

P-Ch 60V Fast Switching MOSFETs

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

Product Summary



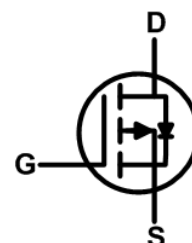
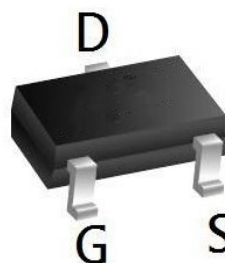
BVDSS	RDSON	ID
-60V	160 mΩ	-2 A

Description

The XR2309 is the high cell density trench P-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications.

The XR2309 meet the RoHS and Green Product requirement with full function reliability approved.

SOT23 Pin Configuration



Absolute Maximum Rating

Parameter	Symbol	Value	Unit
Drain-Source voltage	V_{DS}	-60	V
Gate-Source voltage	V_{GS}	± 20	
Continuous Drain Current	I_D	-2.0	A
Pulsed Drain Current ¹	I_{DM}	-5.2	A
Power Dissipation	P_D	1	W
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-55~ 150	°C
Thermal Resistance from Junction to Ambient ²	$R_{\theta JA}$	125	°C/W

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Electrical Characteristics (T = 25°C unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =-250μA	-60	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current(T _A =25°C)	V _{DS} =-60V, V _{GS} =0V	--	--	-1	μA
	Zero Gate Voltage Drain Current(T _A =125°C)	V _{DS} =-60V, V _{GS} =0V	--	--	-100	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1.0	-1.5	-2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance②	V _{GS} =-10V, I _D =-2A	--	160	200	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance②	V _{GS} =-4.5V, I _D =-1A	--	200	300	mΩ
Dynamic Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =-30V, V _{GS} =0V, f=1MHz	--	310	--	pF
C _{oss}	Output Capacitance		--	22	--	pF
C _{rss}	Reverse Transfer Capacitance		--	15	--	pF
Q _g	Total Gate Charge	V _{DS} =-30V I _D =-2A, V _{GS} =-10V	--	5.4	--	nC
Q _{gs}	Gate Source Charge		--	1.1	--	nC
Q _{gd}	Gate Drain Charge		--	1.6	--	nC
Switching Characteristics						
t _{d(on)}	Turn on Delay Time	V _{DD} =-30V, I _D =-2A, R _G =3.3Ω, V _{GS} =-10V	--	41	--	ns
t _r	Turn on Rise Time		--	22	--	ns
t _{d(off)}	Turn Off Delay Time		-	25	--	ns
t _f	Turn Off Fall Time		--	32	--	ns
Source Drain Diode Characteristics						
I _{SD}	Source drain current(Body Diode)	T _A =25°C	--	--	-2.0	A
V _{SD}	Forward on voltage②	T _J =25°C, I _{SD} =-2A, V _{GS} =0V	--	-0.84	-1.2	V

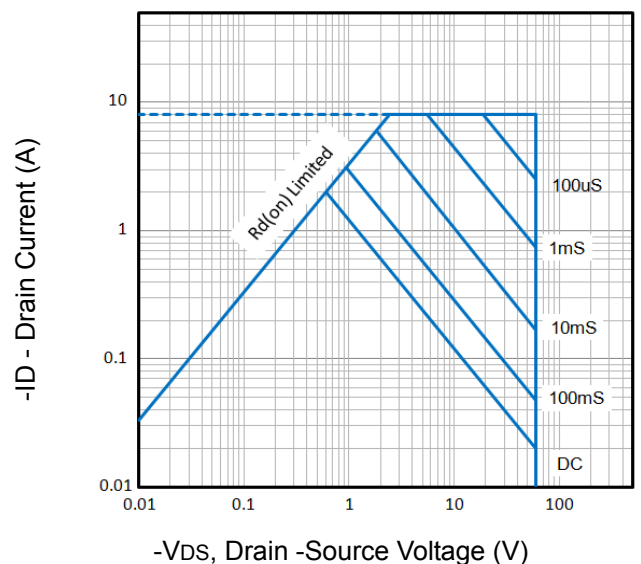
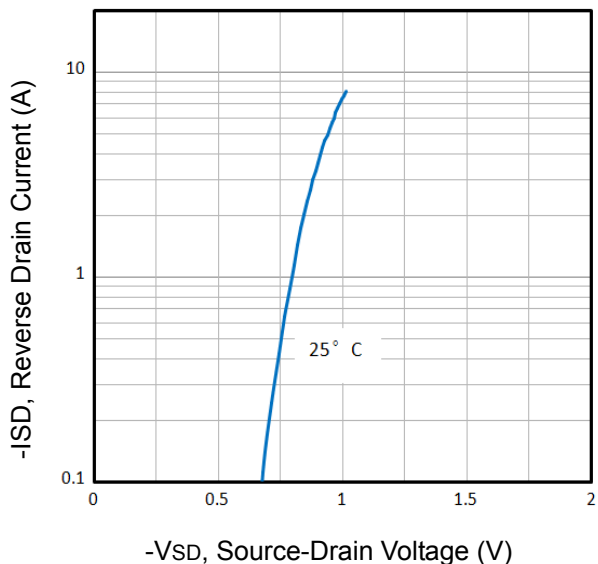
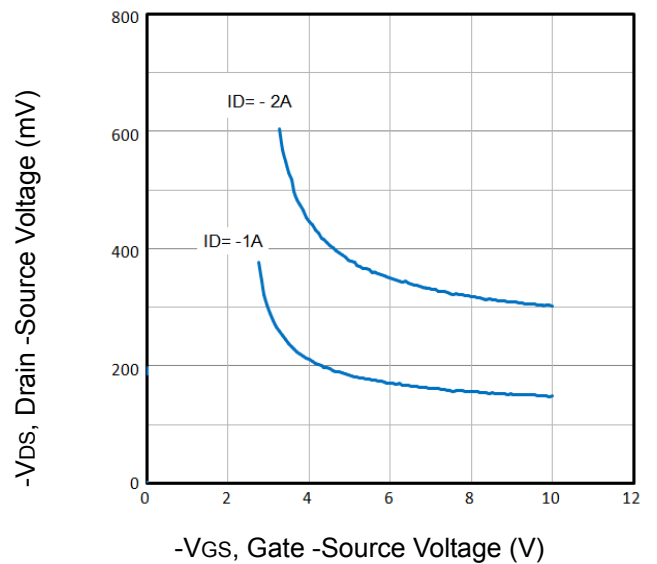
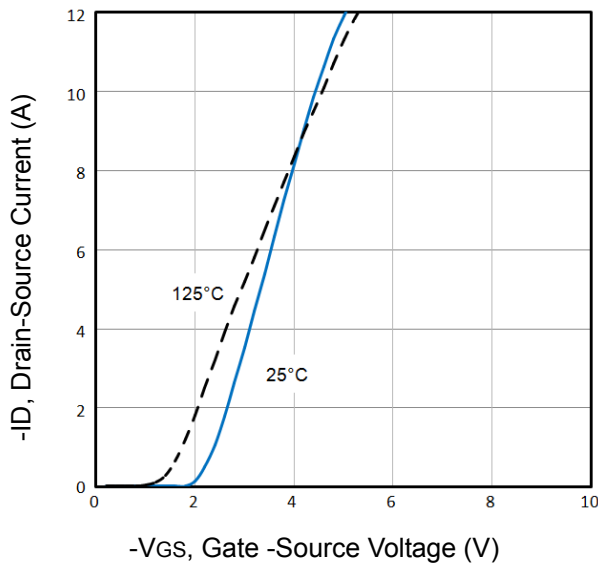
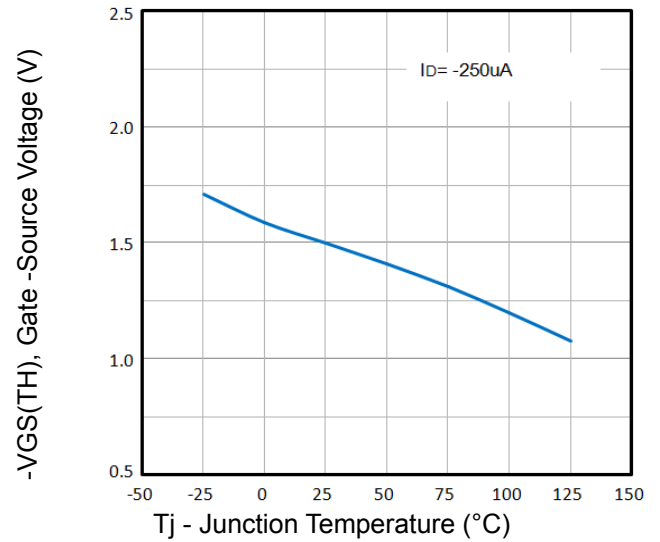
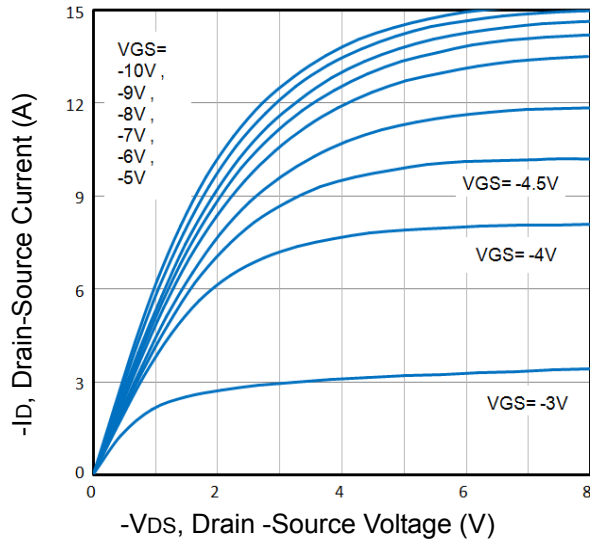
Notes:

① Pulse width limited by maximum allowable junction temperature

②Pulse test ; Pulse width≤300μs, duty cycle≤2%.

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Typical Characteristics



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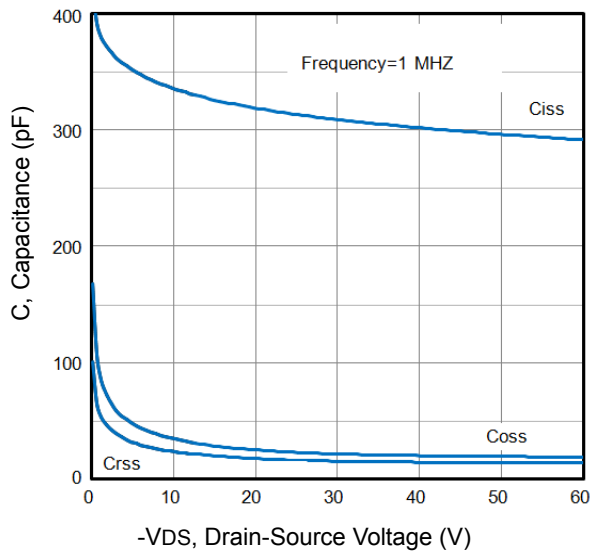


Fig7. Typical Capacitance Vs. Drain-Source Voltage

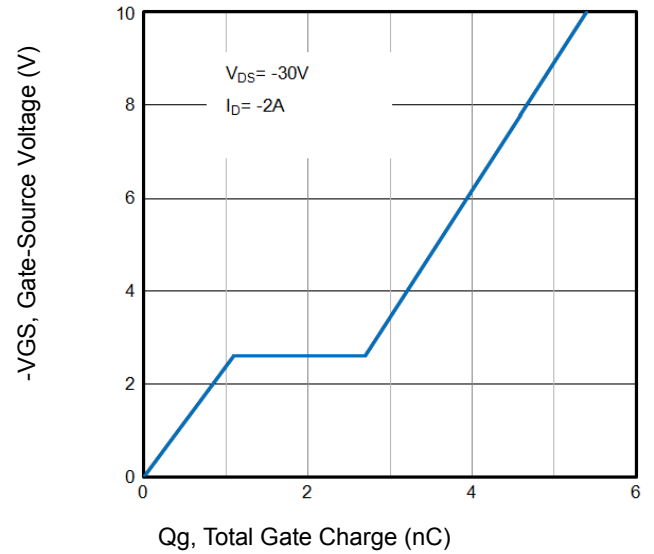


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

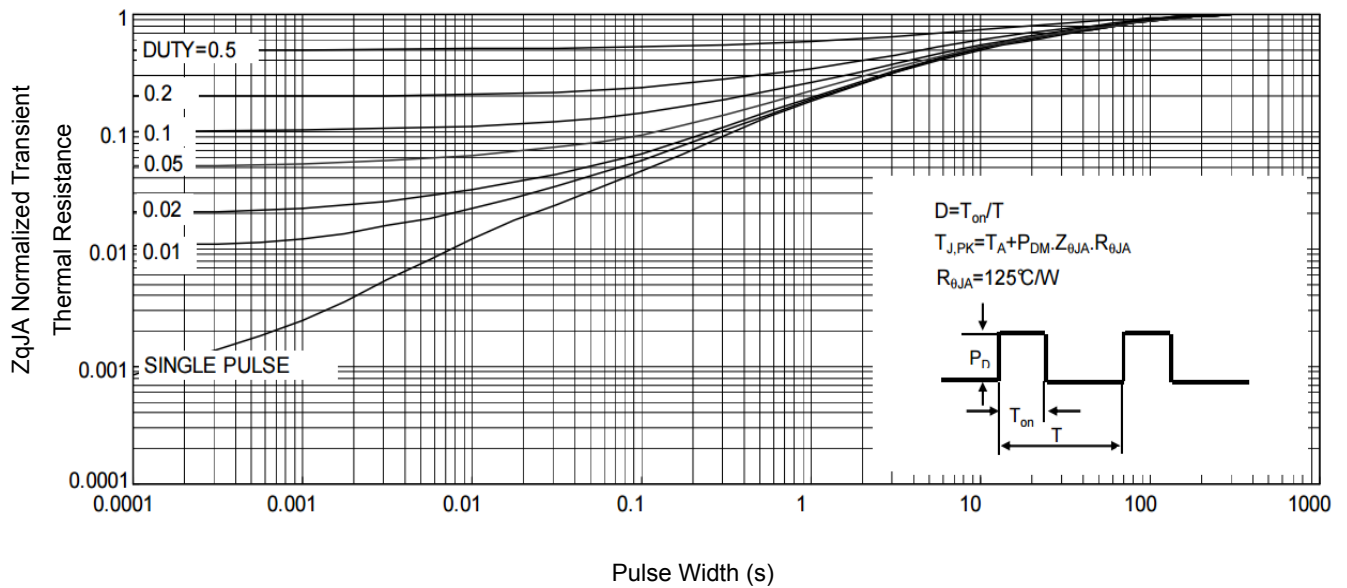


Fig9. Normalized Maximum Transient Thermal Impedance

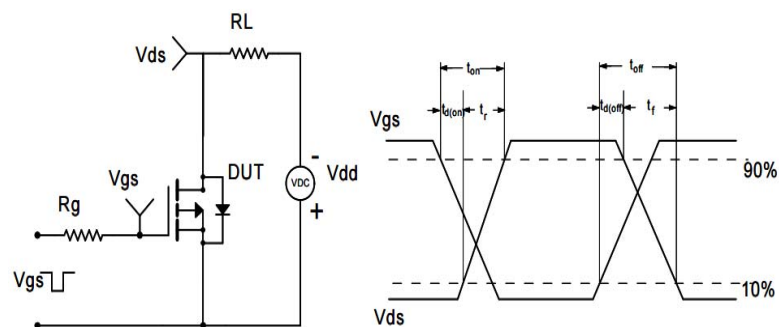
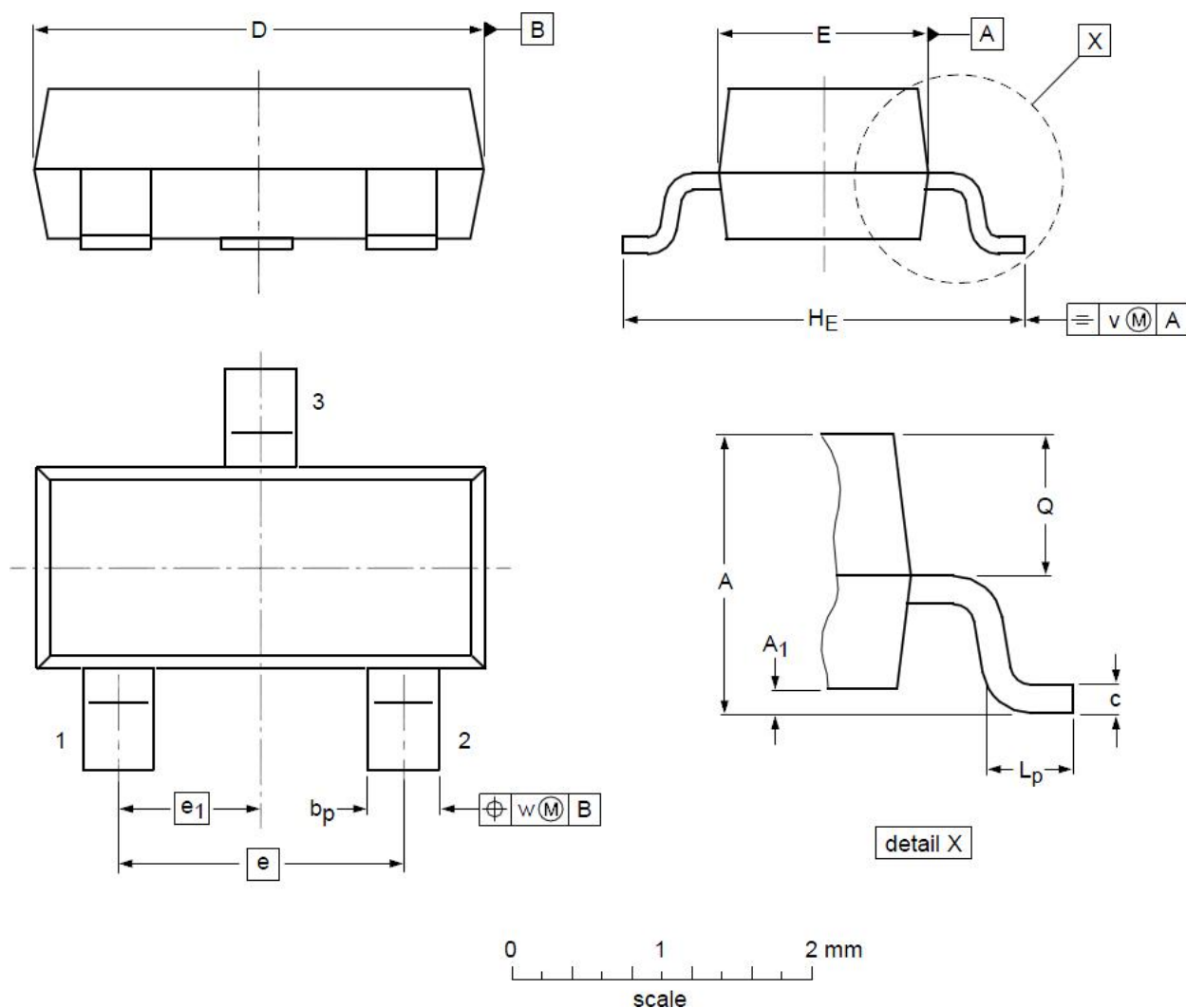


Fig10. Switching Time Test Circuit and waveforms

Package Mechanical Data-SOT-23



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.01	1.15	A ₁	0.01	0.05	0.10
b _p	0.30	0.42	0.50	c	0.08	0.13	0.15
D	2.80	2.92	3.00	E	1.20	1.33	1.40
e	--	1.90	--	e ₁	--	0.95	--
H _E	2.25	2.40	2.55	L _p	0.30	0.42	0.50
Q	0.45	0.49	0.55	v	--	0.20	--
w	--	0.10	--				