General Description

The WSD60N12GDN56 is SGT II technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

The WSD60N12GDN56 meet the RoHS and Green Product requirement, 100% E_{AS} guaranteed with full function reliability approved.

Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
120V	10mΩ	70A

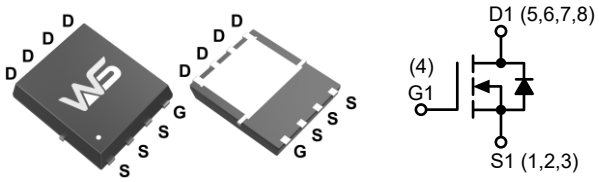
Applications

- Mobile phone fast charging
- Brushless motor
- Home appliance control board

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% E_{AS} Guaranteed
- Green Device Available

DFN5X6-8L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	120	V
V_{GS}	Gate-Source Voltage	±20	
I_D@T_C=25°C	Continuous Drain Current	70	A
I_{DP}	Pulsed Drain Current	150	
E_{AS}	Avalanche Energy, Single pulse	53.8	mJ
P_D@T_C=25°C	Total Power Dissipation	140	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	

Thermal Data

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	25	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case [1]	---	0.89	

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	120	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=10A	---	10	15	mΩ
		V_{GS}=4.5V , I_D=10A	---	18	25	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250μA	1.2	---	2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V , V_{GS}=0V , T_J=25°C	---	---	1.0	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Q_g	Total Gate Charge (10V)	V_{DS}=50V , V_{GS}=10V , I_D=25A	---	33	---	nC
Q_{gs}	Gate-Source Charge		---	5.6	---	
Q_{gd}	Gate-Drain Charge		---	7.2	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=50V , V_{GS}=10V , R_G=2Ω , I_D=25A	---	22	---	ns
T_r	Rise Time		---	10	---	
$T_{d(off)}$	Turn-Off Delay Time		---	85	---	
T_f	Fall Time		---	112	---	
C_{iss}	Input Capacitance	V_{DS}=50V , V_{GS}=0V , f = 1.0MHz	---	2640	---	pF
C_{oss}	Output Capacitance		---	330	---	
C_{rss}	Reverse Transfer Capacitance		---	11	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	50	A
I_{SP}	Pulsed Source Current		---	---	150	
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=12A , T_J=25°C	---	---	1.3	V
t_{rr}	Reverse Recovery Time	I_F=25A , di/dt=100A/μs , T_J=25°C	---	62	---	ns
Q_{rr}	Reverse Recovery Charge		---	135	---	nC

Note:

1. Calculated continuous current based on maximum allowable junction temperature.
2. Repetitive rating: pulse width limited by max. junction temperature.
3. P_D is based on max. junction temperature, using junction-case thermal resistance.
4. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C.
5. V_{DD}=50V, R_G=25Ω, L=0.3mH, starting T_J=25°C.

Typical Characteristics

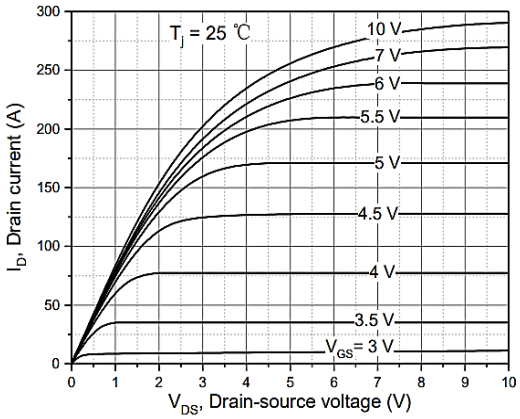


Figure 1. Typ. output characteristics

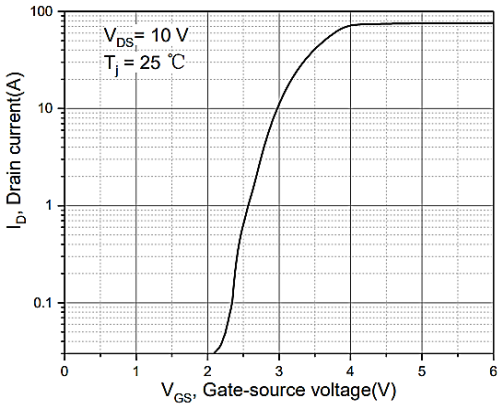


Figure 2. Typ. transfer characteristics

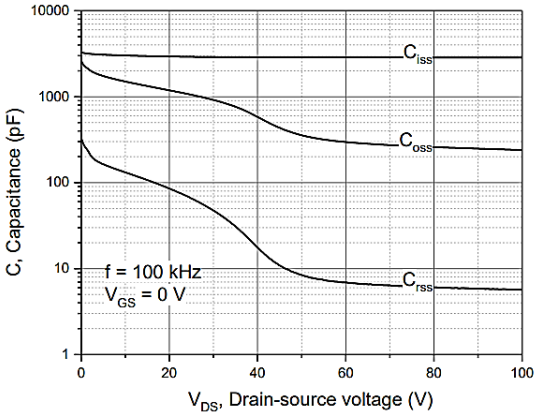


Figure 3. Typ. capacitances

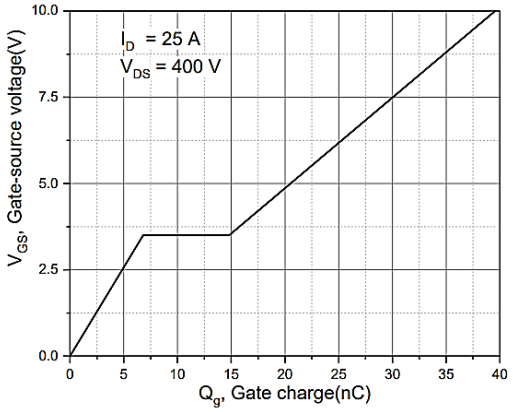


Figure 4. Typ. gate charge

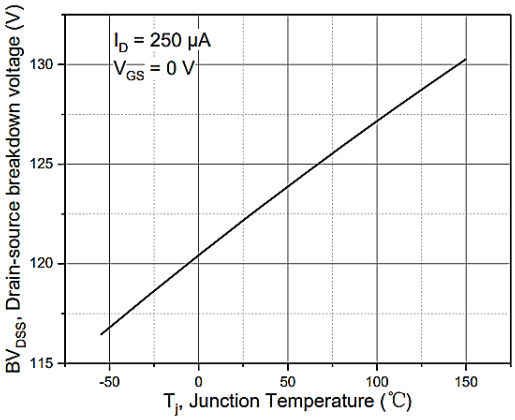


Figure 5. Drain-source breakdown voltage

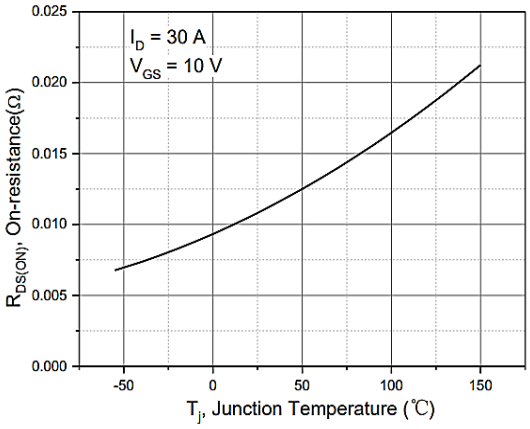


Figure 6. Drain-source on-state resistance

Typical Characteristics (Cont.)

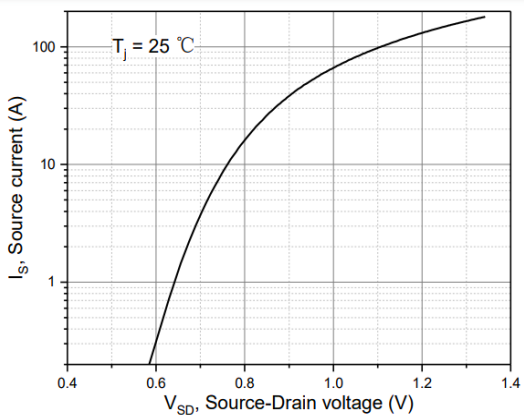


Figure 7. Forward characteristic of body diode

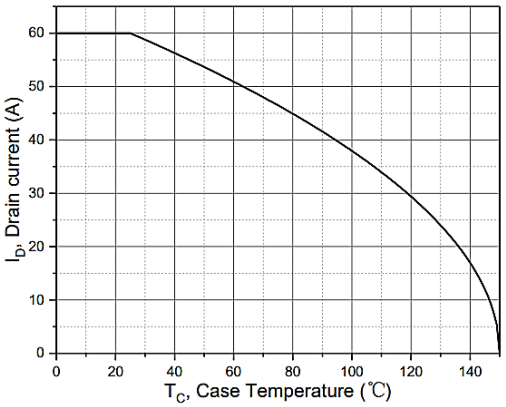


Figure 8. Drain current

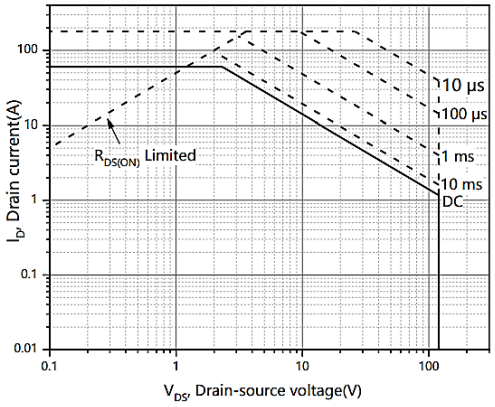
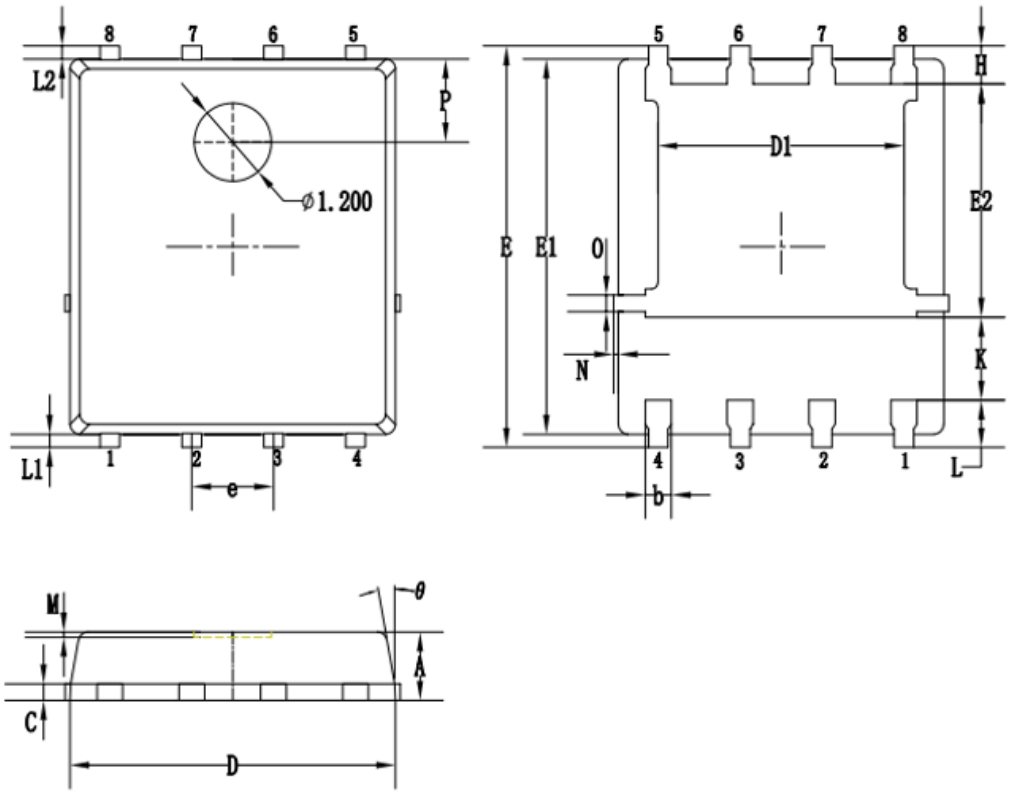


Figure 9. Safe operation area T_C=25 ℃

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	3.72	3.82	3.92
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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