WSD3055GDN56

Dual N-Channel MOSFET

General Description

The WSD3055GDN56 is the highest performance SGT Dual N-Channel MOSFET with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The WSD3055GDN56 meet the RoHS and Green Product requirement, 100% E_{AS} guaranteed with full function reliability approved.

Features

- 100% UIS Tested.
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

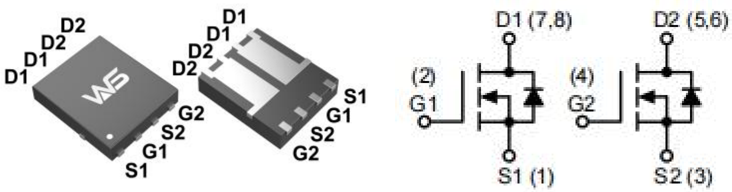
Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
30V	5.5mΩ	45A

Applications

- Power Management for Industrial DC/DC Converters
- Ldeal for high-frequency switching and synchronous rectification

DFN5*6-8L Pin Configuration



Absolute Maximum Ratings (T_A=25°C, Unless Otherwise Noted)

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		30	V
V_{GS}	Gate-Source Voltage		±20	
I_D [7]	Continuous Drain Current	T_C=25°C	45	A
		T_C=100°C	30	
I_{DM} [3]	Pulse Drain Current		90	
P_D [2]	Power Dissipation	T_C=25°C	27	W
I_{AS} [3]	Single pulse Avalanche Current		60	A
E_{AS} [3]	Single pulse Avalanche Energy	L=0.5mH	90	mJ
T_{STG}	Storage Temperature Range		-55 to 150	°C
T_J	Operating Junction Temperature Range		-55 to 150	
$R_{\theta JA}$ [1,4]	Thermal Resistance-Junction to Ambient	t≤10s	30	°C/W
		Steady State	60.5	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		3.1	

Electrical Characteristics (T_J=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions		Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250μA		30	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=20A		---	5.5	6.3	mΩ
			T_J=125°C	---	11	---	
		V_{GS}=4.5V , I_D=15A		---	6.0	7.4	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250μA		1.0	1.4	2.0	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=30V , V_{GS}=0V		---	---	1.0	μA
			T_J=55°C	---	---	5.0	
I_{GSS}	Gate-Source Leakage Current	V_{DS}=0V , V_{GS}=±10V		---	---	±100	nA
g_{fs}	Forward Transconductance	V_{DS}=5V , I_D=20A		---	30	---	S
R_G	Gate Resistance	f=1.0MHz		1.0	2.0	3.0	Ω
Q_g	Total Gate Charge (10V)	V_{DS}=15V , V_{GS}=10V , I_D=20A		---	15	---	nC
Q_{gs}	Gate-Source Charge			---	2.9	---	
Q_{gd}	Gate-Drain Charge			---	2.1	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=5V , V_{GS}=10V , I_D=20A R_L=1Ω , R_{GEN}=3Ω		---	6.5	---	ns
T_r	Rise Time			---	2.5	---	
$T_{d(off)}$	Turn-Off Delay Time			---	17	---	
T_f	Fall Time			---	2.3	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1.0MHz		---	780	---	pF
C_{oss}	Output Capacitance			---	220	---	
C_{rss}	Reverse Transfer Capacitance			---	15.3	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S [7]	Continuous Source Current		---	---	45	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A	---	0.7	1.2	V
t_{rr}	Reverse Recovery Time	I_F=20A , di/dt=500A/μs	---	10	---	ns
Q_{rr}	Reverse Recovery Charge		---	19	---	nC

Note:

1. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ t≤ 10s and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
2. The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
3. Single pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
4. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.
5. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.
6. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C. The SOA curve provides a single pulse rating.
7. The maximum current rating is package limited.
8. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C.
9. The maximum current rating is silicon limited

Typical Characteristics

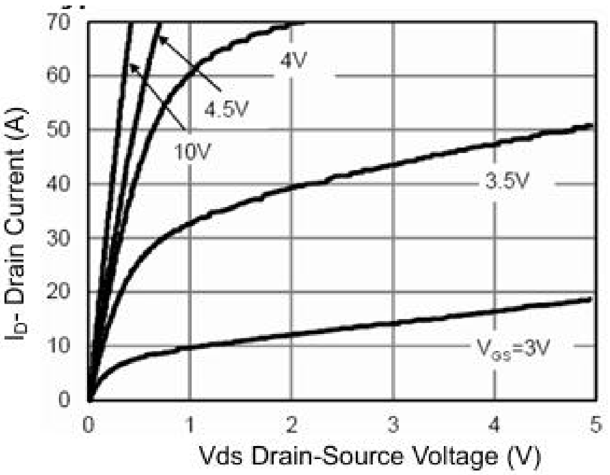


Figure 1 Output Characteristics

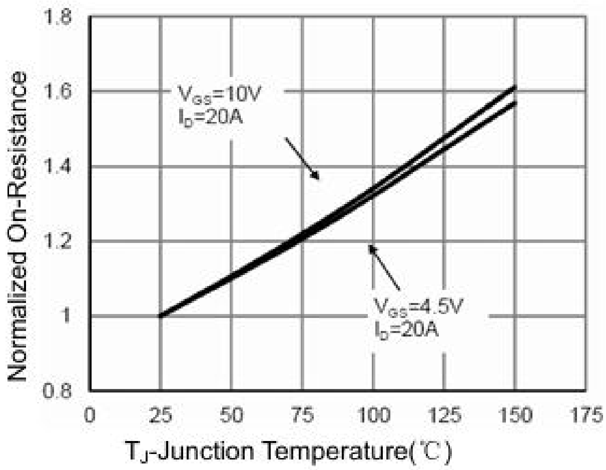


Figure 4 Rdson-Junction Temperature

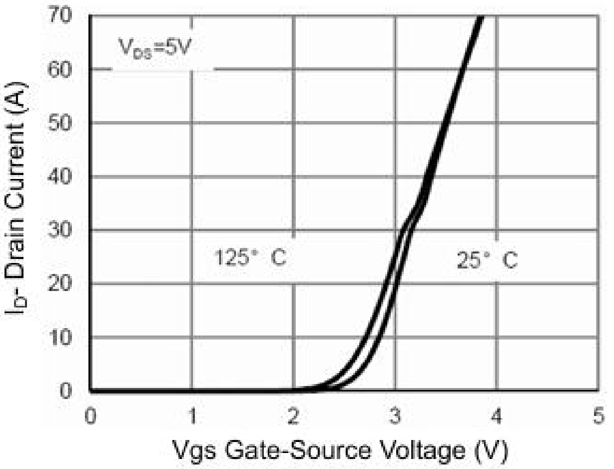


Figure 2 Transfer Characteristics

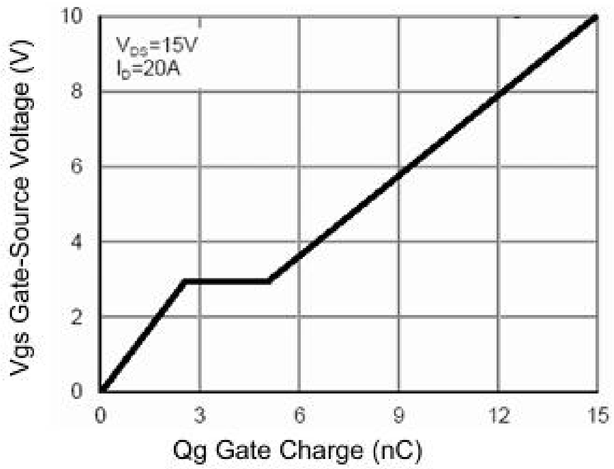


Figure 5 Gate Charge

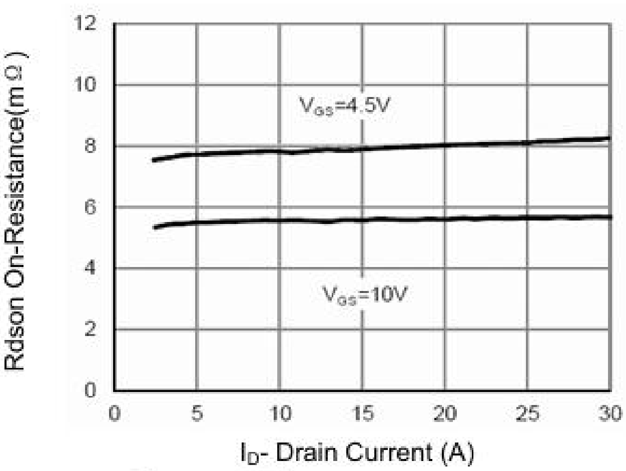


Figure 3 Rdson- Drain Current

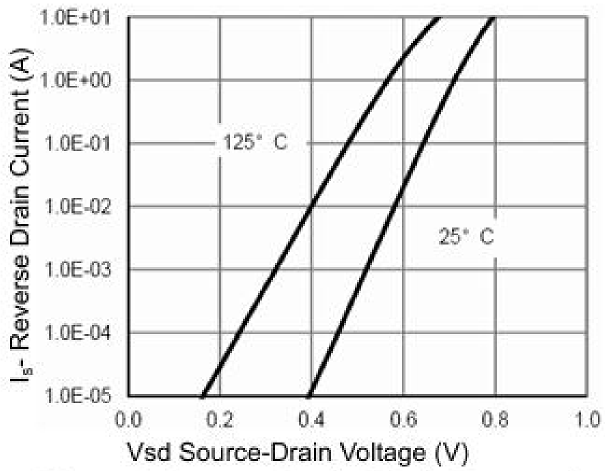


Figure 6 Source- Drain Diode Forward

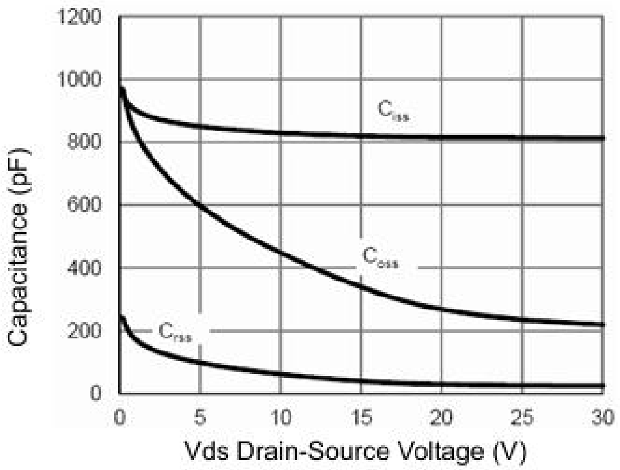


Figure 7 Capacitance vs Vds

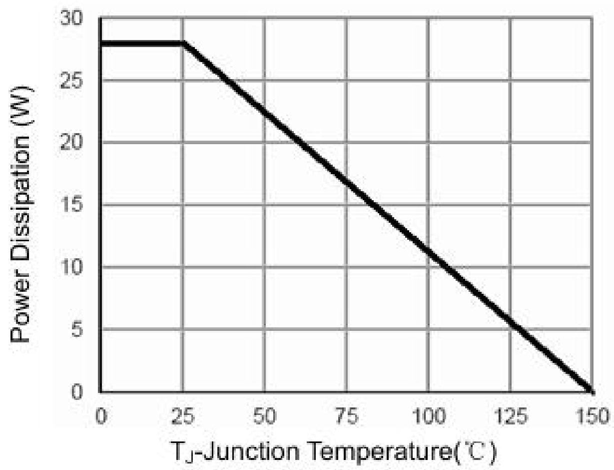


Figure 9 Power De-rating

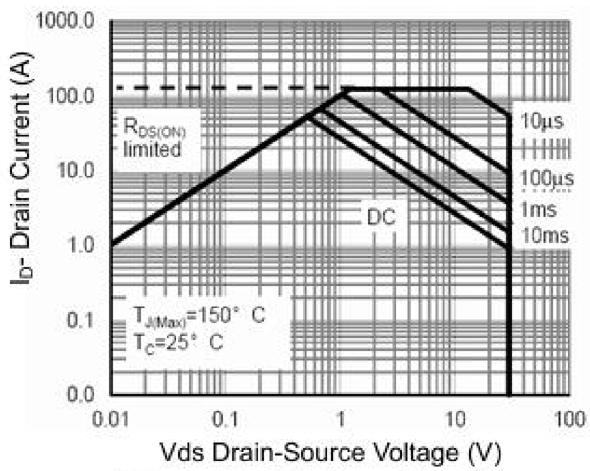


Figure 8 Safe Operation Area

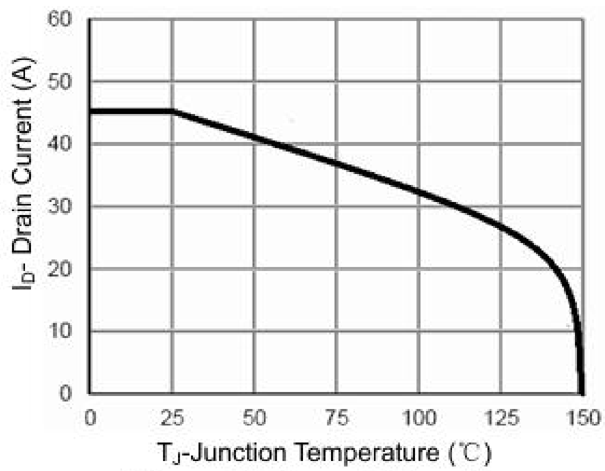


Figure 10 Current De-rating

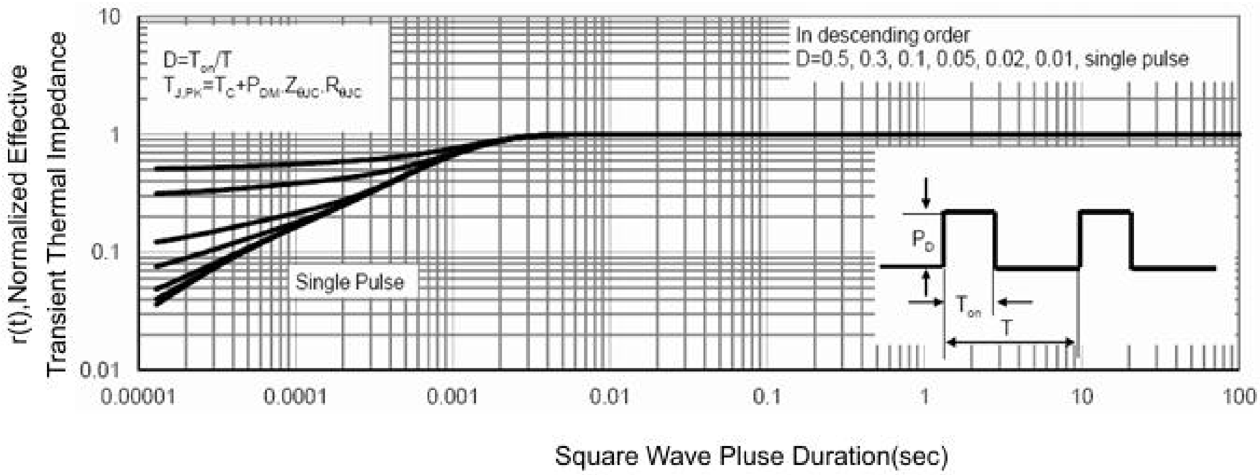
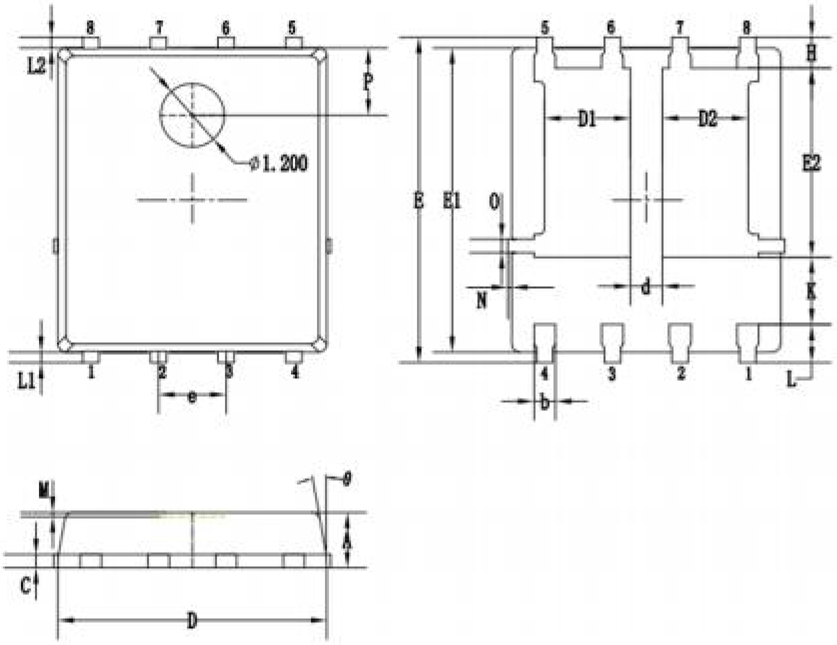


Figure 11 Normalized Maximum Transient Thermal Impedance

Packaging information



SYMBOLS	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.05	1.20
b	0.35	0.40	0.50
C	0.20	0.25	0.35
D	4.90	5.05	5.20
D1/D2	1.51	1.61	1.71
d	0.50	0.60	0.70
E	6.00	6.15	6.30
E1	5.60	5.75	5.90
E2	3.47	3.57	3.67
e	1.27 BSC.		
H	0.48	0.58	0.68
K	1.17	1.27	1.37
L	0.64	0.74	0.84
L1/L2	0.20 REF.		
θ	8°	10°	12°
M	0.08 REF.		
N	0	-	0.15
O	0.25 REF.		
P	1.28 REF.		

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