



P-Channel Enhancement Mode Power MOSFET

Description

The MX2319 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switching application and a wide variety of other applications.

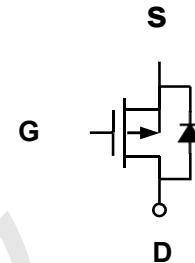
General Features

$V_{DS} \geq -18V, I_D = -7A$
 $R_{DS(ON)}(Typ.) = 17m\Omega @ V_{GS} = -4.5V$
 $R_{DS(ON)}(Typ.) = 22m\Omega @ V_{GS} = -2.5V$

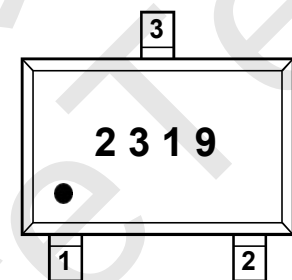
Advanced trench MOSFET process technology
Ultra low on-resistance with low gate charge

Application

- ◆ PWM applications
- ◆ Load switch



Schematic diagram



Marking and pin Assignment



SOT-23-3 (TOP VIEW)

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

parameter	symbol	limit	unit
Drain-source voltage	V_{DS}	-18	V
Gate-source voltage	V_{GS}	± 12	V
Drain current-continuous Drain Current-Pulsed (Note 1)	I_D	-7	A
	I_{DM}	-24	A
Maximum power dissipation	P_D	1.4	W
Operating junction Temperature range	T_j	-55—150	$^\circ C$



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

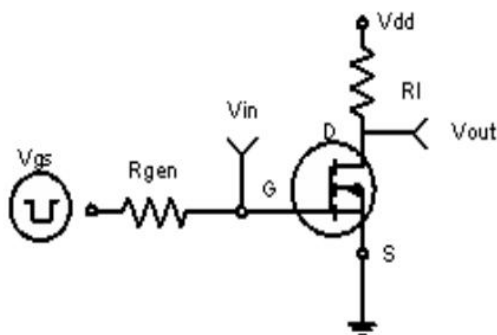
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =-250μA	-18	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-16V, V _{GS} =0V	-	-	-1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±12V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-0.4	-0.7	-1.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-4.5V, I _D =-6A	-	17	20	mΩ
		V _{GS} =-2.5V, I _D =-5A	-	22	28	
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-8A	-	33	-	S
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =-1A	-	-	-1.2	V
Diode Forward Current (Note 2)	I _S		-	-	-3.5	A
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =-6V, V _{GS} =0V, F=1.0MHz	-	1370	-	PF
Output Capacitance	C _{oss}		-	350	-	PF
Reverse Transfer Capacitance	C _{rss}		-	258	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-6V, R _L =0.75Ω V _{GS} =-4.5V, R _{GEN} =3Ω	-	11	-	nS
Turn-on Rise Time	t _r		-	25	-	nS
Turn-Off Delay Time	t _{d(off)}		-	70	-	nS
Turn-Off Fall Time	t _f		-	42	-	nS
Total Gate Charge	Q _g	V _{DS} =-6V, I _D =-8A, V _{GS} =-4.5V	-	13	-	nC
Gate-Source Charge	Q _{gs}		-	2	-	nC
Gate-Drain Charge	Q _{gd}		-	3	-	nC

Notes:

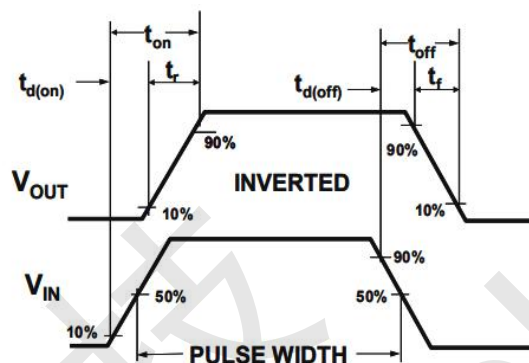
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production.



Typical Performance Characteristics



Switching Test Circuit



Switching Waveforms

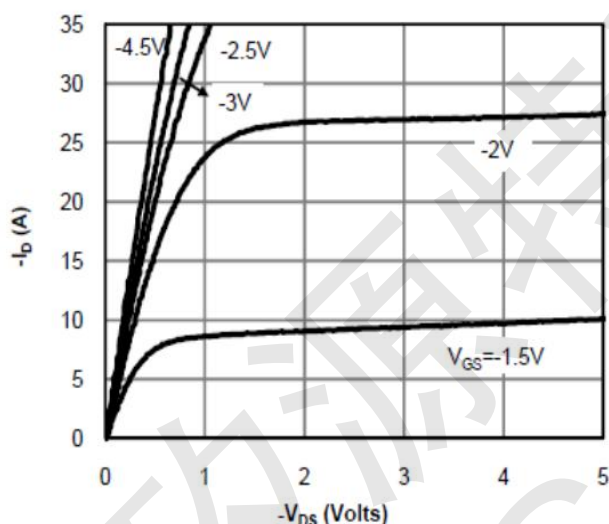


Fig 1: On-Region Characteristics (Note E)

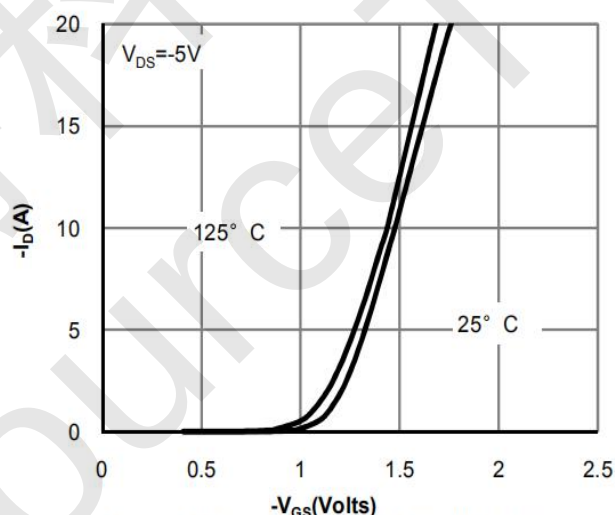


Figure 2: Transfer Characteristics (Note E)

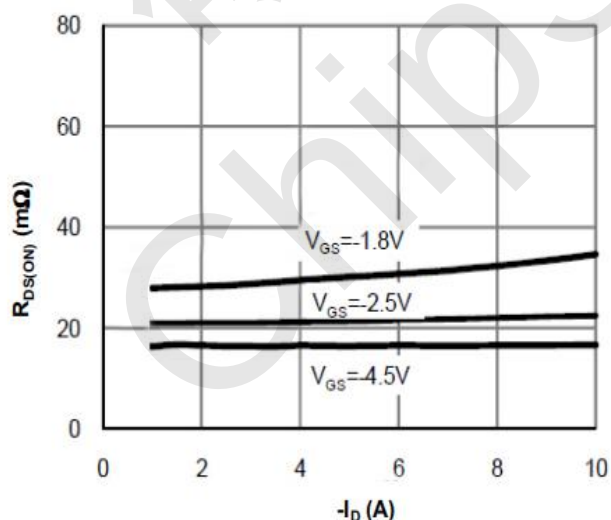


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

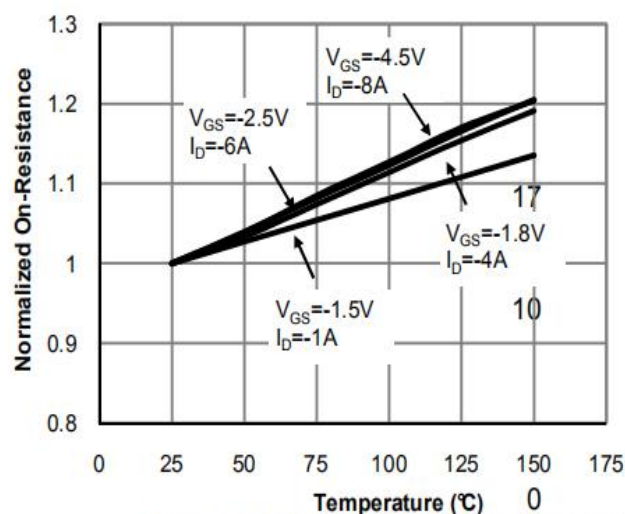


Figure 4: On-Resistance vs. Junction Temperature (Note E)

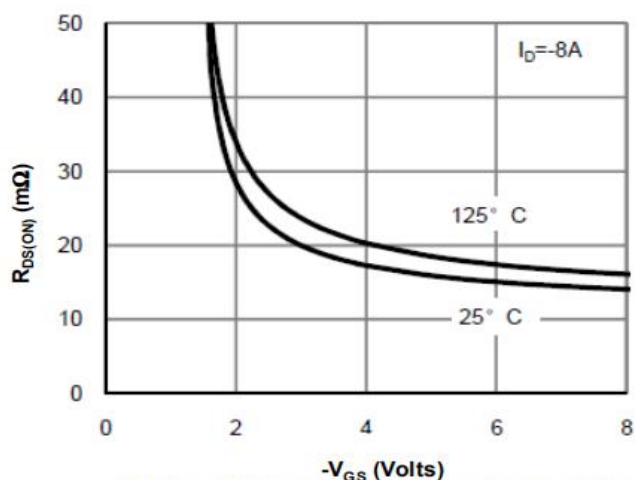


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

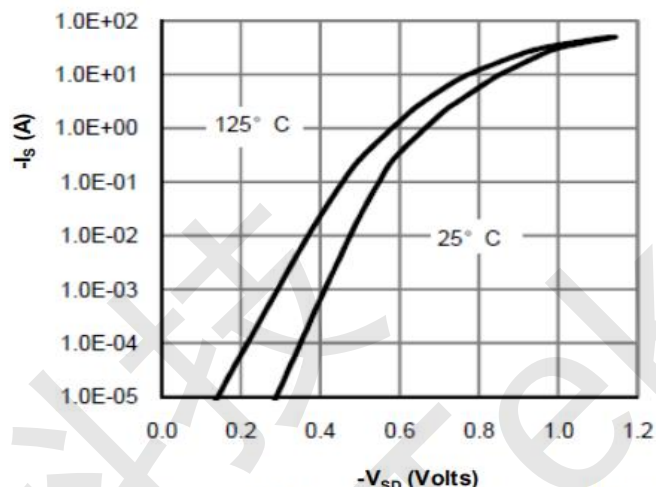


Figure 6: Body-Diode Characteristics (Note E)

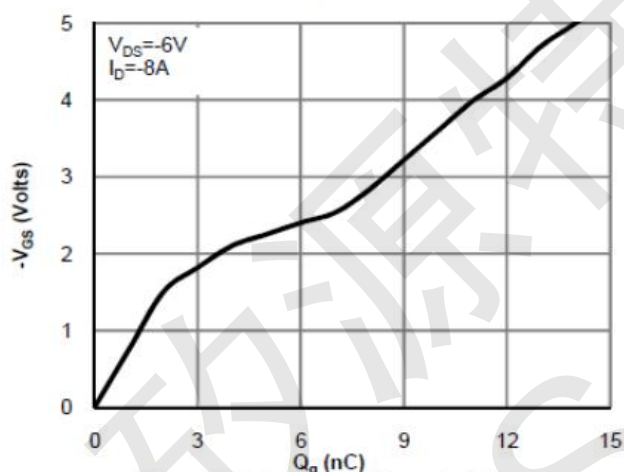


Figure 7: Gate-Charge Characteristics

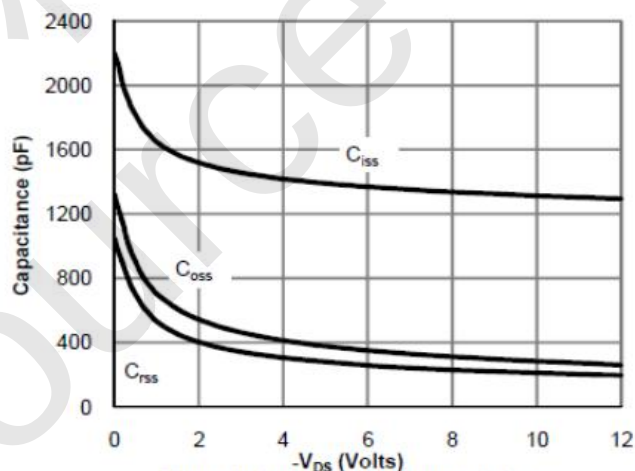


Figure 8: Capacitance Characteristics

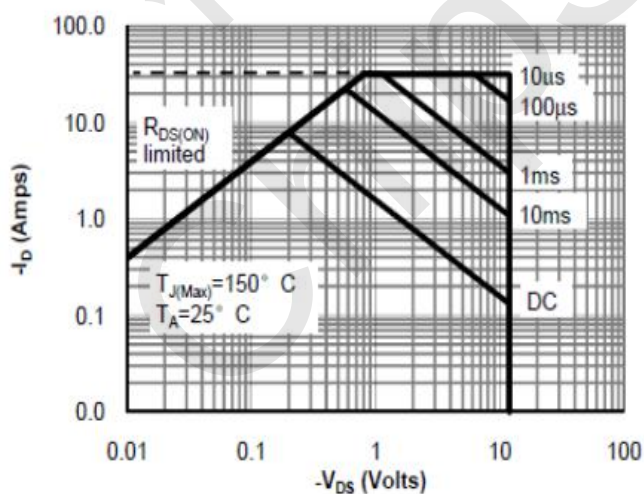


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

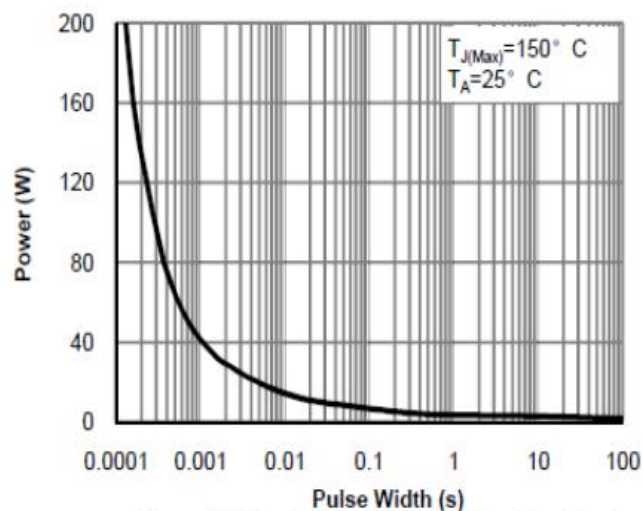
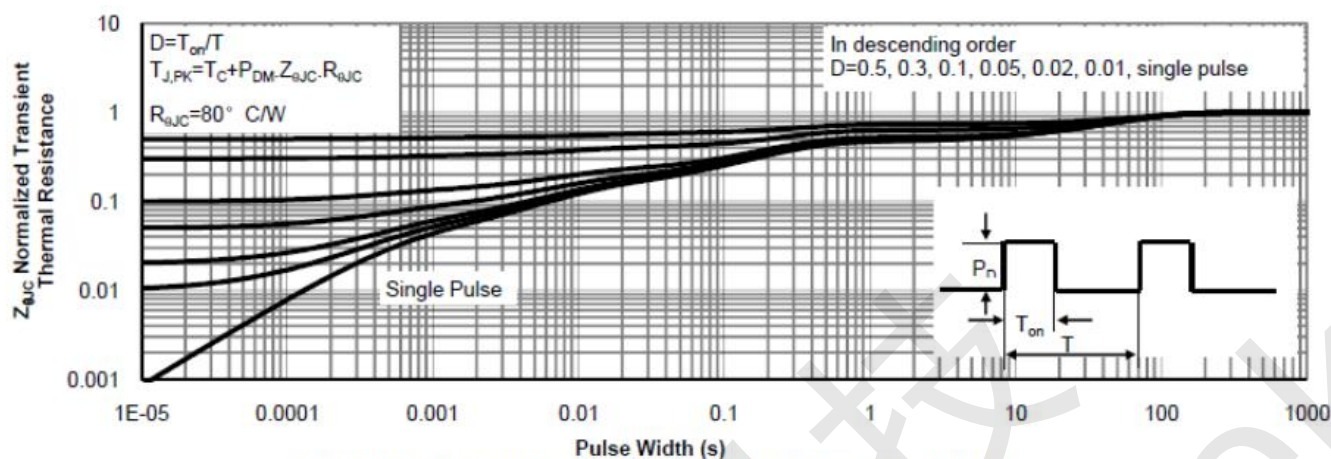
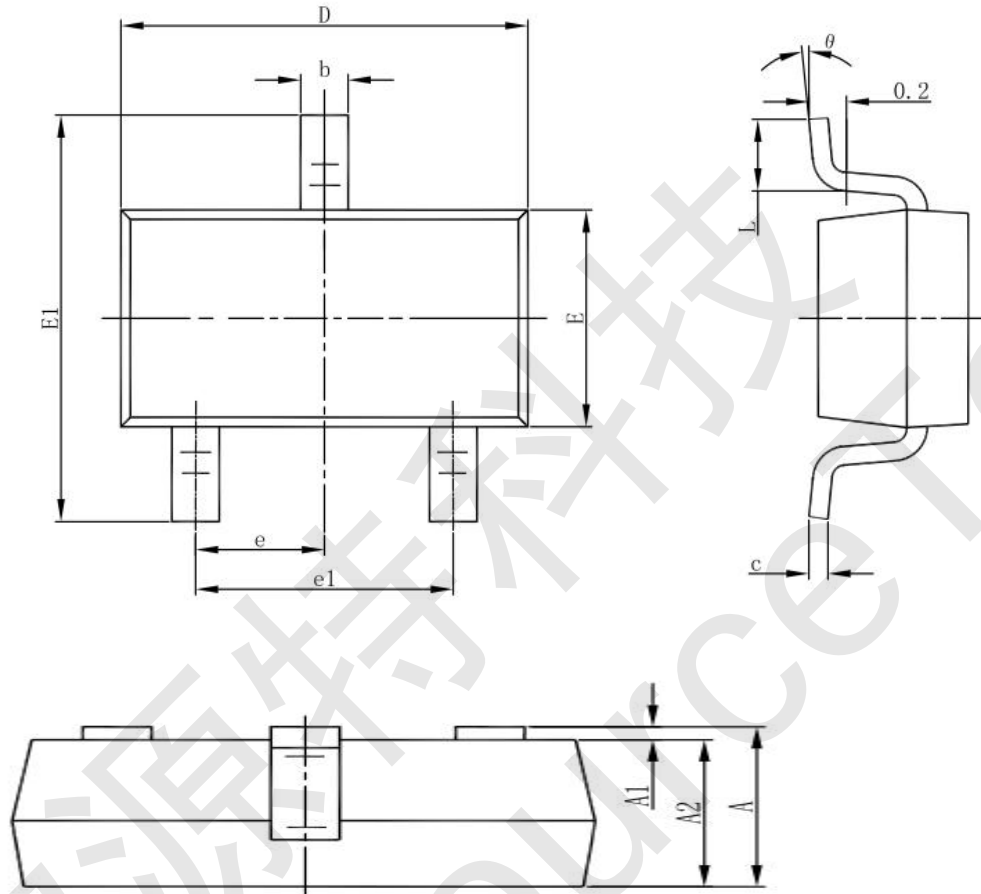


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note H)





SOT-23 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°