WSD45N10GDN56

N-Channel MOSFET

General Description

The WSD45N10GDN56 is the highest performance SGT 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 WSD45N10GDN56 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
- Green Device Available

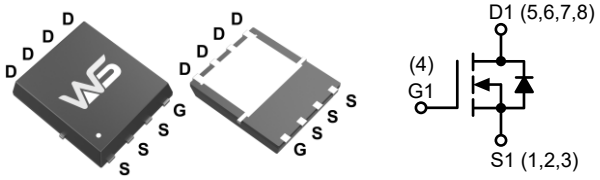
Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
100V	14.5mΩ	45A

Applications

- DC-DC Converter.
- Motor Control.

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°C	Continuous Drain Current, V_{GS} @ 10V	45	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ 10V	33	
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ 10V	12	
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ 10V	9.6	
I_{DM} [1]	Pulsed Drain Current	130	
E_{AS} [2]	Single Pulse Avalanche Energy	169	mJ
I_{AS} [2]	Avalanche Current	26	A
P_D@T_C=25°C	Total Power Dissipation	95	W
P_D@T_A=25°C	Total Power Dissipation	5.0	
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
$R_{\theta JA}$ [3]	Thermal Resistance Junction-ambient	---	60	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	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	100	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C, I_D=1mA	---	0.098	---	V/°C
$R_{DS(ON)}$ [4]	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=26A	---	14.5	17.5	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250μA	1.2	2.0	3.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5.52	---	mV/°C
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V , V_{GS}=0V , T_J=25°C	---	---	1.0	μA
		V_{DS}=80V , V_{GS}=0V , T_J=55°C	---	---	30	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
R_g [5]	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1.0MHz	---	1.0	---	Ω
Q_g [5]	Total Gate Charge (10V)	V_{DS}=50V , V_{GS}=10V , I_D=26A	---	42	59	nC
Q_{gs} [5]	Gate-Source Charge		---	12	---	
Q_{gd} [5]	Gate-Drain Charge		---	12	---	
$T_{d(on)}$ [5]	Turn-On Delay Time	V_{DD}=30V , V_{GEN}=10V , R_G=6Ω I_D=1A , R_L=30Ω	---	19	35	ns
T_r [5]	Rise Time		---	9	17	
$T_{d(off)}$ [5]	Turn-Off Delay Time		---	36	65	
T_f [5]	Fall Time		---	22	40	
C_{iss} [5]	Input Capacitance	V_{DS}=30V , V_{GS}=0V , f=1.0MHz	---	1800	---	pF
C_{oss} [5]	Output Capacitance		---	215	---	
C_{rss} [5]	Reverse Transfer Capacitance		---	42	---	

Diode Characteristics

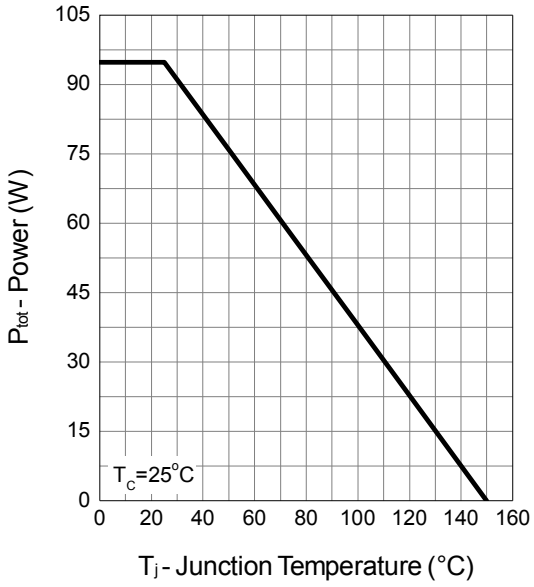
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	26	A
V_{SD} [4]	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25°C	---	---	1.3	V
t_{rr}	Reverse Recovery Time	I_F=20A , dI/dt=100A/μs , T_J=25°C	---	44	---	ns
Q_{rr}	Reverse Recovery Charge		---	95	---	nC

Note:

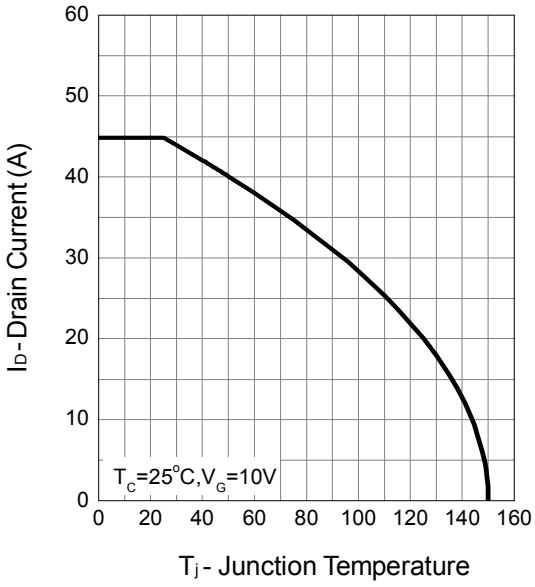
1. Pulse width limited by max. junction temperature.
2. UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_J=25°C).
3. Surface Mounted on 1in2 pad area.
4. Pulse test ; pulse width≤300μs, duty cycle≤2%.
5. Guaranteed by design, not subject to production testing.

Typical Characteristics

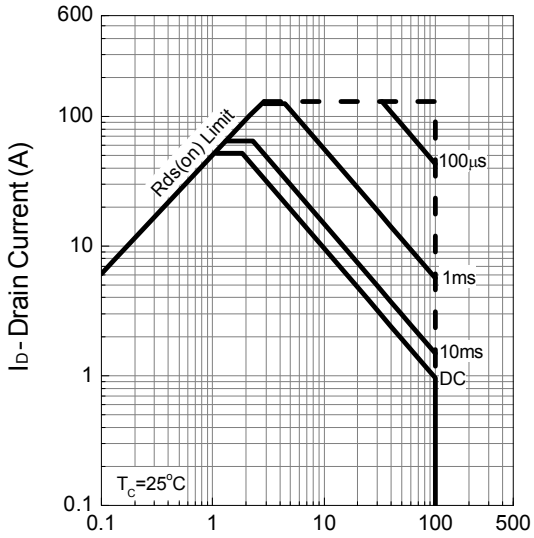
Power Dissipation



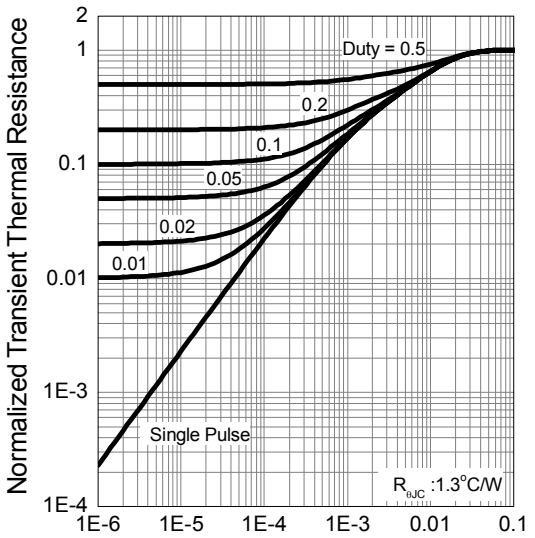
Drain Current



Safe Operation Area

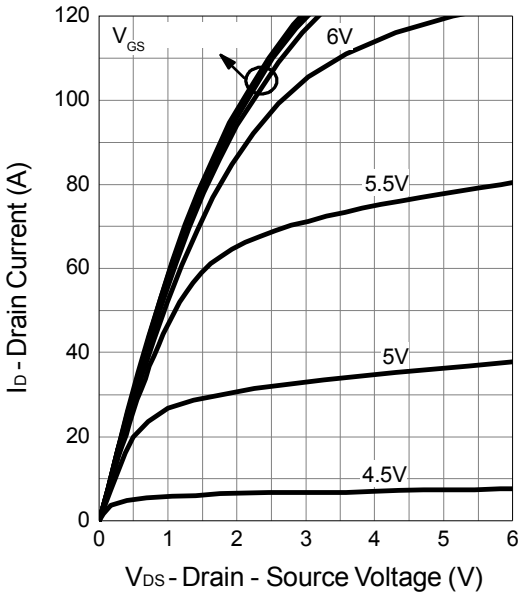


Thermal Transient Impedance

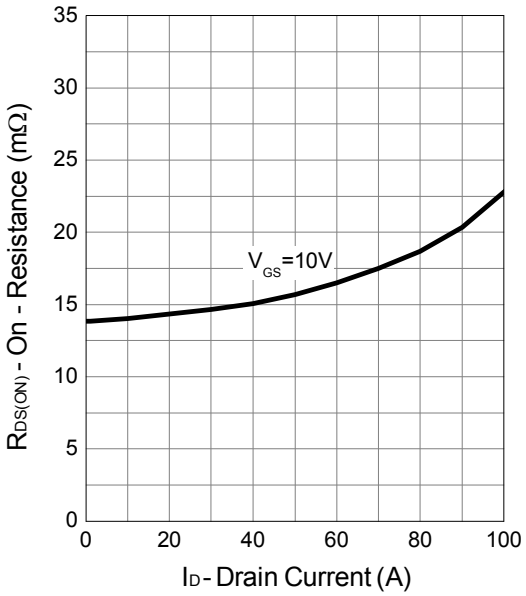


Typical Characteristics (Cont.)

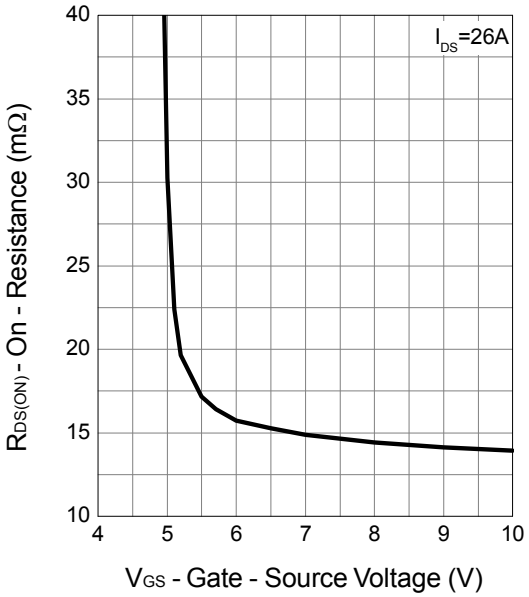
Output Characteristics



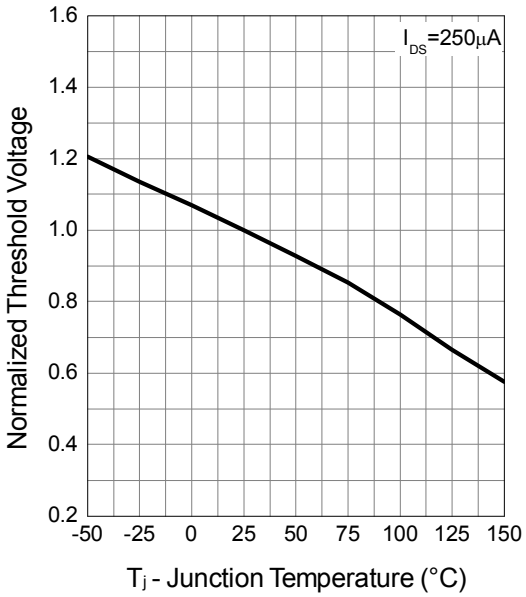
Drain-Source On Resistance



Gate-Source On Resistance

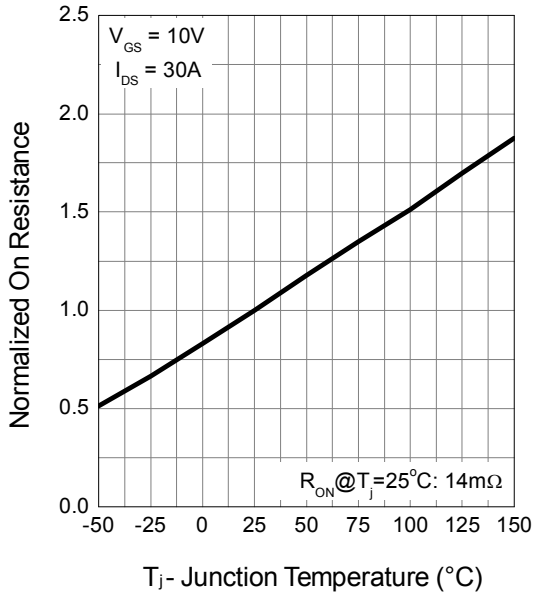


Gate Threshold Voltage

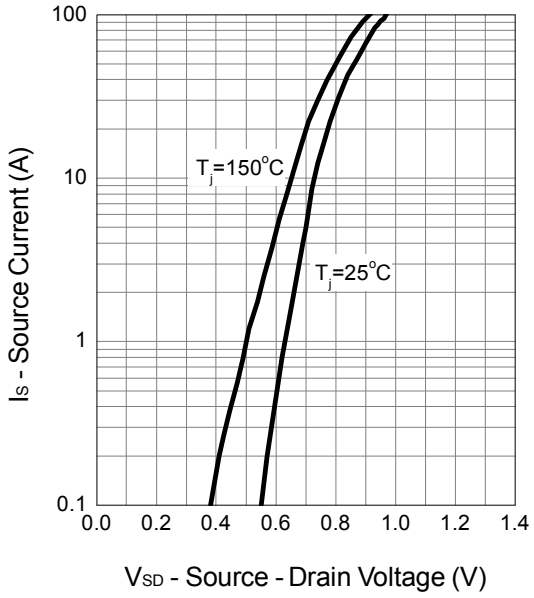


Typical Characteristics (Cont.)

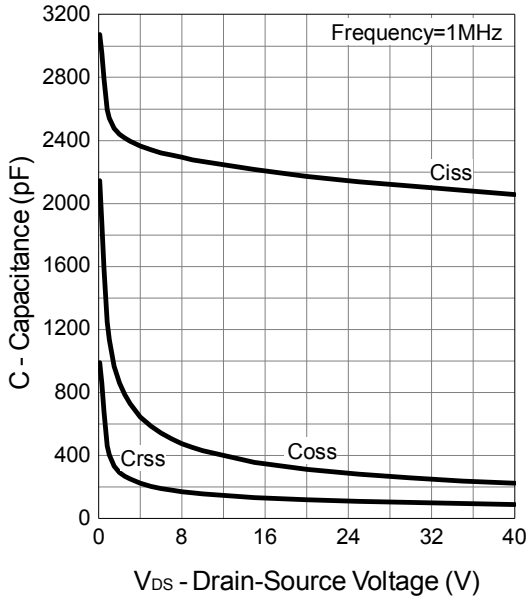
Drain-Source On Resistance



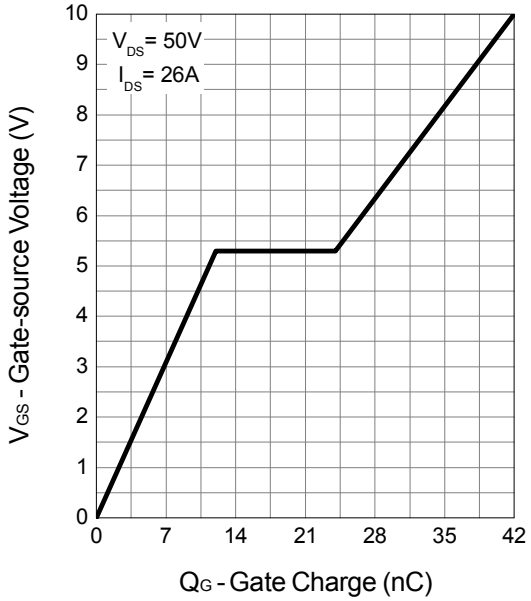
Source-Drain Diode Forward



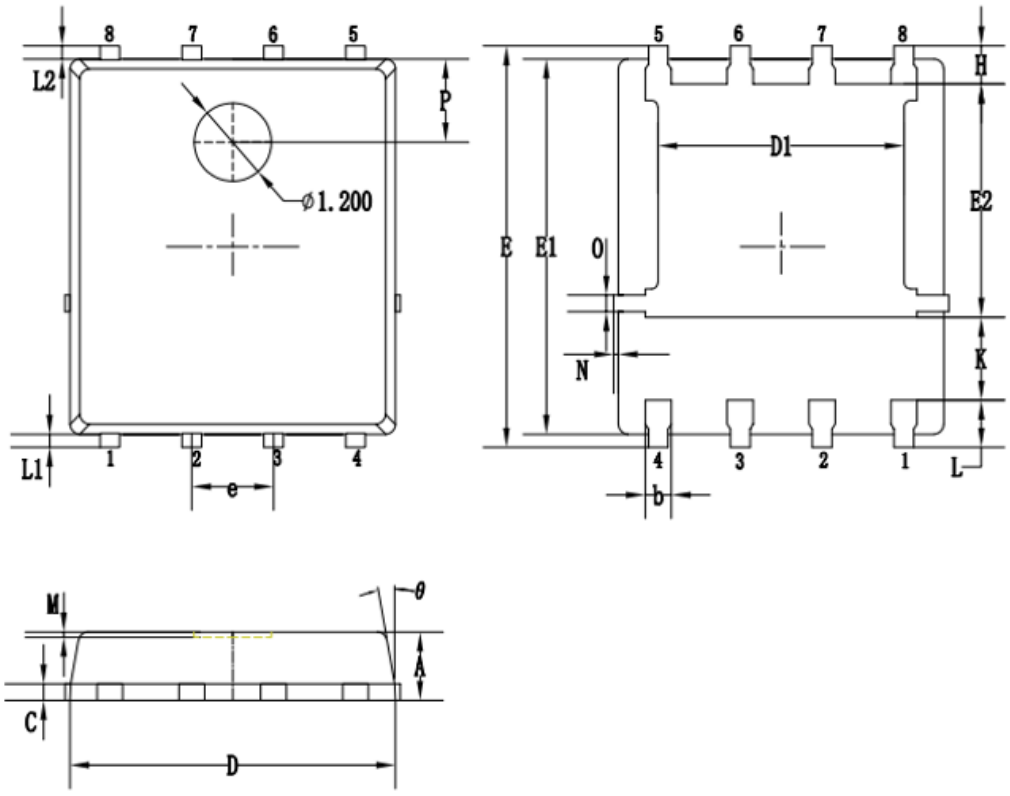
Capacitance



Gate Charge



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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