N-Ch 40V 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

Green

BVDSS	RDSON	ID
40V	19mΩ	7A

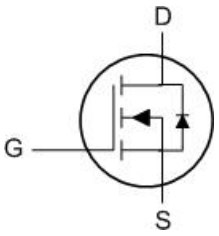
Description

The XR40N05L 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 XR40N05L meets the RoHS and Green Product requirements 100% EAS guaranteed with full function reliability approved.

SOT23-3L Pin Configuration





Absolute Maximum Ratings (T_A=25 °C, unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Continuous Drain Current (Tc=25°C)	7.0	A
	Continuous Drain Current(Tc=100°C)	4	A
I_{DM}	Pulsed Drain Current(Note1)	32.8	A
EAS	Single Pulsed Avalanche Energy	13	mJ
P_D	Maximum Power Dissipation(T_c=25°C)	2.0	W
T_J T_{STG}	Operation Junction and Storage Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	73	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	---	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Static Characterisitics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=8A,	---	19	24	mΩ
		V_{GS}=4.5V , I_D=5A,	---	25	35	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.5	2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=40V , V_{GS}=0V , T_J=25℃	---	----	1	uA
		V_{DS}=-40V, V_{GS}=0V , T_J=55℃	---	---	---	
I_{GSS}	Gate-Source Leakage Current	V_{GS}＝±20V , V_{DS}=0V	---	---	±100	nA
Switching Characteristics						
Q_g	Total Gate Charge	V_{GS}=10V , V_{DS}=20V , I_D=8A	---	12	---	nC
Q_{gs}	Gate-Source Charge		---	3.2	---	
Q_{gd}	Gate-Drain Charge		---	3.1	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=20V,R_{GEN}=3R, R_L=2.5R, V_{GS}=10V	---	4	---	ns
T_r	Rise Time		---	3	---	
$T_{d(off)}$	Turn-Off Delay Time		---	15	---	
T_f	Fall Time		---	2	---	
trr	Body Diode Reverse Recovery Time	I_{SD}=2A ,V_{DD}=100V dIsd/dt=100A/us	---	---	---	ns
Qrr	Body Diode Recerse Recovery Charge		---	---	---	nC
Dynamic Characterisitics						
C_{iss}	Input Capacitance	V_{DS}=20V , V_{GS}=0V , f=1MHz	---	633	---	pF
C_{oss}	Output Capacitance		---	67	---	
C_{rss}	Reverse Transfer Capacitance		---	58	---	
Rg	Gate Resistance	V_{GS}=0V , V_{DS} Open	---	---	---	Ω

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current(Body Diode)	Tc==25°C	---	---	7	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, Is=45A	---	---	1.2	V
Ism	Maximum Pulsed Drain to Source Diode Forward Current		---	---	32	A

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

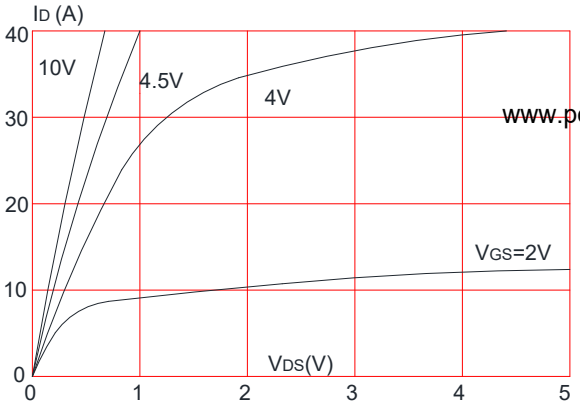
2. EAS condition : T_J=25℃,V_{DD}=20V,V_G=10V,L=0.5mH,Rg=25Ω,I_{AS}=7.2A

   T_J=25℃,V_{DD}=-20V,V_G= -10V,L=0.5mH,Rg=25Ω,I_{AS}=-8.4A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

Typical Performance Characteristics-N

Figure1: Output Characteristics



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Figure 2: Typical Transfer Characteristics

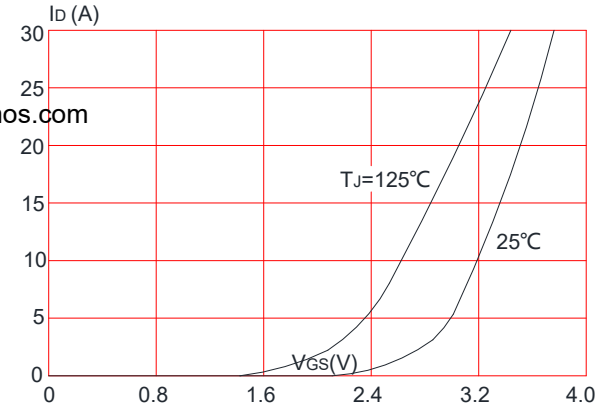


Figure 3: On-resistance vs. Drain Current

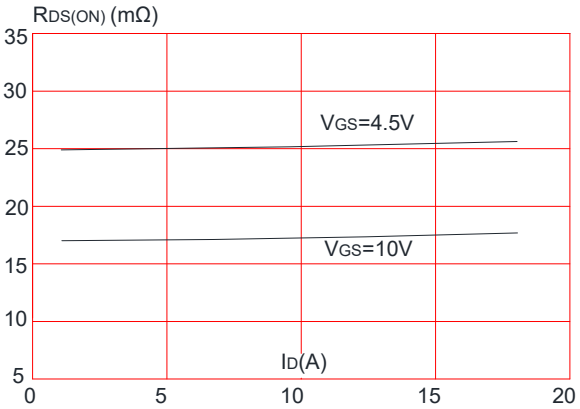


Figure 4: Body Diode Characteristics

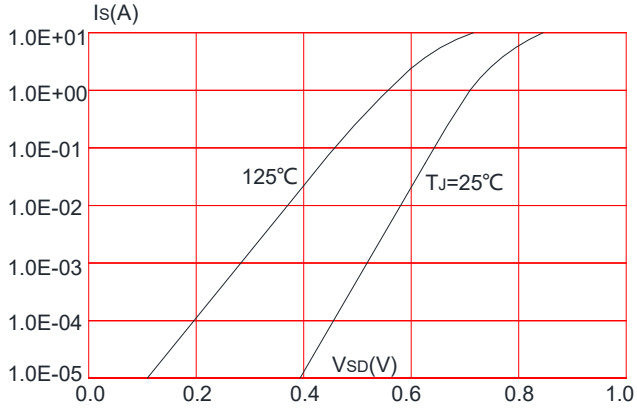


Figure 5: Gate Charge Characteristics

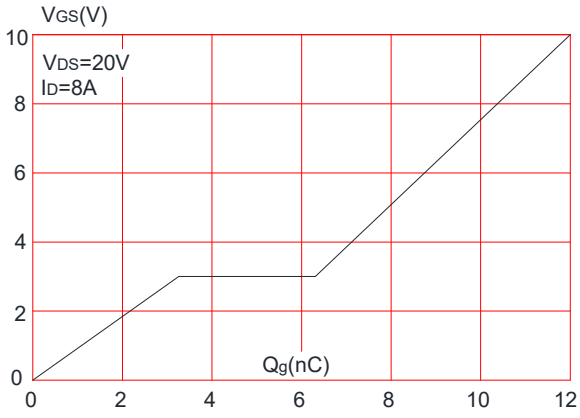


Figure 6: Capacitance Characteristics

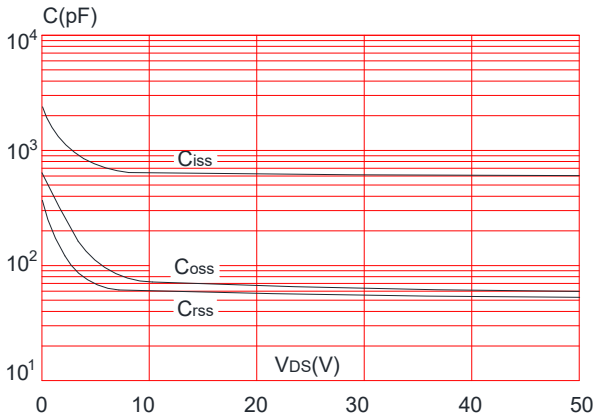


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

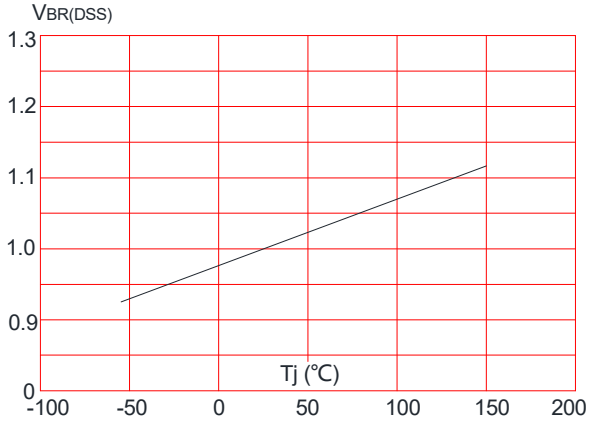


Figure 8: Normalized on Resistance vs. Junction Temperature

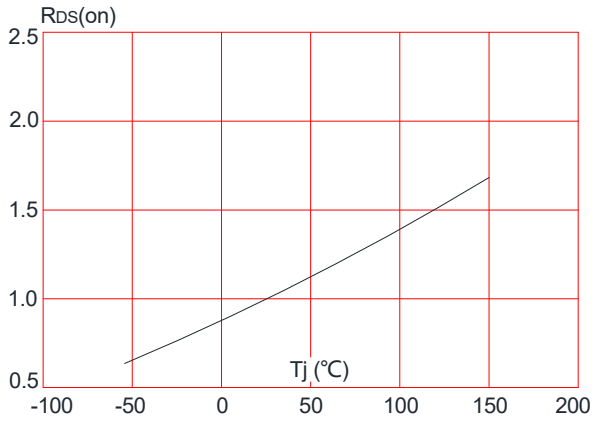


Figure 9: Maximum Safe Operating Area

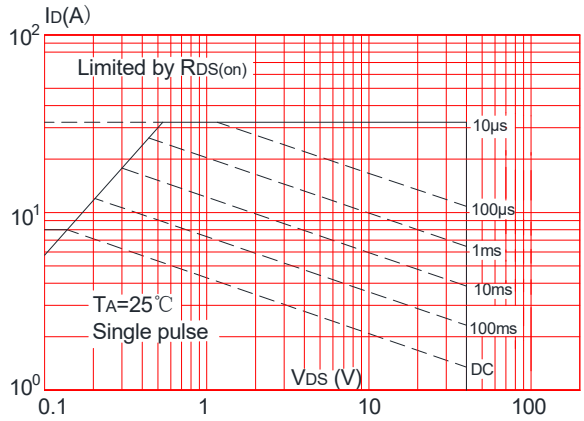


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

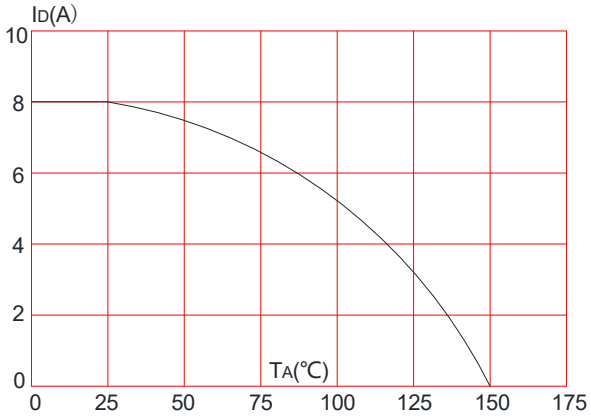
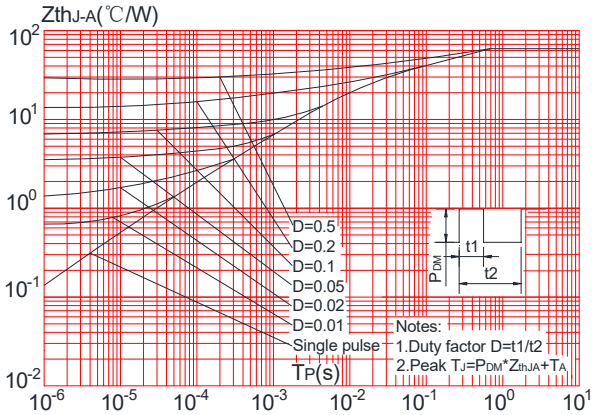
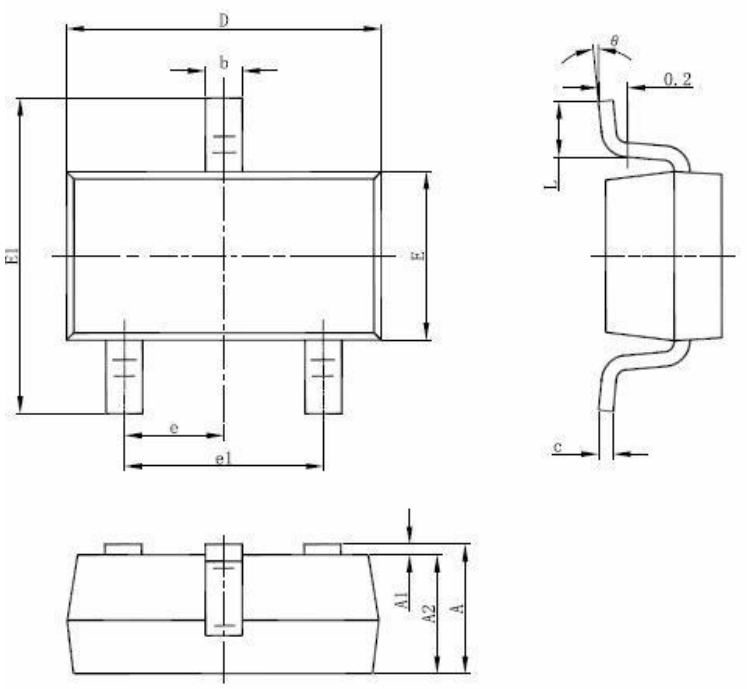


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



SOT-23-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°