Dual N-Ch 30V Fast Switching MOSFETs

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

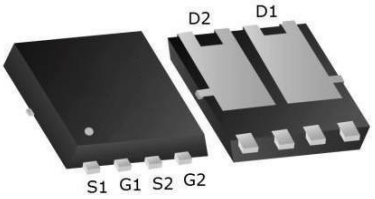
Product Summary

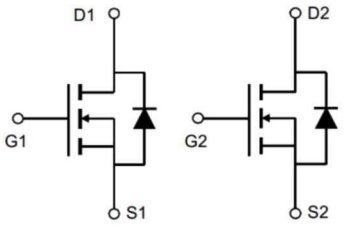
BVDSS	RDSON	ID
30V	15mΩ	20A

Description

The XR304D is the high cell density trenched N-ch MOSFETs, which provides excellent RDSON and gate charge for most of the synchronous buck converter applications.
The XR304D meets the RoHS and Green Product requirements 100% EAS guaranteed with full function reliability approved.

PDFN3333-8L Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	20	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	10	A
I_{DM}	Pulsed Drain Current[2]	56	A
EAS	Single Pulse Avalanche Energy[3]	12.1	mJ
I_{AS}	Avalanche Current	48	A
P_D@T_C=25℃	Total Power Dissipation[4]	6.0	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	---	75	℃/W

Electrical Characteristics (T_J=25℃ 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	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 note2	V_{GS}=10V, I_D=5A	-	15	20	mΩ
		V_{GS}=4.5V, I_D=3A	-	21	29	mΩ
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	-	5.2	-	nC
Q_{gs}	Gate-Source Charge		-	0.9	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	1.3	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=15V, I_D=3A, V_{GS}=10V, R_{REN} =3Ω	-	4.5	-	ns
t_r	Turn-on Rise Time		-	2.5	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	14.5	-	ns
t_f	Turn-off Fall Time		-	3.5	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	12	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	48	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S= 12A	-	-	1.2	V

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	28	A
I_{SM}	Pulsed Source Current[2,5]		---	---	56	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V

Note :
1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3. The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=21A
4. The power dissipation is limited by 150℃ junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Performance Characteristics

Figure1: Output Characteristics

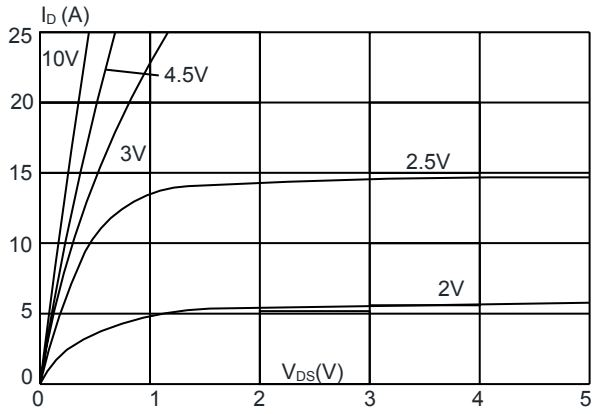


Figure 2: Typical Transfer Characteristics

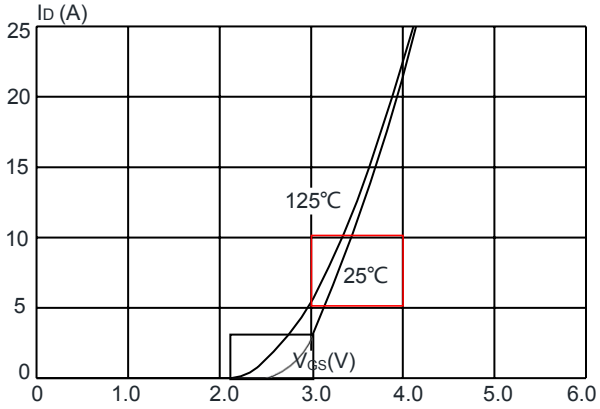


Figure 3: On-resistance vs. Drain Current

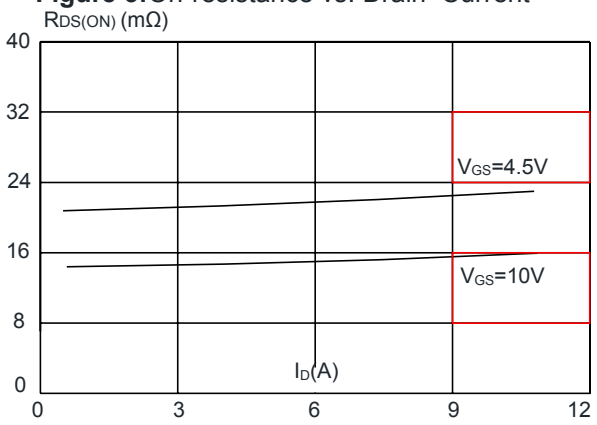


Figure 4: Body Diode Characteristics

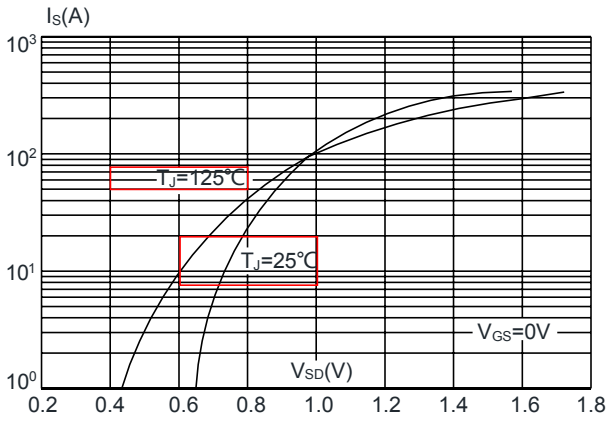


Figure 5: Gate Charge Characteristics

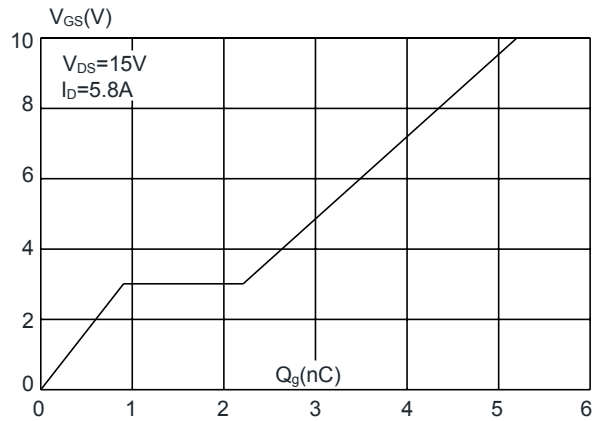


Figure 6: Capacitance Characteristics

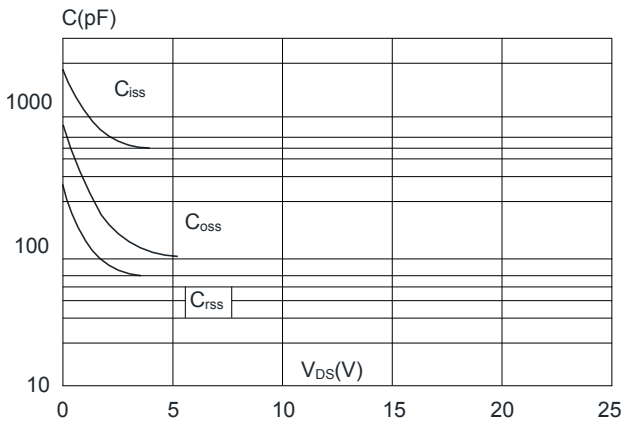


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

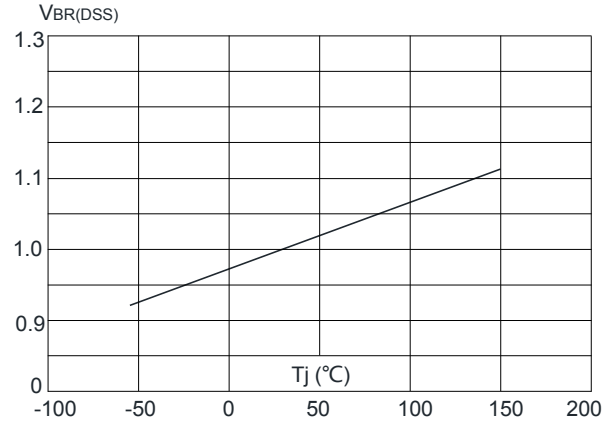


Figure 8: Normalized on Resistance vs. Junction Temperature

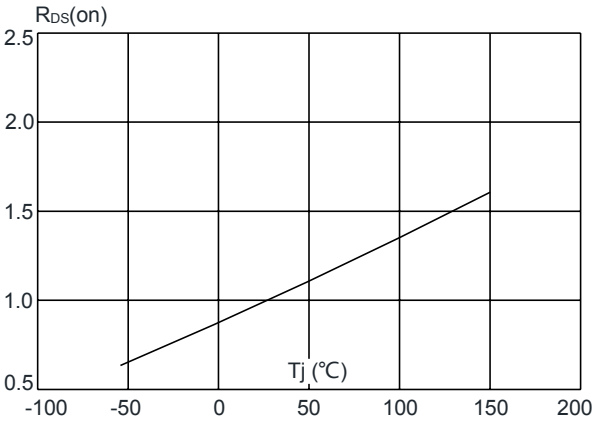


Figure 9: Maximum Safe Operating Area

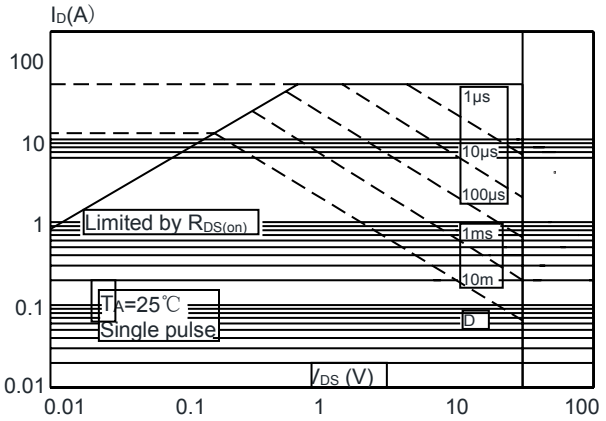


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

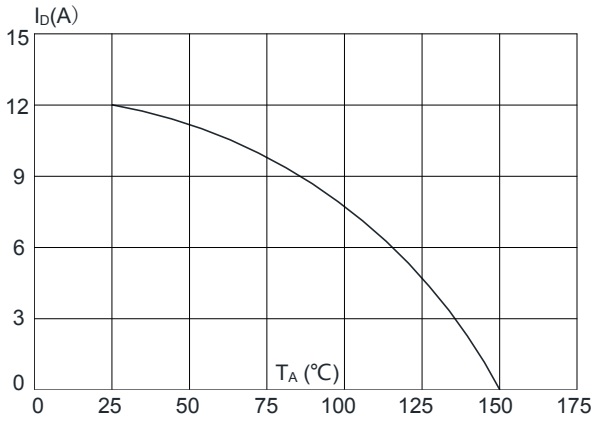
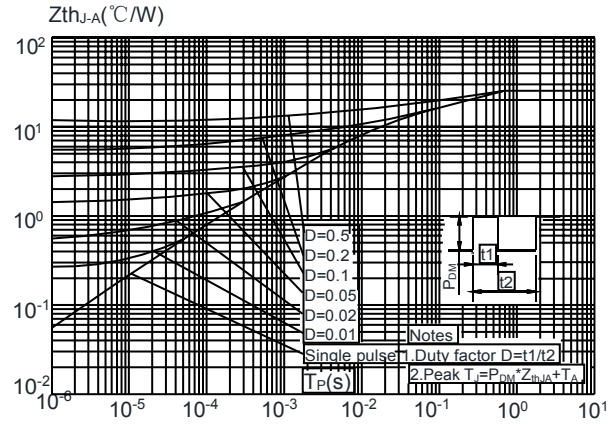
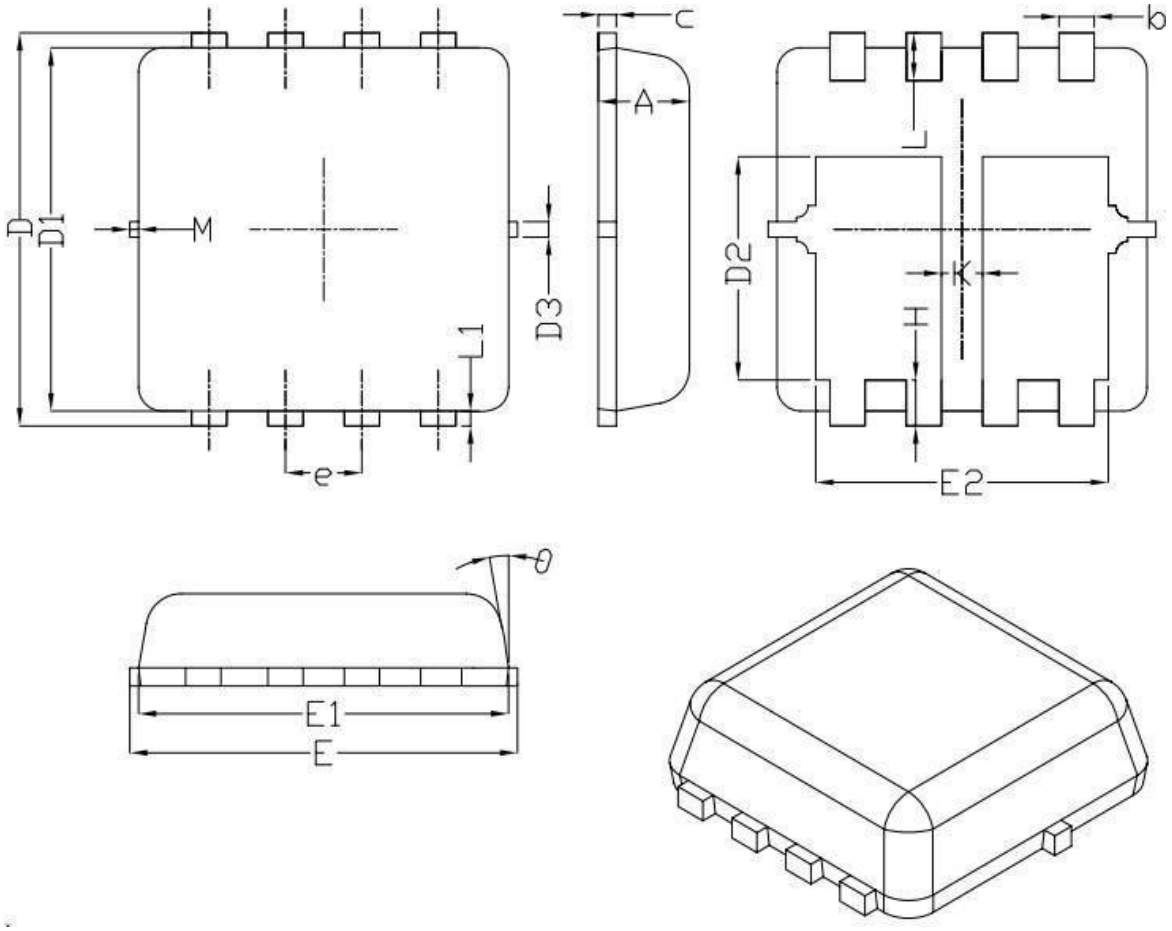


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



PDFN3333-8L Package Information



Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	--	0.13	--
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65 BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	--	0.13	--
K	0.30	--	--
θ	--	10°	12°
M	*	*	0.15
* Not Specified			

Notes:
1. Refer to JEDEC MO-240 variation CA.
2. Dimensions "D1" and "E1" do NOT include mold flash protrusions or gate burrs.
3. Dimensions "D1" and "E1" include interterminal flash or protrusion.