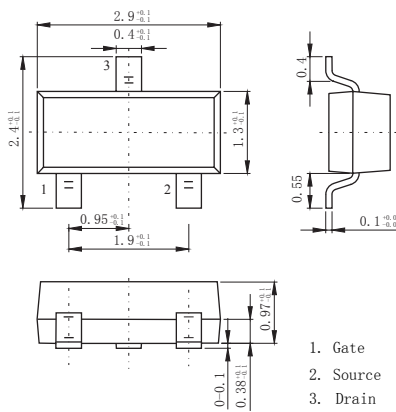


SOT-23



■ Features

- $V_{DS} (V) = 20V$
- $I_D = 3.2 A$ ($V_{GS} = 4.5V$)
- $R_{DS(ON)} < 70m\Omega$ ($V_{GS} = 4.5V$)
- $R_{DS(ON)} < 85m\Omega$ ($V_{GS} = 2.5V$)
- Leading Planar Technology for Low Gate Charge / Fast Switching
- 2.5 V Rated for Low Voltage Gate Drive

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	
Continuous Drain Current (Note.1)	I_D	3.2	A
		2.4	
Pulsed Drain Current @ $t_p=10\mu s$	I_{DM}	10	
Power Dissipation (Note.1)	P_D	1.25	W
Thermal Resistance.Junction- to-Ambient (Note.1) (Note.2)	R_{thJA}	100	$^\circ C/W$
		300	
Lead Temperature for Soldering Purposes (Note.3)	T_L	260	$^\circ C$
Junction Temperature	T_J	150	
Storage Temperature Range	T_{stg}	-55 to 150	

Note.1: Surface-mounted on FR4 board using 1 in sq pad size.

Note.2: Surface-mounted on FR4 board using the minimum recommended pad size.

Note.3: 1/8" from case for 10 s.

■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DS}	$I_D=250\mu A$, $V_{GS}=0V$ (Note.1)	20	24.5		V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=16V$, $V_{GS}=0V$, $T_J=25^\circ C$			1.5	μA
		$V_{DS}=16V$, $V_{GS}=0V$, $T_J=85^\circ C$			10	
Gate-Body Leakage Current	I_{GSS}	$V_{DS}=0V$, $V_{GS}=\pm 12V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu A$ (Note.1)	0.65		1.2	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V$, $I_D=3.6A$		70	80	m Ω
		$V_{GS}=2.5V$, $I_D=3.1A$		85	105	
Forward Transconductance	g_{FS}	$V_{DS}=5V$, $I_D=3.6A$		9		S
Input Capacitance	C_{iss}	$V_{GS}=0V$, $V_{DS}=10V$, $f=1MHz$		200		pF
Output Capacitance	C_{oss}			80		
Reverse Transfer Capacitance	C_{rss}			50		
Total Gate Charge	Q_g	$V_{GS}=4.5V$, $V_{DS}=10V$, $I_D=3.6A$		2.4	6	nC
Gate Source Charge	Q_{gs}			0.5		
Gate Drain Charge	Q_{gd}			0.6		
Turn-On DelayTime	$t_{d(on)}$	$V_{GS}=4.5V$, $V_{DS}=10V$, $I_D=3.6A$, $R_G=6\Omega$ (Note.2)		6.5		ns
Turn-On Rise Time	t_r			12		
Turn-Off DelayTime	$t_{d(off)}$			12		
Turn-Off Fall Time	t_f			3		
Body Diode Reverse Recovery Time	t_{rr}	$I_S=1.6A$, $di/dt=100A/\mu s$, $V_{GS}=0$		7.1		nC
Charge Time	t_a			5		
Discharge Time	t_b			1.9		
Body Diode Reverse Recovery Charge	Q_{rr}			3		
Maximum Body-Diode Continuous Current	I_S				1.6	A
Diode Forward Voltage	V_{SD}	$I_S=1.6A$, $V_{GS}=0V$		0.8	1.2	V

Note.1: Pulse Test: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

Note.2: Switching characteristics are independent of operating junction temperatures.

■ Marking

Marking	TR1*
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■ Typical Characteristics

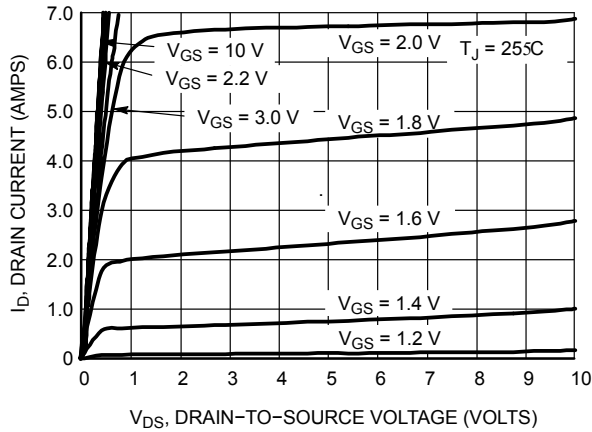


Figure 1. On-Region Characteristics

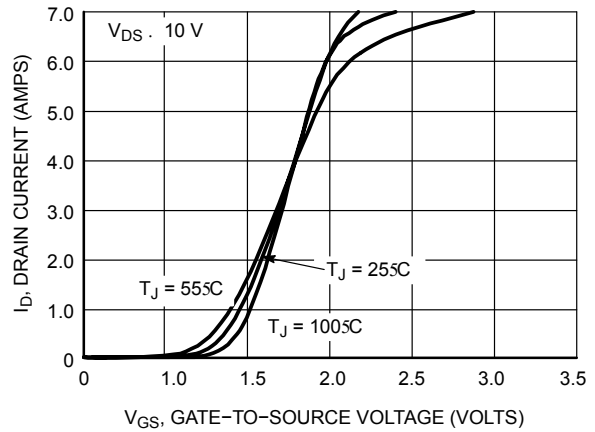


Figure 2. Transfer Characteristics

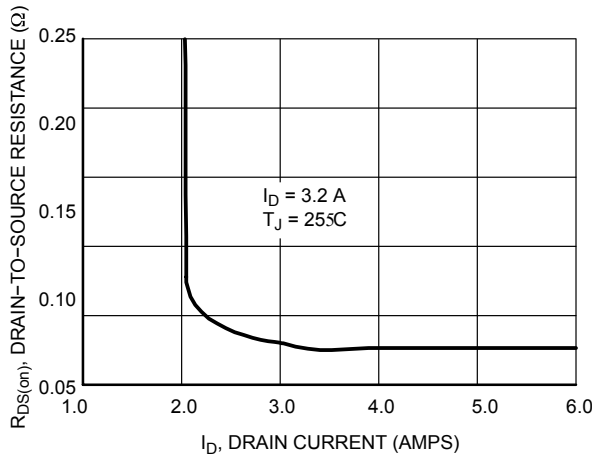


Figure 3. On-Resistance versus Gate-to-Source Voltage

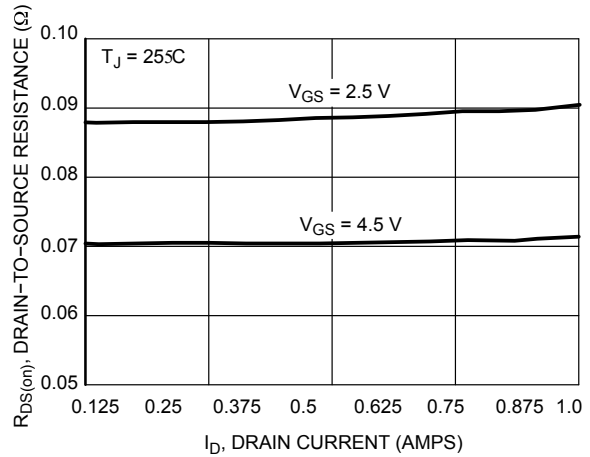


Figure 4. On-Resistance versus Drain Current and Gate Voltage

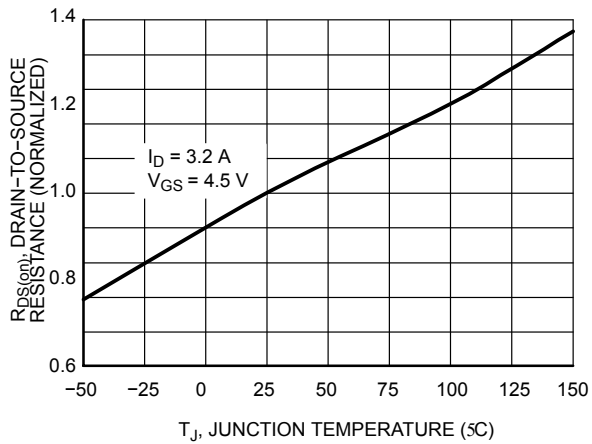


Figure 5. On-Resistance Variation with Temperature

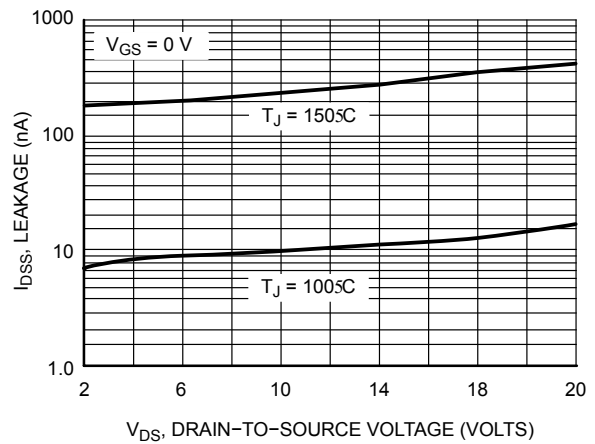


Figure 6. Drain-to-Source Leakage Current versus Voltage

■ Typical Characteristics

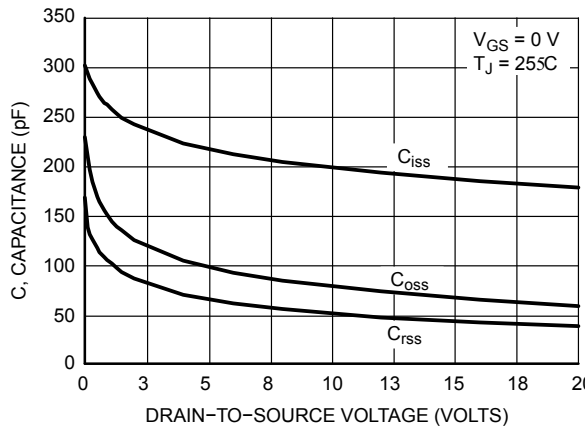


Figure 7. Capacitance Variation

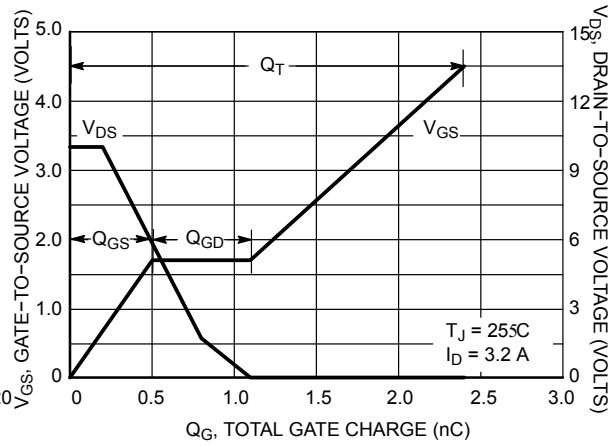


Figure 8. Gate-to-Source and Drain-to-Source Voltage versus Total Gate Charge

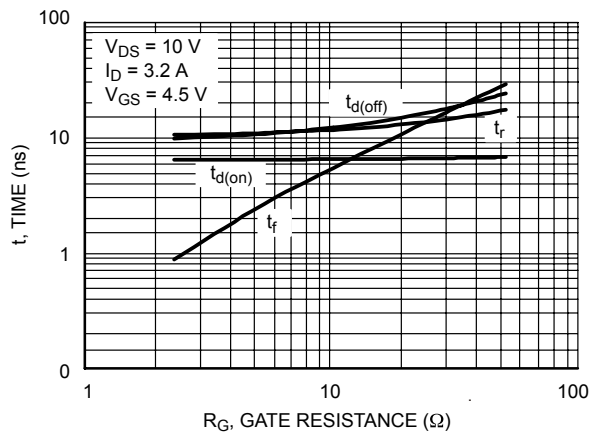


Figure 9. Resistive Switching Time Variation versus Gate Resistance

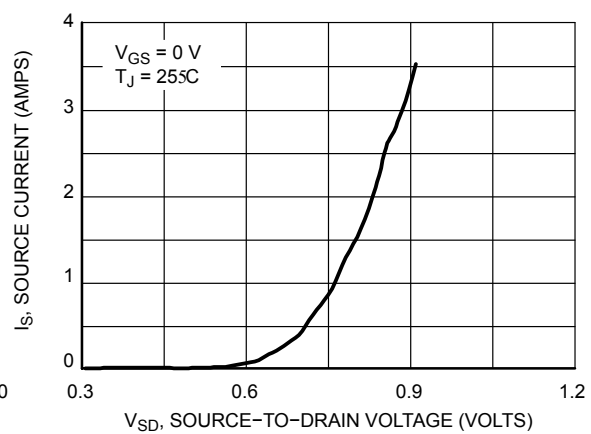


Figure 10. Diode Forward Voltage versus Current