



WANSEMI
万芯半导体

WP2309

Enhancement Mode P-Channel Power MOSFET

SOT23/PMOS/-60V/ $\pm 20V$ /-2V/-2A/140m Ω

Rev1.2



P Channel Advanced Power MOSFET

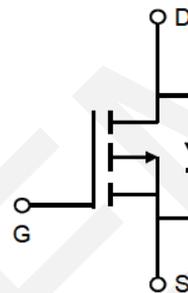
1.Features

- ◆ Fast Switching
- ◆ Improved dv/dt Capability

V_{DS}	$R_{DS(on)}$ Typ.	I_D Max.
-60V	140mΩ @ 10V	-2A

2.Applications

- ◆ Load Switch
- ◆ PWM Application
- ◆ Power management



Schematic Diagram

3.Package Marking and Ordering Information

Part no.	Marking	Package	PCS/Reel	PCS/CTN.
WP2309	N9	SOT23	3,000	180,000

4.Absolute Max Ratings at Ta=25°C (Note1)

Parameter	Symbol	Value	Units
Drain to Source Voltage	V_{DS}	-60	V
Gate to Source Voltage	V_{GS}	±20	V
Drain Current (DC)	I_D	-2	A
Drain Current (Pulse), $PW \leq 300\mu s$	I_{DP}	-8	A
Total Dissipation	P_D	1	W
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	-55 to +150	°C

Note 1: Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

5. Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Junction to ambient	$R_{\theta JA}$	125	$^{\circ}C/W$

Note 2: When mounted on 1 inch square copper board $t \leq 10$ sec The value in any given application depends on the user's specific board design.

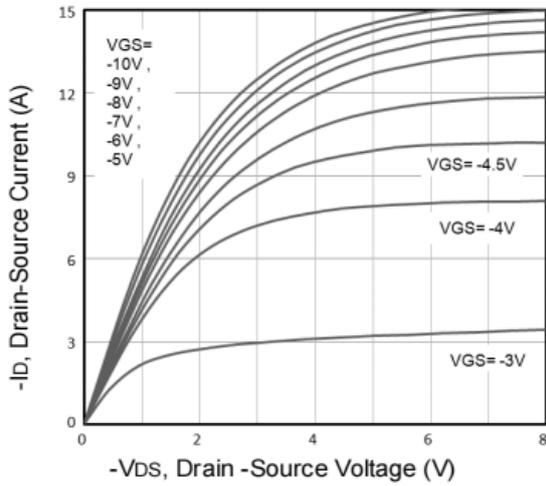
6. Electrical Characteristics at $T_a=25^{\circ}C$ (Note 3)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu A, V_{GS} = 0V$	-60	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -60V, V_{GS} = 0V$	-	-	-1	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	-1.4	-2.0	-2.6	V
Static Drain to Source On-State Resistance	$R_{DS(on)}$	$I_D = -2A, V_{GS} = -10V$	-	140	190	m Ω
Input Capacitance	C_{iss}	$V_{GS}=0V,$ $V_{DS}=-30V,$ Frequency=1.0MHz	-	310	-	pF
Output Capacitance	C_{oss}		-	22	-	pF
Reverse Transfer Capacitance	C_{rss}		-	15	-	pF
Turn-ON Delay Time	$t_{d(on)}$	$I_D = -2A,$ $V_{DS} = -30V,$ $R_{GEN} = 3.3\Omega,$ $V_{GS} = -10V,$	-	41	-	ns
Rise Time	t_r		-	22	-	ns
Turn-OFF Delay Time	$t_{d(off)}$		-	25	-	ns
Fall Time	t_f		-	32	-	ns
Total Gate Charge	Q_g	$V_{DS} = -30V,$	-	5.4	-	nC
	Q_{gs}	$V_{GS} = -10V,$	-	1.1	-	nC
	Q_{gd}	$I_D = -2A$	-	1.6	-	nC
Diode Forward Voltage	V_{FSD}	$I_{SD} = -2A, V_{GS} = 0V$	-	-0.8	-1.2	V

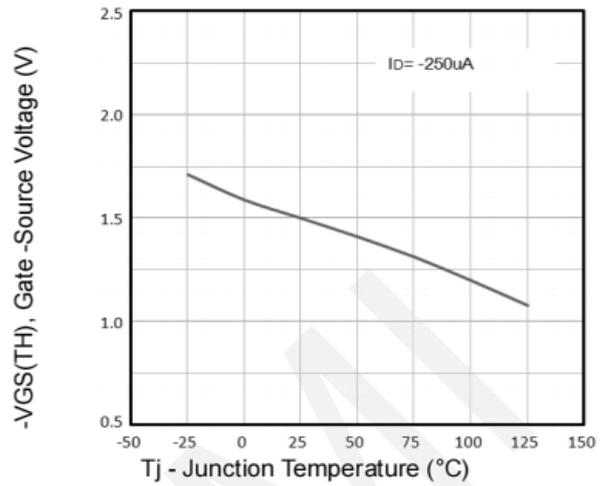
Note 3: Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



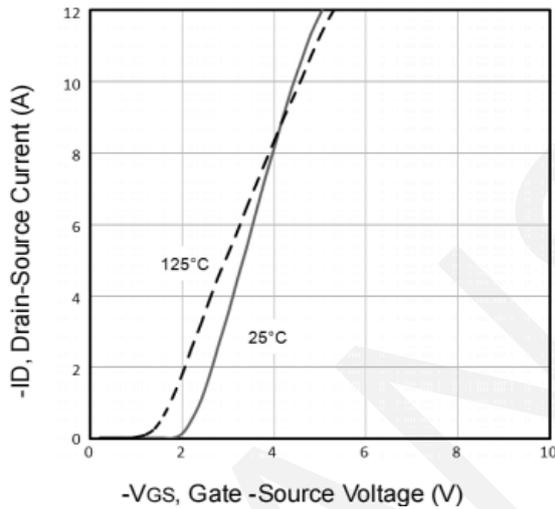
7. Typical electrical and thermal characteristics



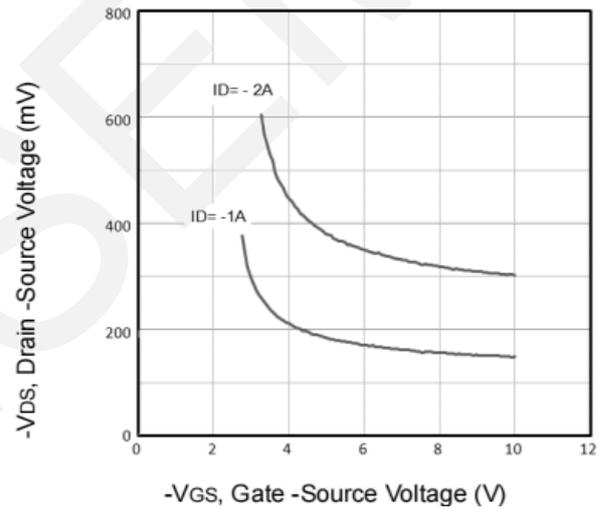
Output Characteristics



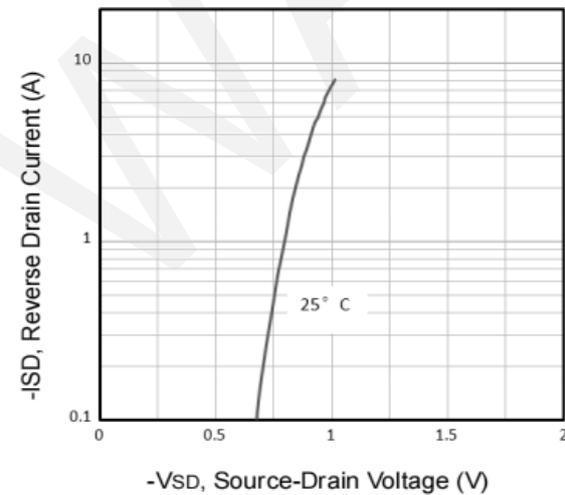
Normalized Threshold Voltage Vs. Temperature



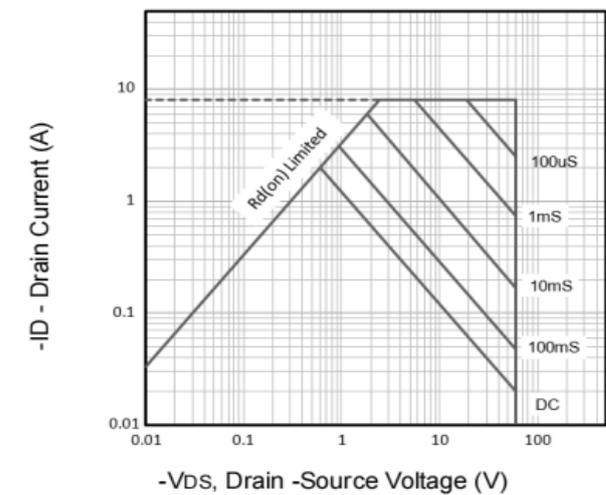
Typical Transfer Characteristics



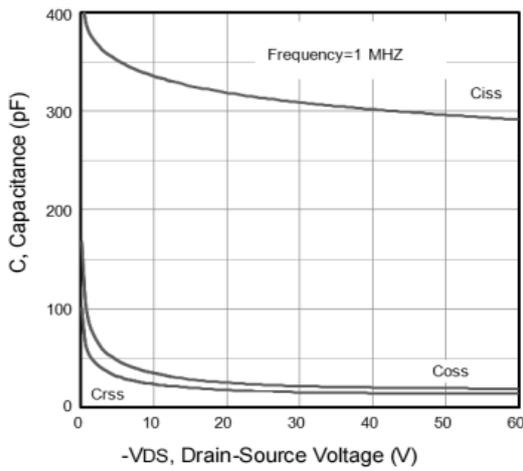
Drain-Source Voltage vs Gate-Source Voltage



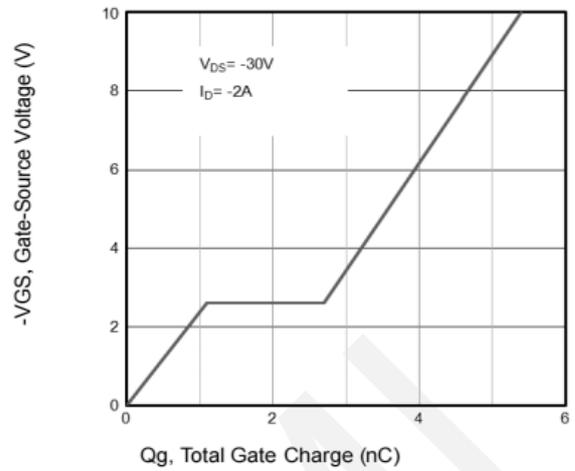
Typical Source-Drain Diode Forward Voltage



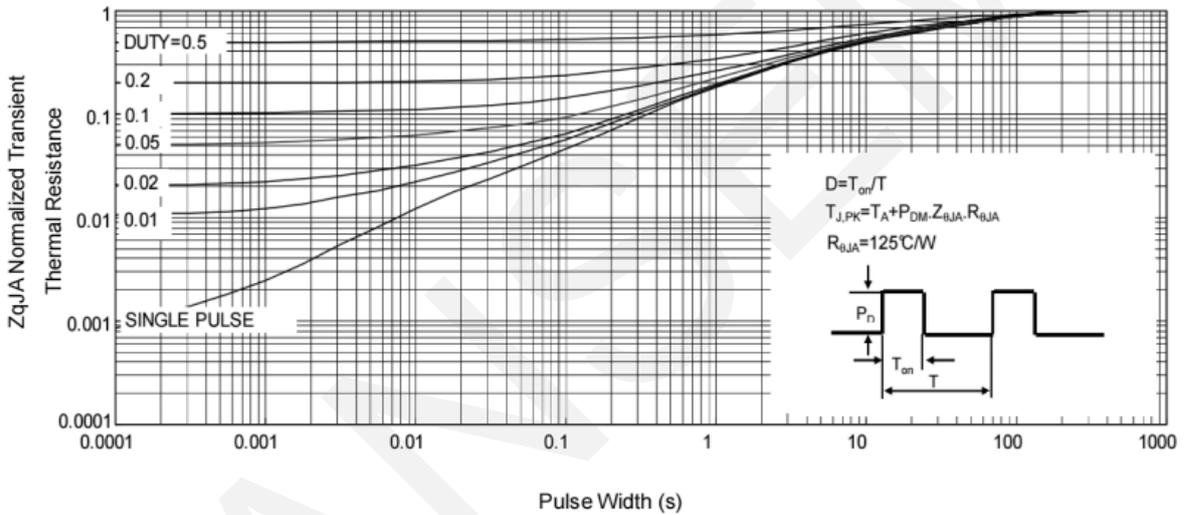
Maximum Safe Operating Area



Typical Capacitance Vs. Drain-Source Voltage



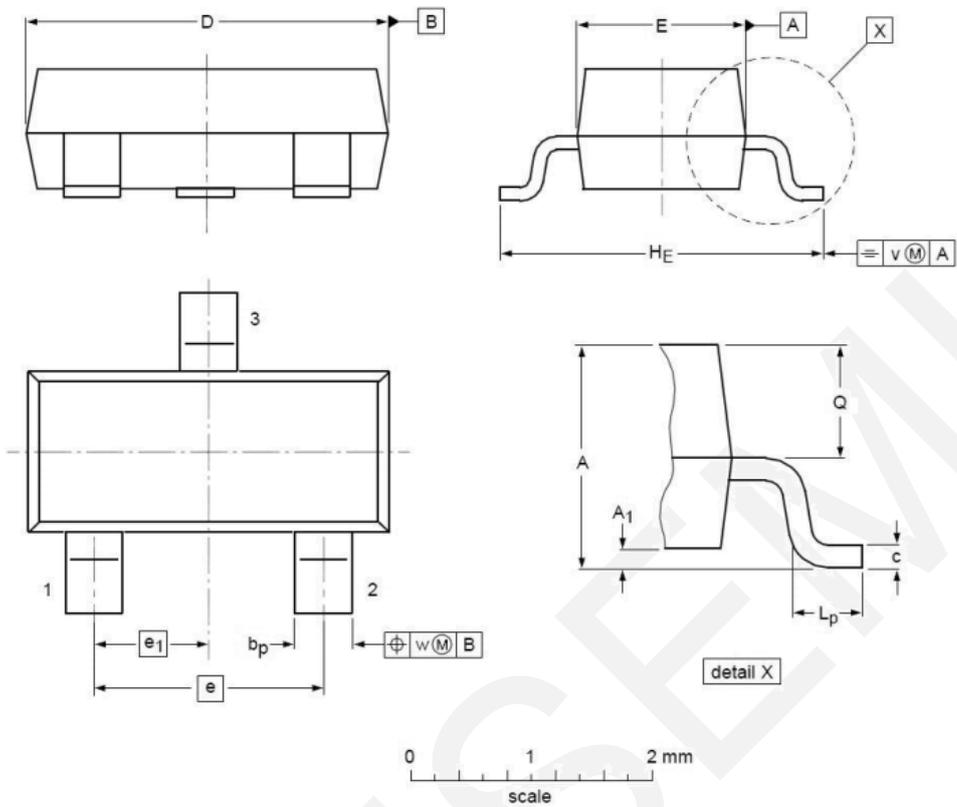
Typical Gate Charge Vs. Gate-Source Voltage



Normalized Maximum Transient Thermal Impedance



8.Package Dimensions



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	--				

9. Important Notice

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