

Product Summary

$V_{(BR)DSS}$	$R_{DS(on) \max}$	I_D $T_A = +25^\circ\text{C}$
55V	130m Ω @ $V_{GS} = 10\text{V}$	2.86 A
	200m Ω @ $V_{GS} = 4.5\text{V}$	2.3 A

Description

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.


Applications

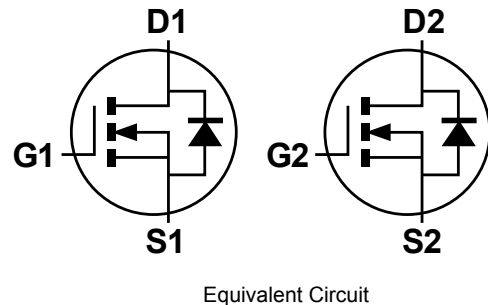
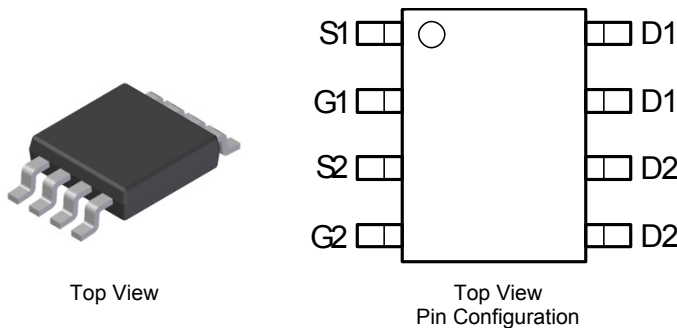
- DC-DC Converters
- Power Management Functions
- Backlighting

Features and Benefits

- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: SO-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
- Terminals: Finish – Tin Finish annealed over Copper leadframe.
Solderable per MIL-STD-202, Method 208 
- Weight: 0.074 grams (approximate)

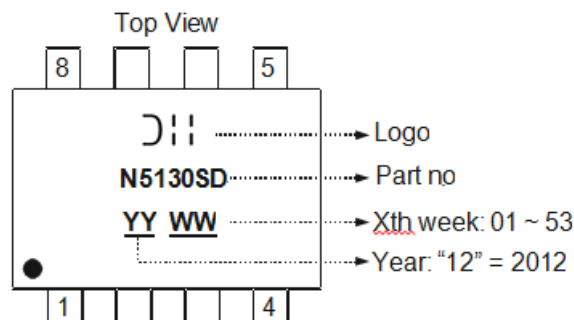


Ordering Information (Note 4)

Part Number	Case	Packaging
HTMN5130SSD-13	SO-8	2,500/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	55	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = 10V	Steady State	T _A = +25°C	I _D	2.6	A
	t < 10s	T _A = +25°C T _A = +70°C	I _D	2.86 2.3	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I _{DM}	8	A
Continuous Source Current (Body Diode) (Note 6)			I _S	2.8	A
Pulsed Source Current (Body Diode)			I _{SM}	8	A
Avalanche Current (Note 5) L = 4.9mH			I _{AS}	6	A
Avalanche Energy (Note 5) L = 4.9mH			E _{AS}	89	mJ

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	1.7	W
	T _A = +70°C		1.1	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	R _{θJA}	72	°C/W
	t < 10s		50	
Thermal Resistance, Junction to Case (Note 6)		R _{θJC}	11.2	
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 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	55	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	100	nA	V _{DS} = 55V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	1	—	3	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	—	130	mΩ	V _{GS} = 10V, I _D = 3 A
		—	—	200		V _{GS} = 4.5V, I _D = 1.5A
Diode Forward Voltage	V _{SD}	—	—	1.0	V	V _{GS} = 0V, I _S = 1.5A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	218.7	—	pF	V _{DS} = 25V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	97.8	—		
Reverse Transfer Capacitance	C _{rss}	—	22.4	—		
Gate Resistance	R _G	—	3.75	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 10V)	Q _g	—	8.9	—	nC	V _{DS} = 40V, I _D = 2A
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	4.7	—		
Gate-Source Charge	Q _{gs}	—	1.0	—		
Gate-Drain Charge	Q _{gd}	—	2.9	—		
Turn-On Delay Time	t _{D(on)}	—	3	—	nS	V _{GS} = 10V, V _{DD} = 25V, R _G = 6Ω, I _D = 1A
Turn-On Rise Time	t _r	—	2.5	—		
Turn-Off Delay Time	t _{D(off)}	—	13.5	—		
Turn-Off Fall Time	t _f	—	6.1	—		
Body Diode Reverse Recovery Time	t _{rr}	—	30.8	—	nS	I _F = 1.5A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q _{rr}	—	35.4	—	nC	I _F = 1.5A, dI/dt = 100A/µs

- Notes:
5. I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep T_J = +25°C.
 6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to product testing.

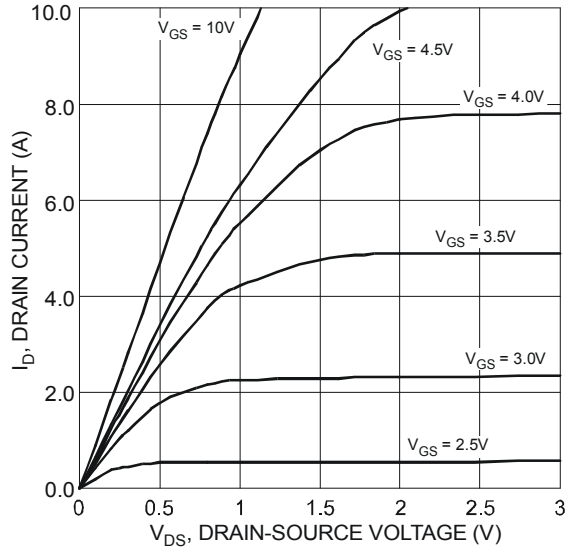


Figure 1 Typical Output Characteristics

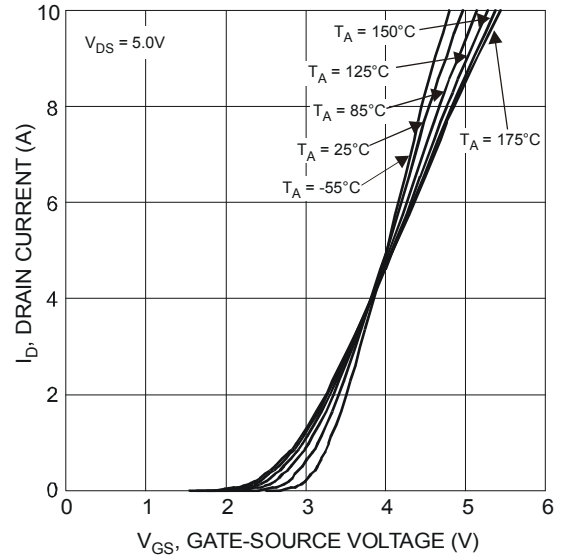


Figure 2 Typical Transfer Characteristics

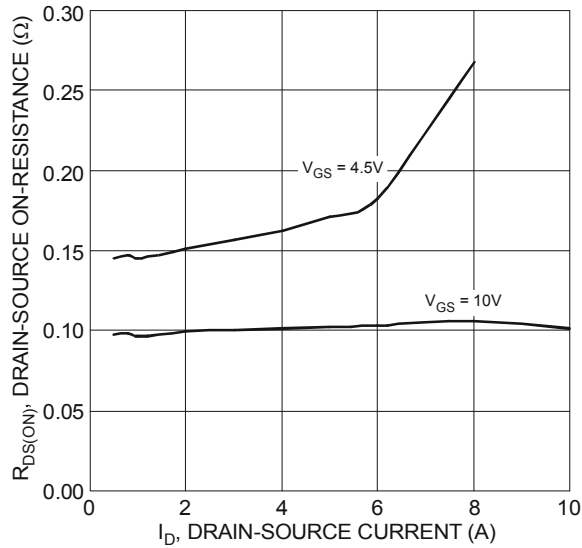


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

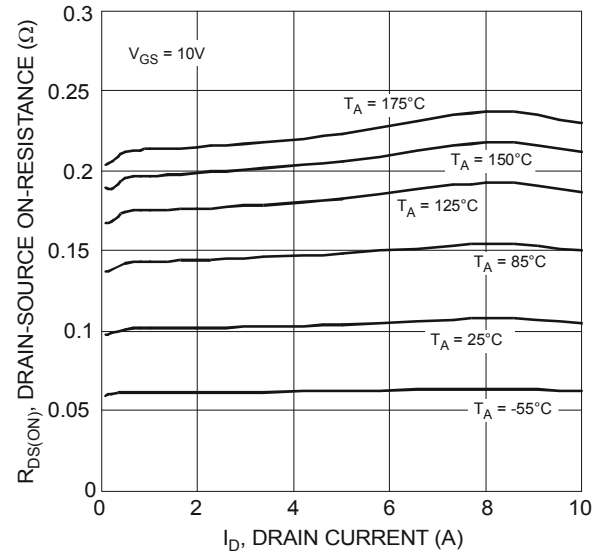


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

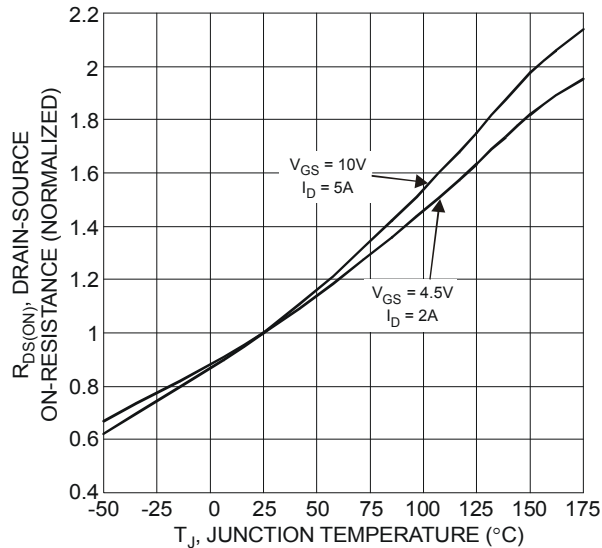


Figure 5 On-Resistance Variation with Temperature

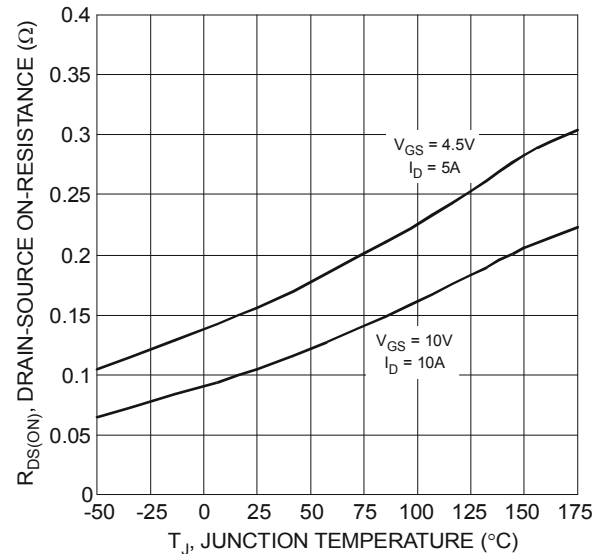


Figure 6 On-Resistance Variation with Temperature

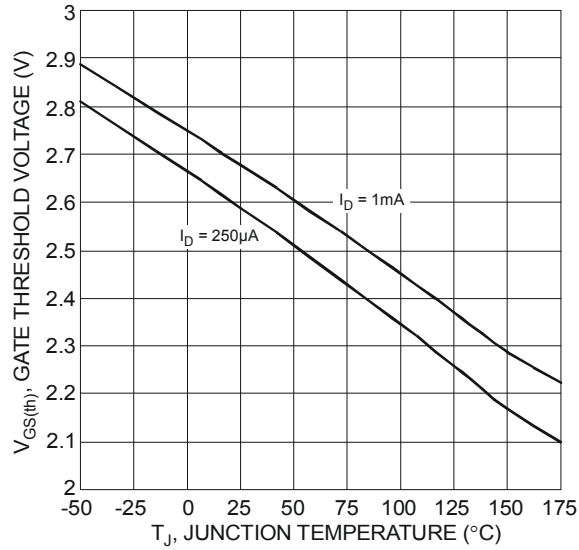


Figure 7 Gate Threshold Variation vs. Ambient Temperature

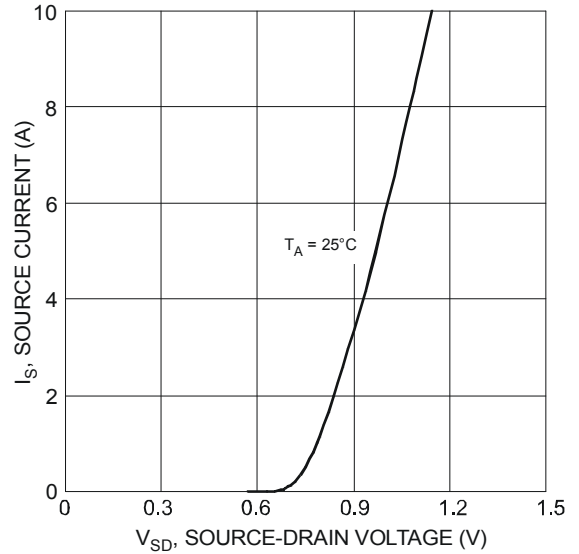


Figure 8 Diode Forward Voltage vs. Current

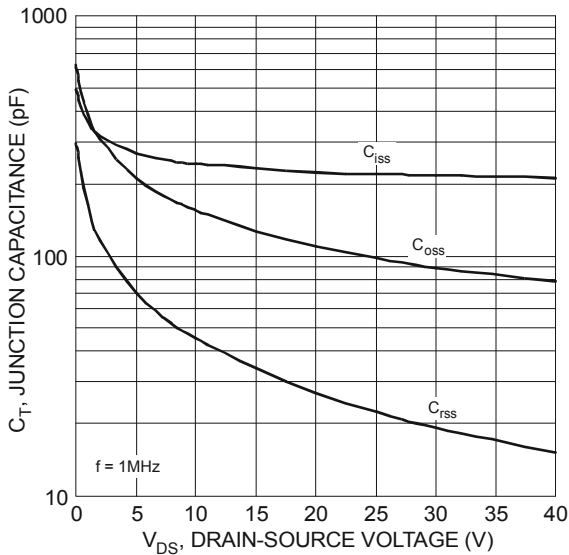


Figure 9 Typical Junction Capacitance

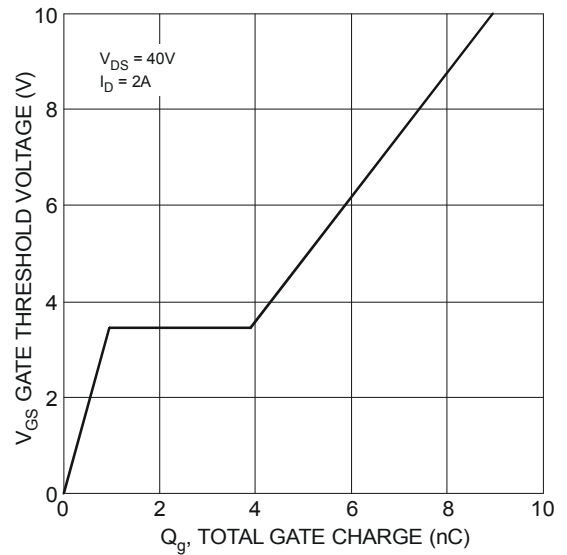
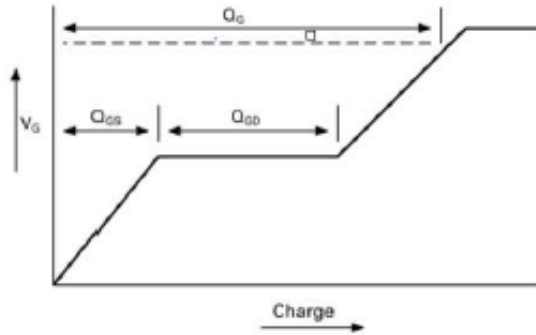
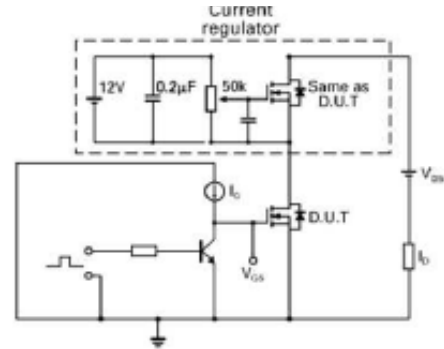


Figure 10 Gate Charge

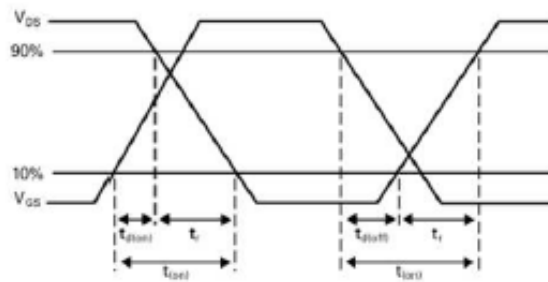
Test Circuits



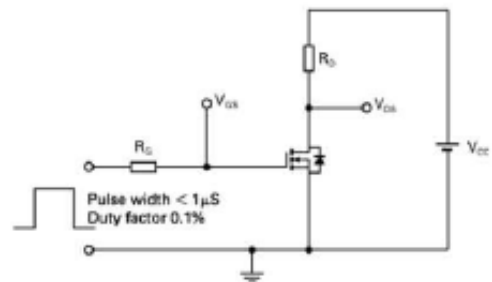
Basic gate charge waveform



Gate charge test circuit



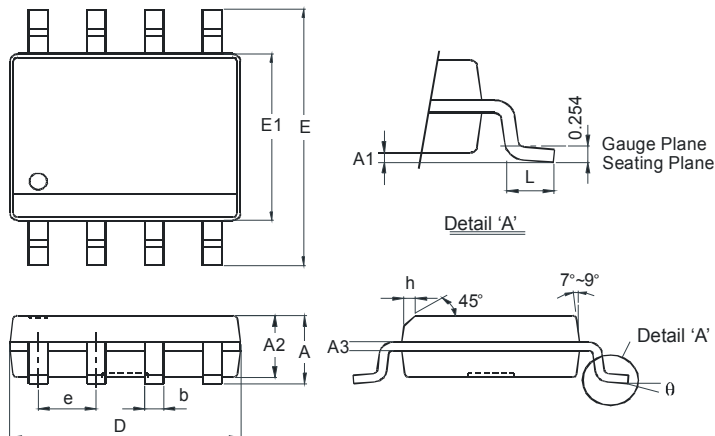
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

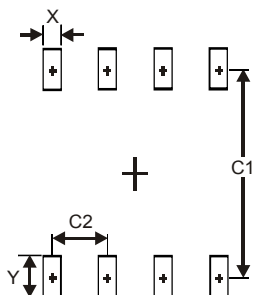
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SO-8		
Dim	Min	Max
A	-	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°
All Dimensions in mm		

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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