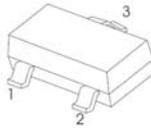


FEATURE

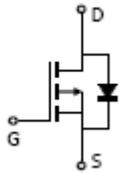
- High density cell design for low $R_{DS(ON)}$
- Voltage controlled small signal switch
- Rugged and reliable
- High saturation current capability

SOT-23

1. GATE
2. SOURCE
3. DRAIN

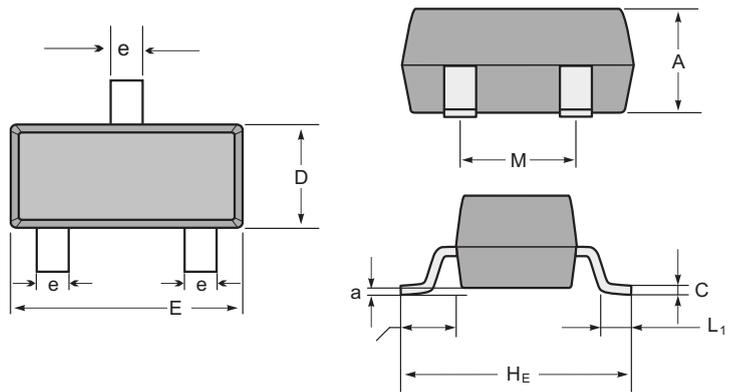


Equivalent Circuit



Marking

Type number	Marking code
6401	F****



SOT-23 mechanical data

UNIT		A	C	D	E	H _E	e	M	L	L ₁	a
mm	max	1.1	0.15	1.4	3.0	2.6	0.5	1.95	0.55 (ref)	0.36 (ref)	0.0
	min	0.9	0.08	1.2	2.8	2.2	0.3	1.7			0.15
mil	max	43	6	55	118	102	20	77	22 (ref)	14 (ref)	0.0
	min	35	3	47	110	87	12	67			6

■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-12	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Drain Current $V_{GS}=4.5V @ T_A=25^\circ\text{C}$	I_D	-4.3	A
Continuous Drain Current $V_{GS}=4.5V @ T_A=70^\circ\text{C}$		-3.4	
Pulsed Drain Current a	I_{DM}	-34	A
Power Dissipation @ $T_A=25^\circ\text{C}$	P_D	1.3	W
Power Dissipation @ $T_A=70^\circ\text{C}$		0.8	
Single Pulse Avalanche Energy b	E_{AS}	33	mJ
Thermal Resistance.Junction- to-Ambient	R_{thJA}	100	$^\circ\text{C}/\text{W}$
Linear Derating Factor		0.01	$\text{W}/^\circ\text{C}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Junction and Storage Temperature Range	T_{stg}	-55 to 150	

Notes:

a.Repetitive Rating :Pulse width limited by maximum junction temperature

6401

■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{DSS}	I _D =-250 μ A, V _{GS} =0V	-12			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{Ds} =-12V, V _{GS} =0V			-1	μ A
		V _{Ds} =-9.6V, V _{GS} =0V, T _J = 55°C			-25	
Gate-Body leakage current	I _{GSS}	V _{Ds} =0V, V _{GS} =± 8V			± 100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{Ds} =V _{GS} I _D =-250 μ A	-0.4	-0.55	-0.95	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =-4.5V, I _D =-4.3A		35	50	m Ω
		V _{GS} =-2.5V, I _D =-2.5A			85	
		V _{GS} =-1.8V, I _D =-2A			125	
Forward Transconductance	g _{FS}	V _{Ds} =-10V, I _D =-4.3A	8.6			S
Input Capacitance	C _{iss}	V _{GS} =0V, V _{Ds} =-10V, f=1MHz		830		pF
Output Capacitance	C _{oss}			180		
Reverse Transfer Capacitance	C _{rss}			125		
Total Gate Charge	Q _g	V _{GS} =-5.0V, V _{Ds} =-10V, I _D =-4.3A		10	15	nC
Gate Source Charge	Q _{gs}			1.4	2.1	
Gate Drain Charge	Q _{gd}			2.6	3.9	
Turn-On DelayTime	t _{d(on)}	I _D =-1.0A, V _{Ds} =-6.0V, R _L =6 Ω, R _{GEN} =89 Ω		11		ns
Turn-On Rise Time	t _r			32		
Turn-Off DelayTime	t _{d(off)}			250		
Turn-Off Fall Time	t _f			210		
Body Diode Reverse Recovery Time	t _{rr}	I _F =-1.3A, di/dt=-100A/ μ s		22	33	
Body Diode Reverse Recovery Charge	Q _{rr}	I _F =-1.3A, di/dt=-100A/ μ s		8	12	Nc
Maximum Body-Diode Continuous Current	I _s				1.3	A
Diode Forward Voltage	V _{SD}	I _s =-1.3A, V _{GS} =0V			-1.2	V

RATING AND CHARACTERISTIC CURVES (6401)

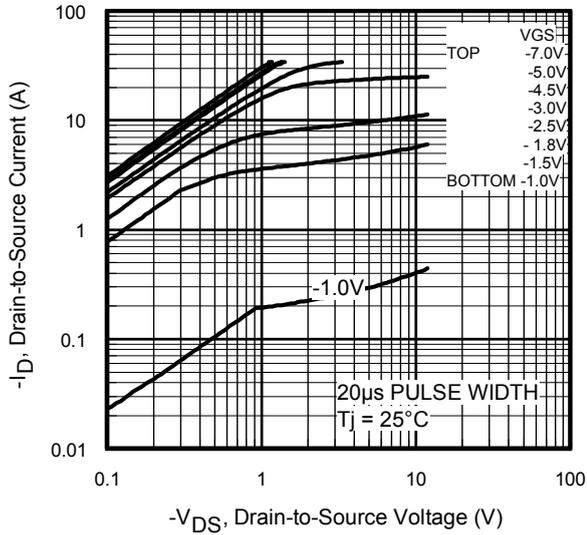


Fig 1. Typical Output Characteristics

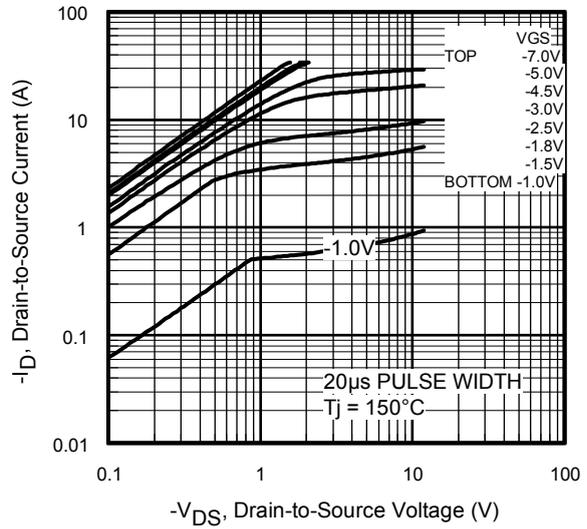


Fig 2. Typical Output Characteristics

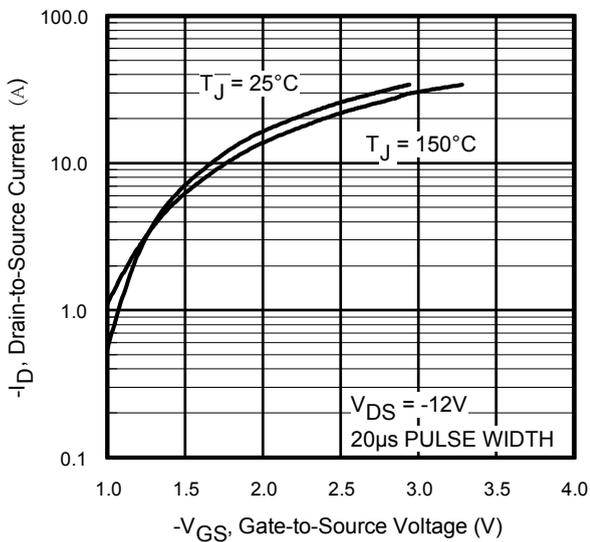


Fig 3. Typical Transfer Characteristics

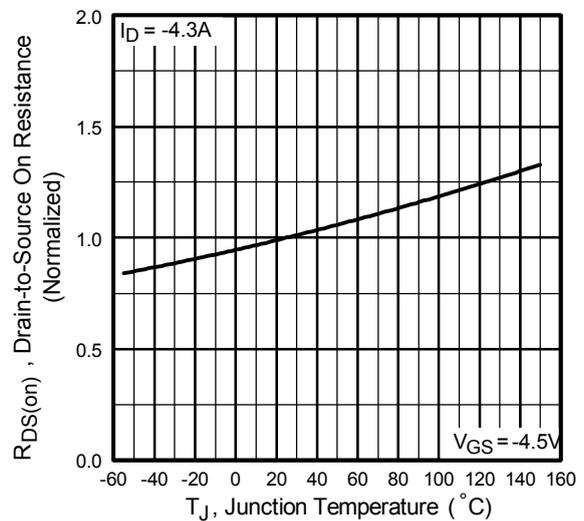


Fig 4. Normalized On-Resistance Vs. Temperature

RATING AND CHARACTERISTIC CURVES (6401)

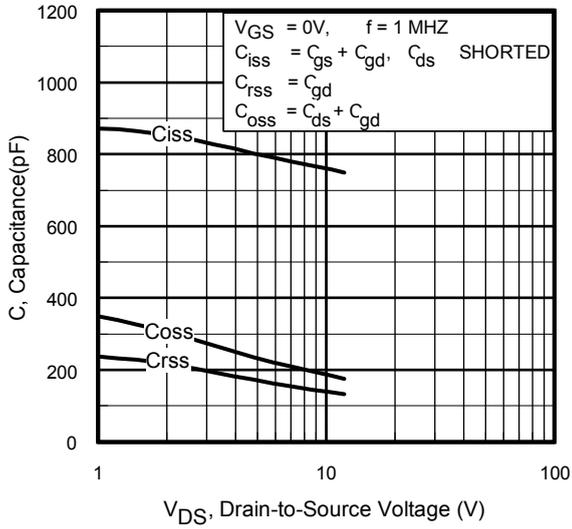


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

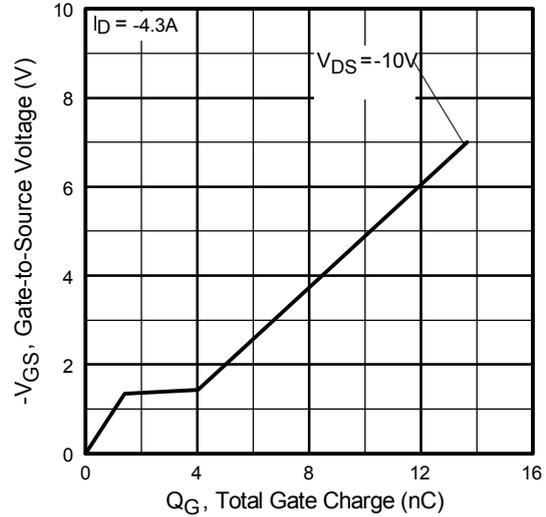


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

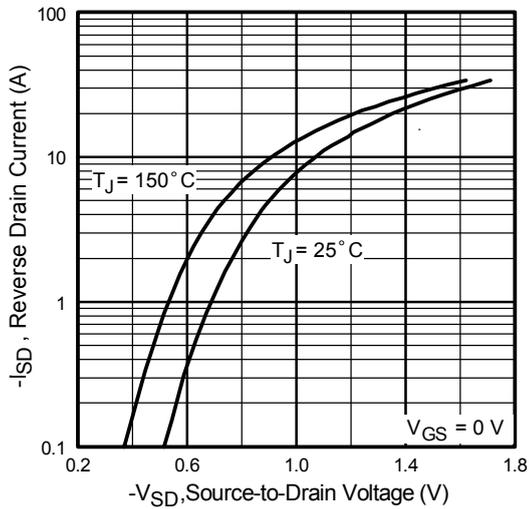


Fig 7. Typical Source-Drain Diode Forward Voltage

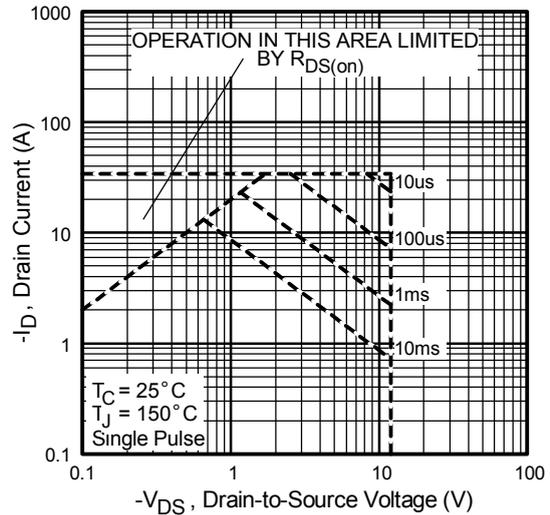


Fig 8. Maximum Safe Operating Area

RATING AND CHARACTERISTIC CURVES (6401)

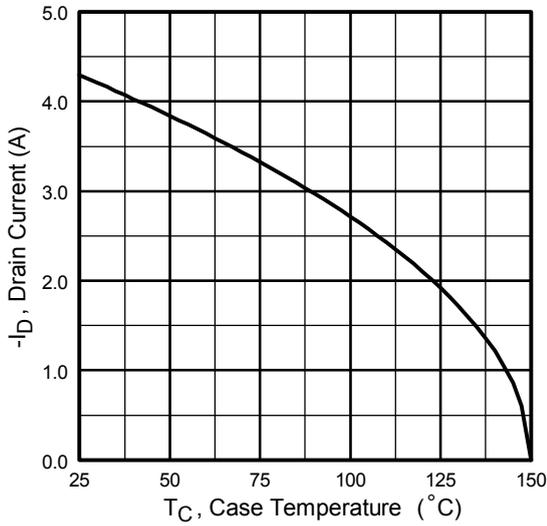


Fig 9. Maximum Drain Current Vs. Case Temperature

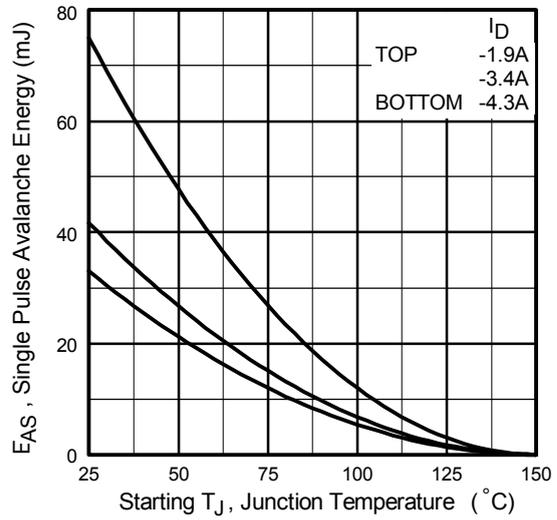


Fig 10. Maximum Avalanche Energy Vs. Drain Current

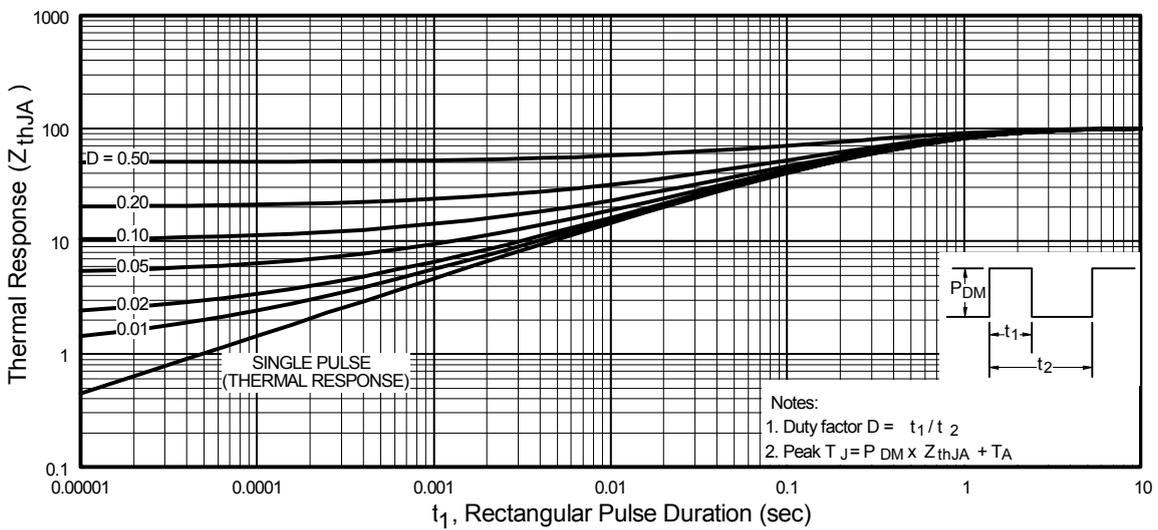


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

RATING AND CHARACTERISTIC CURVES (6401)

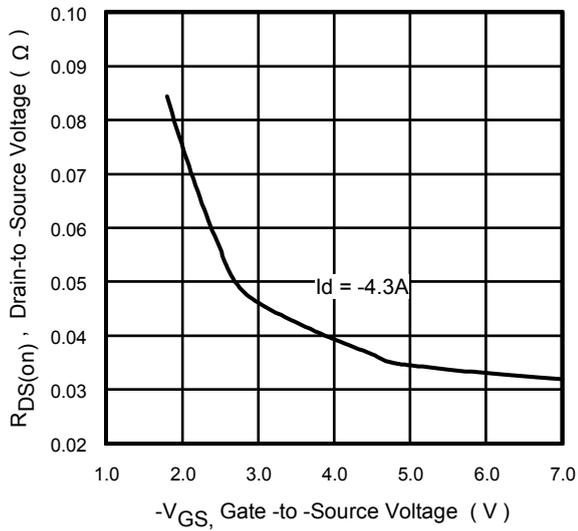


Fig 12. Typical On-Resistance Vs. Gate Voltage

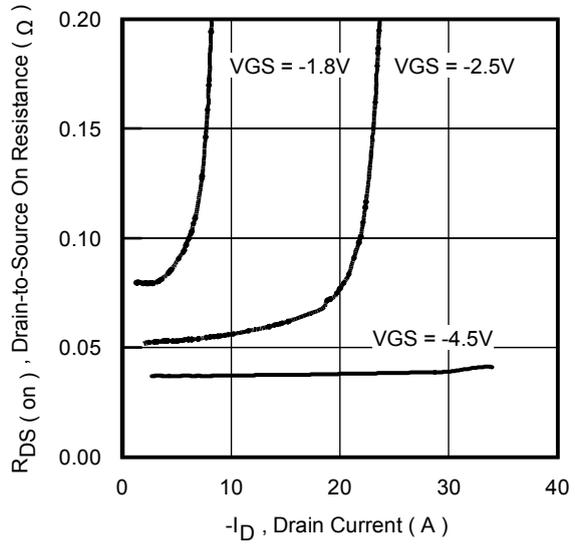


Fig 13. Typical On-Resistance Vs. Drain Current

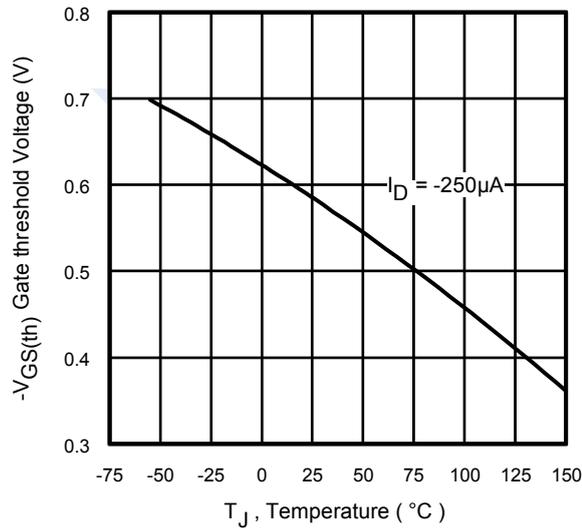


Fig 14. Typical Threshold Voltage Vs. Junction Temperature