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

Device	BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_C = +25°C (Note 10)
Q1 & Q2	30V	11.1mΩ @ V_{GS} = 10V	30A
		13.8mΩ @ V_{GS} = 4.5V	28A
		22.0mΩ @ V_{GS} = 3.8V	22A

Features and Benefits

- Low Gate Threshold Voltage

Description

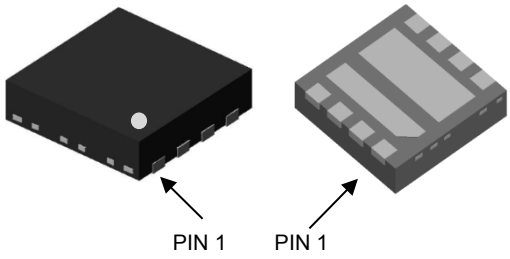
This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$), yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

Applications

- General Purpose Interfacing Switch
- Power Management Functions

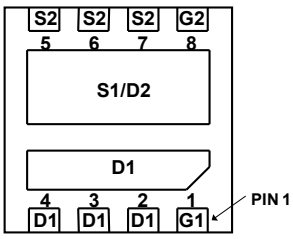
Mechanical Data

- Case: V-DFN3030-8 (Type K)
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper Lead-Frame. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.02 grams (Approximate)

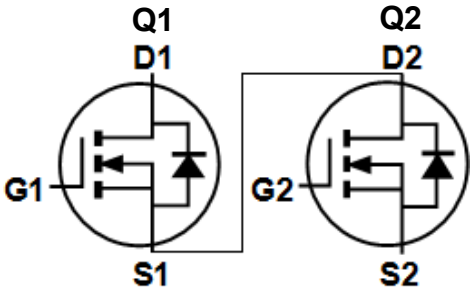


Top View Bottom View

V-DFN3030-8 (Type K)



Bottom View
Internal Schematic



Equivalent Circuit

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

Characteristic			Symbol	Q1&Q2	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	+20, -16	V
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State (Note 10)	T_C = +25°C T_C = +70°C	I_D	30 25	A
	t<10s	T_A = +25°C T_A = +70°C	I_D	14 11	A
Maximum Body Diode Forward Current (Note 6)			I_S	2.1	A
Pulsed Drain Current (100μs Pulse, Duty Cycle = 1%)			I_{DM}	80	A
Pulsed Body Diode Forward Current (370μs Pulse, Duty Cycle = 1%)			I_{SM}	80	A
Avalanche Current (Note 7) L = 0.1mH			I_{AS}	19.3	A
Avalanche Energy (Note 7) L = 0.1mH			E_{AS}	18.6	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	1.2	W
	T_A = +70°C		0.8	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	107	°C/W
	t<10s		63	
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	2.0	W
	T_A = +70°C		1.2	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	64	°C/W
	t<10s		39	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	7.6	
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 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	V_{DS} = 24V, V_{GS} = 0V
Zero Gate Voltage Drain Current T_J = +150°C (Note 9)	I_{DSS}	—	—	100	μA	V_{DS} = 24V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = 20V, V_{DS} = 0V 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	$R_{DS(ON)}$	—	7.2	11.1	mΩ	V_{GS} = 10V, I_D = 14.4A
		—	10.5	13.8		V_{GS} = 4.5V, I_D = 7A
		—	13	22.0		V_{GS} = 3.8V, I_D = 5A
Diode Forward Voltage	V_{SD}	—	—	1.2	V	V_{GS} = 0V, I_S = 10A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	748	1,500	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	447	895		
Reverse Transfer Capacitance	C_{rss}	—	43	90		
Gate Resistance	R_g	—	1.0	2.0	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 10V)	Q_g	—	13.8	20	nC	V_{DS} = 15V, I_D = 14.4A
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	6.4	9		
Gate-Source Charge	Q_{gs}	—	2.2	5		
Gate-Drain Charge	Q_{gd}	—	2.2	5		
Turn-On Delay Time	$t_{D(ON)}$	—	3.5	7	ns	V_{GS} = 10V, V_{DD} = 15V, R_g = 1Ω, I_D = 10A
Turn-On Rise Time	t_R	—	5.0	10		
Turn-Off Delay Time	$t_{D(OFF)}$	—	8.6	17		
Turn-Off Fall Time	t_F	—	1.4	3		
Body Diode Reverse Recovery Time	t_{RR}	—	18	33	ns	I_F = 10A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q_{RR}	—	7.7	15	nC	I_F = 10A, di/dt = 100A/μs

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate.
7. UIS in production with L = 0.1mH, starting T_A = +25°C.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.
10. Package limited.

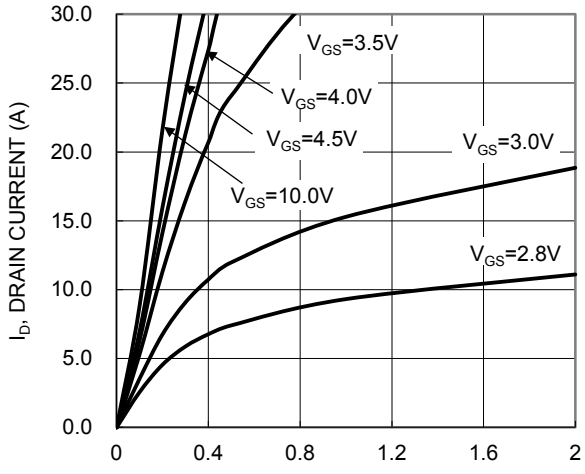


Figure 1. Typical Output Characteristic

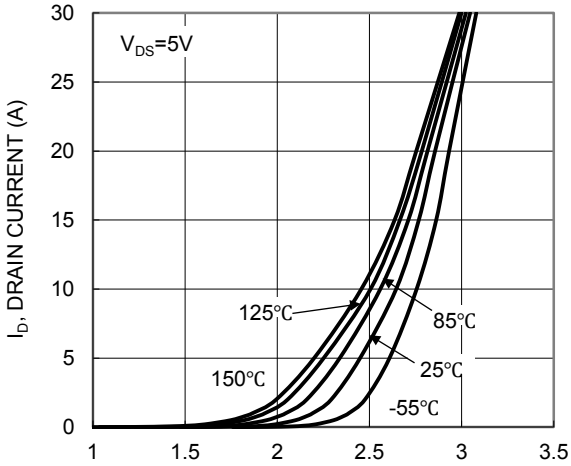


Figure 2. Typical Transfer Characteristic

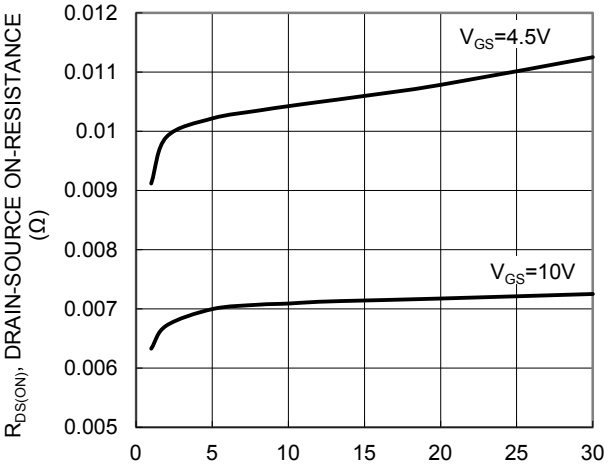


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

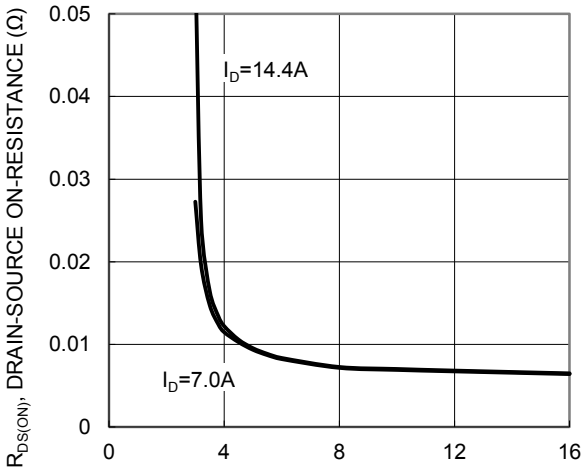


Figure 4. Typical Transfer Characteristic

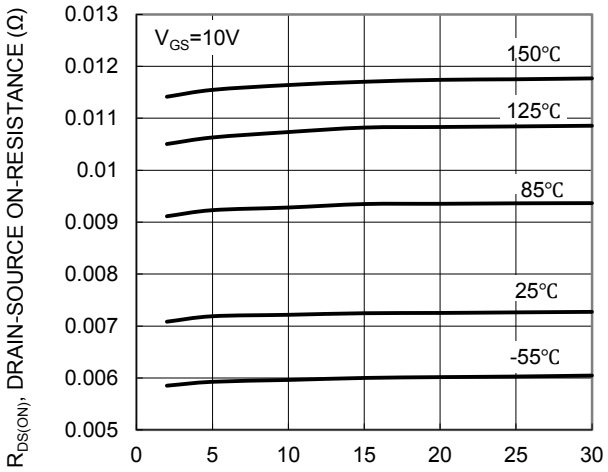


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

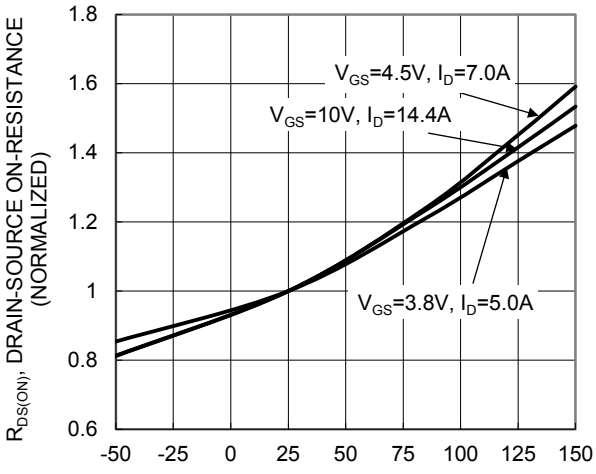


Figure 6. On-Resistance Variation with Junction Temperature

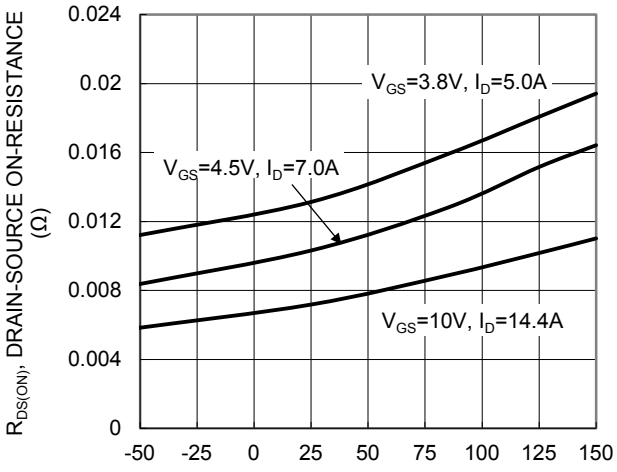


Figure 7. On-Resistance Variation with Junction Temperature

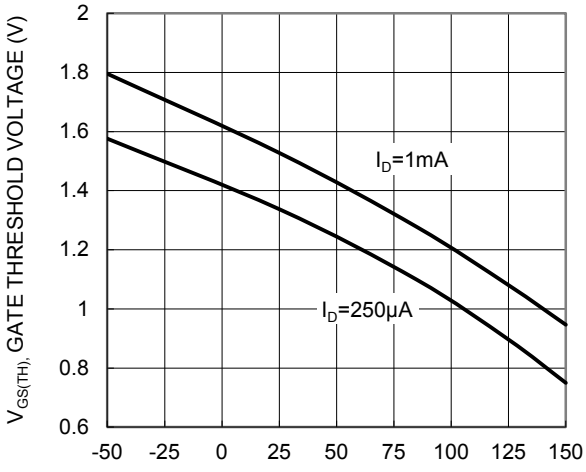


Figure 8. Gate Threshold Variation vs. Junction Temperature

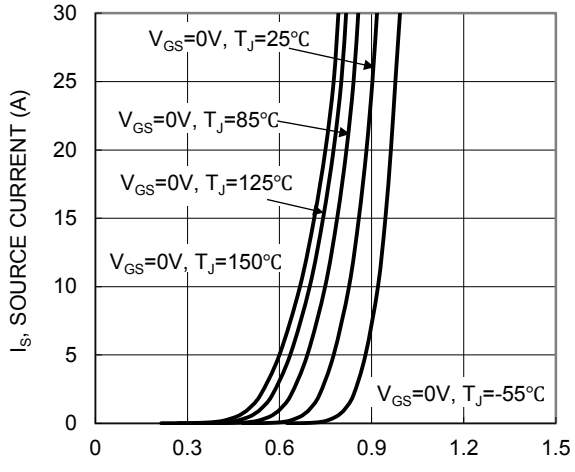


Figure 9. Diode Forward Voltage vs. Current

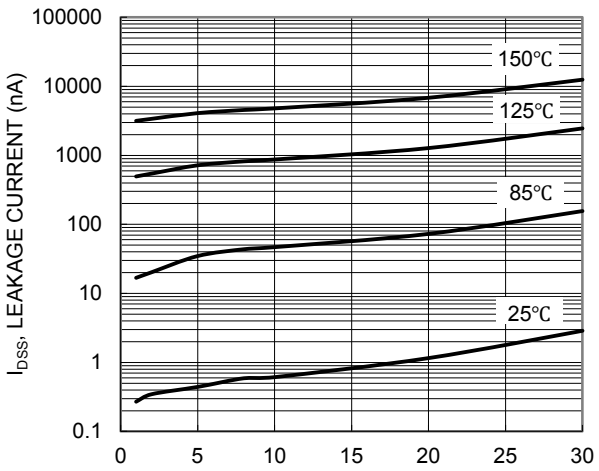


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

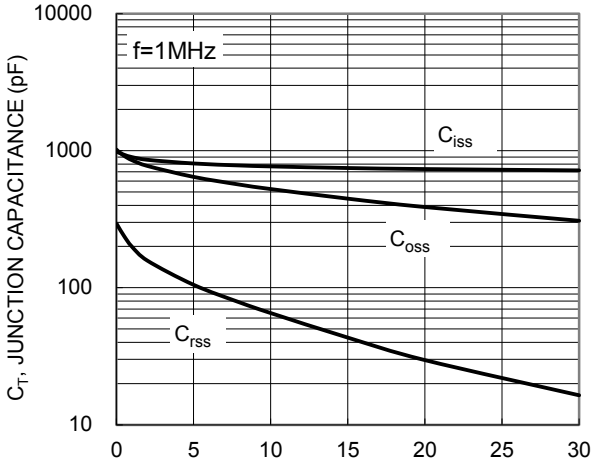


Figure 11. Typical Junction Capacitance

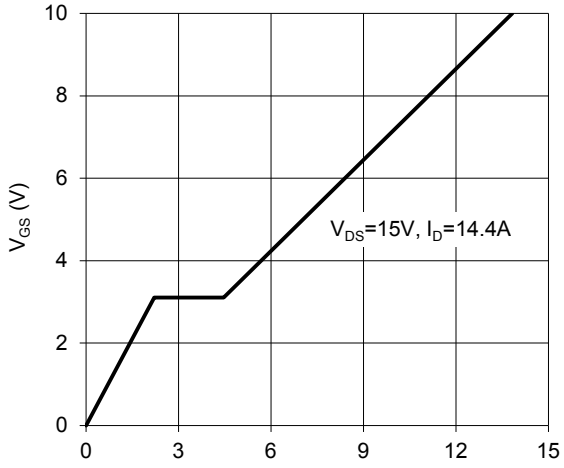


Figure 12. Gate Charge

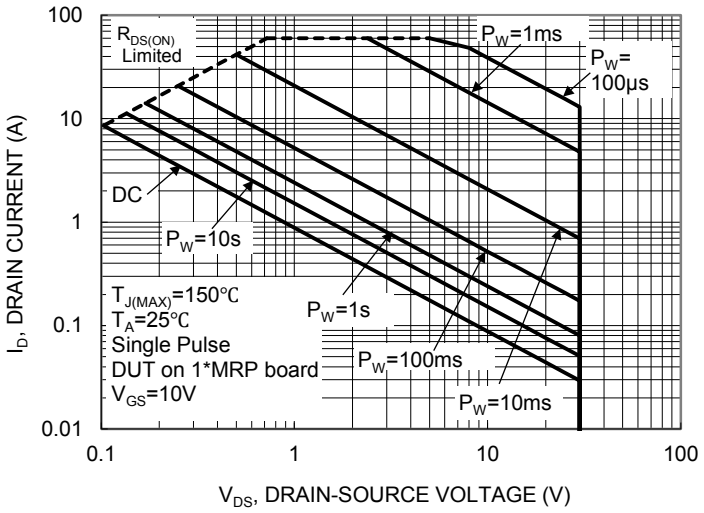


Figure 13. SOA, Safe Operation Area

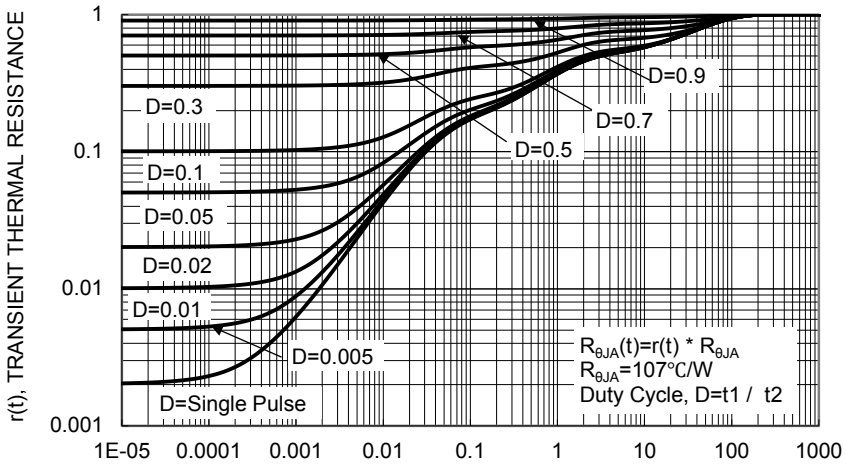
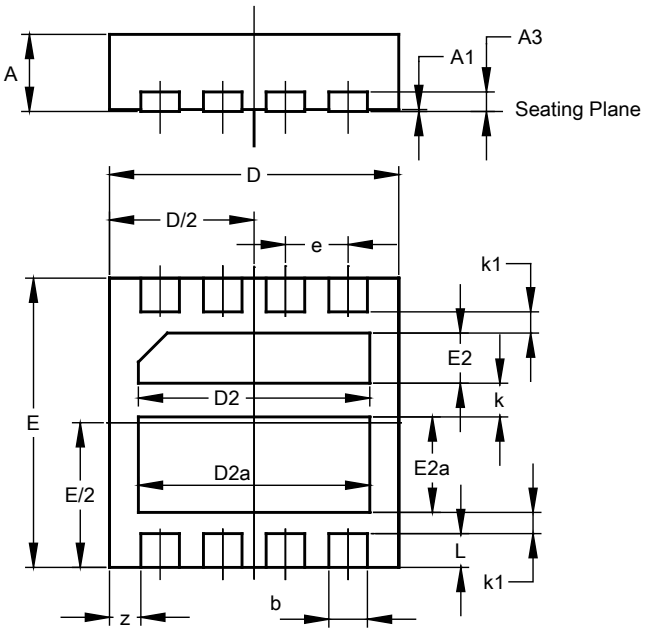


Figure 14. Transient Thermal Resistance

Package Outline Dimensions

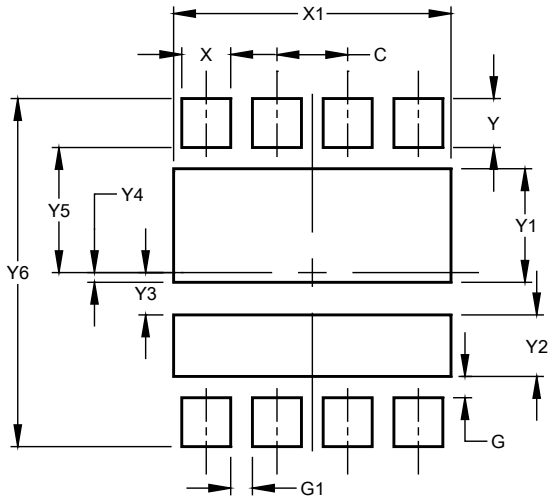
V-DFN3030-8 (Type K)



V-DFN3030-8 (Type K)			
Dim	**Min**	**Max**	**Typ**
A	0.77	0.85	0.80
A1	0.00	0.05	0.02
A3	0.20BSC		
b	0.35	0.45	0.40
D	2.95	3.050	3.00
D2	2.30	2.50	2.40
D2a	2.30	2.50	2.40
E	2.95	3.050	3.00
E2	0.42	0.62	0.52
E2a	0.89	1.09	0.99
e	0.65BSC		
k	-	-	0.35
k1	-	-	0.22
L	0.30	0.40	0.35
z	0.325BSC		
All Dimensions in mm			

Suggested Pad Layout

V-DFN3030-8 (Type K)



Dimensions	Value (in mm)
C	0.650
G	0.195
G1	0.200
X	0.450
X1	2.550
Y	0.450
Y1	1.044
Y2	0.566
Y3	0.389
Y4	0.089
Y5	1.150
Y6	3.200