



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 Max $T_A = +25^\circ C$
-40V	29m Ω @ $V_{GS} = -10V$	-8.0A
	45m Ω @ $V_{GS} = -4.5V$	-6.0A

Description and Applications

This 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.

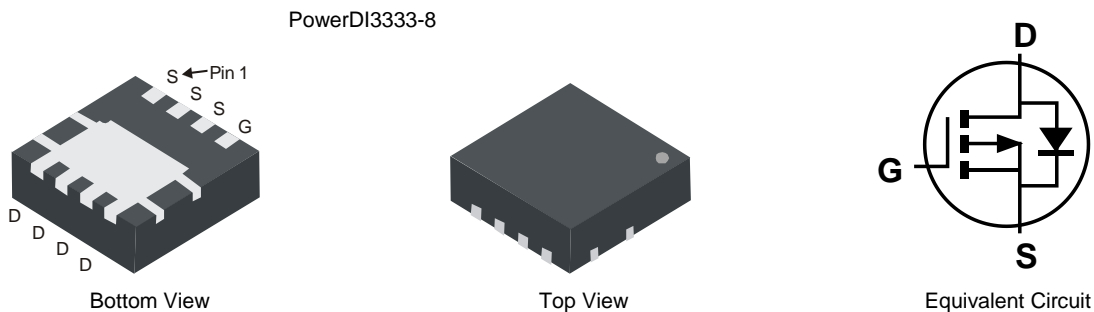
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

- Rated to $+175^\circ C$ – Ideal for High Ambient Temperature Environments
- Low $R_{DS(ON)}$ – Ensures On State Losses Are Minimized
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- Occupies Just 33% of the Board Area Occupied by SO-8 Enabling Smaller End Product

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
- 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)



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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-40	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = -10V	Steady State	T _A = +25°C T _A = +70°C	I _D	-8.0 -6.7	A
	Steady State	T _C = +25°C T _C = +70°C	I _D	-22 -18	A
Pulsed Drain Current (380μs Pulse, Duty Cycle = 1%)			I _{DM}	-88	A
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	-2.0	A
Pulsed Source Current (380μs Pulse, Duty Cycle = 1%)			I _{SM}	-88	A
Avalanche Current (Note 7) L = 0.1mH			I _{AS}	-25	A
Avalanche Energy (Note 7) L = 0.1mH			E _{AS}	32	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P _D	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	R _{θJA}	125	°C/W
	t < 10s		85	
Total Power Dissipation (Note 6)		P _D	2.8	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	R _{θJA}	54	°C/W
	t < 10s		36	
Thermal Resistance, Junction to Case (Note 6)		R _{θJC}	6	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +175	°C

Electrical Characteristics (@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}	-40	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	-1	μA	V _{DS} = -40V, 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	—	-3.0	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	18	29	mΩ	V _{GS} = -10V, I _D = -3A
		—	23	45		V _{GS} = -4.5V, I _D = -3A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{ISS}	—	1626	—	pF	V _{DS} = -20V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{OSS}	—	135	—	pF	
Reverse Transfer Capacitance	C _{RSS}	—	107	—	pF	
Gate Resistance	R _g	—	11	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	17	—	nC	V _{DS} = -20V, I _D = -3A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	34	—	nC	
Gate-Source Charge	Q _{gs}	—	3.7	—	nC	
Gate-Drain Charge	Q _{gd}	—	6.0	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	3.9	—	ns	V _{GS} = -10V, V _{DS} = -20V, R _G = 3Ω, I _D = -3A
Turn-On Rise Time	t _R	—	2.8	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	83	—	ns	
Turn-Off Fall Time	t _F	—	30	—	ns	
Body Diode Reverse Recovery Time	t _{RR}	—	17.3	—	ns	I _F = -3A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	7.2	—	nC	I _F = -3A, di/dt = 100A/μs

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

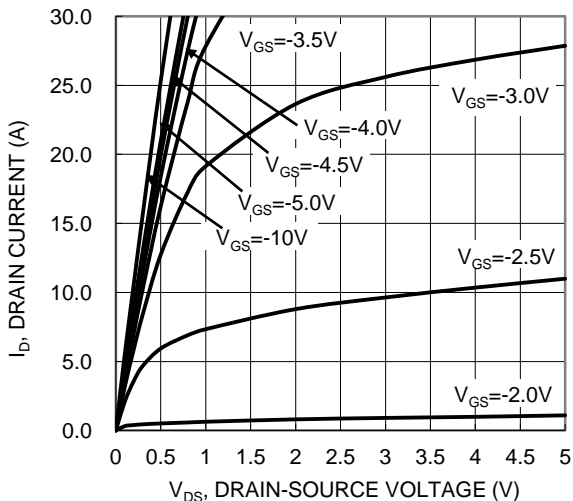


Figure 1. Typical Output Characteristic

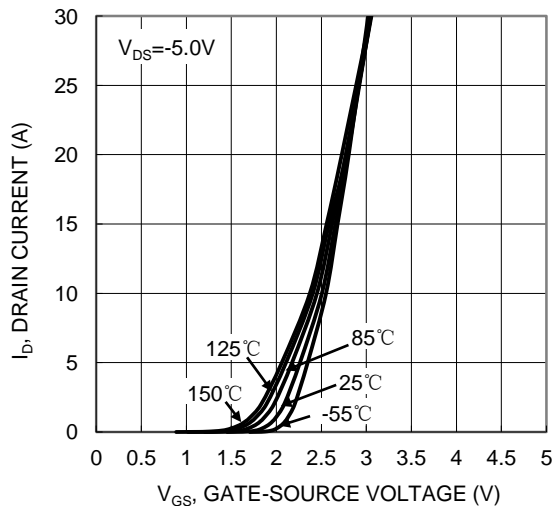


Figure 2. Typical Transfer Characteristic

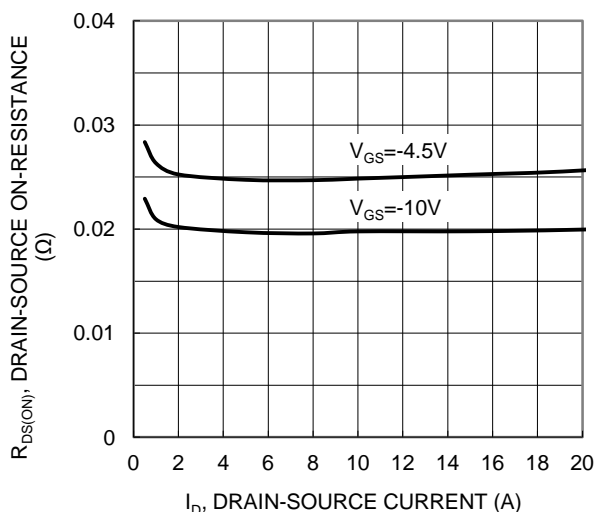


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

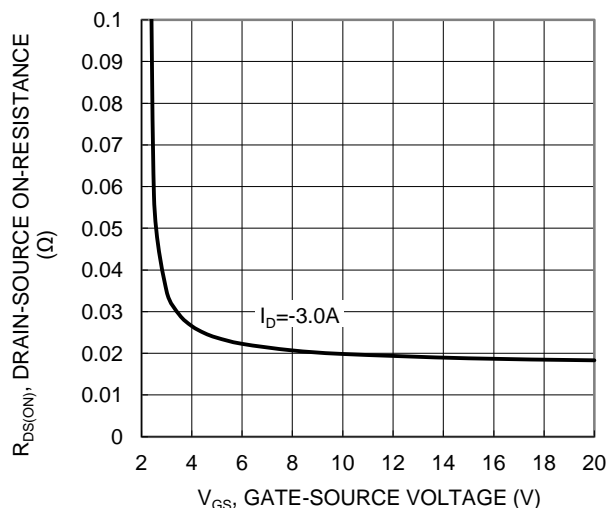


Figure 4. Typical Transfer Characteristic

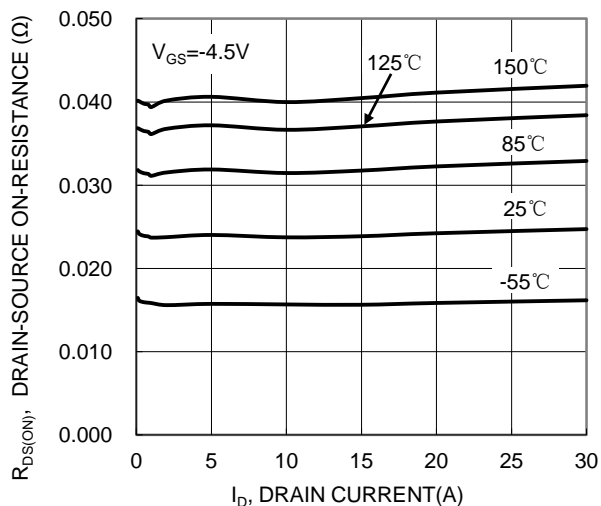


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

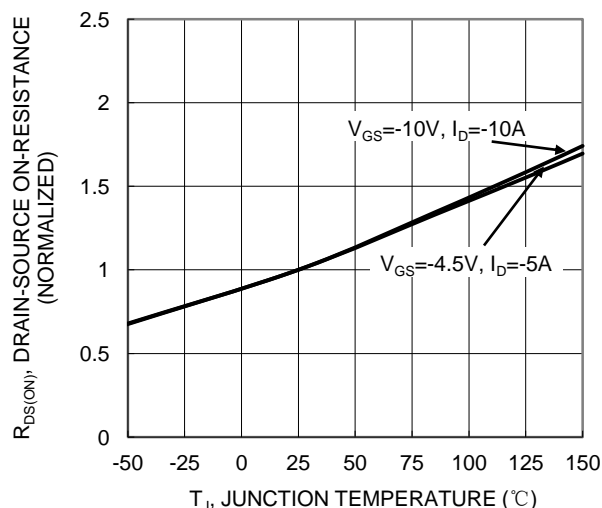


Figure 6. On-Resistance Variation with Temperature

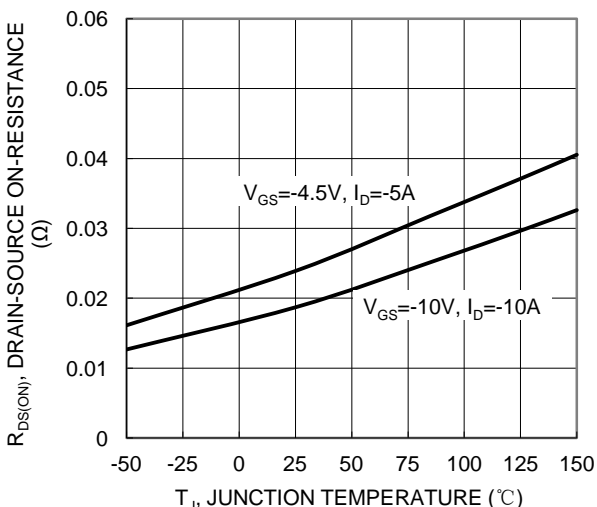


Figure 7. On-Resistance Variation with Temperature

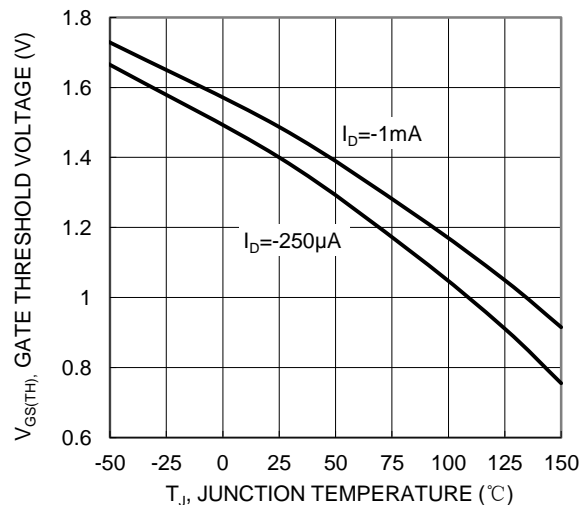


Figure 8. Gate Threshold Variation vs. Junction Temperature

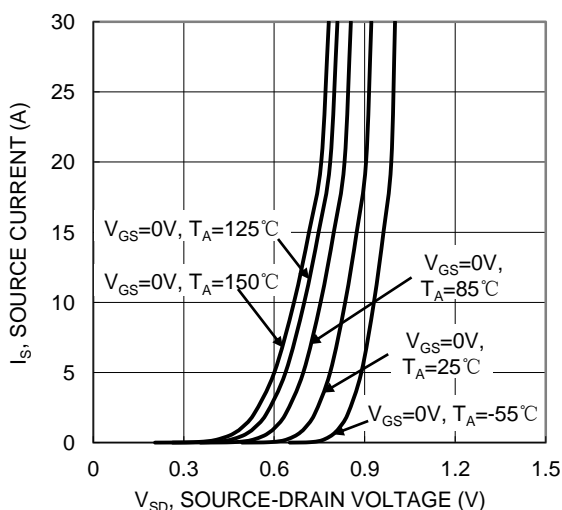


Figure 9. Diode Forward Voltage vs. Current

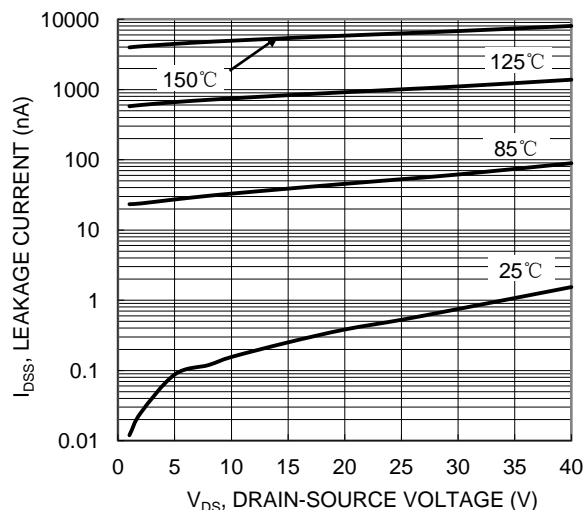


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

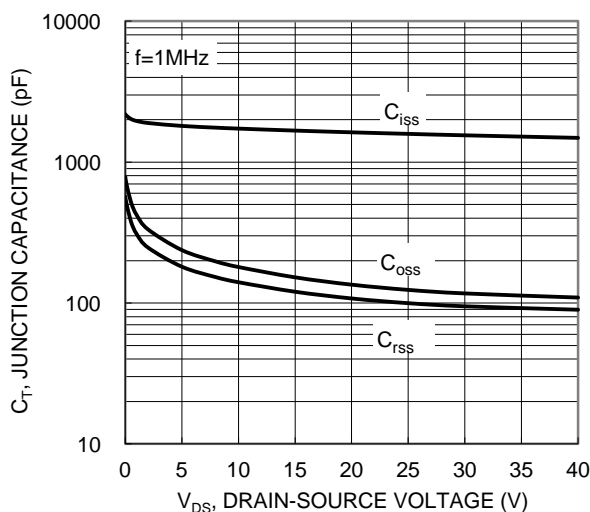


Figure 11. Typical Junction Capacitance

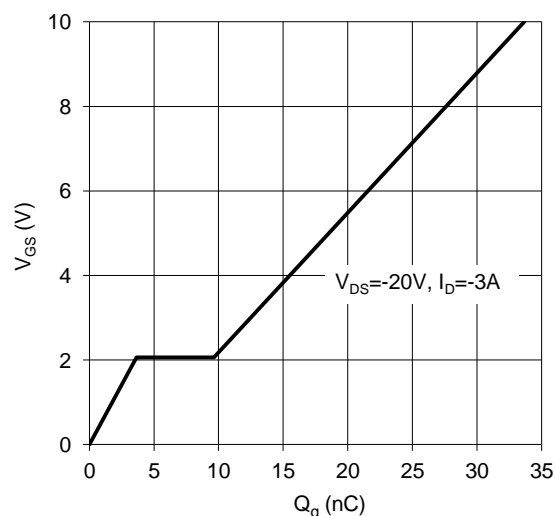


Figure 12. Gate Charge

