优尚

YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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Product Summary

BV_{DSS}	$R_{DS(ON)\ max}$	I_D T_A = +25°C
24V	7mΩ @ V_{GS} = 10V	50
	8mΩ @ V_{GS} = 4.5V	47
	10mΩ @ V_{GS} = 3.7V	42
	12mΩ @ V_{GS} = 2.5V	38

Description

This new generation MOSFET is 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
- Analog Switch

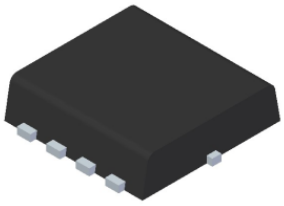
Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage

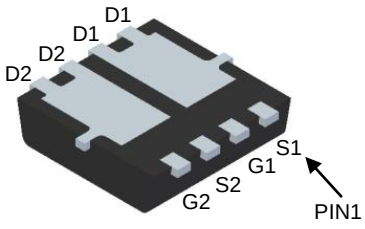
Mechanical Data

- Case: PowerDI®3333-8 (Type UXC)
- 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 Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.072 grams (Approximate)

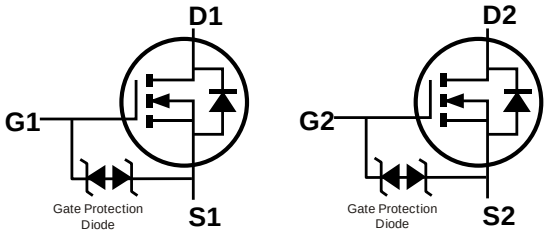
PowerDI3333-8 (Type UXC)



Top View



Bottom View



Equivalent Circuit

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	24	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Drain Current (Note 7) V_{GS} = 10V	Steady State	T_C = +25°C T_C = +70°C	I_D	50 40	A
Maximum Body Diode Forward Current (Note 7)			I_S	30	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	70	A
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%)			I_{SM}	70	A
Avalanche Current (Note 8) L = 0.1mH			I_{AS}	26	A
Avalanche Energy (Note 8) L = 0.1mH			E_{AS}	34	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	141	°C/W
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	1.9	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	66	°C/W
Thermal Resistance, Junction to Case (Note 7)		$R_{\theta JC}$	4.8	°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 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	24	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current (T_J = +25°C)	I_{DSS}	—	—	1	µA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±10V, V_{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.5	—	1.5	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	5.9	7.0	mΩ	V_{GS} = 10V, I_D = 14A
		—	6.3	8.0		V_{GS} = 4.5V, I_D = 14A
		—	6.7	10.0		V_{GS} = 3.7V, I_D = 14A
		—	8.9	12.0		V_{GS} = 2.5V, I_D = 13A
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	2,060	—	pF	V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	547	—		
Reverse Transfer Capacitance	C_{rss}	—	517	—		
Gate Resistance	R_G	—	1.6	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	24.8	—	nC	V_{DD} = 10V, I_D = 5A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	46.7	—		
Gate-Source Charge	Q_{gs}	—	3	—		
Gate-Drain Charge	Q_{gd}	—	9.6	—		
Turn-On Delay Time	$t_{D(ON)}$	—	3.7	—	ns	V_{DD} = 10V, V_{GS} = 10V, R_G = 3Ω, I_D = 5A
Turn-On Rise Time	t_R	—	7.2	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	37.5	—		
Turn-Off Fall Time	t_F	—	23.3	—		
Reverse Recovery Time	t_{RR}	—	19.9	—	ns	I_F = 5A, di/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	9.0	—	nC	

Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
7. Thermal resistance from junction to soldering point (on the exposed drain pad).
8. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

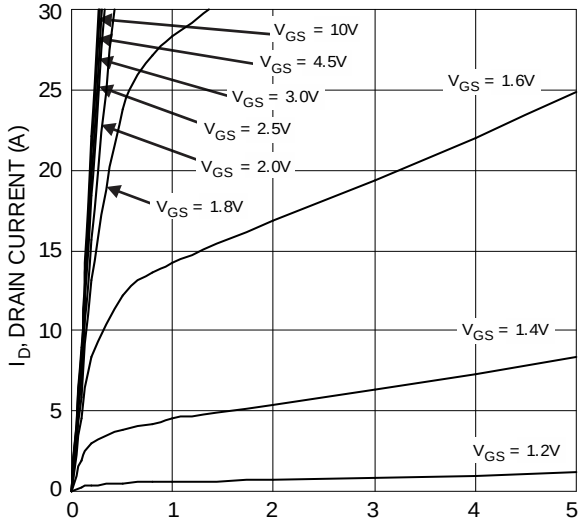


Figure 1 Typical Output Characteristics

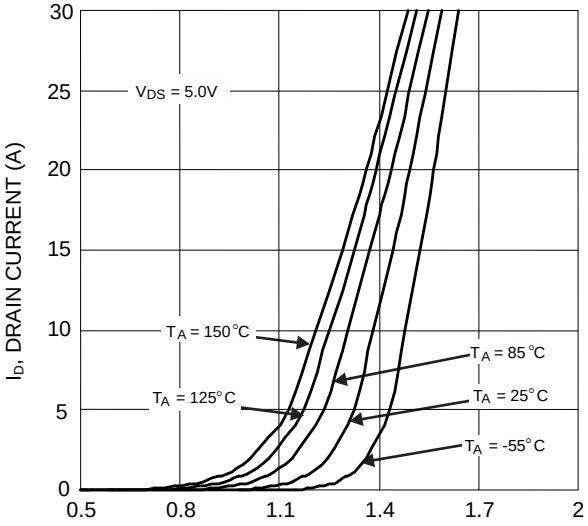


Figure 2 Typical Transfer Characteristics

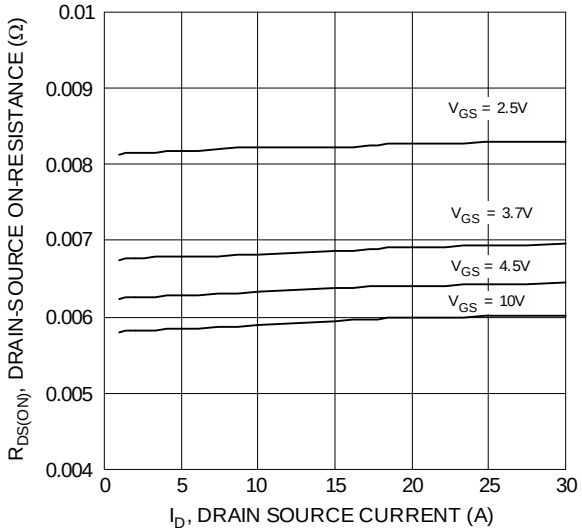


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

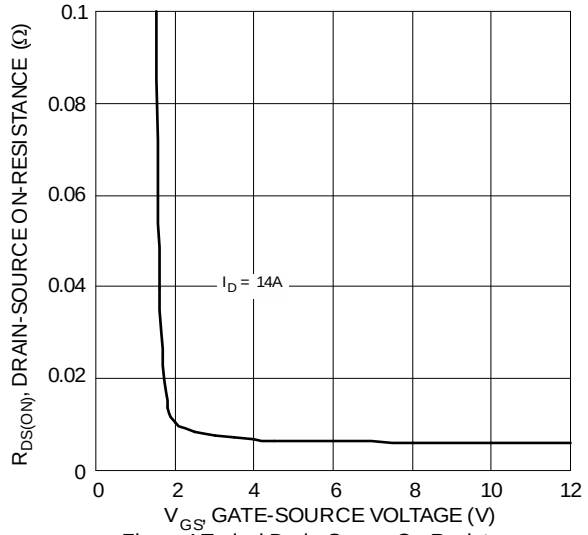


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

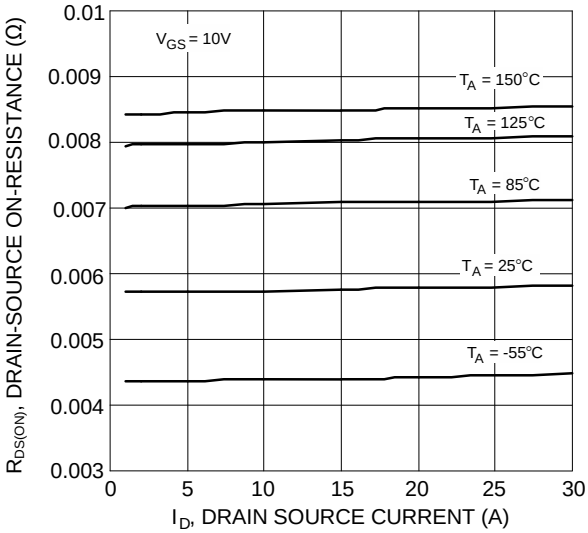


Figure 5 Typical On-Resistance vs. Drain Current and Junction Temperature

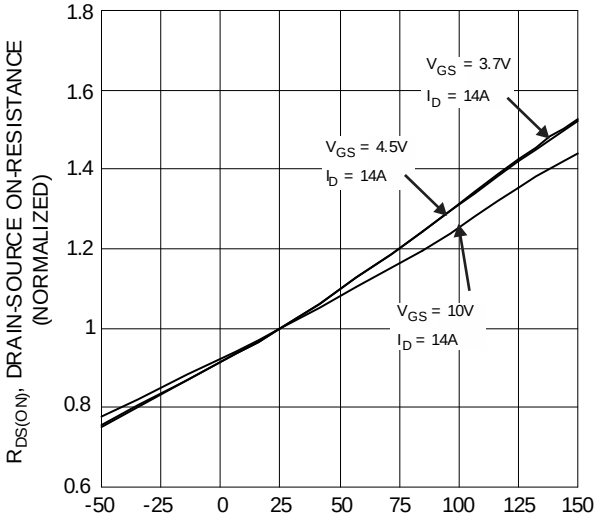


Figure 6 On-Resistance Variation with Temperature

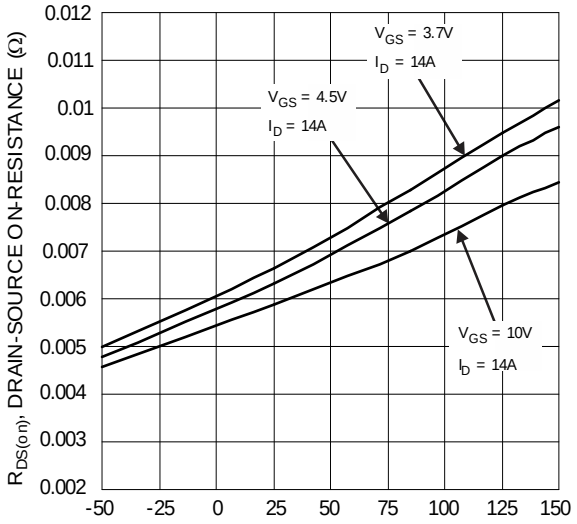


Figure 7 On-Resistance Variation with Junction Temperature

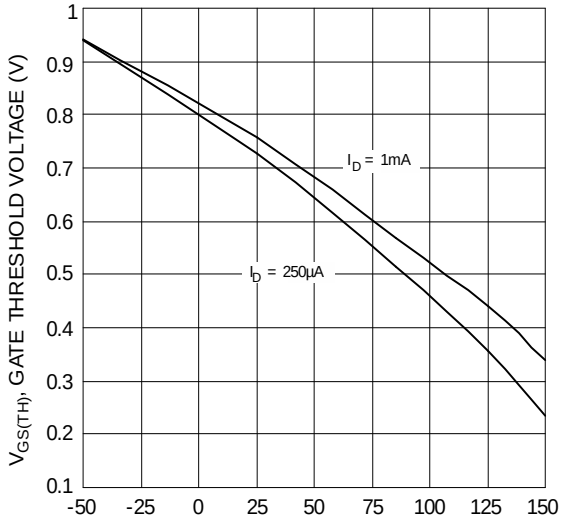


Figure 8 Gate Threshold Variation vs. Junction Temperature

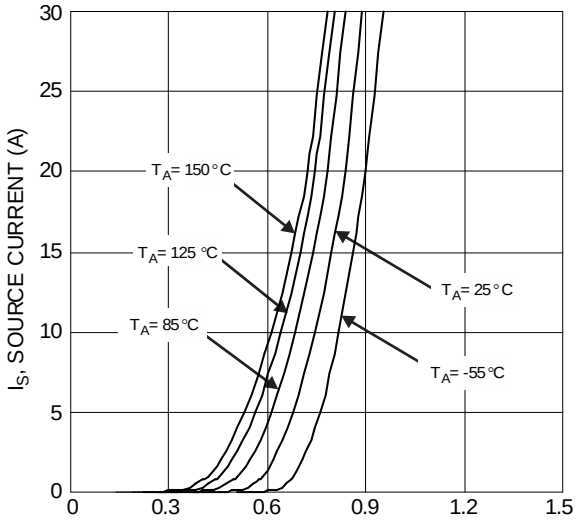


Figure 9 Diode Forward Voltage vs. Current

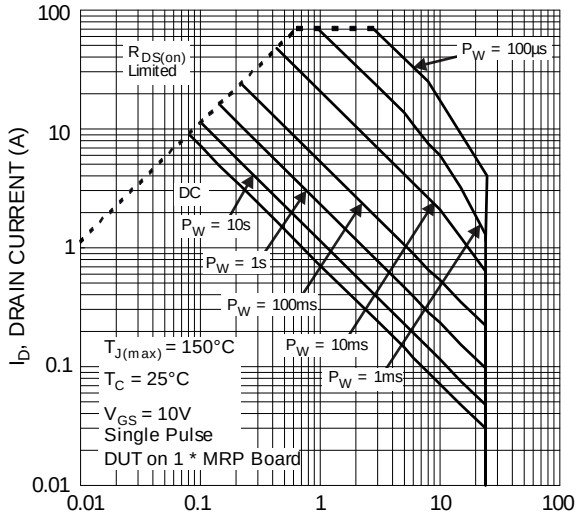


Figure 10 SOA, Safe Operation Area

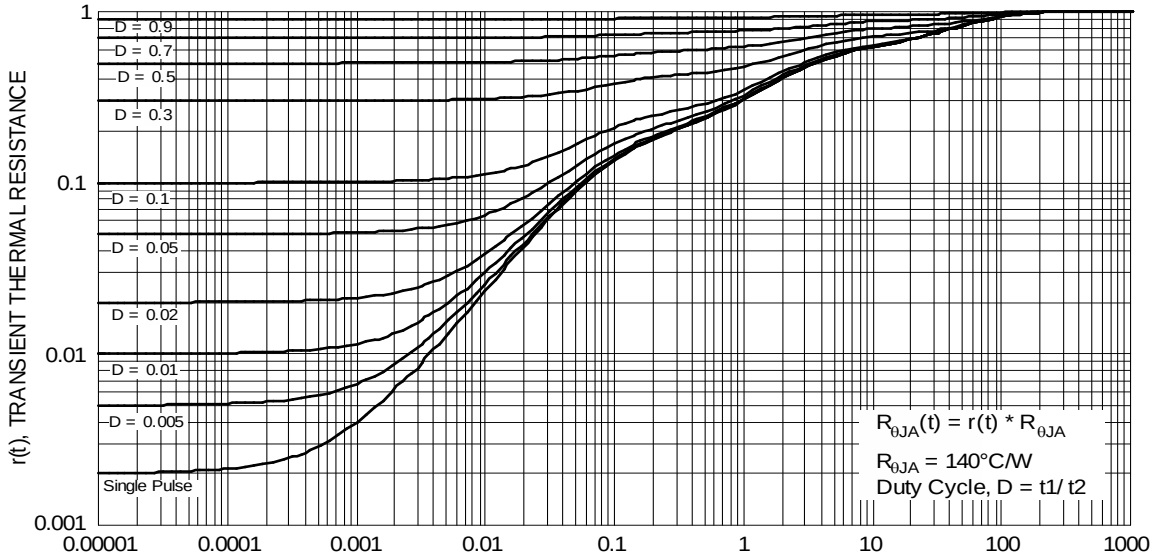


Figure 11. Transient Thermal Resistance

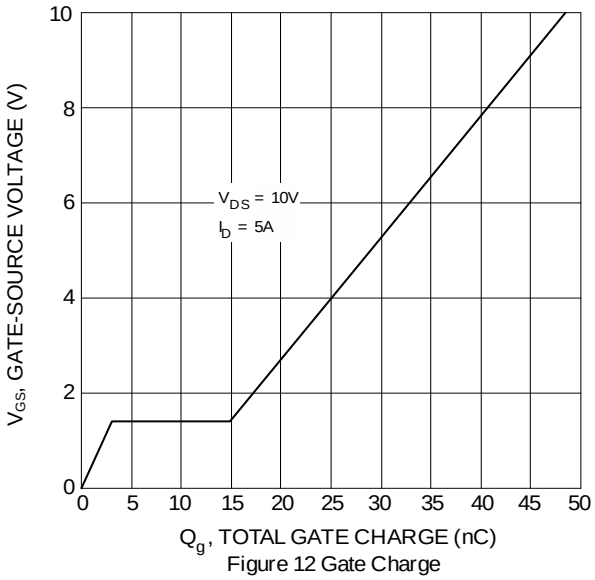
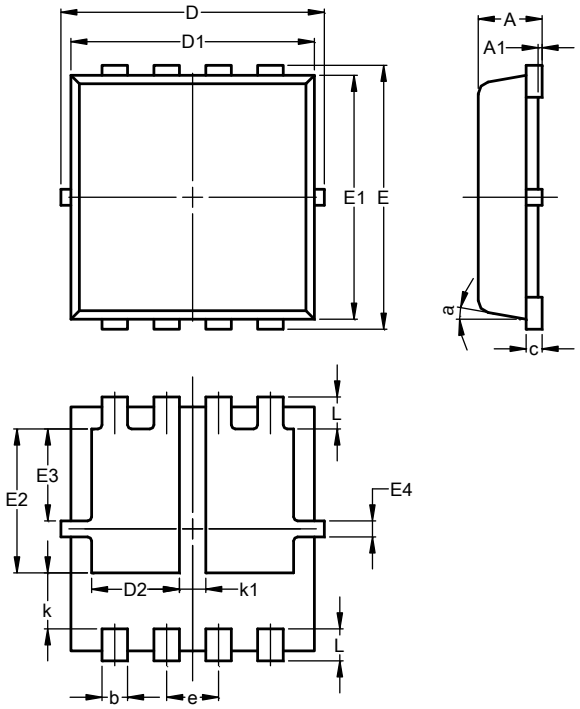


Figure 12 Gate Charge

Package Outline Dimensions

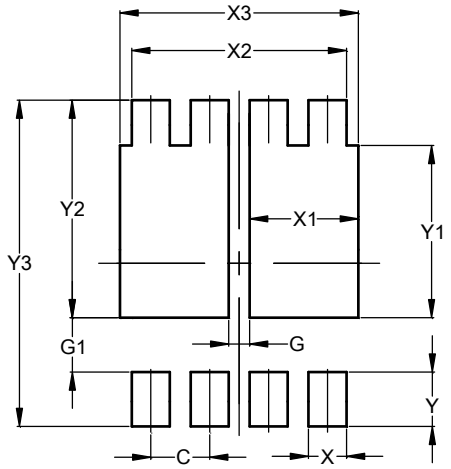
PowerDI3333-8 (Type UXC)



PowerDI3333-8 (Type UXC)			
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	0.90	1.30	1.10
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	–	–	0.65
L	0.30	0.50	0.40
k	0.50	0.90	0.70
k1	0.13	0.53	0.33
a	0°	12°	10°
All Dimensions in mm			

Suggested Pad Layout

PowerDI3333-8 (Type UXC)



Dimensions	Value (in mm)
C	0.650
G	0.230
G1	0.600
X	0.420
X1	1.200
X2	2.370
X3	2.630
Y	0.600
Y1	1.900
Y2	2.400
Y3	3.600