

P-Channel 20-V (D-S) MOSFET– ESD Protected
FEATURES

- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance
- ESD Protected 2KV HBM

Application

- Portable Devices
- Consumer Electronics

Mechanical

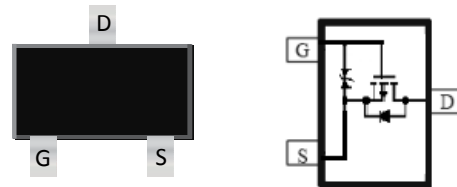
- Case: SOT-23 Package

Packing Information

Package	Packing
SOT-23	3Kpcs / 7" Reel

PRODUCTY SUMMARY

V_{DS}	$R_{DS(on)}$ m(Ω)		I_D (A)
-20	50	@ $V_{GS} = -4.5V$	-3.3
	58	@ $V_{GS} = -2.5V$	-3.0
	88	@ $V_{GS} = -1.8V$	-1.5

SOT-23

Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Drain Current ¹⁾	I_D	-3.3	A
Maximum Power Dissipation	P_D	0.5	W
Pulsed Drain Current ²⁾	I_{DM}	-13.2	A
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Typical Thermal Resistance

Parameter	Symbol	Limit	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	100	$^\circ\text{C/W}$

Note:

$R_{\theta JA}$ 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 mounted on a 1 inch FR-4 with 2oz. square pad of copper

Electrical Characteristics (T _A = 25°C UNLESS OTHERWISE NOTED)						
Characteristics	Symbol	Test Condition	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	B _{VDSS}	V _{GS} = 0V, I _D = -250uA	-20			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250uA	-0.3	-0.6	-1.0	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =-4.5V, I _D =-3.3A	-	42	50	mΩ
		V _{GS} =-2.5V, I _D =-3.0A	-	49	58	mΩ
		V _{GS} =-1.8V, I _D =-1.5A	-	-	88	mΩ
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-20V, V _{GS} =0V		-0.01	-1.0	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±8V, V _{DS} =0V		±6	±10	uA
Dynamic ³⁾						
Total Gate Charge	Q _g	V _{DS} =-10V, I _D =-4.3A, V _{GS} =-4.5V (Note 1,2)	-	24	-	nC
Gate-Source Charge	Q _{gs}		-	1.5	-	nC
Gate-Drain Charge	Q _{gd}		-	2.5	-	nC
Input Capacitance	C _{iss}	V _{DS} =-10V, V _{GS} =0V, f=1.0MHZ	-	907	-	pF
Output Capacitance	C _{oss}		-	90	-	pF
Reverse Transfer Capacitance	C _{rss}		-	70	-	pF
Switching						
Turn-On Delay Time	t _{d(on)}	V _{DD} =-10V, I _D =-4.3A, V _{GS} =-4.5V, RG=6Ω (Note 1,2)	-	45	-	ns
Turn-On Rise Time	t _r		-	79	-	ns
Turn-Off Delay Time	t _{d(off)}		-	193	-	ns
Turn-Off Fall Time	t _f		-	826	-	ns
Drain-Source Diode						
Maximum Continuous Drain-Source	I _S	-	-	-	-1.5	A
Diode Forward Voltage	V _{SD}	I _S =-1.0A, V _{GS} =0V	-	-	-1.2	V

Note:

1. Pulse width<300us, Duty cycle<2%
2. Fused current that based on wire numbers and diameter
3. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTIC CURVES

Fig.1 On-Region Characteristics

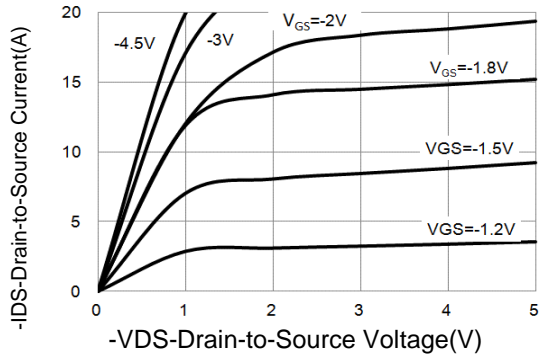


Fig.2 Transfer Characteristics

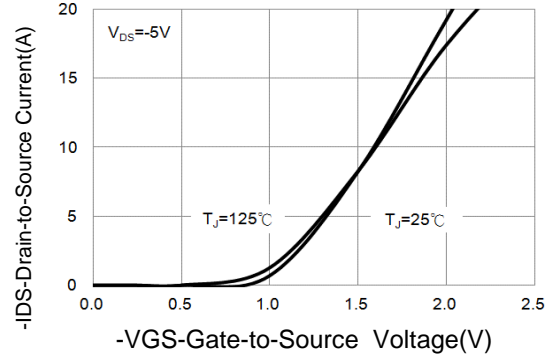


Fig.3 On-Resistance vs. Drain Current

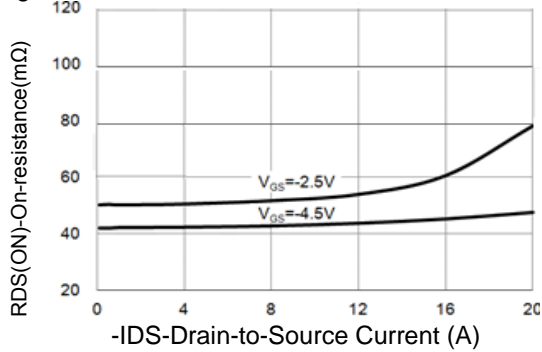


Fig.4 On-Resistance vs. Junction temperature

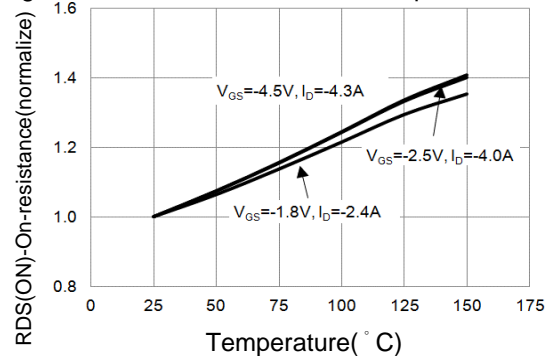


Fig.5 On-Resistance Variation with VGS.

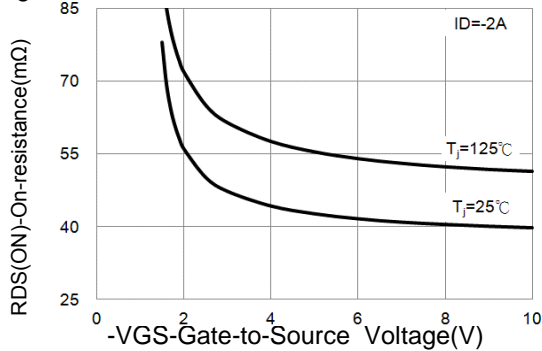


Fig.6 Body Diode Characteristics

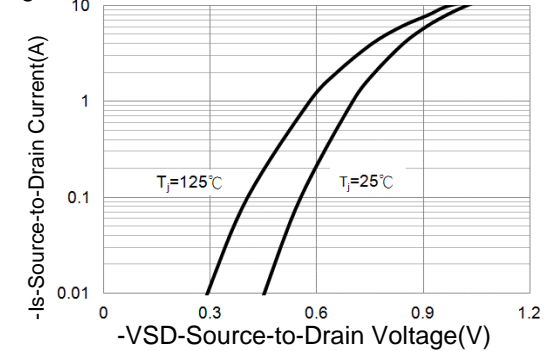


Fig.7 Gate-Charge Characteristics

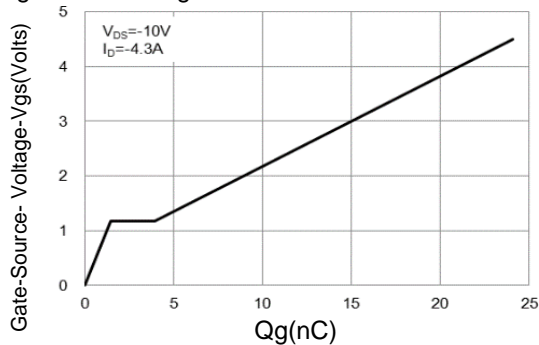
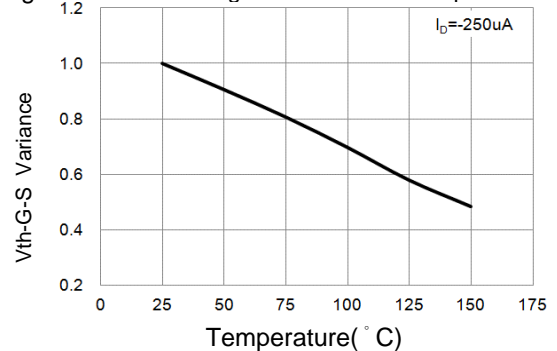
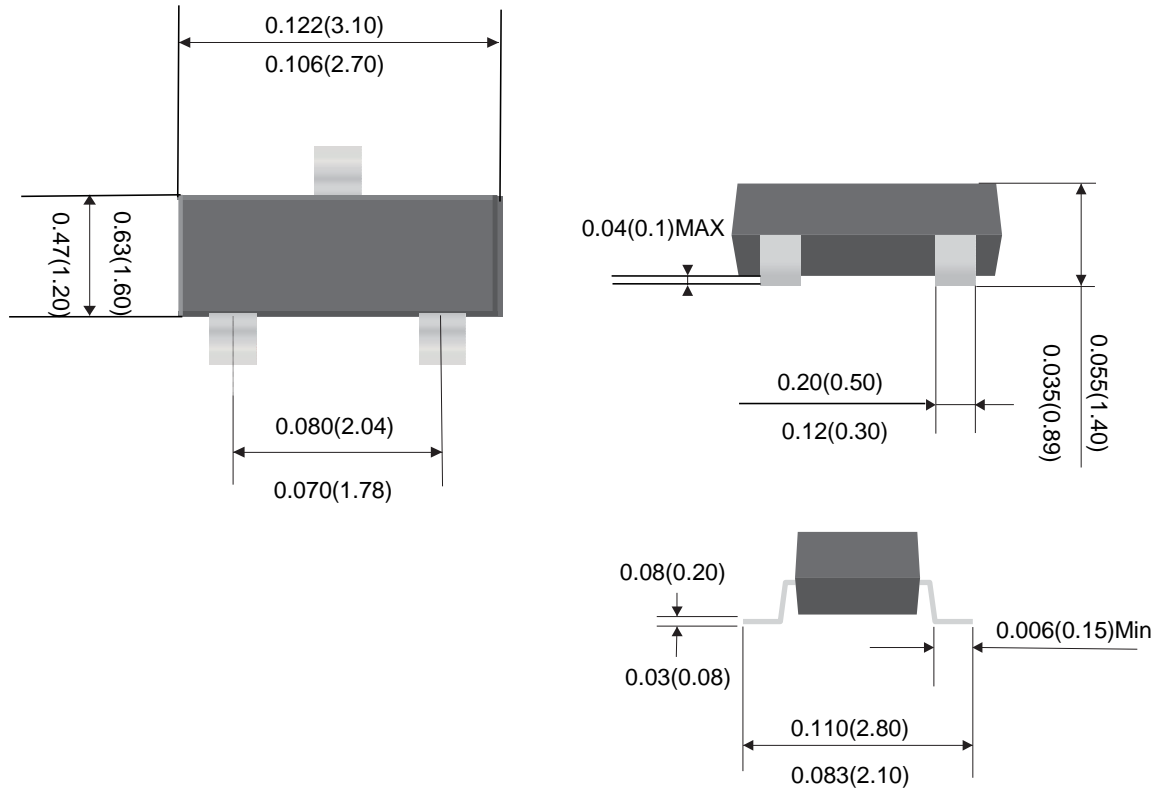


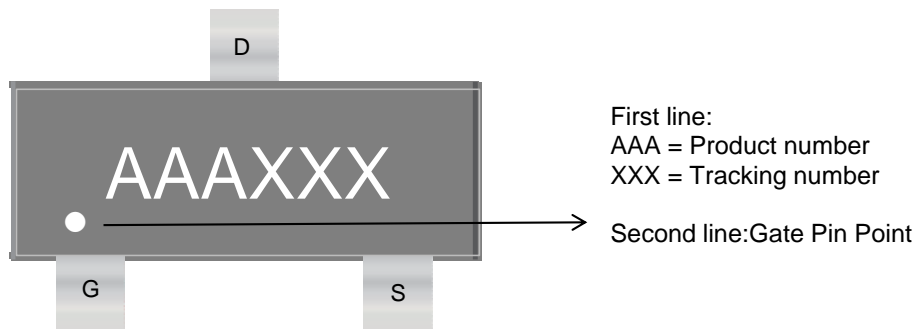
Fig.8 Threshold Voltage Variation with Temperature.



Package Outline Dimensions (inches and millimeters)



Marking Information



Motive reserves the right to make changes without further notice to any products herein. Motive makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motive assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in Motive data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motive does not convey any license under its patent rights nor the rights of others. Motive products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motive product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motive products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motive and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motive was negligent regarding the design or manufacture of the part.