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

0755-83047638
ysbdt@szyoushang.cn
www.szyoushang.cn

企业微信二维码　企业QQ二维码

Product Summary

BV_{DSS}	$R_{DS(ON)}$ MAX	I_D MAX T_A = +25°C
-12V	59mΩ @ V_{GS} = -4.5V	-3.9A
	81mΩ @ V_{GS} = -2.5V	-3.3A
	115mΩ @ V_{GS} = -1.8V	-2.8A

Features

- Low On-Resistance
- Low Input Capacitance
- Low Profile, 0.6mm Max Height
- ESD Protected Gate

Description

This 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.

Applications

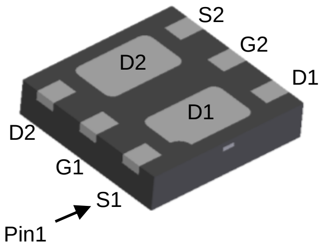
- Load Switch
- Power Management Functions
- Portable Power Adaptors

Mechanical Data

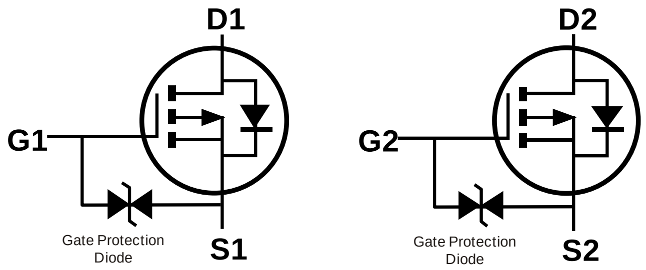
- Case: U-DFN2020-6
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ⓔ4
- Terminals Connections: See Diagram Below
- Weight: 0.0065 grams (Approximate)

ESD PROTECTED

U-DFN2020-6
(Type B)



Bottom View



Q1 P-CHANNEL

Q2 P-CHANNEL

Internal Schematic

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-12	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 5) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-3.9 -3.1	A
	t < 5s	T_A = +25°C T_A = +70°C	I_D	-5.0 -4.0	A
Maximum Continuous Body Diode Forward Current (Note 5)			I_S	-1.7	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	-25	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	Steady State	P_D	1.36	W
	t < 5s		1.89	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	92	°C/W
	t < 5s		66	
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	18	
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 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	-12	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	-1.0	µA	V_{DS} = -12V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.4	—	-1	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	37	59	mΩ	V_{GS} = -4.5V, I_D = -3.6A
		—	48	81		V_{GS} = -2.5V, I_D = -3.1A
		—	69	115		V_{GS} = -1.8V, I_D = -2.6A
		—	88	215		V_{GS} = -1.5V, I_D = -0.5A
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	V_{GS} = 0V, I_S = -3.7A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	1028	—	pF	V_{DS} = -6V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	285	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	254	—	pF	
Gate Resistance	R_g	—	19.6	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = -4.5V)	Q_g	—	13	—	nC	V_{DS} = -10V, I_D = -4.7A
Total Gate Charge (V_{GS} = -8V)		—	20.8	—	nC	
Gate-Source Charge	Q_{gs}	—	1.8	—	nC	
Gate-Drain Charge	Q_{gd}	—	4.5	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	5.6	—	ns	V_{DD} = -6V, V_{GS} = -4.5V, R_L = 1.6Ω, R_G = 1Ω
Turn-On Rise Time	t_R	—	12.8	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	30.7	—	ns	
Turn-Off Fall Time	t_F	—	25.4	—	ns	
Body Diode Reverse Recovery Time	t_{RR}	—	31.6	—	ns	I_S = -3.6A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	7.8	—	nC	I_S = -3.6A, dI/dt = 100A/µs

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.

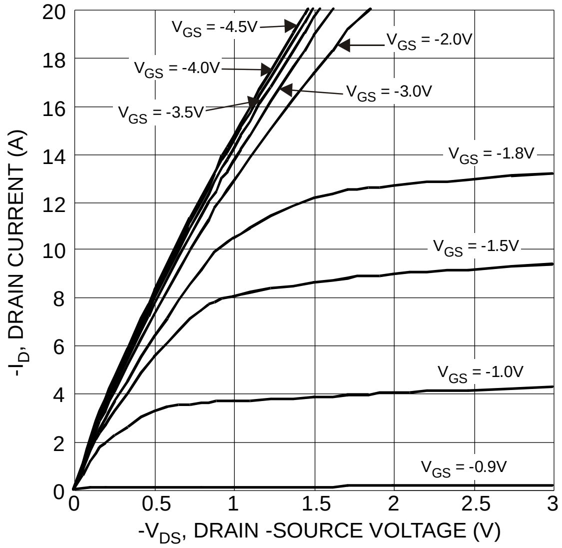


Figure 1 Typical Output Characteristics

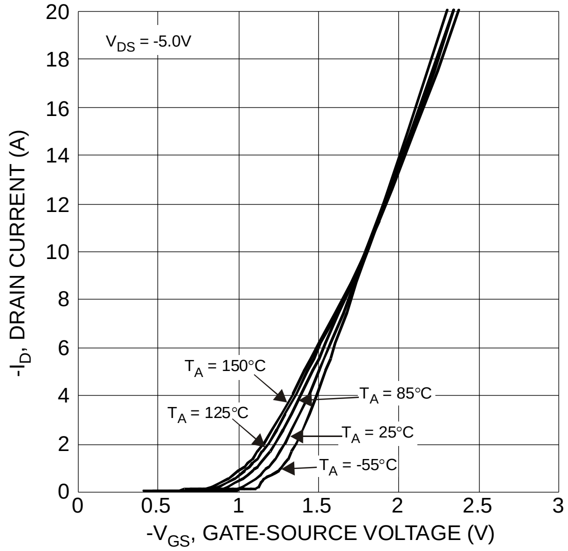


Figure 2 Typical Transfer Characteristics

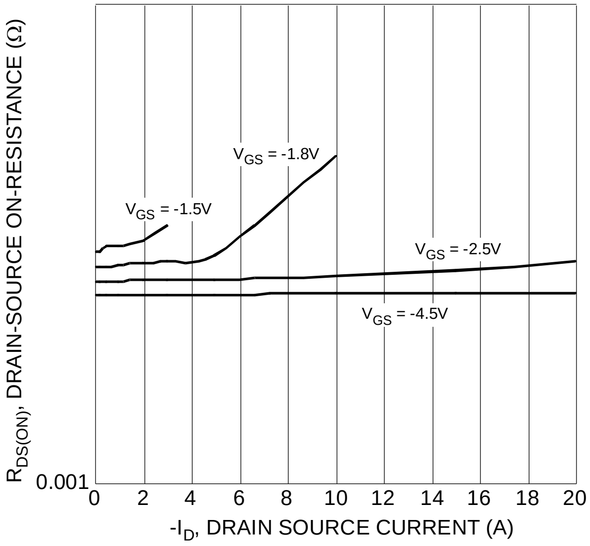


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

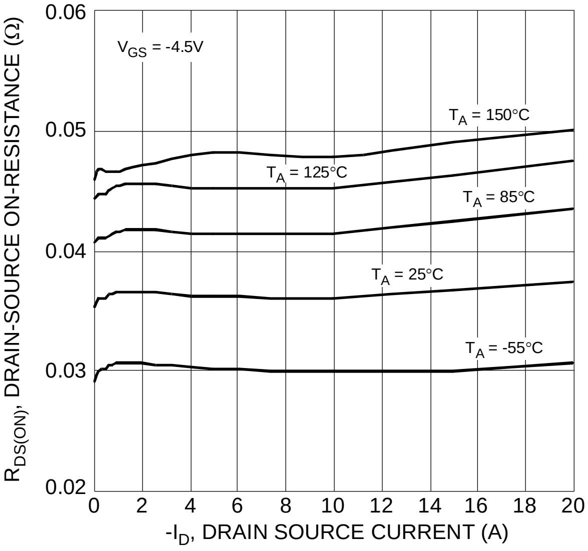


Figure 4 Typical On-Resistance vs.
Drain Current and Temperature

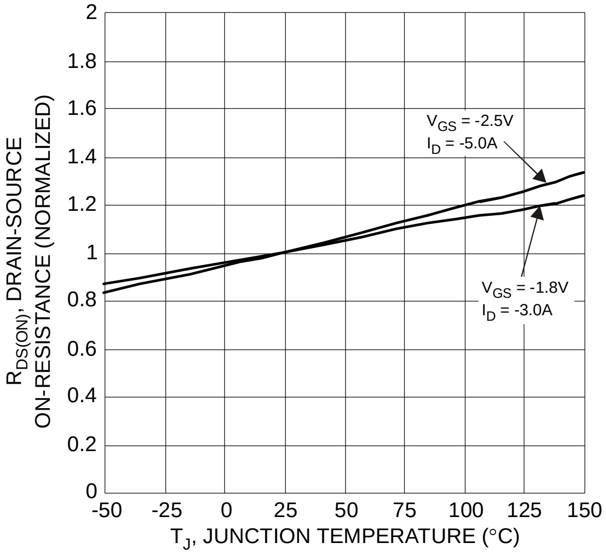


Figure 5 On-Resistance Variation with Temperature

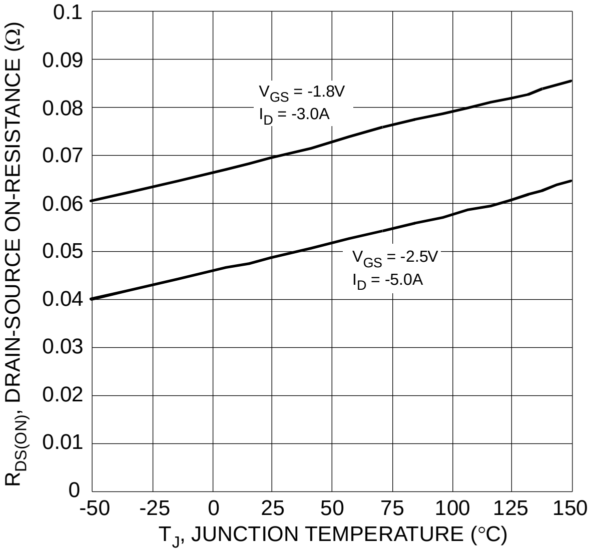


Figure 6 On-Resistance Variation with Temperature

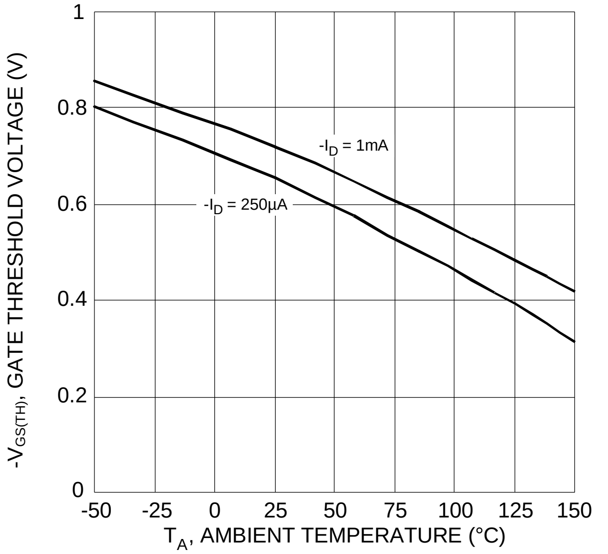


Figure 7 Gate Threshold Variation vs. Ambient Temperature

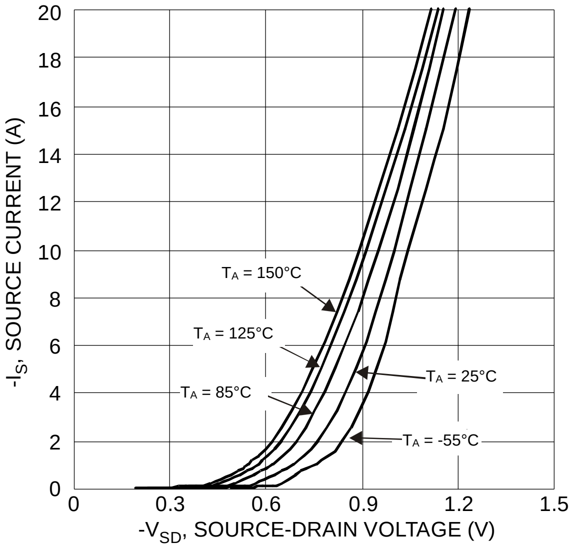


Figure 8 Diode Forward Voltage vs. Current

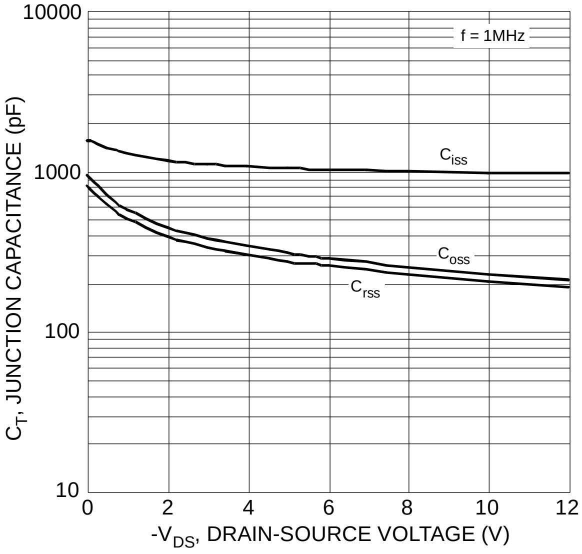


Figure 9 Typical Junction Capacitance

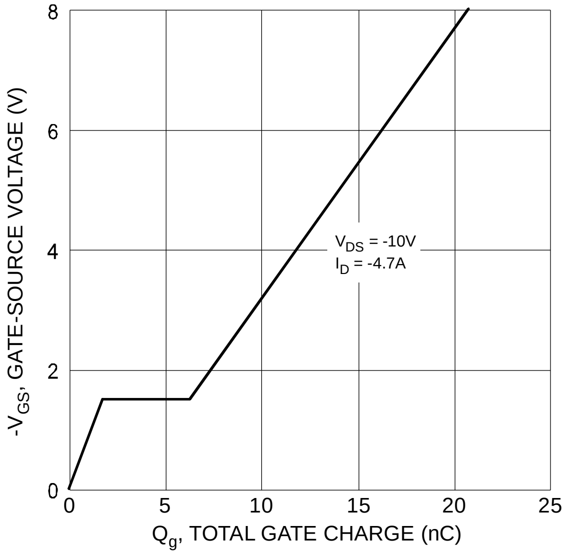


Figure 10 Gate-Charge Characteristics

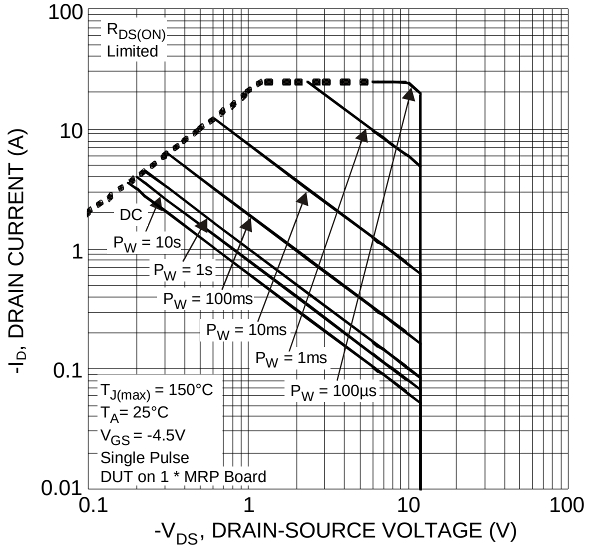


Figure 11 SOA Safe Operation Area

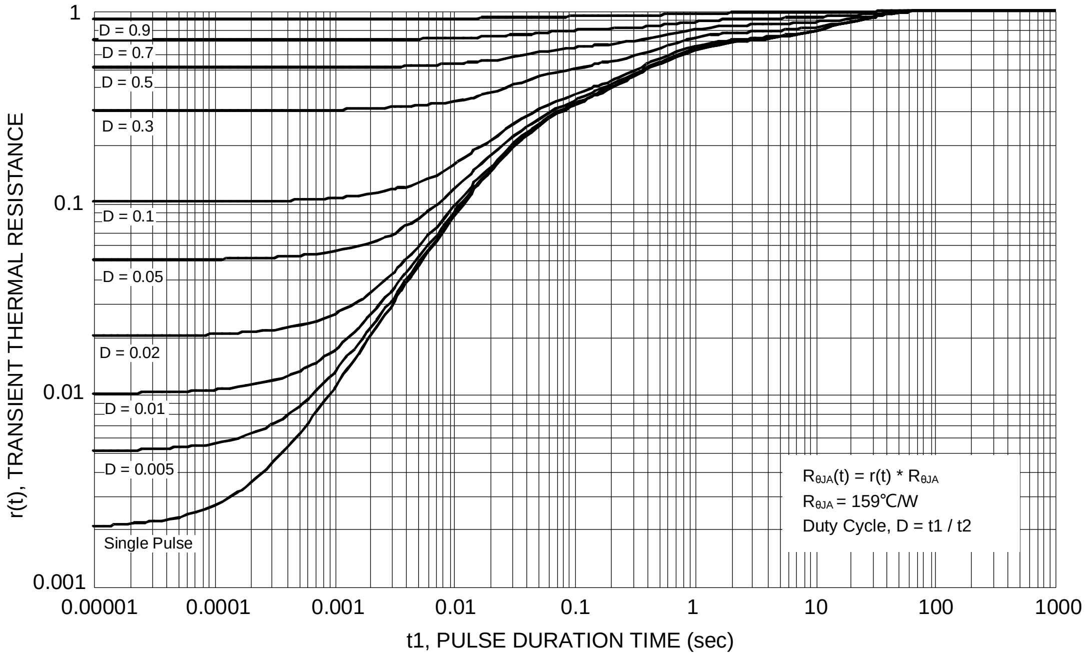
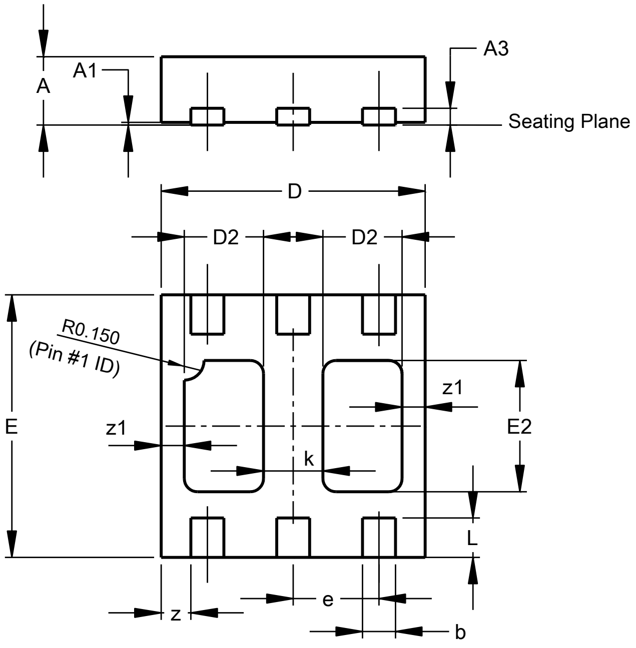


Figure 12 Transient Thermal Resistance

Package Outline Dimensions

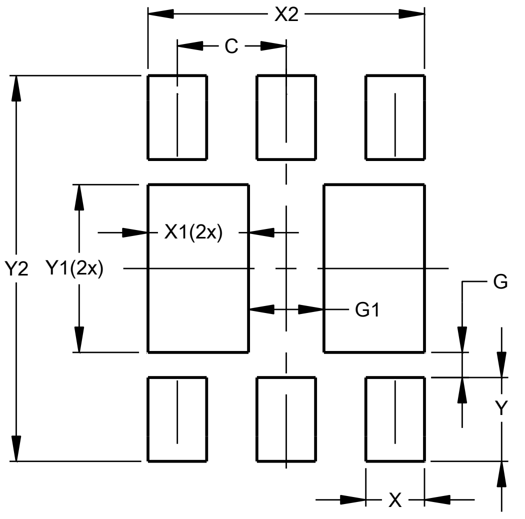
U-DFN2020-6 (Type B)



U-DFN2020-6 Type B			
Dim	**Min**	**Max**	**Typ**
A	0.545	0.605	0.575
A1	0.00	0.05	0.02
A3	-	-	0.13
b	0.20	0.30	0.25
D	1.95	2.075	2.00
D2	0.50	0.70	0.60
e	-	-	0.65
E	1.95	2.075	2.00
E2	0.90	1.10	1.00
k	-	-	0.45
L	0.25	0.35	0.30
z	-	-	0.225
z1	-	-	0.175
All Dimensions in mm			

Suggested Pad Layout

U-DFN2020-6 (Type B)



Dimensions	Value (in mm)
C	0.650
G	0.150
G1	0.450
X	0.350
X1	0.600
X2	1.650
Y	0.500
Y1	1.000
Y2	2.300