P-Channel 20V (D-S) MOSFET

General Description

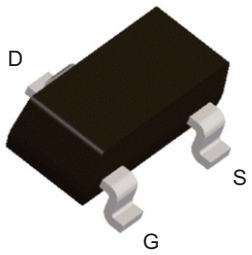
This miniature surface mount MOSFET uses advanced trench process, low $R_{DS(ON)}$ assures minimal power loss and energy conversion , which makes this device ideal for use in power management circuit.

Features

- V_{DS} (V) = -20V
- I_D(A) = -4. 4A (V_{GS} = -4. 5V)
- $R_{DS(on)}$ = 52 mΩ @ V_{GS} = -4. 5V
- $R_{DS(on)}$ = 72 mΩ@ V_{GS} =- 2.5V
- $R_{DS(on)}$ = 120 mΩ@ V_{GS} = -1. 8V
- Low gate charge
- Fast switching speed

Applications

- Load switch
- DC−DC converters
- Power management



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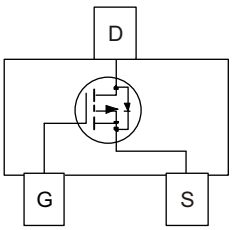


Absolute Maximum Ratings (T_A = 25℃ Unless Otherwise Noted)

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±8	
Continuous Drain Current [a]	T_A=25℃	I_D	-4. 4	A
	T_A=70℃		-3. 5	
Pulsed Drain Current [b]		I_{DM}	-17. 6	
Continuous Source Current (Diode Conduction) [a]		I_S	-1. 25	A
Power Dissipation [a]	T_A=25℃	P_D	1.4	W
	T_A=70℃		1. 0	
Operating Junction and Storage Temperature Range		T_J,T_{stg}	-55 to 150	℃

Thermal Resistance Ratings

Parameter		Symbol	Maximum	Units
Maximum Junction-to-Ambient [a]	t<= 10 sec	$R_{\theta JA}$	90	℃/W
	Steady-State		130	

Package Outlines and Ordering Information

Device	Device Marking	Reel Size	Tape Width	Quantity
MI2305	MPLS	7''	8mm	3000 units

Specifications (T_A = 25℃ Unless Otherwise Noted)

Parameter	Symbol	Test Conditions	Limits			Units
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=-250uA	-20			V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} =V_{GS},I_D = -250 uA	-0. 62	-0. 8	-1. 36	V
Gate-Body Leakage	I_{GSS}	V_{DS}=0V,V_{GS}=±8V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V,V_{GS}=0V			-1	uA
		V_{DS}=-20V,V_{GS}=0V, T_J=55℃			-10	uA
On-State Drain Current [c]	$I_{D(on)}$	V_{DS}=-5V,V_{GS}=-4. 5V	-17. 6			A
Drain-Source On-Resistance [c]	$R_{DS(on)}$	V_{GS}=-4. 5V,I_D=-4. 4A		46	52	mΩ
		V_{GS}=-2.5 V, I_D=-3. 0A		60	72	mΩ
		V_{GS}=-1.8 V, I_D=-1. 0A		90	120	mΩ
Forward Tranconductance [c]	g_{fs}	V_{DS}=-5V,I_D=-4. 4A		13		S
Diode Forward Voltage	V_{SD}	I_S=-1. 0A,V_{GS}=0V		-0. 7	-1. 2	V
Dynamic						
Input Capacitance	C_{iss}	V_{DS}=-4V,V_{GS}=0V f=1MHz		1240		pF
Output Capacitance	C_{oss}			370		pF
Reverse Transfer Capacitance	C_{rss}			210		pF
Total Gate Charge	Q_g	V_{DS}=-4V,V_{GS}=-4.5V I_D =-4. 4 A		10	15	nC
Gate-Source Charge	Q_{gs}			2		nC
Gate-Drain Charge	Q_{gd}			3. 5		nC
Switching						
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=-4V, I_D=-1.0A, R_G=6 ohm, V_{GEN}=-4. 5V		14		ns
Rise Time	t_r			20		ns
Turn-Off Delay Time	$t_{d(off)}$			88		ns
Fall-Time	t_f			54		ns

Notes : a. Surface Mounted on 1" x 1" FR4 Board.
b. Pulse width limited by maximum junction temperature
c. Pulse test: PW <= 300us duty cycle <= 2%.

Typical Electrical and Thermal Characteristics

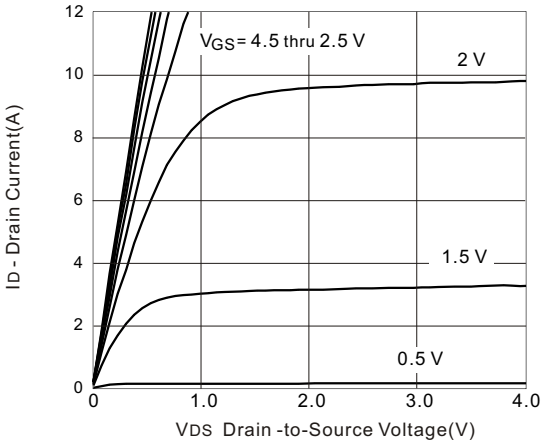


Figure1: Output Characteristics

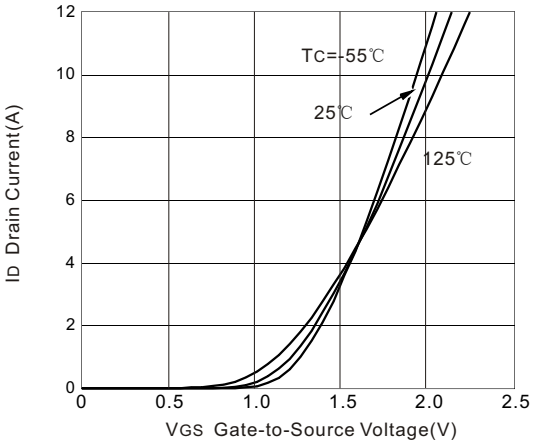


Figure2: Transfer Characteristics

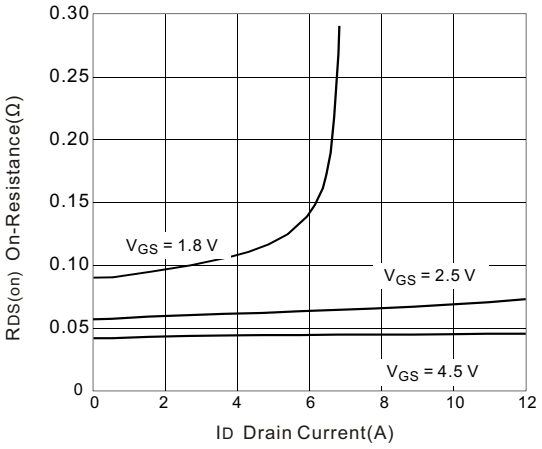


Figure3: On-Resistance vs. Drain Current

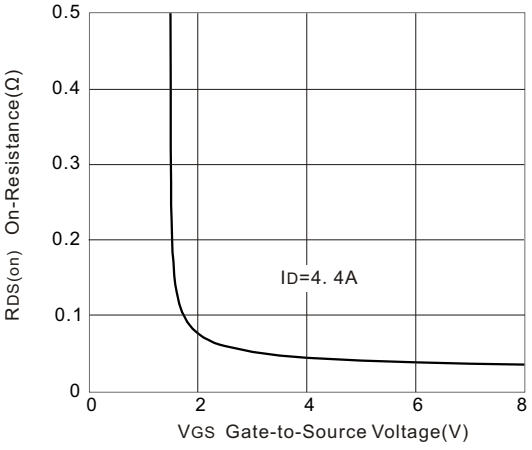


Figure4: On-Resistance vs.Gate-to-Source Voltage

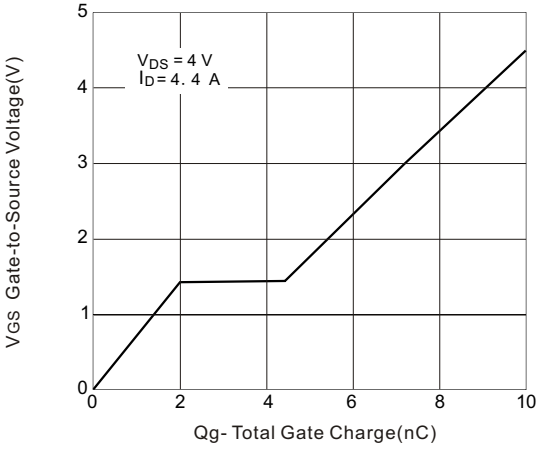


Figure5: Gate Charge

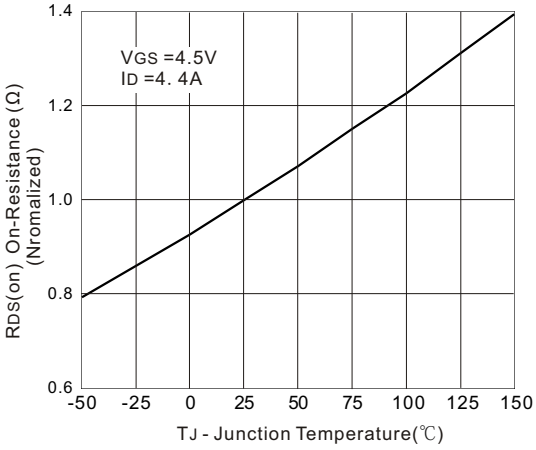


Figure6: On -Resistance vs.Junction Temperature

Typical Electrical and Thermal Characteristics

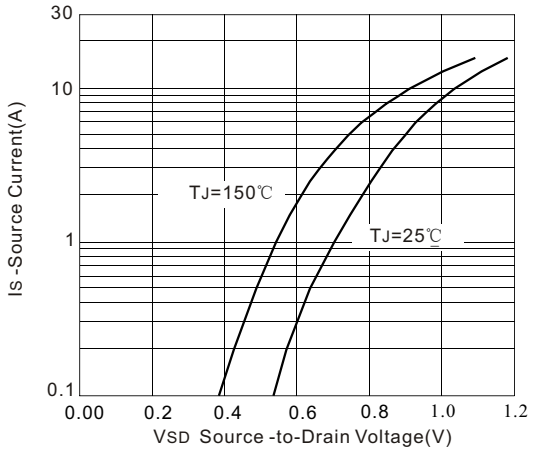


Figure 7: Source-Drain Forward Voltage

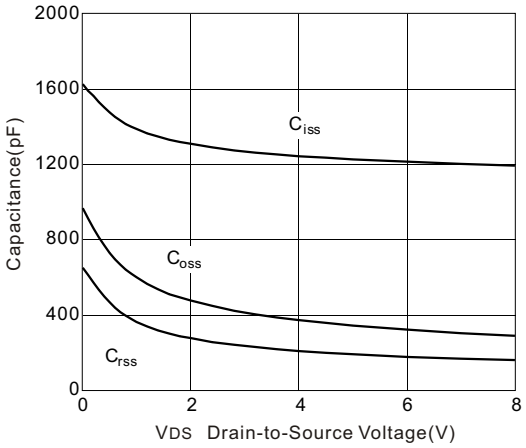


Figure8: Capacitance

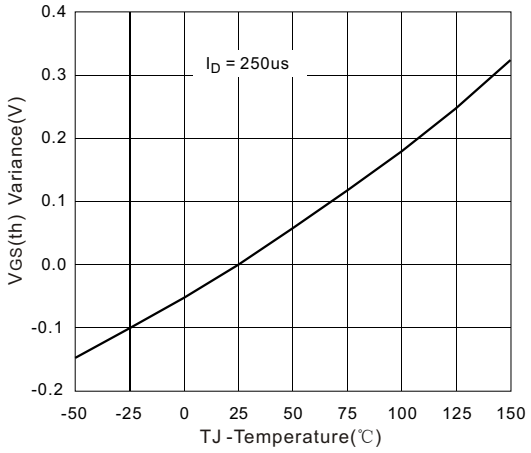


Figure9: Threshold Voltage

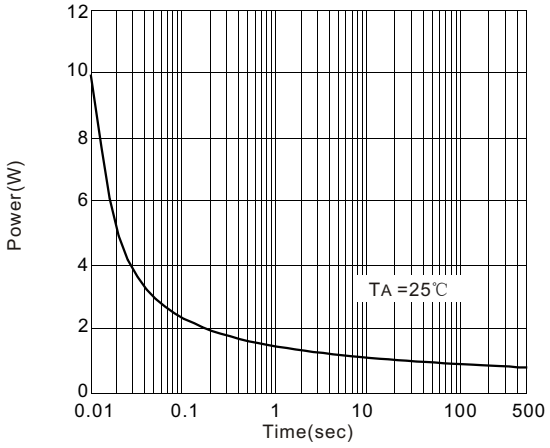


Figure10 :Single Pulse Power

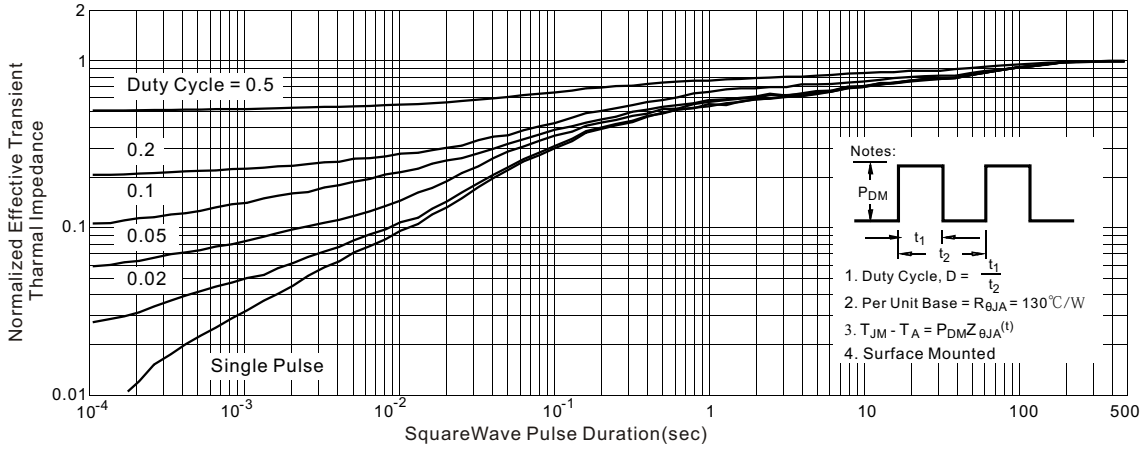
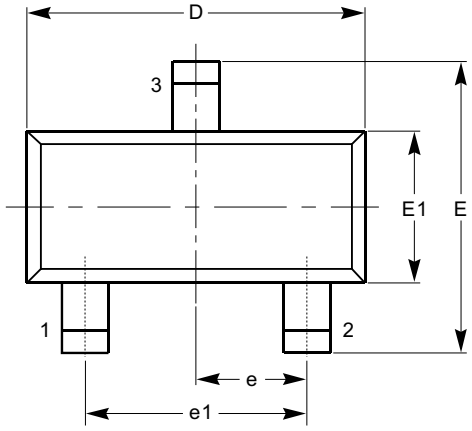


Figure11 :Normalized Thermal Transient Impedance,Junction-to-Ambient

Package Outline

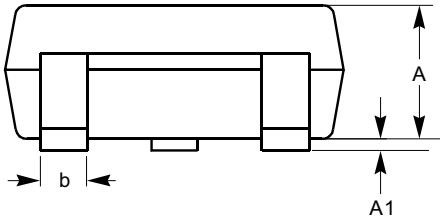
SOT23_3Lead



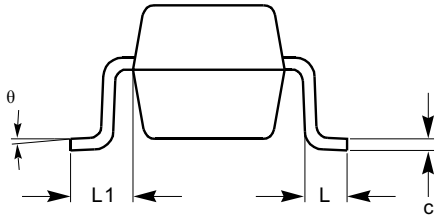
TOP VIEW

Unit: mm

Symbol	Min	Nom	Max
A	0.70	1.00	1.15
A1	0.00	---	0.13
b	0.30	0.40	0.50
c	0.08	0.13	0.20
D	2.80	2.90	3.10
E	2.60	2.80	3.00
E1	1.40	1.60	1.80
e	0.95 BSC		
e1	1.90 BSC		
L	0.40 REF		
L1	0.54 REF		
θ	0°	5°	8°



SIDE VIEW



END VIEW

Notes:

(1) All dimensions are in millimeters.Angles in degrees.
(2) Package body sizes exclude mold flash and gate burrs.
(3) Complies with JEDEC TO-236.

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