

General Description

The WSD60N12GDN56 is SGT II technology to provide excellent RDS(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% EAS guaranteed with full function reliability approved.

Features

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

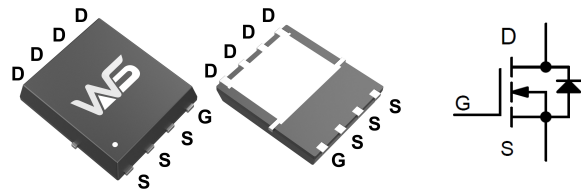
Product Summary

BV_{DSS}	R_{DSON}	I_D
120V	10mΩ	70A

Applications

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

DFN5X6 Pin Configuration



Absolute Maximum Ratings

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

Thermal Data

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

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
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	mΩ
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	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=1MHz	---	2640	---	pF
C _{oss}	Output Capacitance		---	330	---	
C _{riss}	Reverse Transfer Capacitance		---	11	---	
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	50	A
I _{SP}	Pulsed Source Current		---	---	150	A
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) Pd is based on max. junction temperature, using junction-case thermal resistance.
- 4) The value of R_{θJA} 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}=50 V, R_G=25 Ω, L=0.3 mH, starting T_J=25 °C.

Typical Operating Characteristics

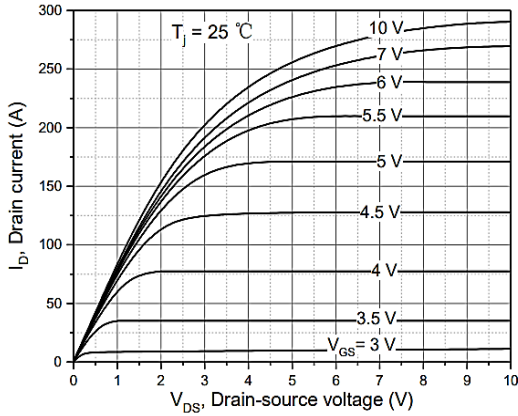


Figure 1. Typ. output characteristics

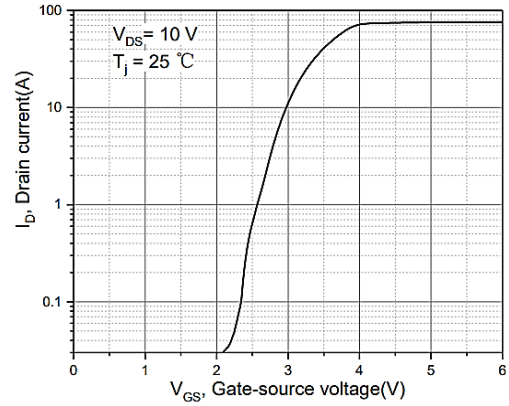


Figure 2. Typ. transfer characteristics

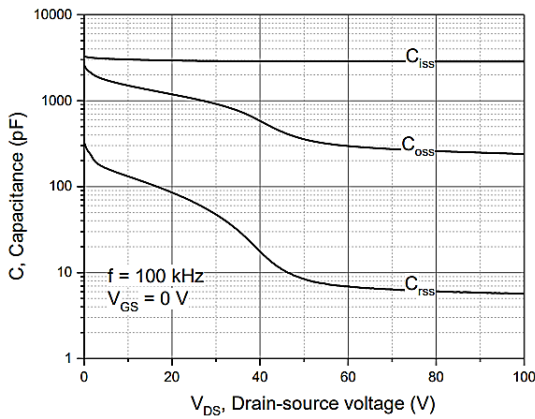


Figure 3. Typ. capacitances

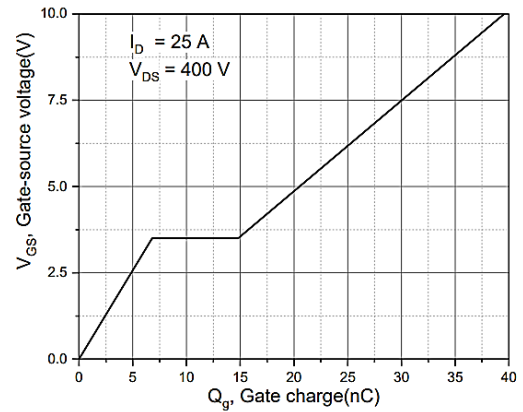


Figure 4. Typ. gate charge

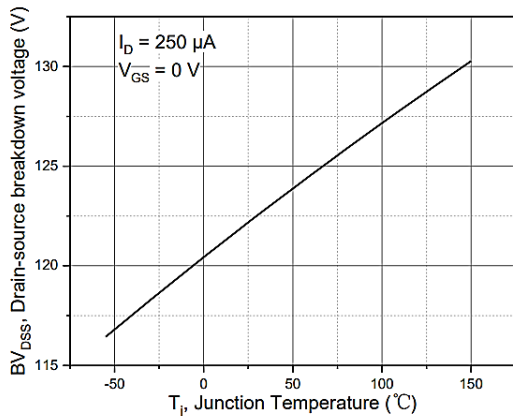


Figure 5. Drain-source breakdown voltage

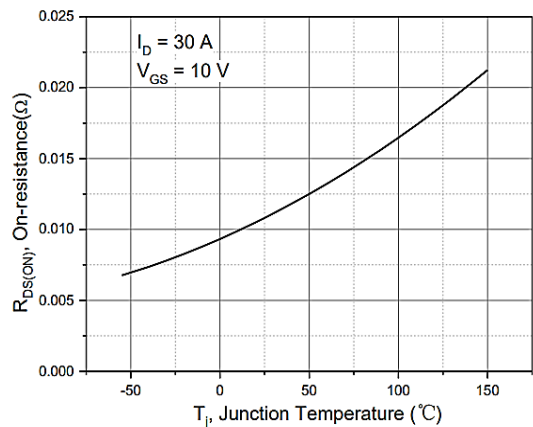


Figure 6. Drain-source on-state resistance

Typical Operating Characteristics (Cont.)

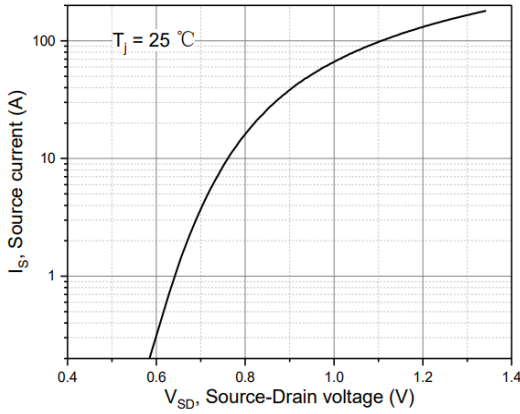


Figure 7. Forward characteristic of body diode

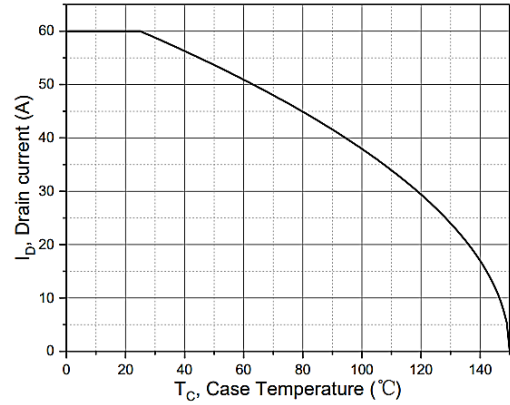


Figure 8. Drain current

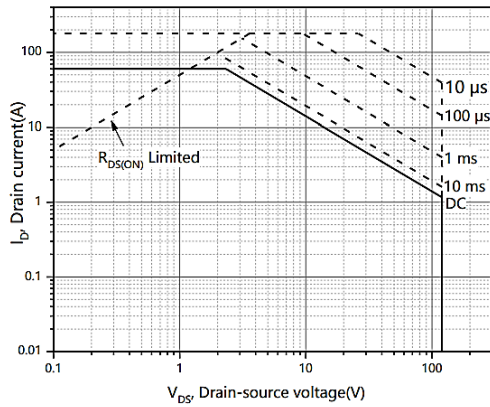


Figure 9. Safe operation area $T_C=25\text{ }^\circ\text{C}$



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