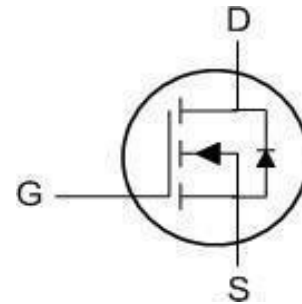




- ★ Super Low Gate Charge
- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

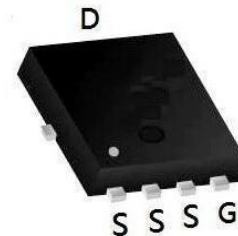


Description

The WLQ20N03D is the high cell density trenched N-ch MOSFETs, which provide excellent R_{DS(on)} and gate charge for most of the synchronous buck converter applications.

The WLQ20N03D meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

PDFN3333-8L Pin Configuration



Product Summary

BVDSS	R _{DS(on)}	I _D
30V	15mΩ	20A

Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		10s	Steady State	
V _{DS}	Drain-Source Voltage	30		V
V _{GS}	Gate-Source Voltage	±20		V
I _{D@T_C=25°C}	Continuous Drain Current, V _{GS} @ 10V ¹	20		A
I _{D@T_C=100°C}	Continuous Drain Current, V _{GS} @ 10V ¹	8		A
I _{DM}	Pulsed Drain Current ²	38		A
EAS	Single Pulse Avalanche Energy ³	28		mJ
I _{AS}	Avalanche Current	13.8		A
P _{D@T_C=25°C}	Total Power Dissipation ⁴	5.5		W
T _{STG}	Storage Temperature Range	-55 to 175		°C
T _J	Operating Junction Temperature Range	-55 to 175		°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJC}	Thermal Resistance Junction-Case ¹	---	36	°C/W



Electrical Characteristics (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} = 0V,	-	-	1.0	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.5	2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance <small>note3</small>	V _{GS} =10V, I _D =5A	-	15	20	mΩ
		V _{GS} =4.5V, I _D =3A	-	21	29	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1.0MHz	-	490	-	pF
C _{oss}	Output Capacitance		-	79	-	pF
C _{rss}	Reverse Transfer Capacitance		-	61	-	pF
Q _g	Total Gate Charge	V _{DS} =15V, I _D =5.8A, V _{GS} =10V	-	10	-	nC
Q _{gs}	Gate-Source Charge		-	1.7	-	nC
Q _{gd}	Gate-Drain("Miller") Charge		-	2.5	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} =15V, I _D =3A, V _{GS} =10V, R _{REN} =3Ω	-	6	-	ns
t _r	Turn-on Rise Time		-	15	-	ns
t _{d(off)}	Turn-off Delay Time		-	17	-	ns
t _f	Turn-off Fall Time		-	17	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	9	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	36	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =9A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I _F =5A, di/dt=100A/μs	-	7	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	2	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition : T_J=25°C, V_{DD}=15V, V_G=10V, L=0.5mH, R_g=25Ω, I_{AS}=6A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%



Typical Performance Characteristics

Figure 1: Output Characteristics

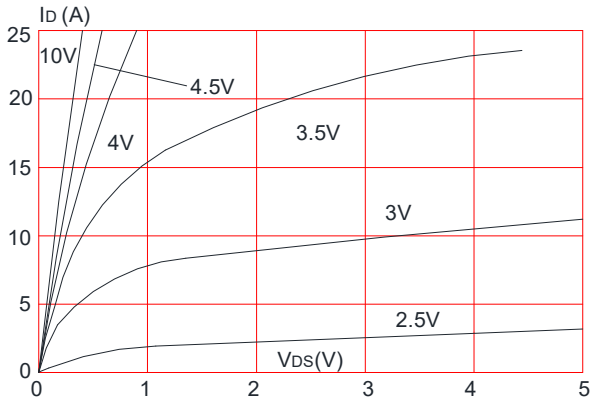


Figure 2: Typical Transfer Characteristics

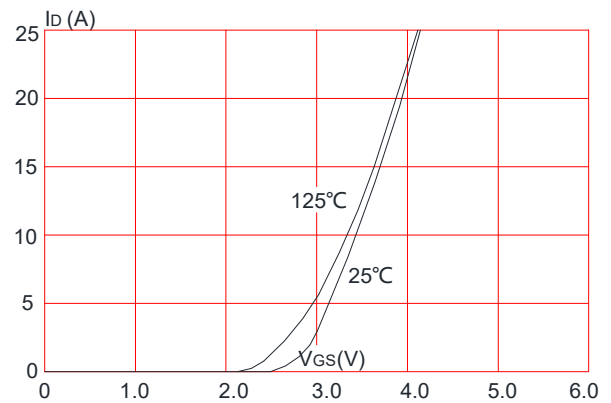


Figure 3: On-resistance vs. Drain Current

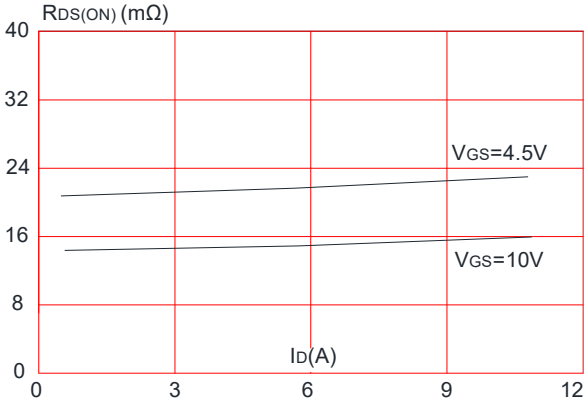


Figure 4: Body Diode Characteristics

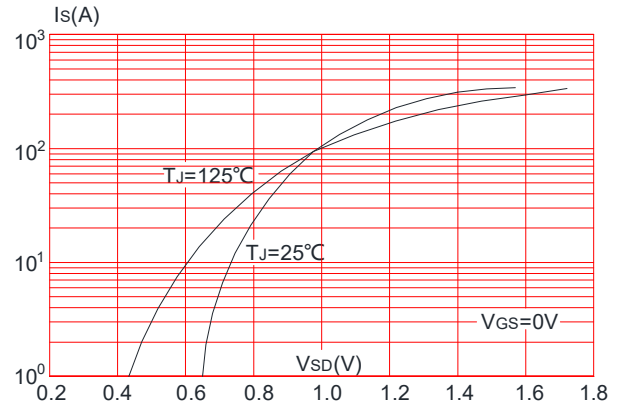


Figure 5: Gate Charge Characteristics

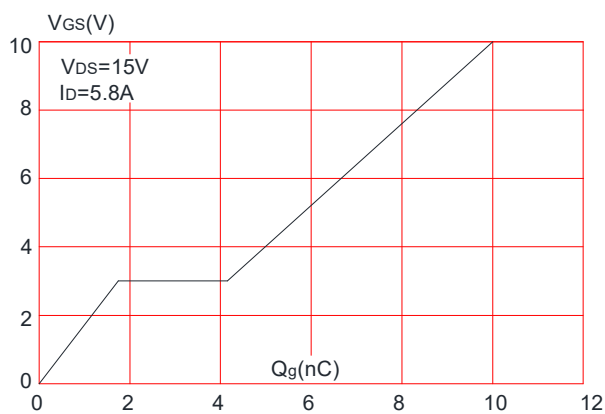


Figure 6: Capacitance Characteristics

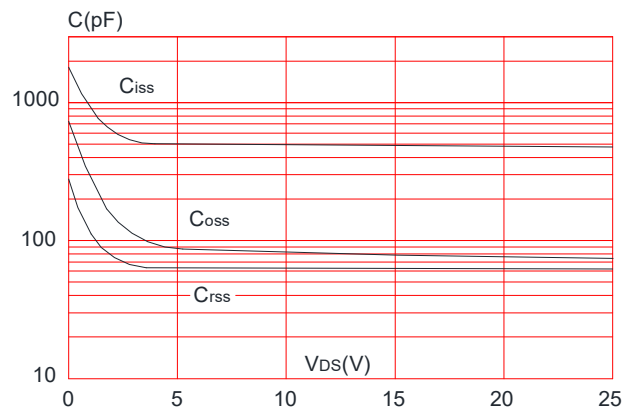




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

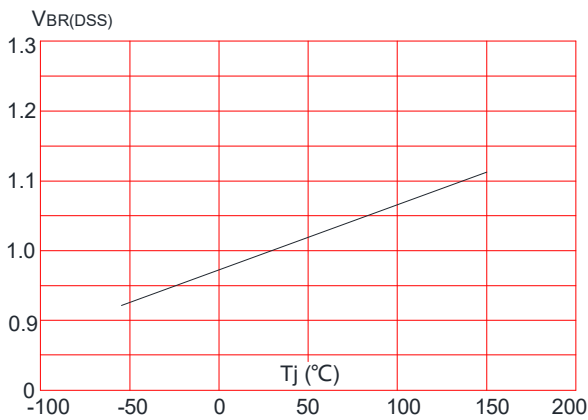


Figure 8: Normalized on Resistance vs. Junction Temperature

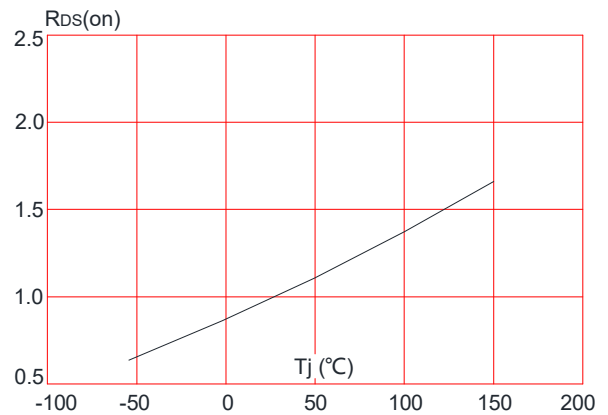


Figure 9: Maximum Safe Operating Area

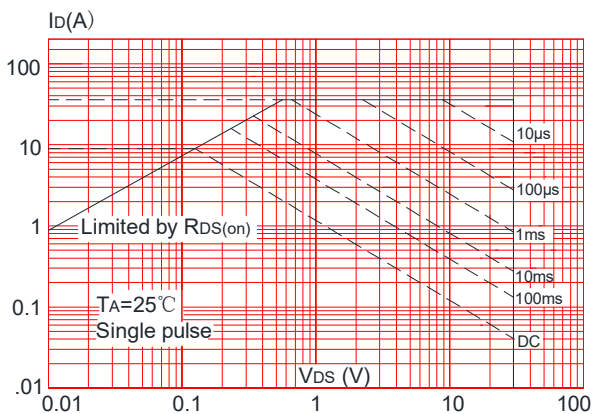


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

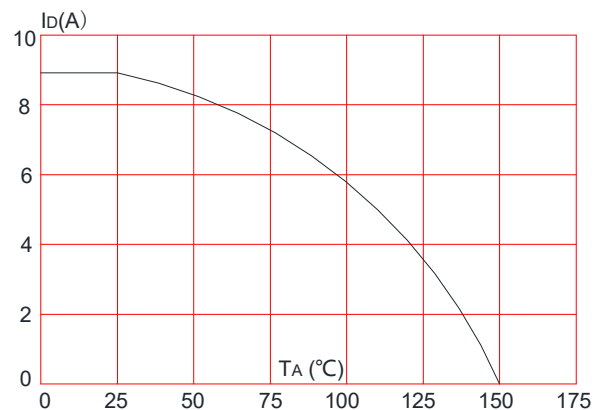
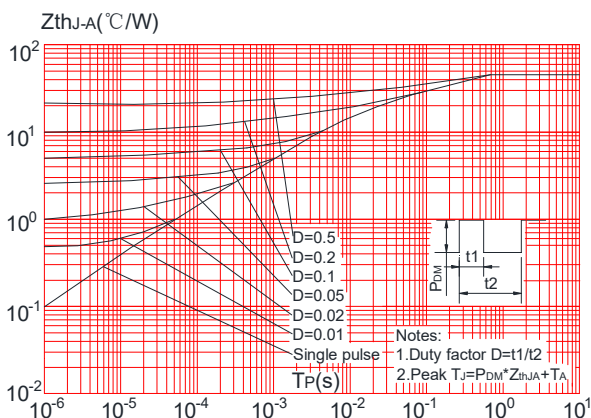


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





Test Circuit

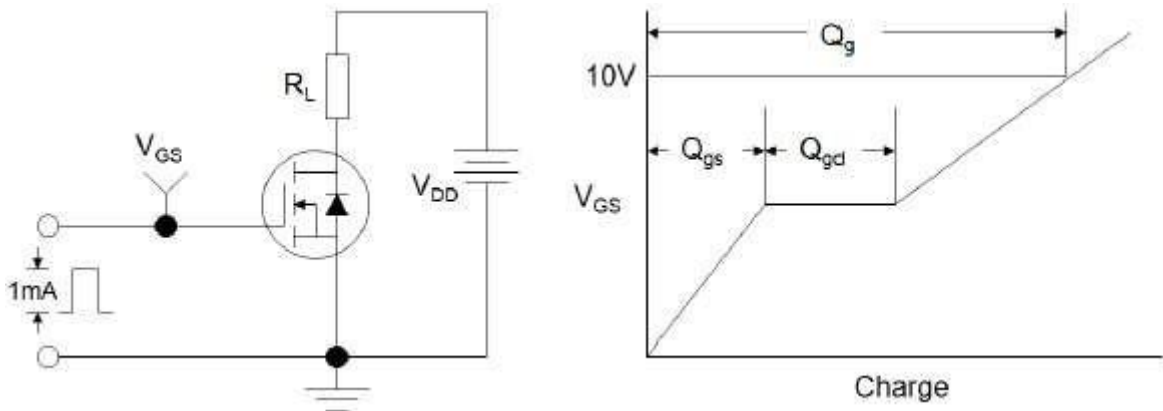


Figure1:Gate Charge Test Circuit & Waveform

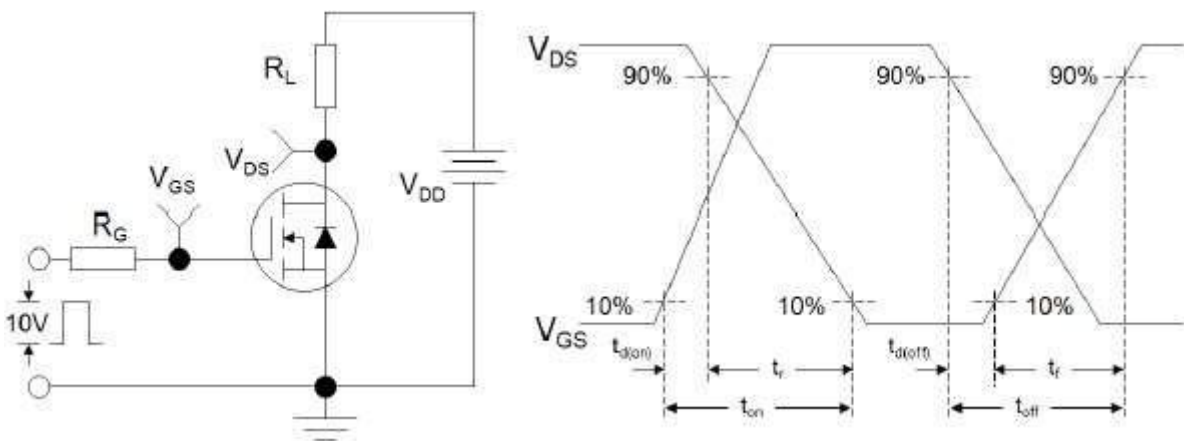


Figure 2: Resistive Switching Test Circuit & Waveforms

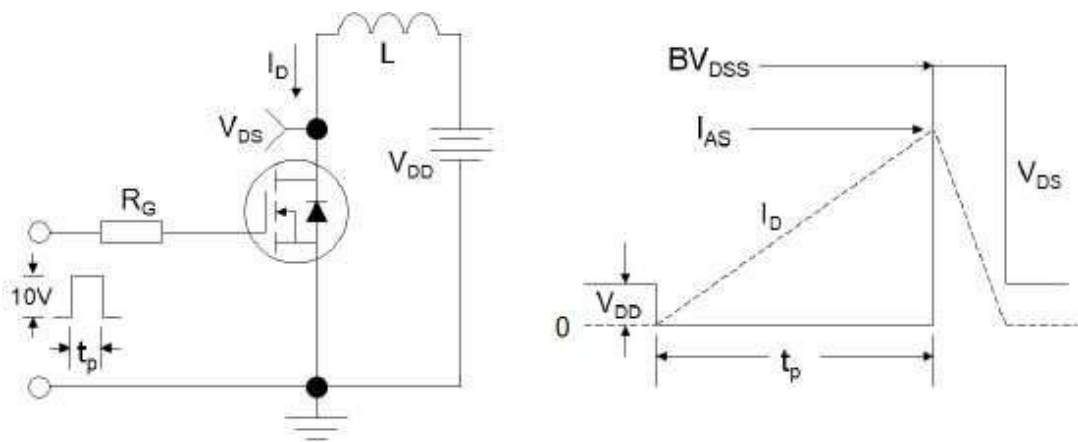
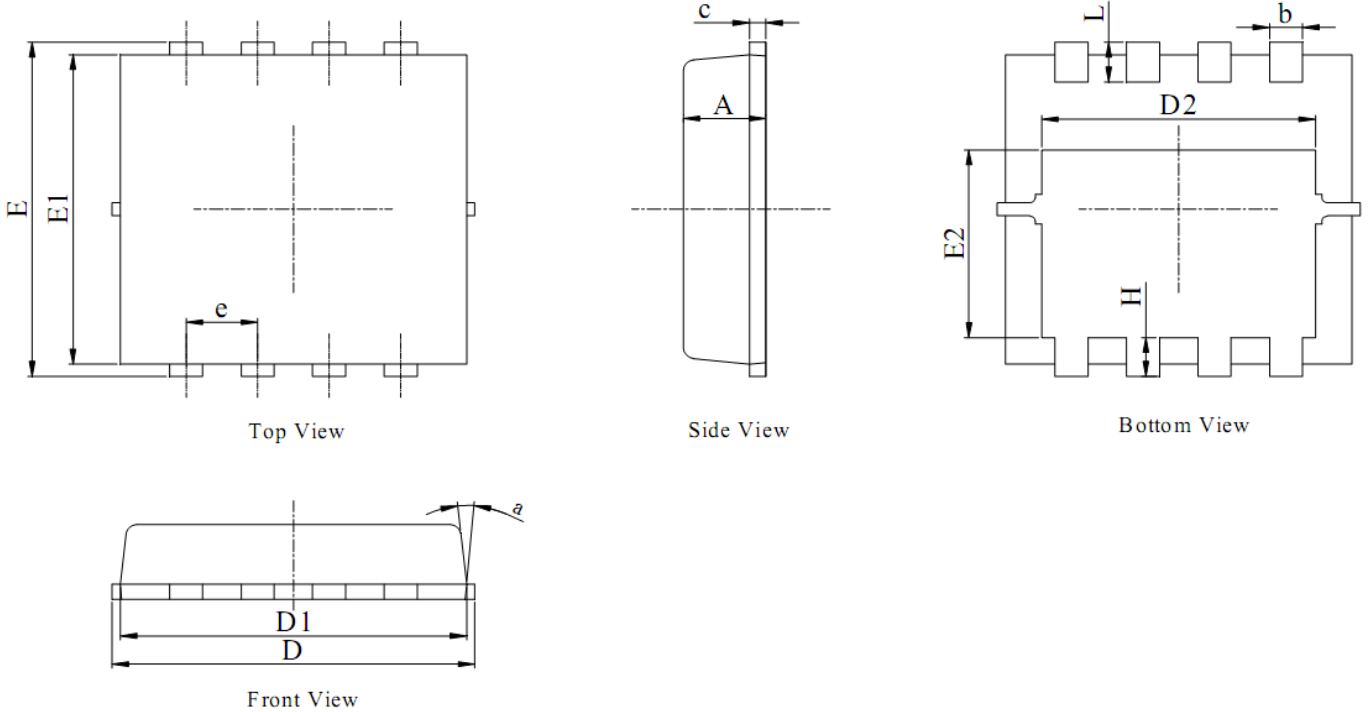


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



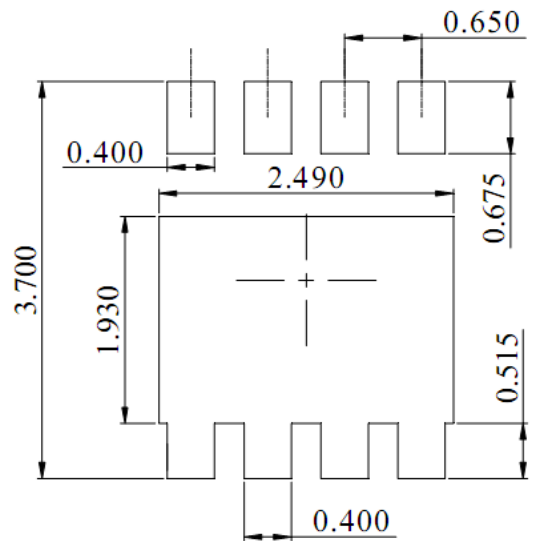
Package Mechanical Data-PDFN3333-8L-Single



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. ALL DIMENSIONS IN MILLIMETER (ANNGLE IN DEGREE).
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.20	0.25
D	3.00	3.15	3.25
D1	2.95	3.05	3.15
D2	2.39	2.49	2.59
E	3.20	3.30	3.40
E1	2.95	3.05	3.15
E2	1.70	1.80	1.90
e	0.65 BSC		
H	0.30	0.40	0.50
L	0.25	0.40	0.50
a	---	---	15°



DIMENSIONS:MILLIMETERS



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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.