P-Channel 20V (D-S) MOSFET

General Description

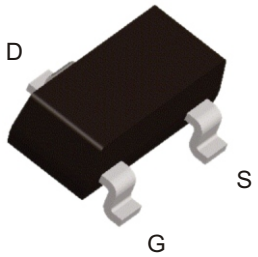
This miniature surface monut MOSFET uses advanced trench process, low $R_{DS(on)}$ assures minimal power loss and energy conversion, which makes this device ideal for use in power management circuit.

Applications

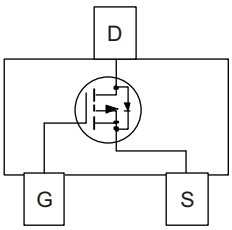
- Load switch
- DC−DC converters
- Power management

Features

- V_{DS} (V) = -20V
- I_D(A) = -3.3A （V_{GS} = -4. 5V）
- $R_{DS(on)}$ = 85 mΩ @ V_{GS} = -4.5V
- $R_{DS(on)}$ = 95 mΩ @ V_{GS} = -2.5V
- $R_{DS(on)}$ =120 mΩ @ V_{GS} = -1.8V
- Low gate charge
- Fast switching speed



SOT23



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	-3.3	A
	T_A=70℃		-2.6	
Pulsed Drain Current [b]		I_{DM}	-13	
Continuous Source Current (Diode Conduction) [a]		I_S	-1. 0	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	

Ordering Information

Device	Device Marking	Reel Size	Tape Width	Quantity
MI2303	MPAS	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. 45	-0. 61	-0. 9	V
Gate-Body Leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±12V			±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	-13			A
Drain-Source On-Resistance [c]	$R_{DS(on)}$	V_{GS}=-4. 5V, I_D=-4.4A		35	50	mΩ
		V_{GS}=-2.5 V, I_D=-2.0A		45	65	mΩ
		V_{GS}=-1.8 V, I_D=-1.0A		60	75	mΩ
Forward Tranconductance [c]	g_{fs}	V_{DS}=-5V, I_D=-2. 8A		16		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}=-10V, V_{GS}=0V f=1MHz		1020		pF
Output Capacitance	C_{oss}			191		pF
Reverse Transfer Capacitance	C_{rss}			140		pF
Switching						
Total Gate Charge	Q_g	V_{GS}=-4.5V, V_{DS}=-10V, I_D=-3.3A		12	19	nC
Gate Sourse Charge	Q_{gs}			1. 7		nC
Gate Drain Charge	Q_{gd}			3. 2		nC
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=-10V, R_G=6ohm, V_{GEN}=-4.5V R_L=10ohm		25	40	ns
Rise Time	t_r			42	63	ns
Turn-Off Delay Time	$t_{d(off)}$			70	110	ns
Fall-Time	t_f			47	74	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

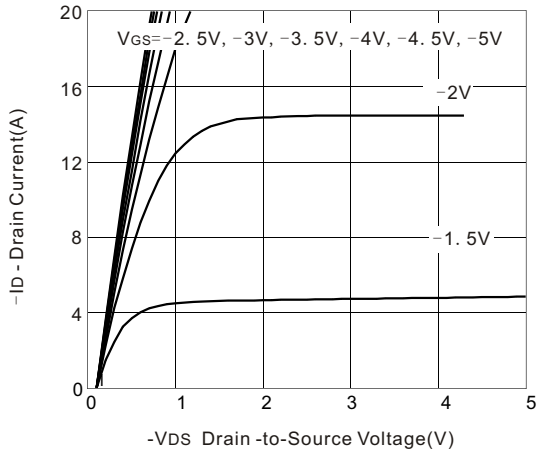


Figure 1. On-Region Characteristics

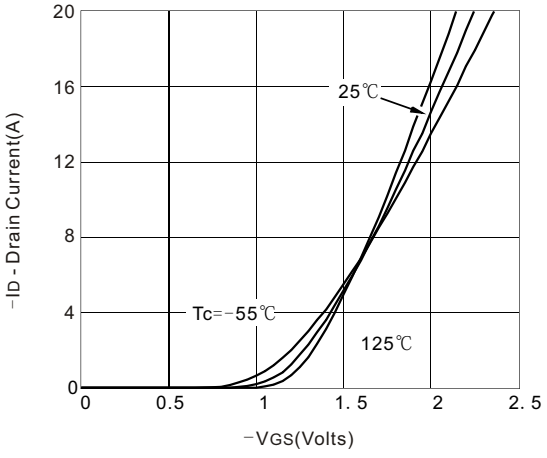


Figure 2. Transfer Characteristics

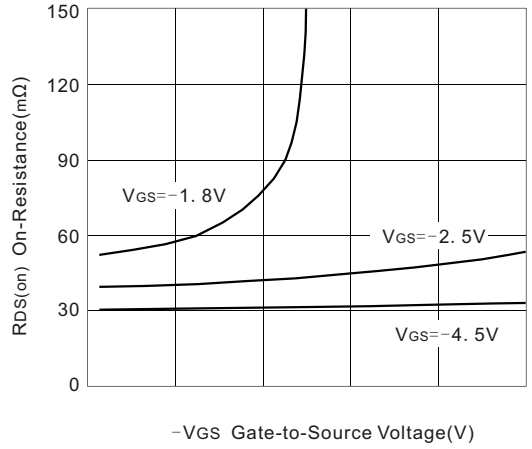


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

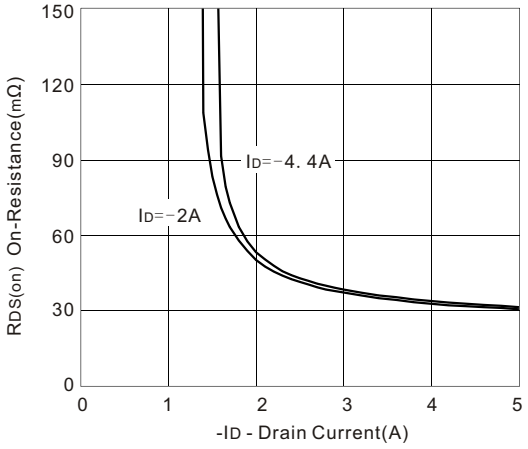


Figure 4. On Resistance vs. Gate-to-Source Voltage

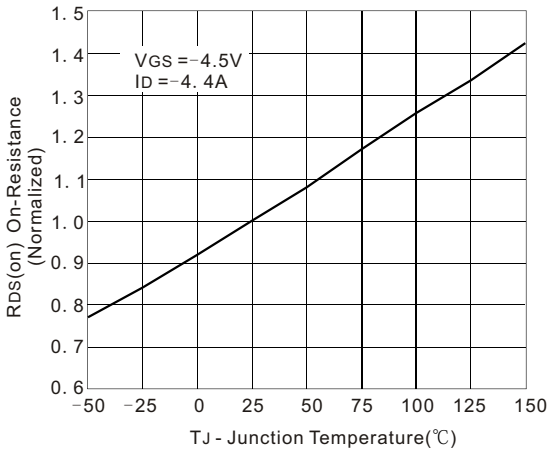


Figure 5. On-Resistance Variation with Temperature

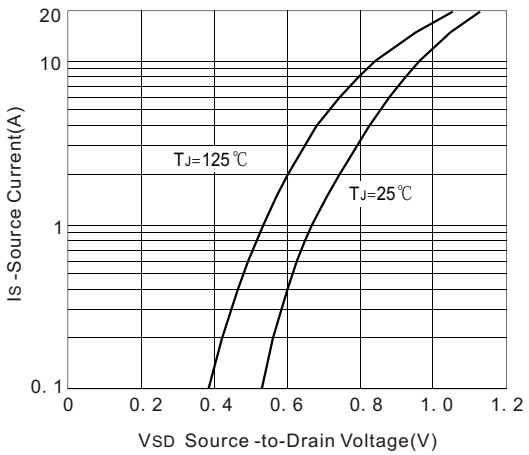


Figure 6: Source-Drain Forward Voltage

Typical Electrical and Thermal Characteristics

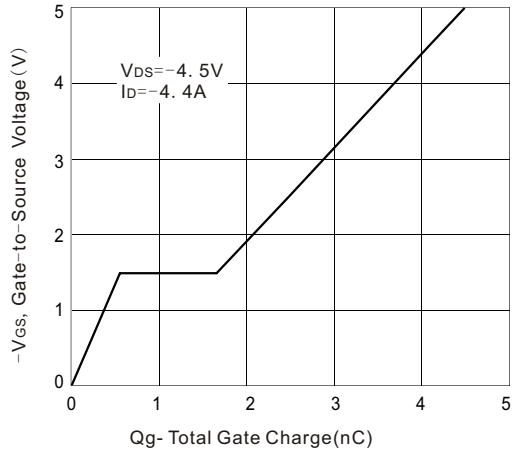


Figure 7. Gate Charge

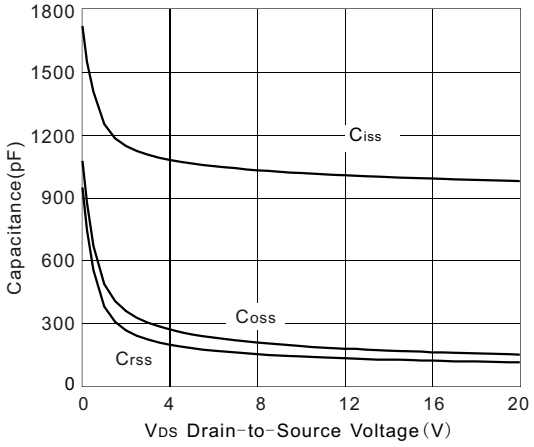


Figure 8:Capacitance

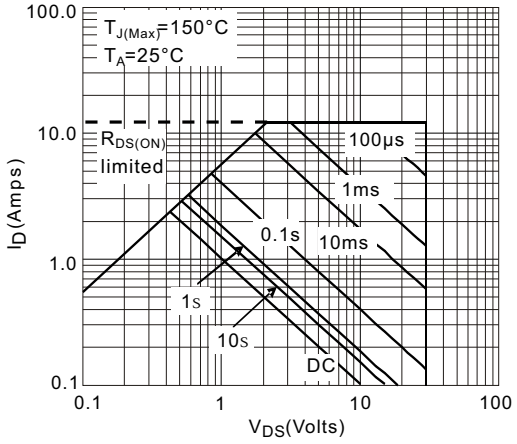


Figure 9: Maximum Forward Biased Safe Operating Area (Note d)

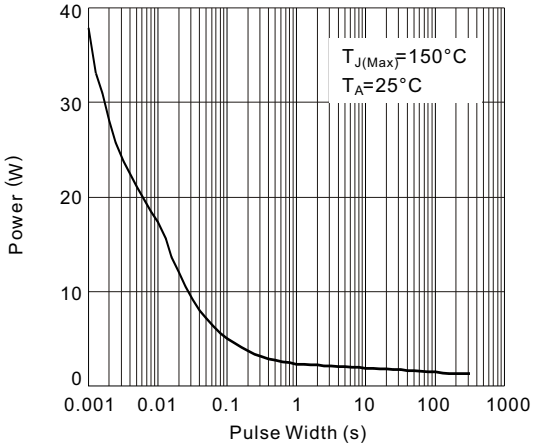


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note d)

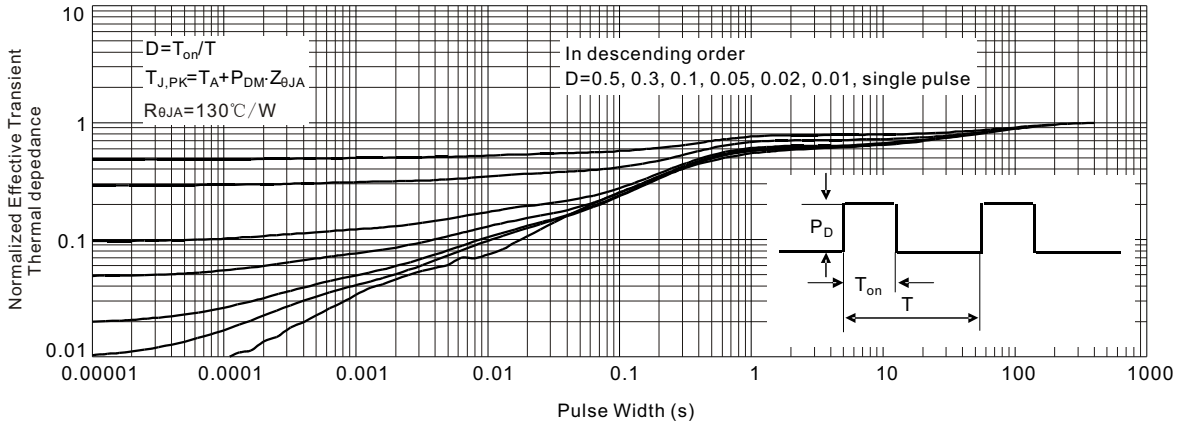
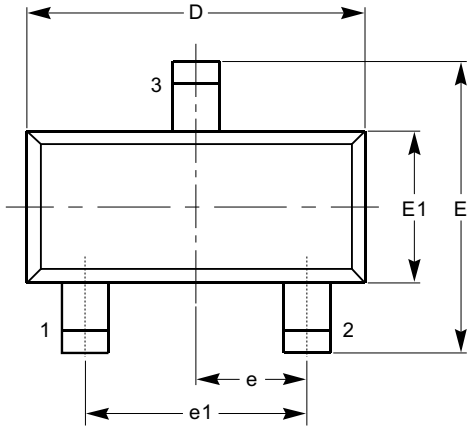


Figure 11: Normalized Maximum Transient Thermal Impedance

Note d: These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

Package Outline

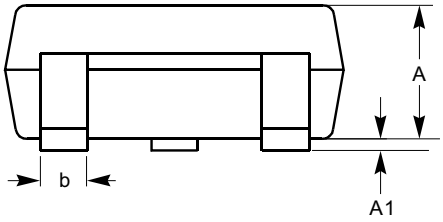
SOT23_3Lead



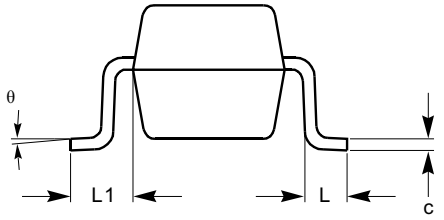
TOP VIEW

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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