

General Description

The WSD40N10GDN56 is the highest performance trench 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 WSD40N10GDN56 meet the RoHS and Green Product requirement, 100% E_{AS} guaranteed with full function reliability approved.

Features

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

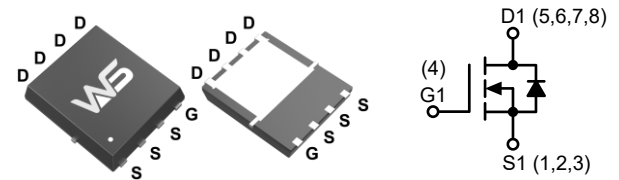
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
100V	16m Ω	40A

Applications

- Power Management in TV Converter.
- DC-DC Converter
- LED TV Back Light

DFN5X6-8L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	
$I_D@T_C=25^\circ C$	Continuous Drain Current	40	A
I_{DP}	Pulsed Drain Current	120	
E_{AS}	Single Pulse Avalanche Energy	30	mJ
$P_D@T_C=25^\circ C$	Total Power Dissipation	72	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	

Thermal Data

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	1.74	

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	100	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =8A	---	16	20	mΩ
		V _{GS} =4.5V, I _D =6A	---	22	26	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250μA	1.0	---	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	I _D =8A, V _{DS} =50V, V _{GS} =10V	---	19.8	---	nC
Q _{gs}	Gate-Source Charge		---	2.4	---	
Q _{gd}	Gate-Drain Charge		---	5.3	---	
T _{d(on)}	Turn-On Delay Time	V _{GS} =10V, V _{DS} =50V, R _G =2.2Ω, I _D =10A	---	17.8	---	ns
T _r	Rise Time		---	3.9	---	
T _{d(off)}	Turn-Off Delay Time		---	33.5	---	
T _f	Fall Time		---	3.2	---	
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V, f = 1.0MHz	---	1191	---	pF
C _{oss}	Output Capacitance		---	194	---	
C _{rss}	Reverse Transfer Capacitance		---	4.1	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	40	A
I _{SP}	Pulsed Source Current		---	---	120	
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 =12A, dI/dt=100A/μs, T _J =25°C	---	50.2	---	ns
Q _{rr}	Reverse Recovery Charge		---	95.1	---	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_{θJA} is measured with the device mounted on 1 in² 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

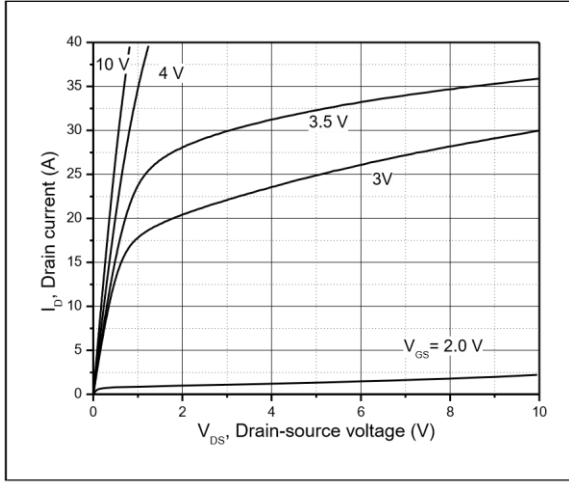


Figure 1, Typ. output characteristics

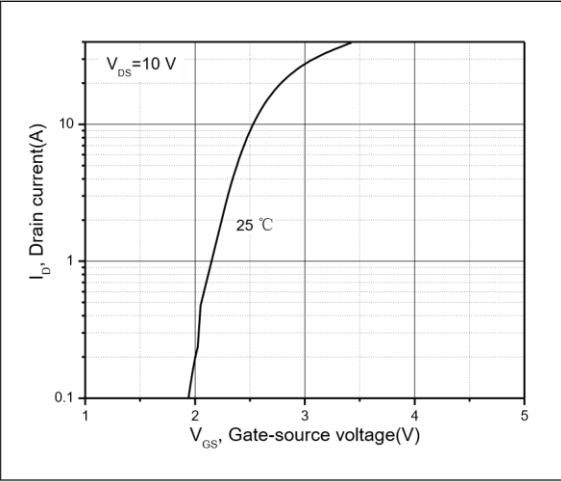


Figure 2, Typ. transfer characteristics

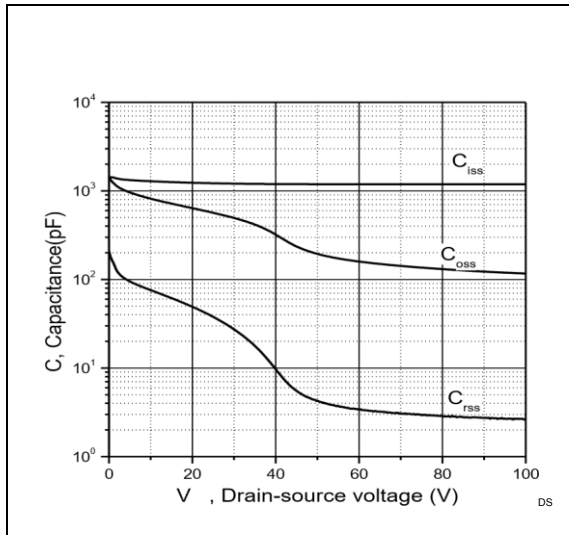


Figure 3, Typ. capacitances

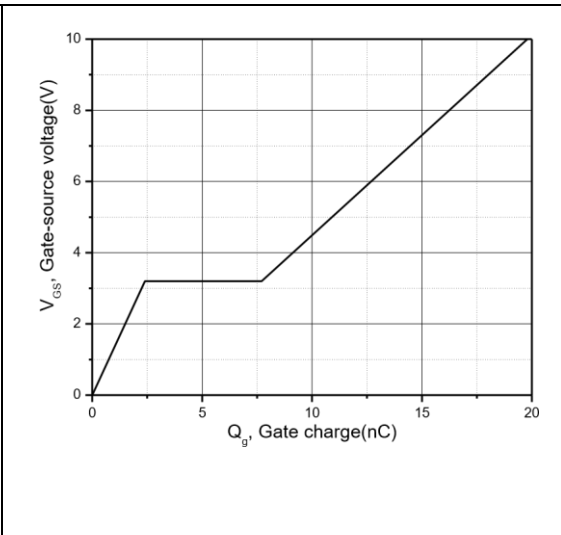


Figure 4, Typ. gate charge

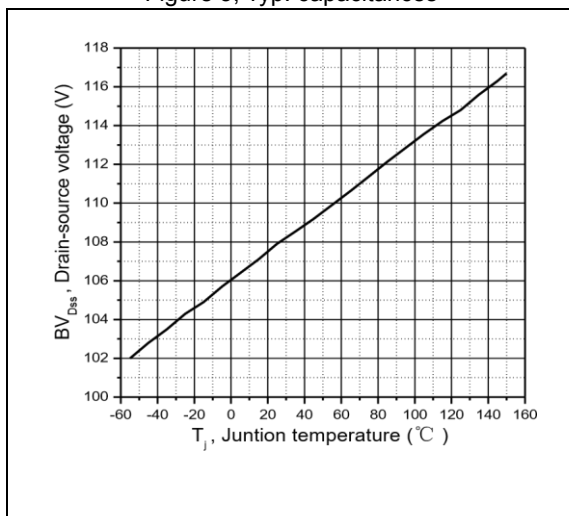


Figure 5, Drain-source breakdown voltage

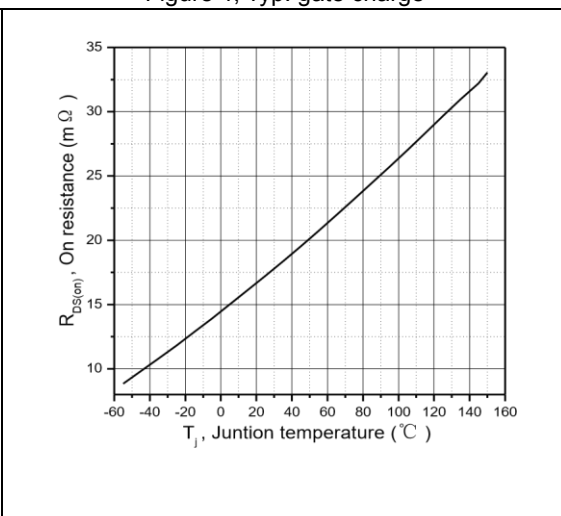


Figure 6, Drain-source on-state resistance

Typical Characteristics (Cont.)

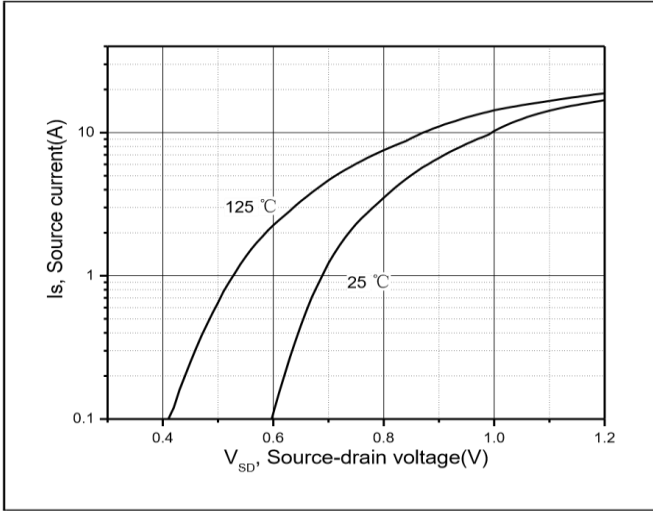


Figure 7, Forward characteristic of body diode

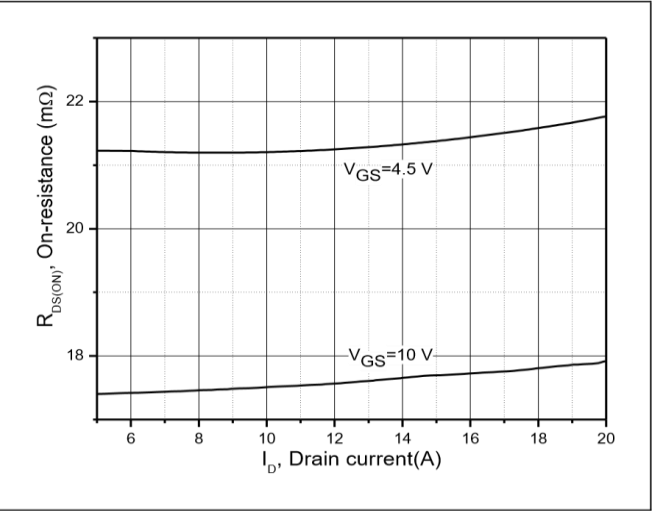


Figure 8, Drain-source on-state resistance

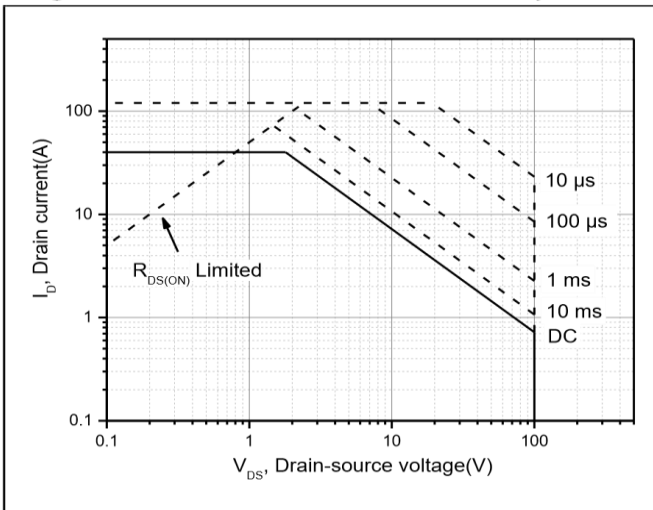
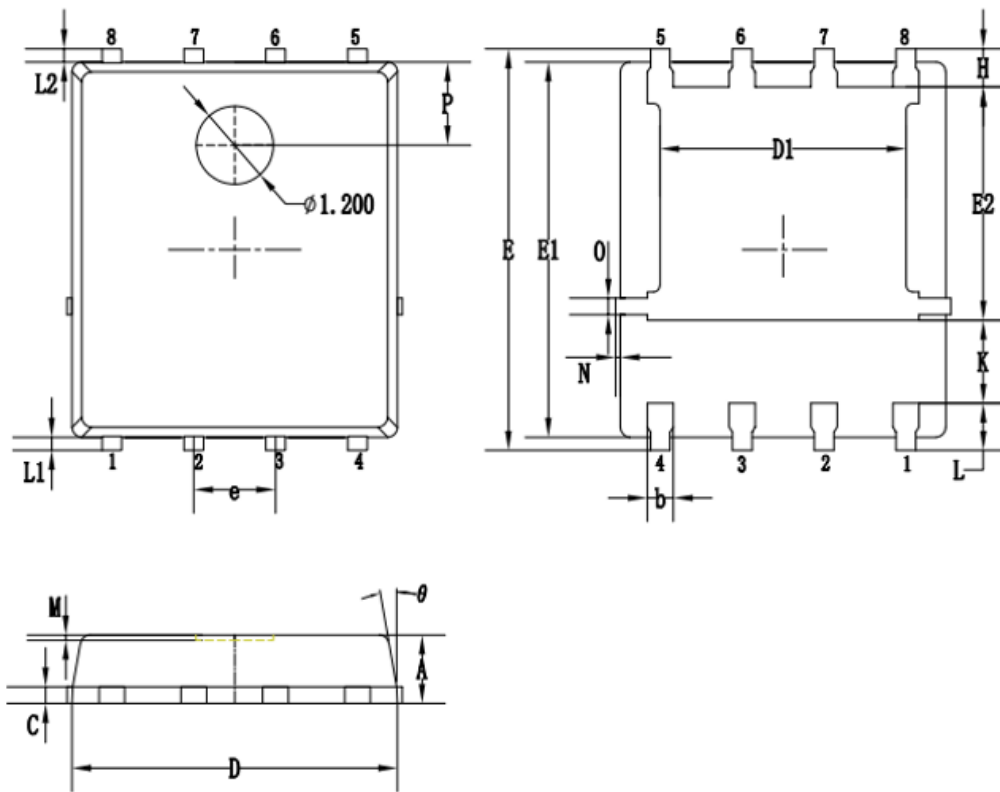


Figure 9, Safe operation area $T_C=25\text{ }^\circ\text{C}$

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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