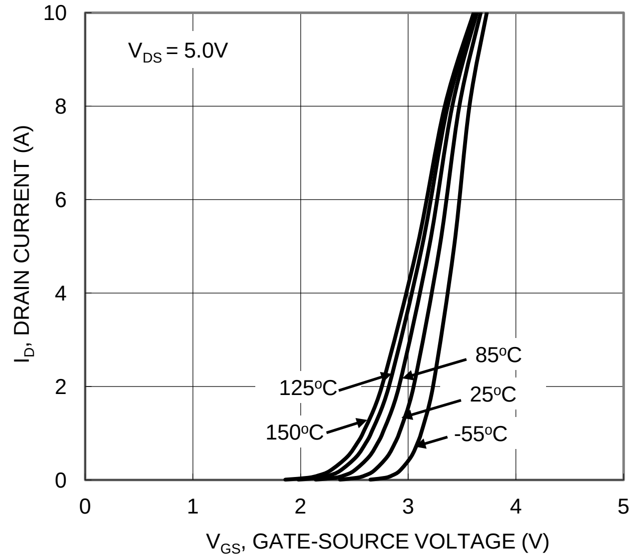


Figure 2. Typical Transfer Characteristic

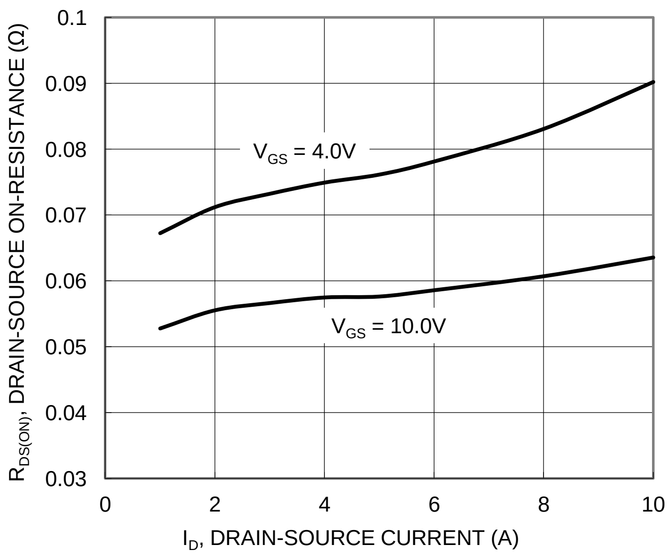


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

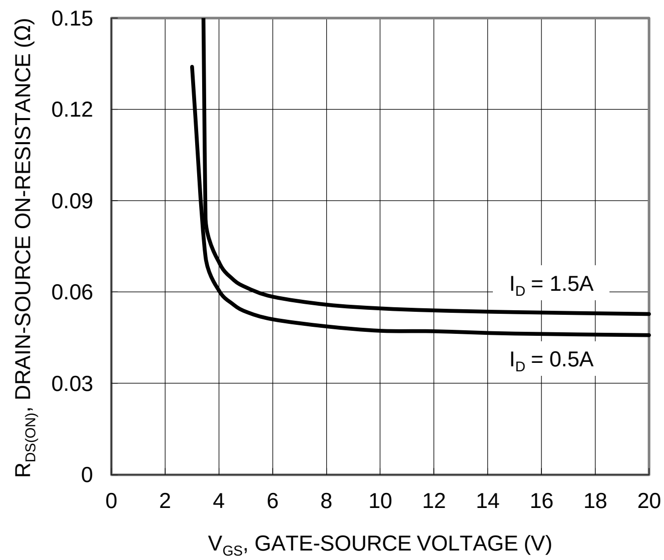


Figure 4. Typical Transfer Characteristic

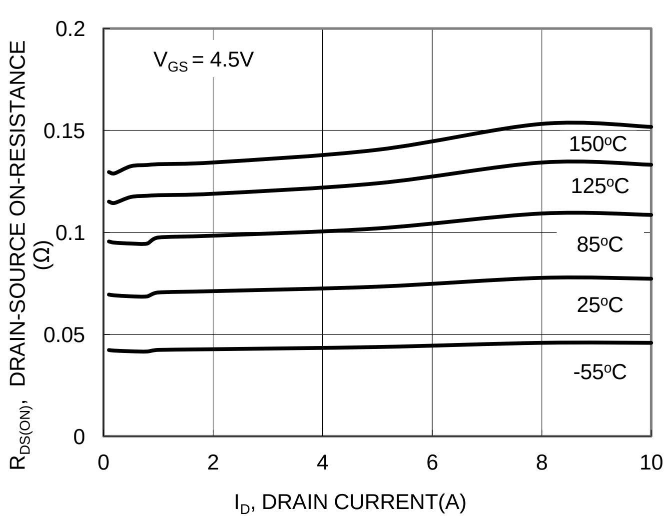


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

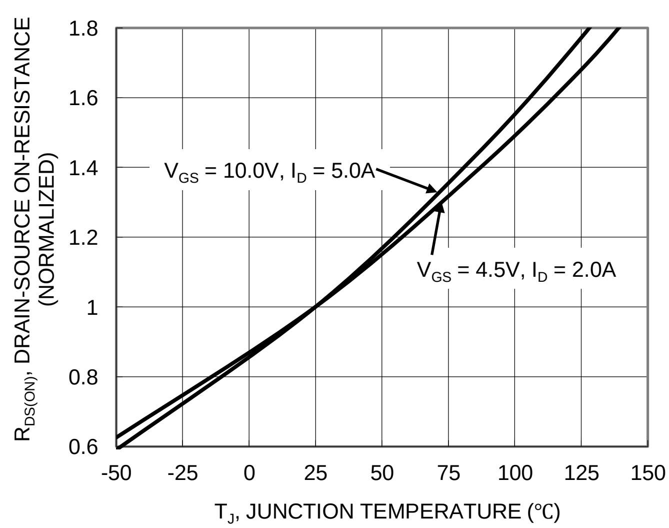


Figure 6. On-Resistance Variation with Temperature

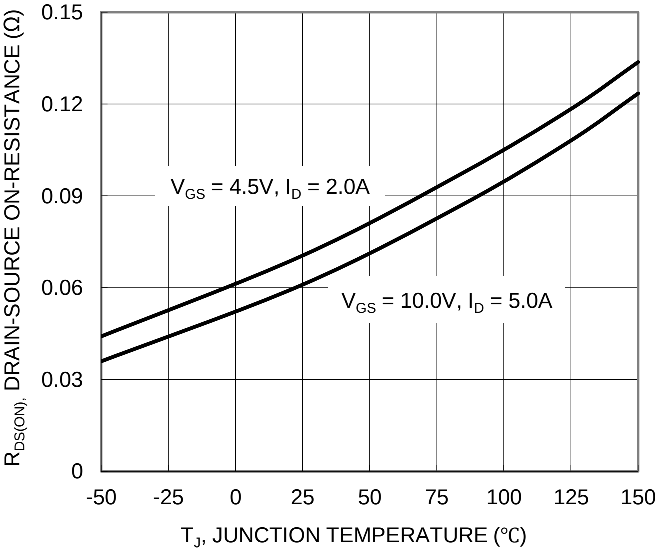


Figure 7. On-Resistance Variation with Temperature

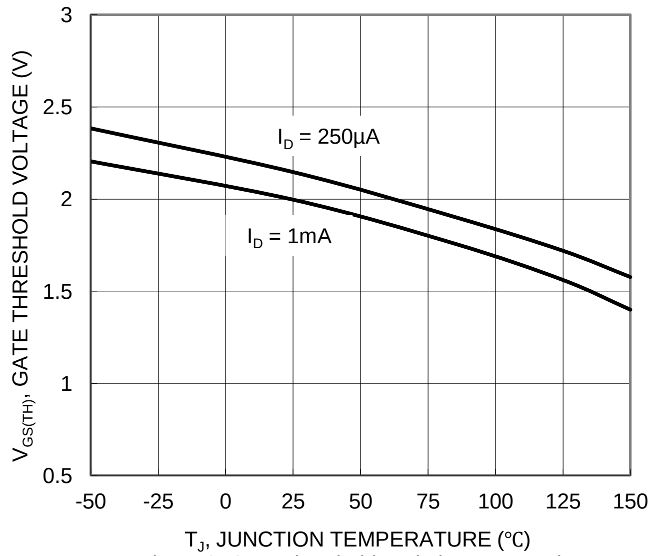


Figure 8. Gate Threshold Variation vs. Junction Temperature

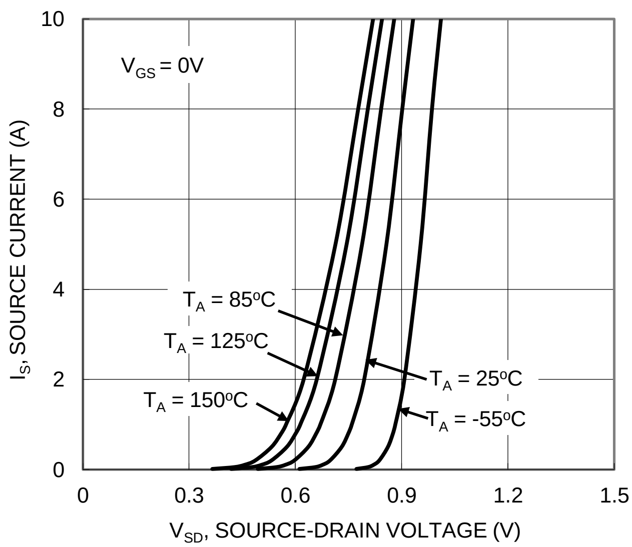


Figure 9. Diode Forward Voltage vs. Current

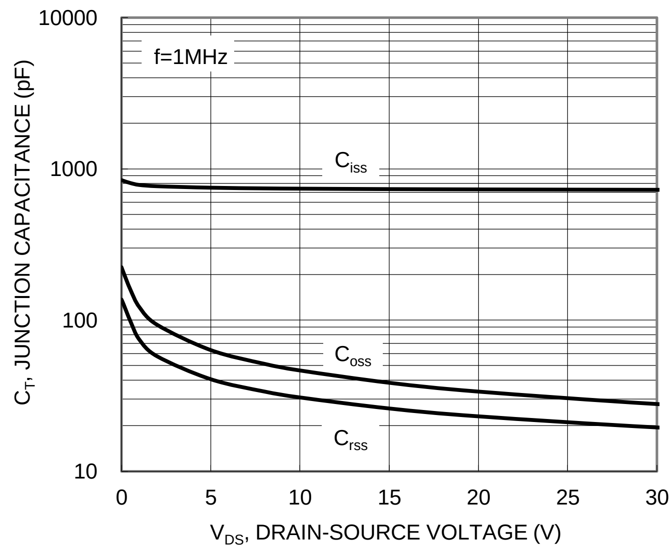


Figure 10. Typical Junction Capacitance

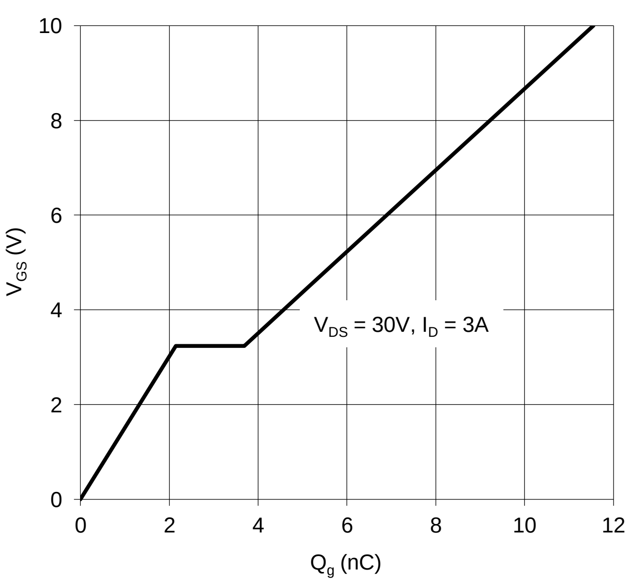


Figure 11. Gate Charge

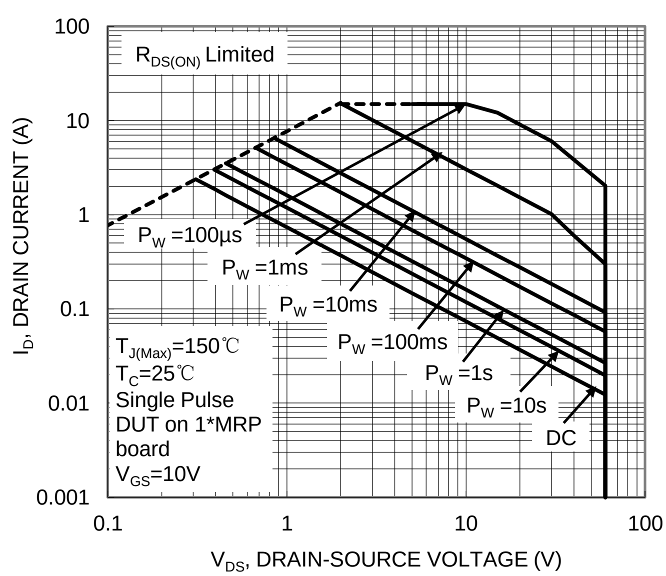


Figure 12. SOA, Safe Operation Area

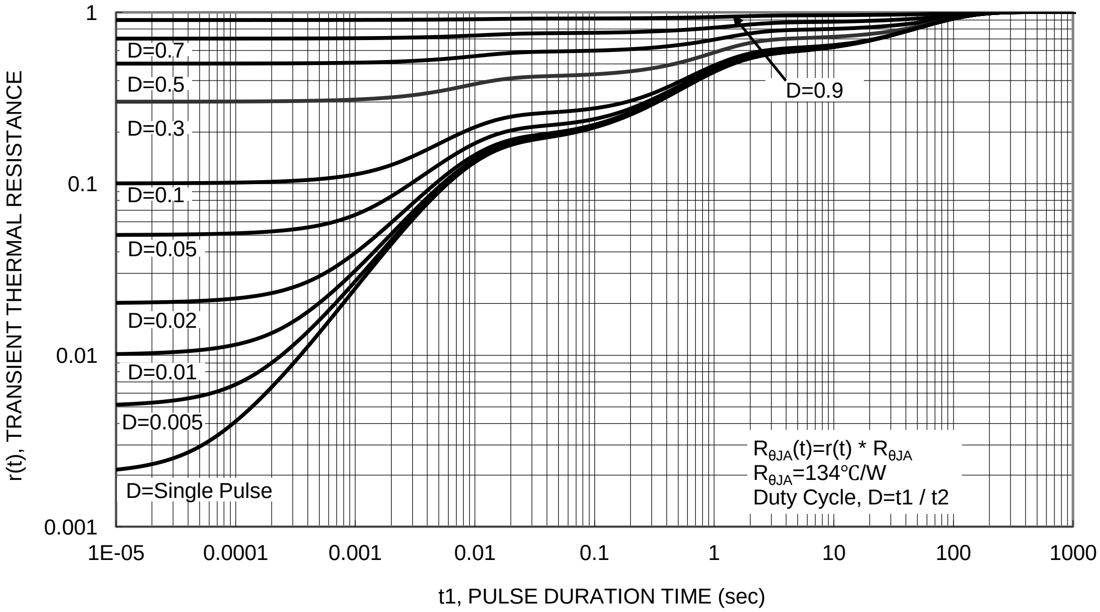


Figure 13. Transient Thermal Resistance

NEW PRODUCT

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}	-60	–	–	V	V_{GS} = 0V, I_D = -250μA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	–	–	-1	μA	V_{DS} = -60V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	–	–	±100	nA	V_{GS} = ±16V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	-1	–	-3	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	–	115	150	mΩ	V_{GS} = -10V, I_D = -1A
			170	250		V_{GS} = -4.5V, I_D = -0.5A
Forward Transfer Admittance	$\|Y_{fs}\|$	–	2.8	–	S	V_{DS} = -5V, I_D = -1A
Diode Forward Voltage	V_{SD}	–	-0.7	-1.2	V	V_{GS} = 0V, I_S = -2A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	–	612	–	pF	V_{DS} = -20V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	–	36	–	pF	
Reverse Transfer Capacitance	C_{rss}	–	26	–	pF	
Gate Resistance	R_g	–	13	–	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = -10V)	Q_g	–	8.9	–	nC	V_{DS} = -30V, I_D = -2A
Total Gate Charge (V_{GS} = -4.5V)	Q_g	–	4.3	–	nC	
Gate-Source Charge	Q_{gs}	–	1.4	–	nC	
Gate-Drain Charge	Q_{gd}	–	1.7	–	nC	
Turn-On Delay Time	$t_{D(ON)}$	–	7.6	–	ns	V_{GS} = -10V, V_{DS} = -30V, R_G = 50Ω, I_D = -1A
Turn-On Rise Time	t_R	–	11.6	–	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	–	79.8	–	ns	
Turn-Off Fall Time	t_F	–	37.8	–	ns	

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

NEW PRODUCT

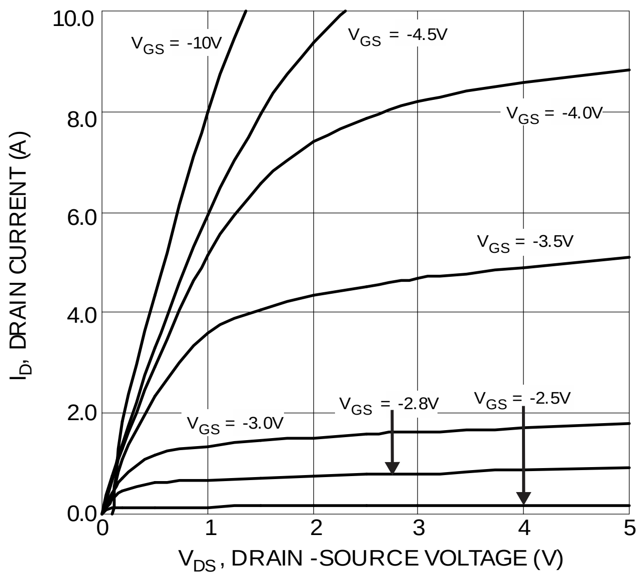


Figure 14 Typical Output Characteristics

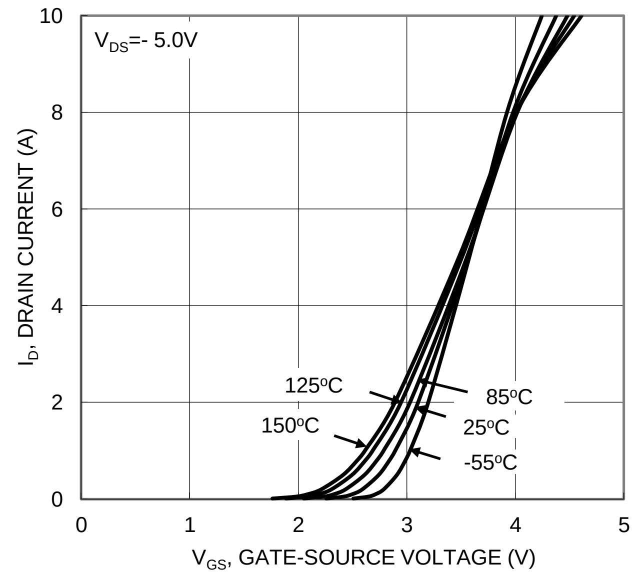


Figure 15. Typical Transfer Characteristic

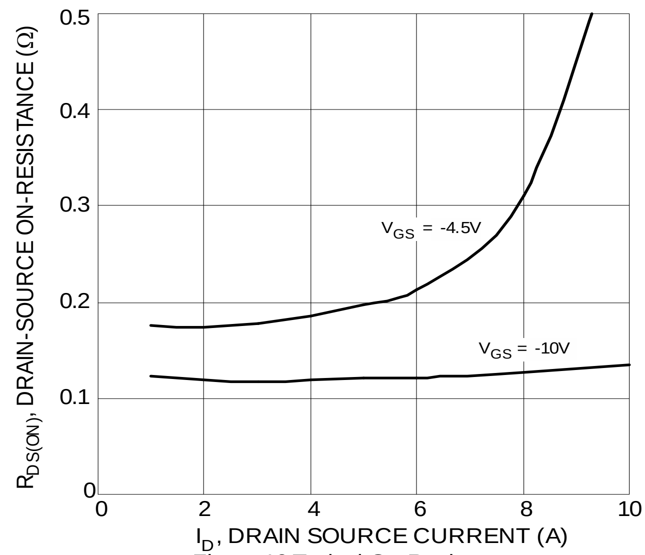


Figure 16 Typical On-Resistance vs. Drain Current and Gate Voltage

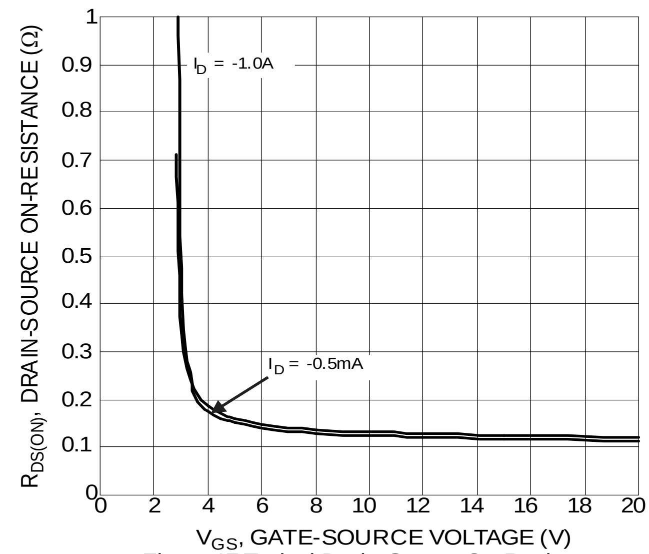


Figure 17 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

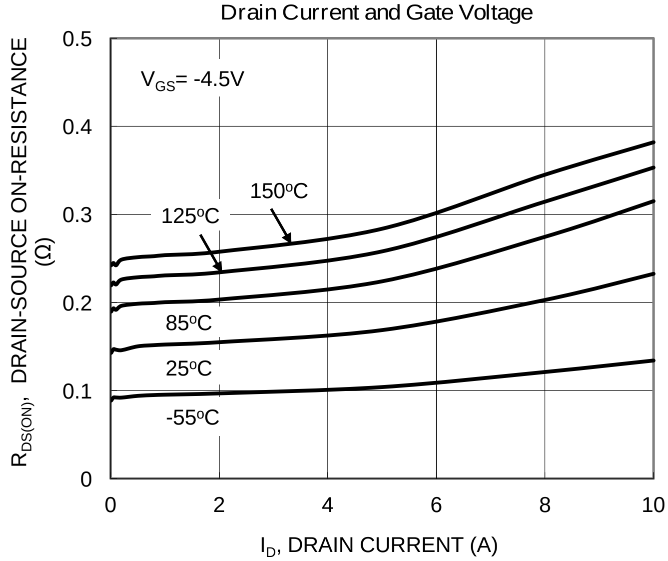


Figure 18. Typical On-Resistance vs. Drain Current and Temperature

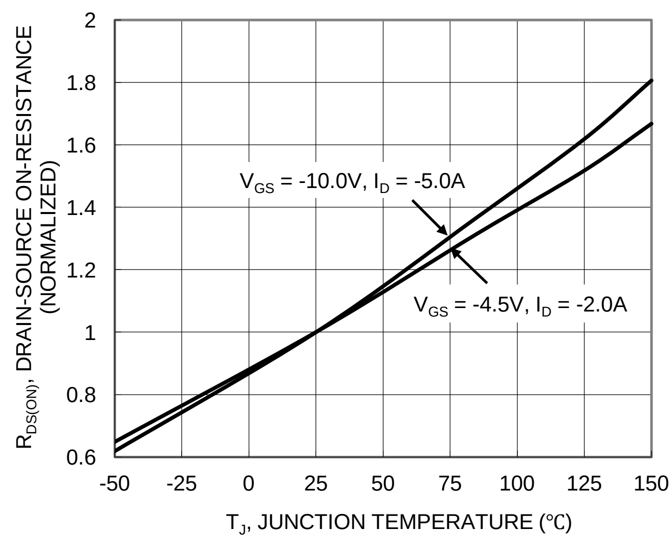


Figure 19. On-Resistance Variation with Temperature

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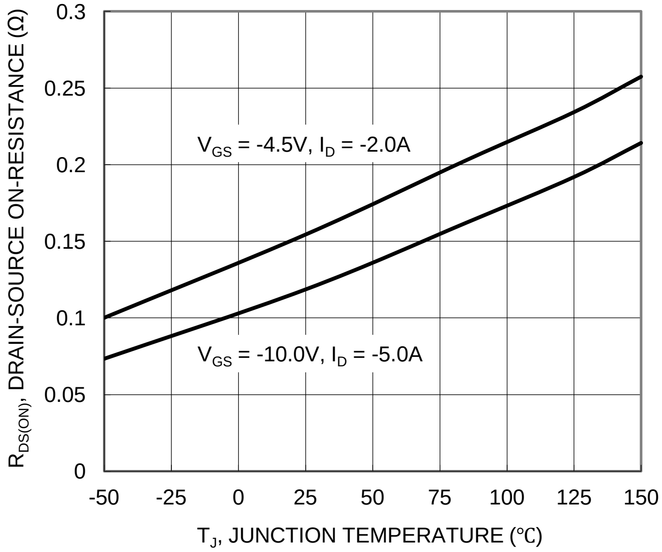

Figure 20. On-Resistance Variation with Temperature

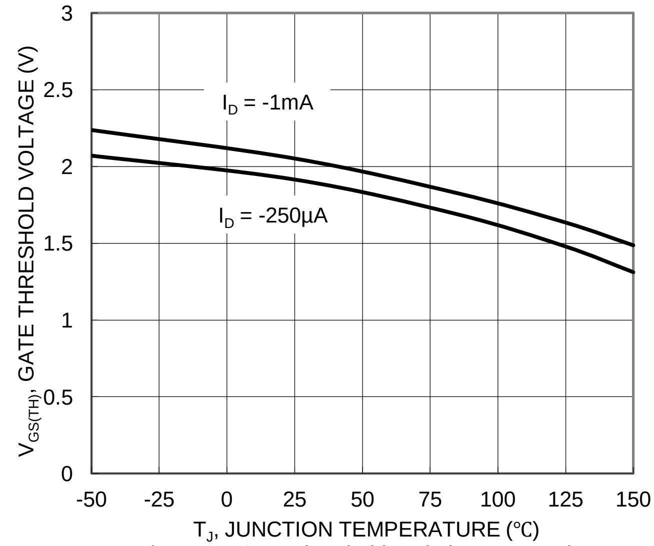

Figure 21. Gate Threshold Variation vs. Junction Temperature

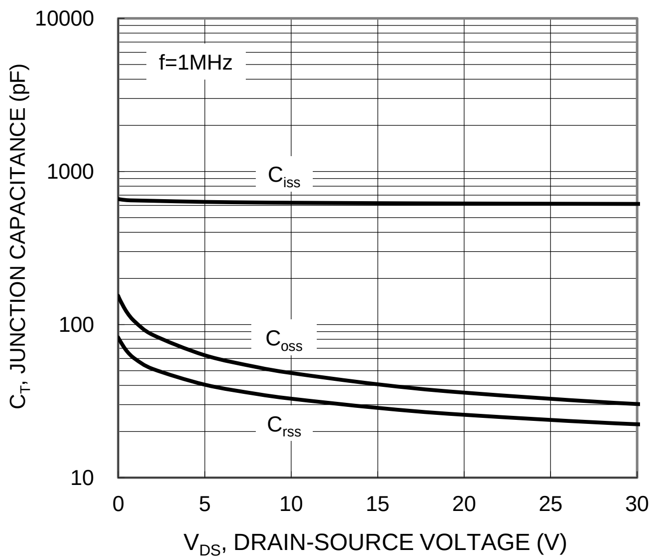

Figure 22. Typical Junction Capacitance

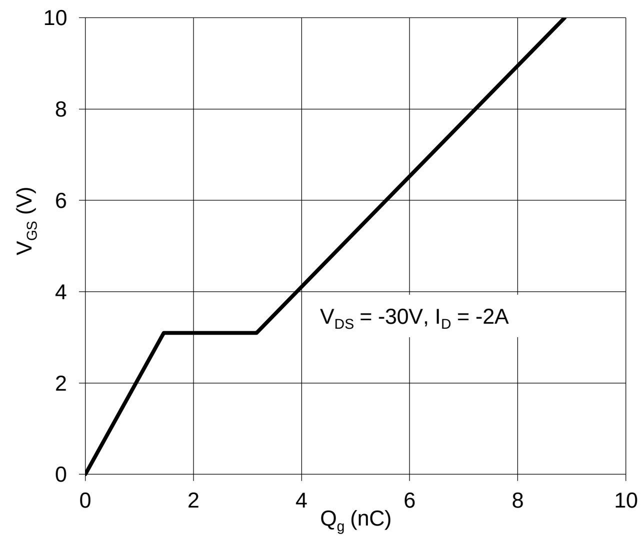

Figure 23. Gate Charge

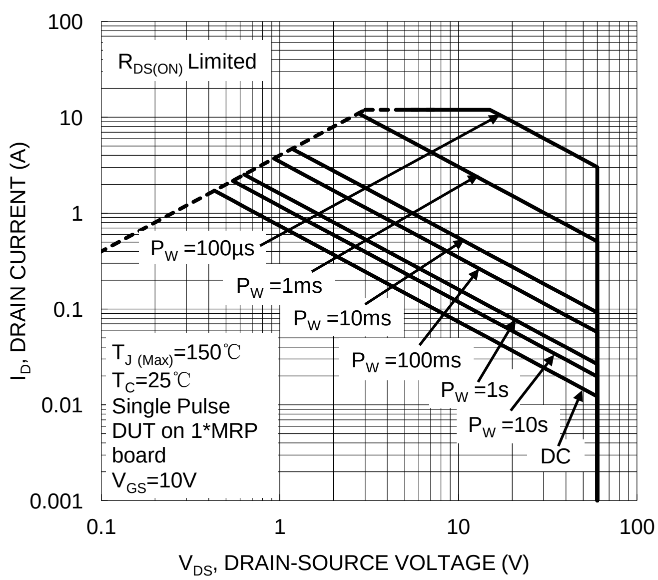

Figure 24. SOA, Safe Operation Area

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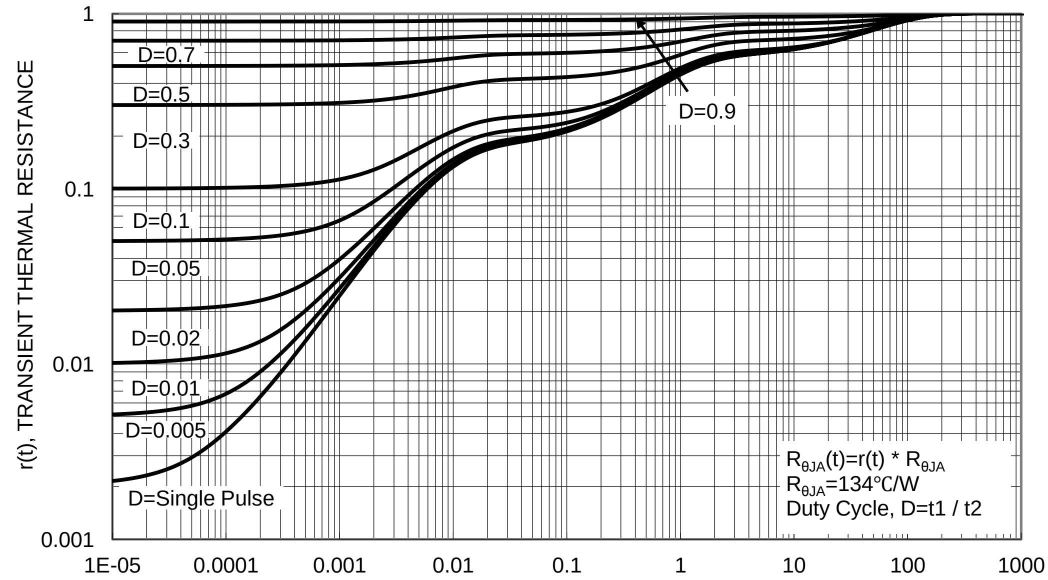
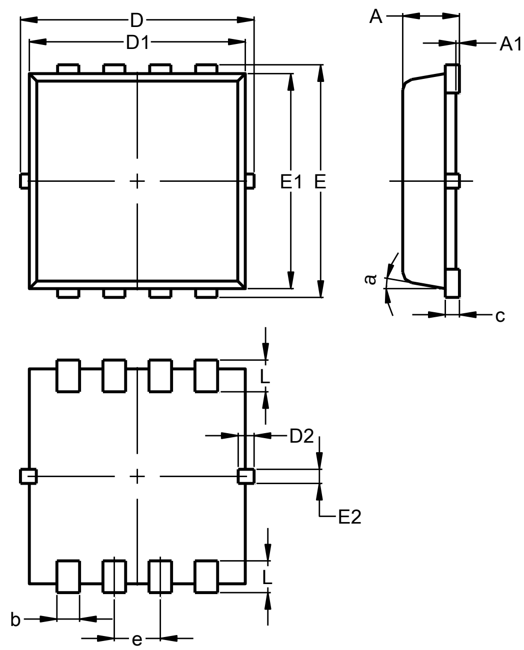


Figure 25. Transient Thermal Resistance

Package Outline Dimensions

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

POWERDI3333-8
(Type UXB)

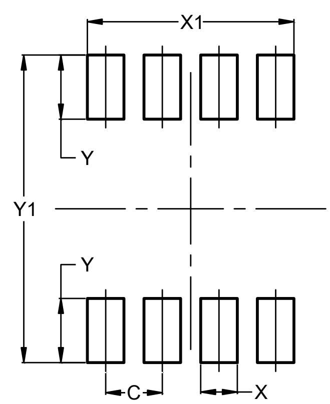


POWERDI3333-8 (Type UXB)			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	0.10	0.35	0.23
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	0.10	0.30	0.20
e	–	–	0.65
L	0.35	0.55	0.45
a	0°	12°	10°
All Dimensions in mm			

Suggested Pad Layout

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

POWERDI3333-8
(Type UXB)



Dimensions	Value (in mm)
C	0.650
X	0.420
X1	2.370
Y	0.730
Y1	3.500

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