

Descriptions

This -20V -4A P-Channel MOSFET in a SOT23-3 Plastic Package.

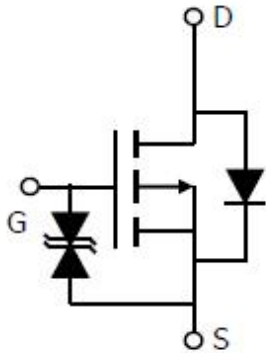
Features

- $R_{DS(ON)} < 41\text{ m}\Omega, V_{GS} = -4.5\text{V}$
- $R_{DS(ON)} < 53\text{ m}\Omega, V_{GS} = -2.5\text{V}$
- Halogen-free Product.

Applications

Load switch, Battery protection.

Equivalent Circuit



Pinning



PIN1: Gate

PIN 2: Source

PIN 3: Drain

Marking

Marking	AFH
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Absolute Maximum Ratings(Ta=25°C)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 8	V
Drain Current-Continuous @ $T_C = 25^\circ\text{C}$	I_D	-4	A
Drain Current-Pulsed Note1 @ $T_C = 25^\circ\text{C}$	I_{DM}	-30	A
Maximum Power Dissipation	P_D	1.5	W
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to +150	$^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient Note2	$R_{\theta JA}$	100	$^\circ\text{C/W}$

Electrical Characteristics(Ta=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	B_{VDSS}	$V_{GS}=0V$ $I_{DS}=-250\mu A$	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-20V$ $V_{GS}=0V$			-1	μA
Gate-Body Leakage	I_{GSS}	$V_{GS}=\pm 8V$ $V_{DS}=0V$			± 10	μA
Gate Threshold Voltage	V_{TH}	$V_{DS}=V_{GS}$ $I_{DS}=-250\mu A$	-0.3	-0.6	-0.9	V
Drain-Source On-State Resistance	R_{DS}	$V_{GS}=-4.5V$ $I_{DS}=-4A$		35	41	$m\Omega$
		$V_{GS}=-2.5V$ $I_{DS}=-4A$		45	53	
Input Capacitance	C_{iss}	$V_{DS}=-10V$ $V_{GS}=0V$ $f=1MHz$		750		pF
Output Capacitance	C_{oss}			110		
Reverse Transfer Capacitance	C_{rss}			80		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=-10V$ $V_{GS}=-4.5V$ $R_G=3$ $R_L=2.5$		15.6		ns
Rise Time	t_r			11.2		
Turn-Off Delay Time	$t_{d(off)}$			23.1		
Fall Time	t_f			32.7		
Total Gate Charge at 10V	Q_g	$V_{DS}=-10V$ $I_{DS}=-4A$ $V_{GS}=-4.5V$		10		nC
Gate to Source Gate Charge	Q_{gs}			1.5		
Gate to Drain "Miller" Charge	Q_{gd}			2.2		
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V$ $I_{DS}=-1A$		-0.7		V

Notes:

1. Pulse Test: Pulse Width 300 μs , Duty Cycle 2%.
2. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design. $R_{\theta JA}$ shown below for single device operation on FR-4 in still air.

Electrical Characteristic Curve

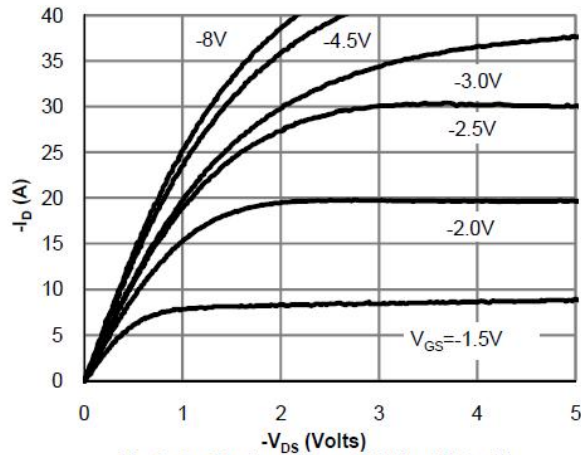


Fig 1: On-Region Characteristics (Note E)

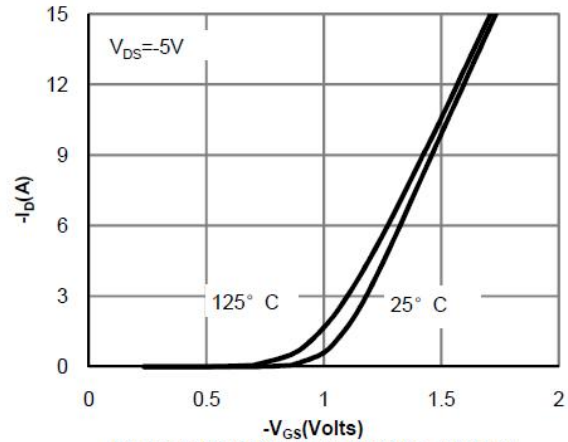


Figure 2: Transfer Characteristics (Note E)

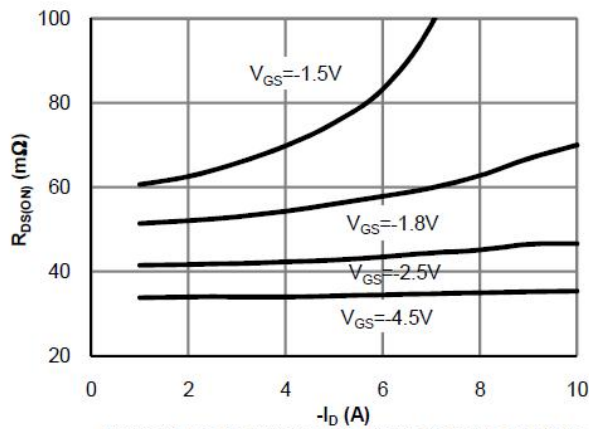


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

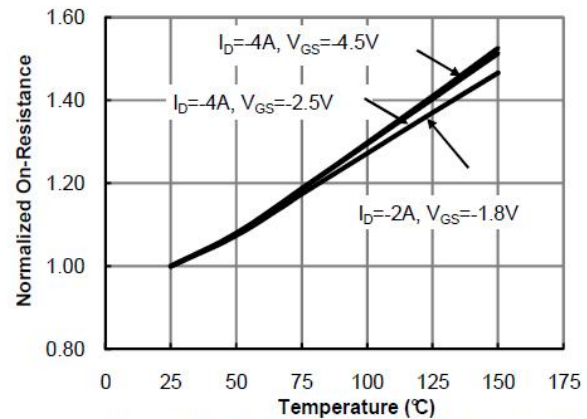


Figure 4: On-Resistance vs. Junction Temperature (Note E)

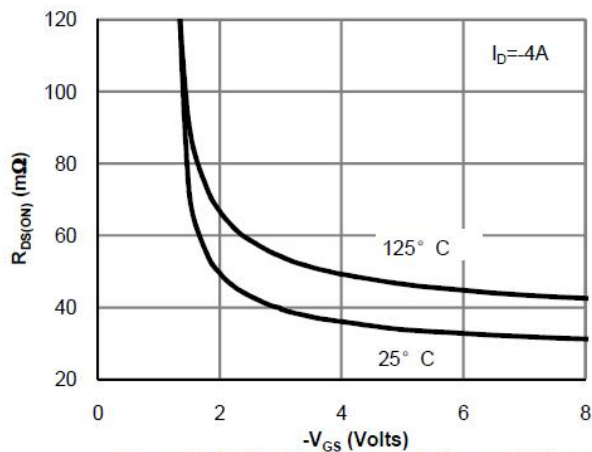


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

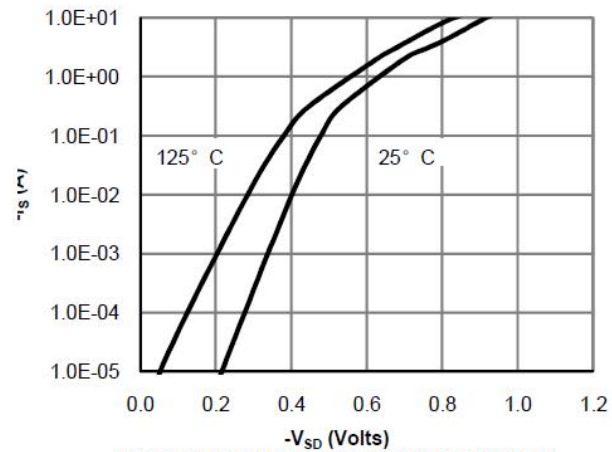
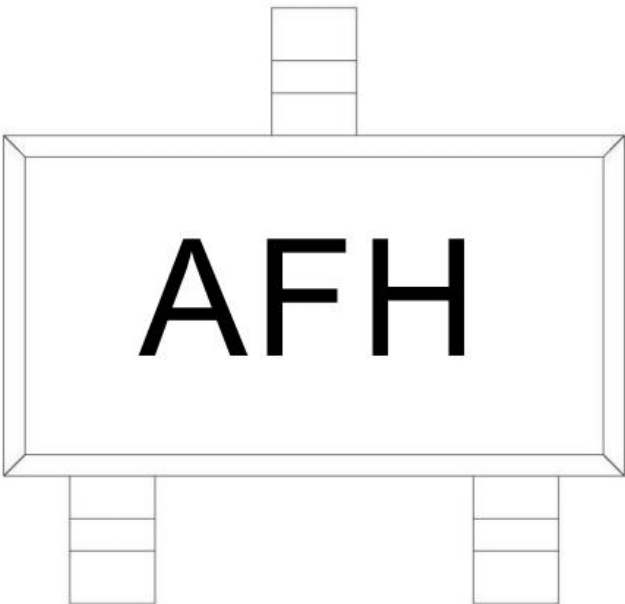


Figure 6: Body-Diode Characteristics (Note E)

Marking Instructions



Note:
AF: Product Type
H: Company Code

Packaging SPEC

REEL INFORMATION

Package Type	Units					Dimension (unit: mm ³)		
	Units/Reel	Reels/Inner Box	Units/Inner Box	Inner Boxes/Outer Box	Units/Outer Box	Reel	Inner Box	Outer Box
SOT23-3	3,000	10	30,000	4	120,000	7" ×8	210×205×205	445×230×435

Package Outline Dimensions

