

General Description

The WSD40L66DN56 uses advanced trench 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 WSD40L66DN56 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

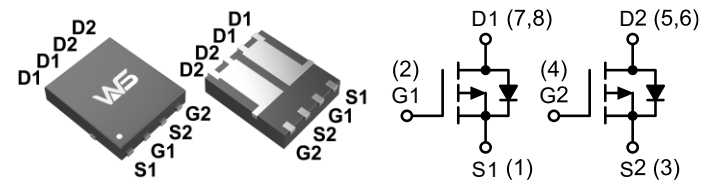
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
-40V	9.8m Ω	-66A

Applications

- Battery protection
- Load switch
- Uninterruptible Power Supply(UPS)

DFN5X6-8L Pin Configuration



Absolute Maximum Ratings ($T_C=25^\circ\text{C}$, Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -10V$ ¹	-66	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -10V$ ¹	-42	
I_{DM}	Pulsed Drain Current ²	-105	
E_{AS}	Single Pulse Avalanche Energy ³	146	mJ
$P_D@T_C=25^\circ\text{C}$	Power Dissipation ⁴	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	

Thermal Data

Symbol	Parameter	Rating	Units
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient ¹	25	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case ¹	2.4	

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	-40	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.023	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-30A	---	9.8	13	mΩ
		V _{GS} =-4.5V, I _D =-20A	---	15	20	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250μA	-1.0	-1.6	-2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	4.74	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-32V, V _{GS} =0V, T _J =25°C	---	---	1.0	μA
		V _{DS} =-32V, V _{GS} =0V, T _J =55°C	---	---	5.0	
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0V, V _{GS} =±20V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =-5V, I _D =-18A	---	24	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1.0MHz	---	7	14	Ω
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-20V, V _{GS} =-4.5V, I _D =-12A	---	27.9	---	nC
Q _{gs}	Gate-Source Charge		---	7.7	---	
Q _{gd}	Gate-Drain Charge		---	7.5	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =-15V, V _{GS} =-10V, R _G =3.3Ω, I _D =-1A	---	40	---	ns
T _r	Rise Time		---	35.2	---	
T _{d(off)}	Turn-Off Delay Time		---	100	---	
T _f	Fall Time		---	9.6	---	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1.0MHz	---	3500	---	pF
C _{oss}	Output Capacitance		---	323	---	
C _{rss}	Reverse Transfer Capacitance		---	222	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	-52	A
I _{SM}	Pulsed Source Current ^{2,5}		---	---	-105	
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.0	V

Note:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
2. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
3. The power dissipation is limited by 150°C junction temperature.
4. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Typical Characteristics

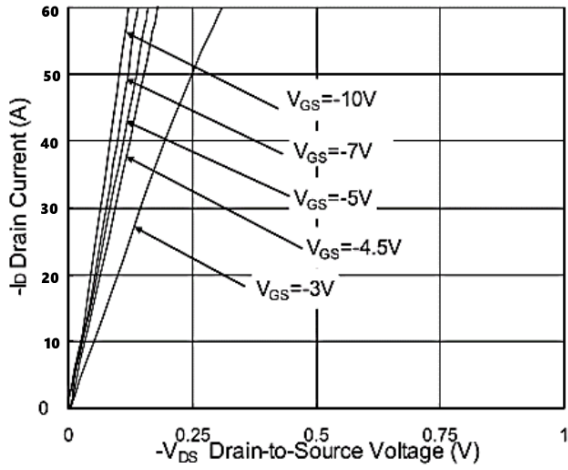


Fig.1 Typical Output Characteristics

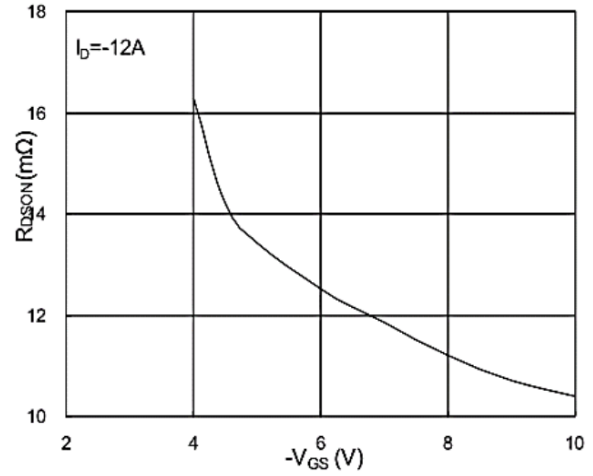


Fig.2 On-Resistance v.s Gate-Source

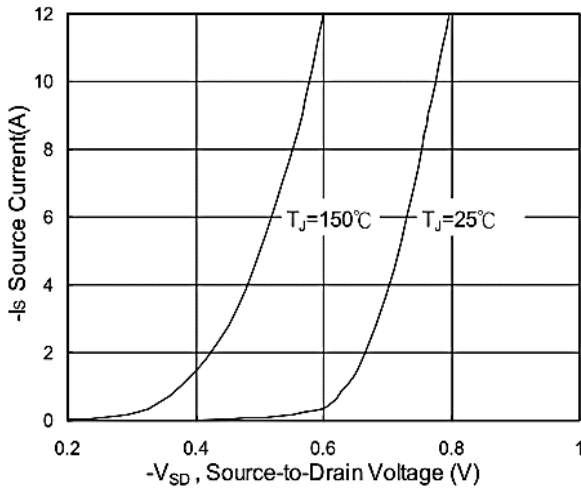


Fig.3 Forward Characteristics Of Reverse

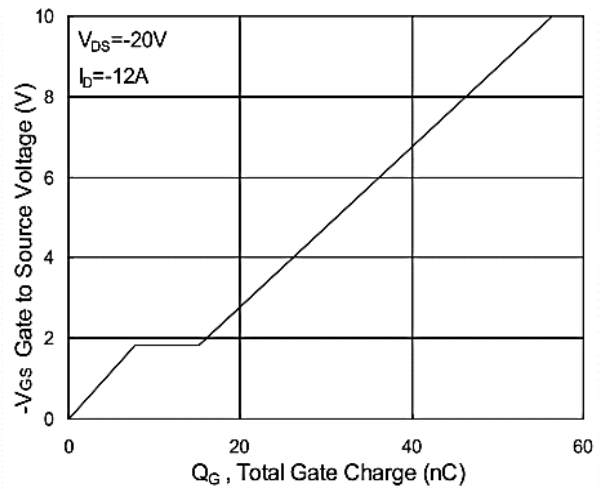


Fig.4 Gate-Charge Characteristics

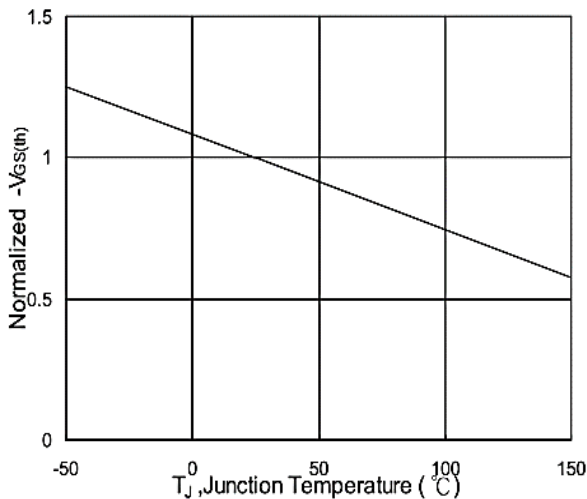


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

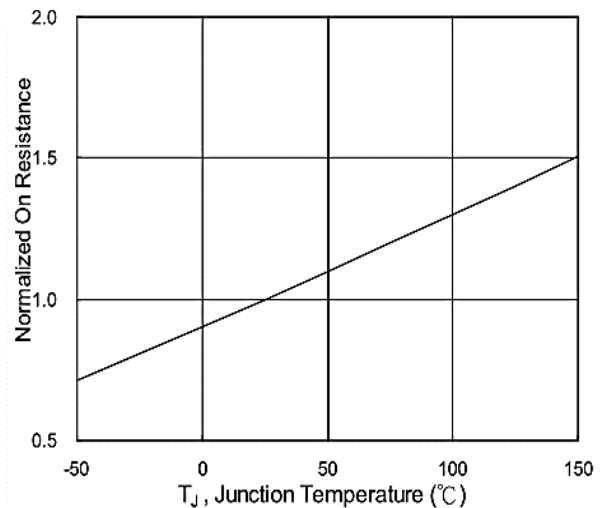


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

Typical Characteristics (Cont.)

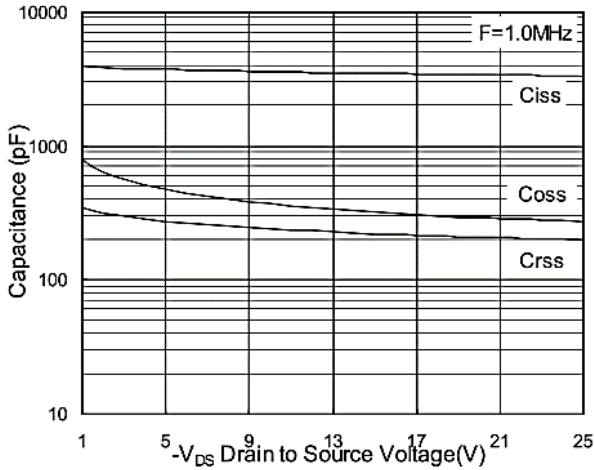


Fig.7 Capacitance

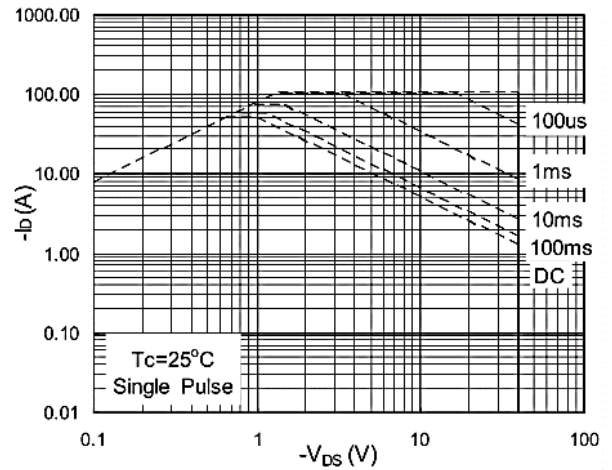


Fig.8 Safe Operating Area

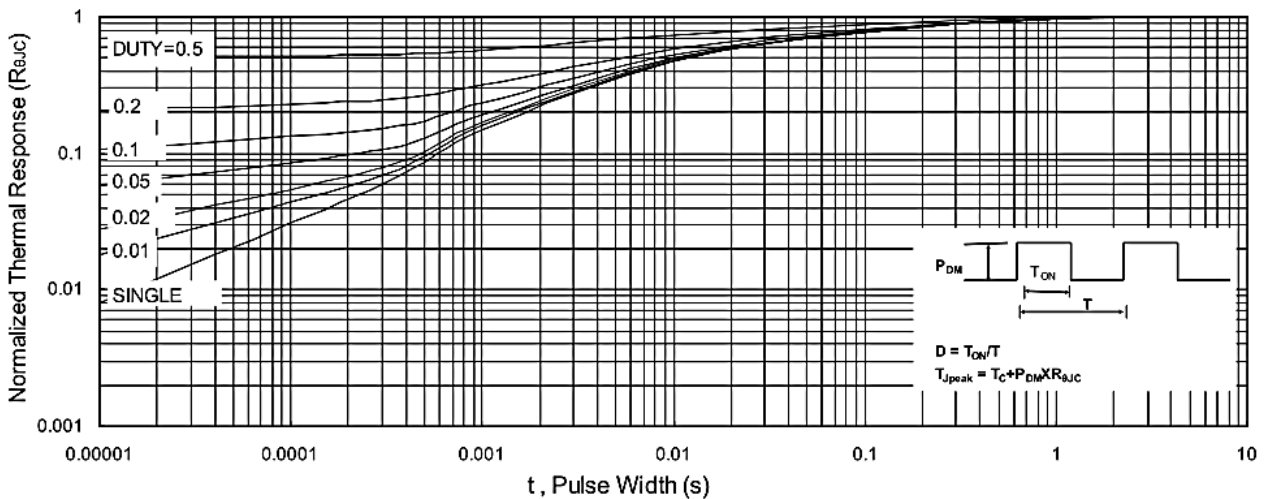


Fig.9 Normalized Maximum Transient Thermal Impedance

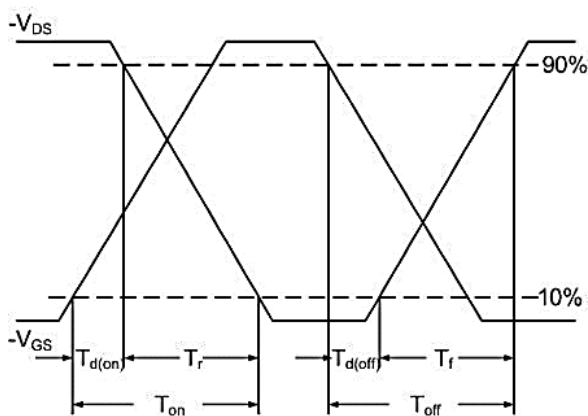


Fig.10 Switching Time Waveform

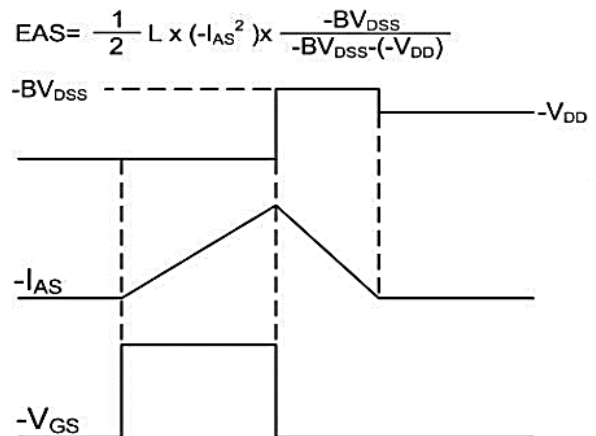
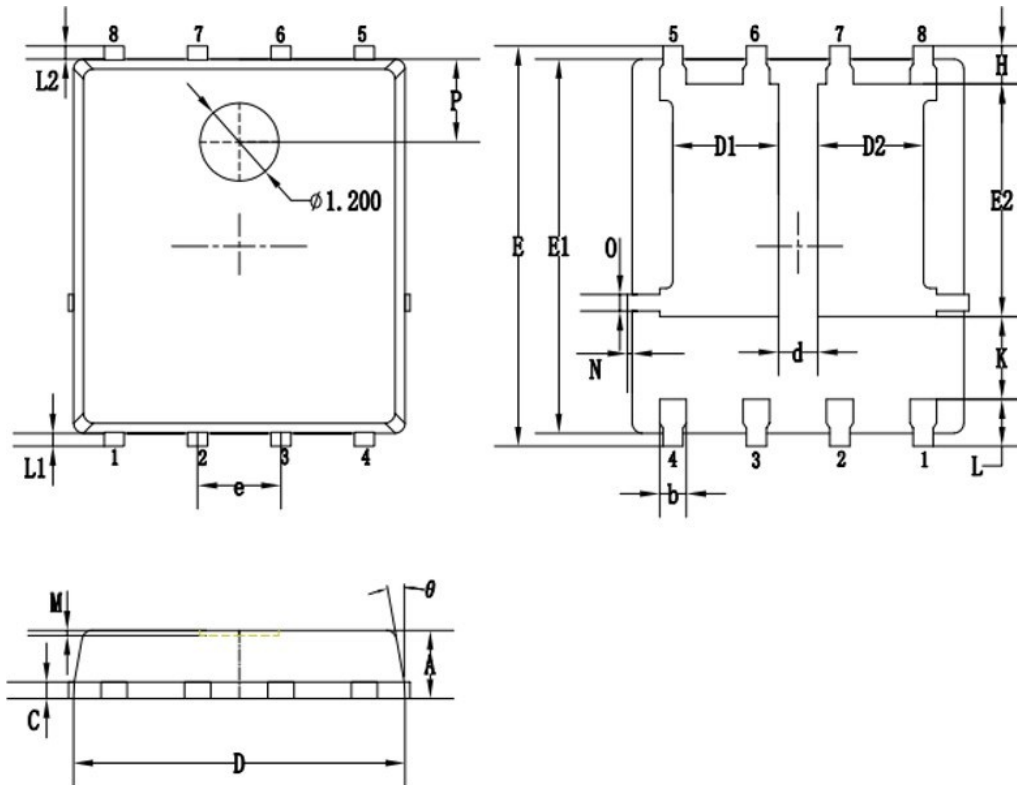


Fig.11 Unclamped Inductive Waveform

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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