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

$V_{(BR)DSS}$	$R_{DS(on)\ max}$	I_D T_A = 25°C
20V	18mΩ @ V_{GS} = 4.5V	5.2A
	30mΩ @ V_{GS} = 1.8V	4.0A

Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed

Description and Applications

This new generation MOSFET has been 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.

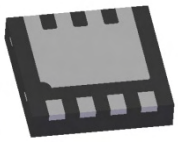
- Power management functions
- Battery Pack
- Load Switch

Mechanical Data

- Case: U-DFN3030-8
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Weight: 0.0172 grams (approximate)

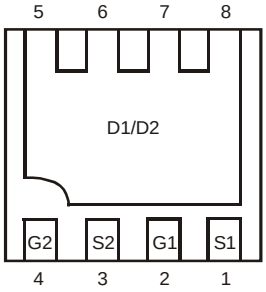
U-DFN3030-8

ESD PROTECTED TO 2kV

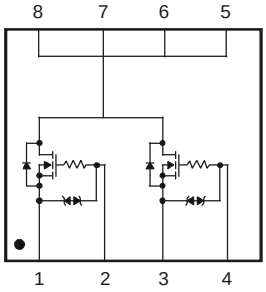


Top View

Bottom View



Bottom View
Pin Configuration



Top View
Equivalent Circuit

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 4)	Steady State	T_A = 25°C T_A = 70°C	I_D	5.2 4.1	A
Pulsed Drain Current (10μs pulse, duty cycle = 1%)			I_{DM}	30	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P_D	0.77	W
Thermal Resistance, Junction to Ambient @T_A = 25°C (Note 4)	$R_{\theta JA}$	169	°C/W
Thermal Resistance, Junction to Case @T_A = 25°C (Note 4)	$R_{\theta JC}$	15.8	°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 5)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	-	-	V	V_{GS} = 0V, I_D = 250μA
Gate-Source Breakdown Voltage	BV_{GSO}	±8	-	-	V	V_{DS} = 0V, I_G = ±250μA
Zero Gate Voltage Drain Current T_J = 25°C	I_{DSS}	-	-	1.0	μA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±10	μA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 5)						
Gate Threshold Voltage	$V_{GS(th)}$	0.4	0.71	1.1	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	13	18	mΩ	V_{GS} = 4.5V, I_D = 6A
			13.5	19		V_{GS} = 4.0V, I_D = 6A
			14	20.5		V_{GS} = 3.1V, I_D = 6A
			15	22		V_{GS} = 2.5V, I_D = 6A
			21	30		V_{GS} = 1.8V, I_D = 6A
Forward Transfer Admittance	$\|Y_{fs}\|$	-	25	-	S	V_{DS} = 5V, I_D = 6A
Diode Forward Voltage	V_{SD}	-	0.75	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 6)						
Input Capacitance	C_{iss}	-	1472	-	pF	V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	311	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	141	-	pF	
Gate Resistance	R_g	-	1.46	-	Ω	V_{DS} =0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	-	16.0	-	nC	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 6A
Gate-Source Charge	Q_{gs}	-	36.6	-	nC	
Gate-Drain Charge	Q_{gd}	-	2.1	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	2.6	-	ns	V_{DD} = 10V, V_{GS} = 5V, R_{GEN} = 3Ω, R_L = 1.7Ω
Turn-On Rise Time	t_r	-	13.2	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	84.5	-	ns	
Turn-Off Fall Time	t_f	-	46.8	-	ns	

Notes: 4. Device mounted on FR-4 PCB, with minimum recommended pad layout.
5. Repetitive rating, pulse width limited by junction temperature
6. Guaranteed by design. Not subject to product testing

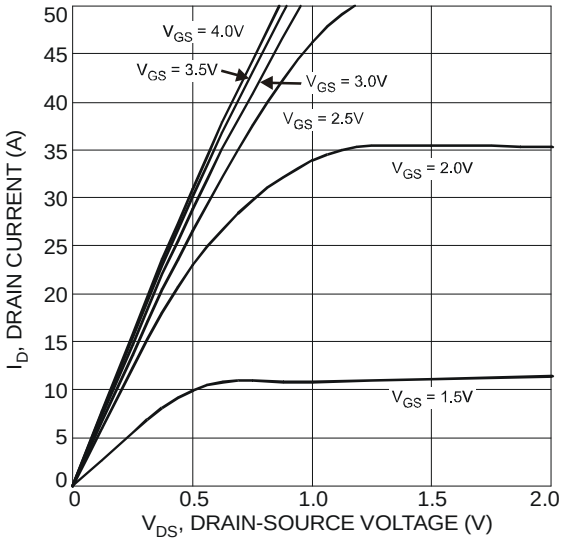


Fig.1 Typical Output Characteristic

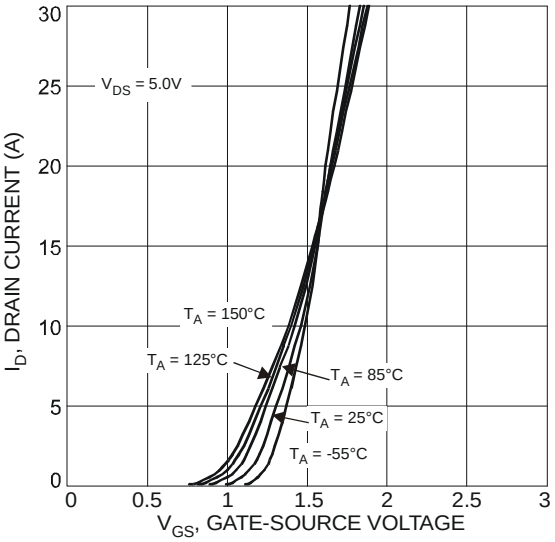


Fig.2 Typical Transfer Characteristics

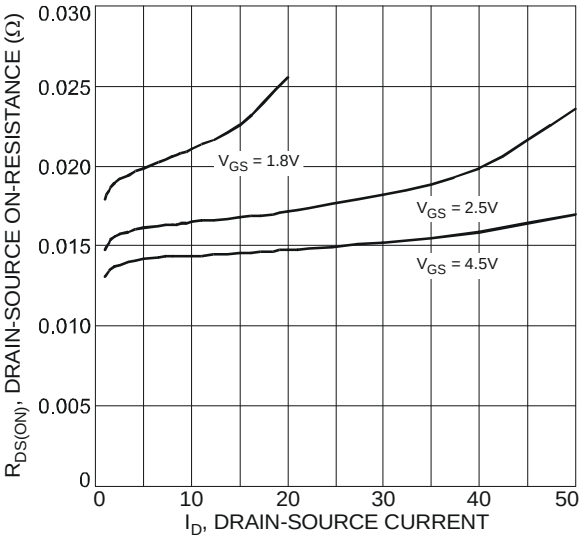


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

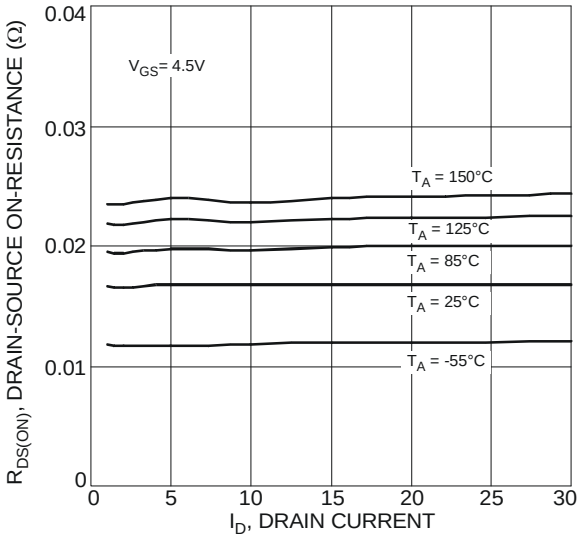


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

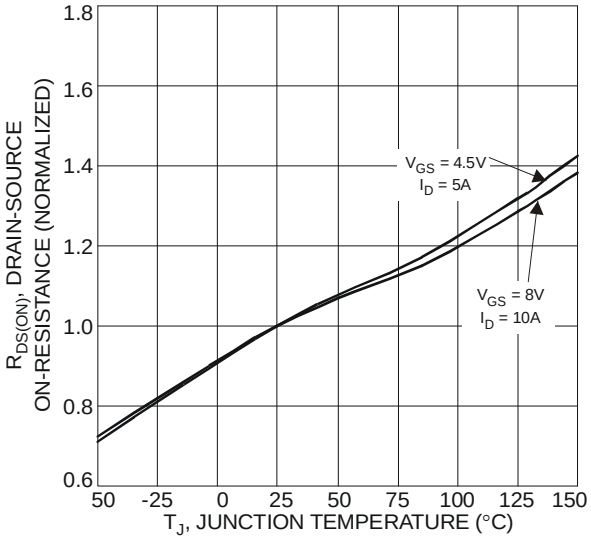


Fig. 5 On-Resistance Variation with Temperature

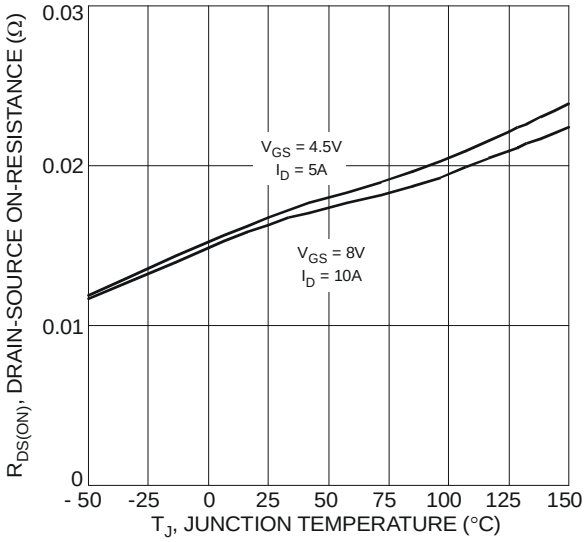


Fig. 6 On-Resistance Variation with Temperature

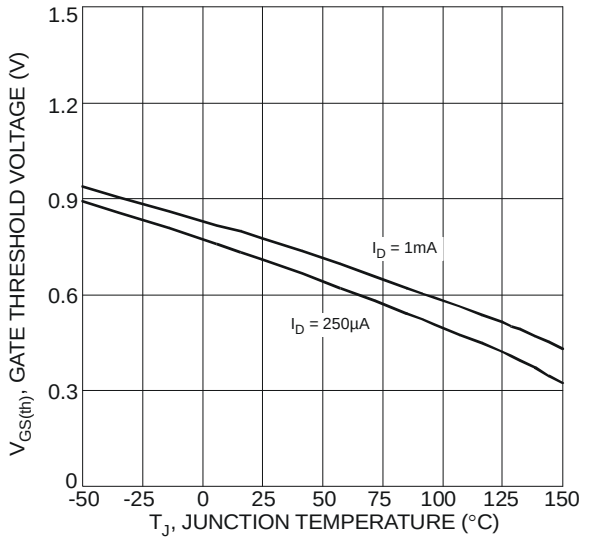


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

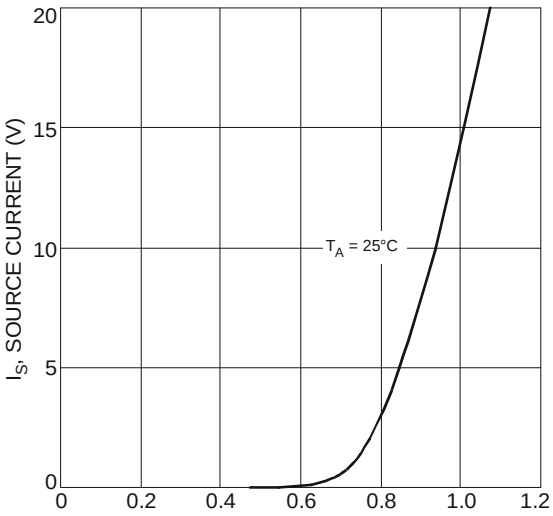


Fig. 8 Diode Forward Voltage vs. Current

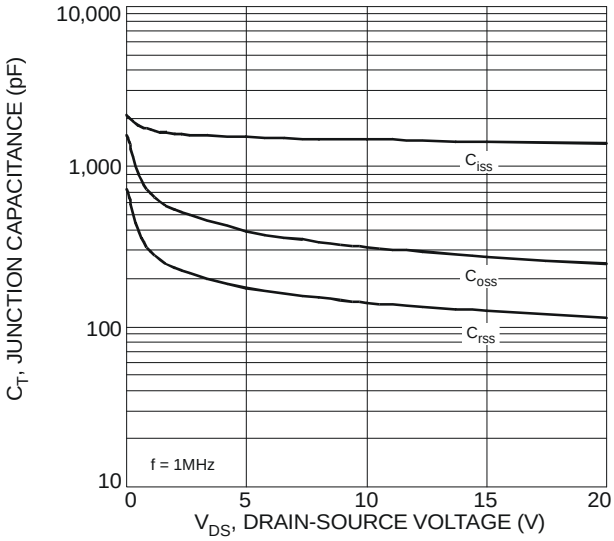


Fig. 9 Typical Junction Capacitance

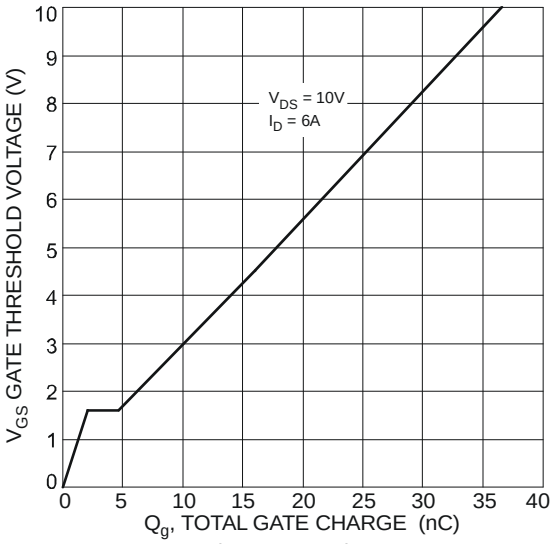


Fig. 10 Gate Charge

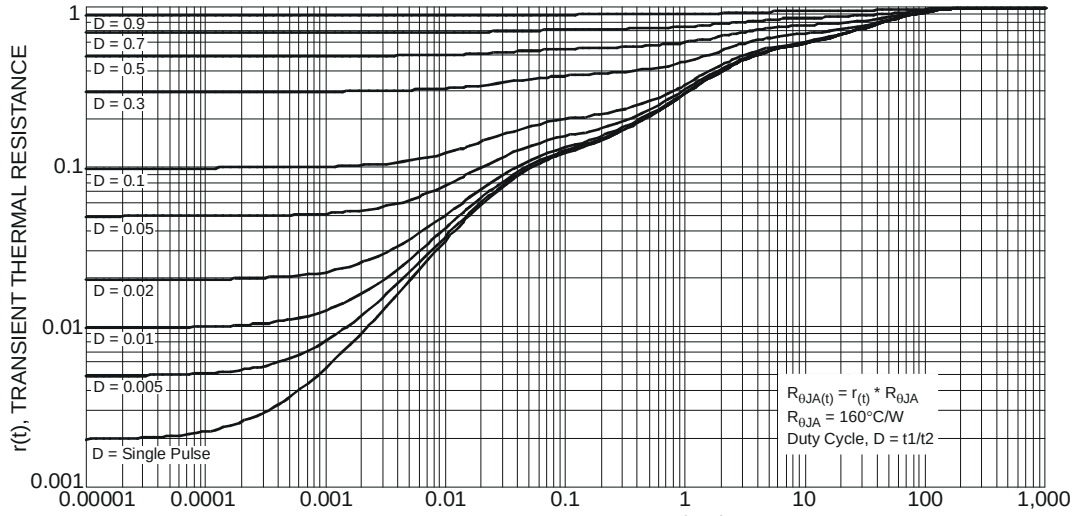
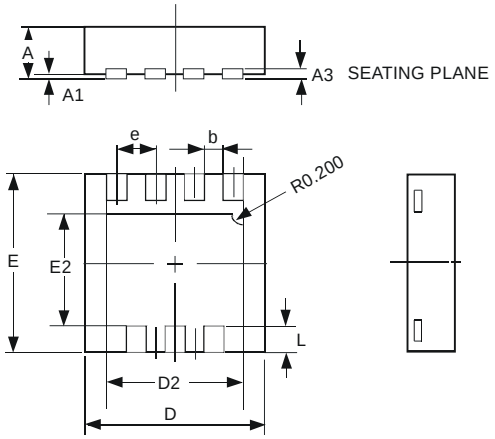


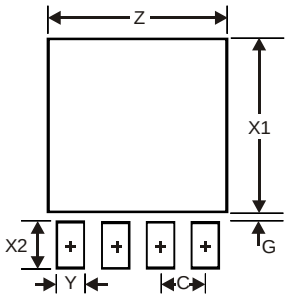
Fig. 11 Transient Thermal Resistance

Package Outline Dimensions



U-DFN3030-8			
Dim	**Min**	**Max**	**Typ**
A	0.57	0.63	0.60
A1	0	0.05	0.02
A3	—	—	0.15
b	0.29	0.39	0.34
D	2.90	3.10	3.00
D2	2.19	2.39	2.29
e	—	—	0.65
E	2.90	3.10	3.00
E2	1.64	1.84	1.74
L	0.30	0.60	0.45
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	2.59
G	0.11
X1	2.49
X2	0.65
Y	0.39
C	0.65