

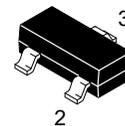
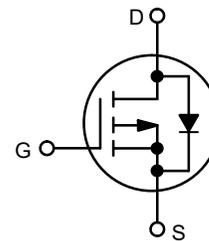
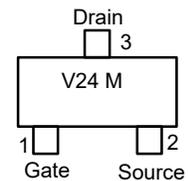
**MAXIMUM RATINGS** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	$V_{DSS}$	-60	V
Gate-to-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	Steady State	$T_A = 25^\circ\text{C}$	$I_D$ -1.1 A
		$T_A = 100^\circ\text{C}$	-0.67
Power Dissipation	Steady State	$T_A = 25^\circ\text{C}$	$P_D$ -0.47 W
		$T_A = 100^\circ\text{C}$	0.19
Pulsed Drain Current	$T_A = 25^\circ\text{C}, t_p = 10 \text{ s}$	$I_{DM}$ 25	A
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$
Source Current (Body Diode)	$I_S$	-0.6	A
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	$T_L$	260	$^\circ\text{C}$

**THERMAL RESISTANCE MAXIMUM RATINGS**

Parameter	Symbol	Value	Unit
Junction-to-Ambient - Steady State	$R_{JA}$	268	$^\circ\text{C}/\text{W}$

$V_{(BR)DSS}$	$R_{DS(on)} \text{ MAX}$	$I_D \text{ MAX}$
-60 V	230 mΩ @ -10 V	-1.1 A
	365 mΩ @ -4.5 V	

**P-Channel**

**SOT-23**


V24 = Device Code  
 M = Date Code\*  
 ■ = Pb-Free Package

**ELECTRICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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**OFF CHARACTERISTICS**

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -250\ \mu\text{A}$	-60			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0\text{ V}, V_{DS} = -60\text{ V}$	$T_J = 25^\circ\text{C}$		-1.0	$\mu\text{A}$
			$T_J = 125^\circ\text{C}$		-10	
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA

**ON CHARACTERISTICS** (Note 4)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = -250\ \mu\text{A}$	-1.5		-2.5	V
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -3\text{ A}$		183	230	m $\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -3\text{ A}$		280	365	
Forward Transconductance	$g_{FS}$	$V_{DS} = -15\text{ V}, I_D = -5\text{ A}$	4			S

**CHARGES AND CAPACITANCES**

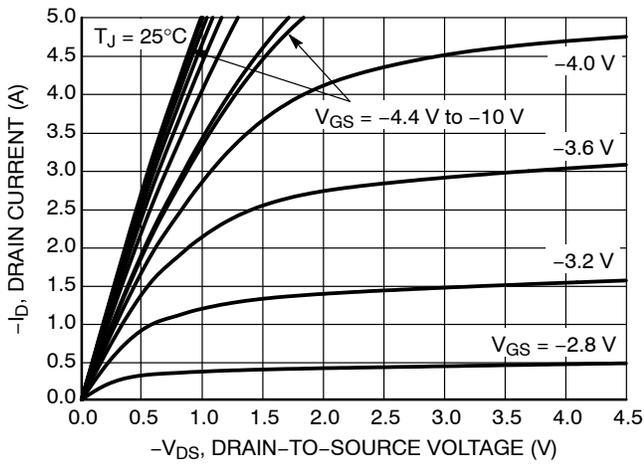
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = -25\text{ V}$		240		pF
Output Capacitance	$C_{oss}$			27.6		
Reverse Transfer Capacitance	$C_{rss}$			18.5		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = -4.5\text{ V}, V_{DS} = -48\text{ V}, I_D = -3\text{ A}$		2.3		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.5		
Gate-to-Source Charge	$Q_{GS}$			0.9		
Gate-to-Drain Charge	$Q_{GD}$			1.0		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = -10\text{ V}, V_{DS} = -48\text{ V}, I_D = -3\text{ A}$		4.3		

**SWITCHING CHARACTERISTICS** (Note 5)

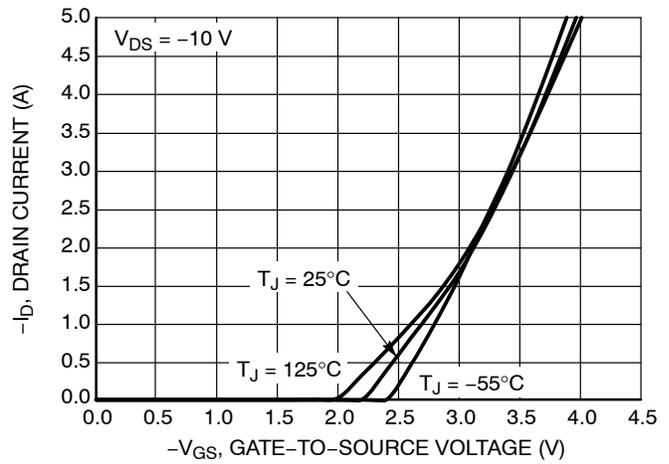
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = -4.5\text{ V}, V_{DS} = -48\text{ V}, I_D = -3\text{ A}, R_G = 2.5\ \Omega$		6.6		ns
Rise Time	$t_r$			10.6		
Turn-Off Delay Time	$t_{d(off)}$			12.2		
Fall Time	$t_f$			3.5		

**DRAIN-SOURCE DIODE CHARACTERISTICS**

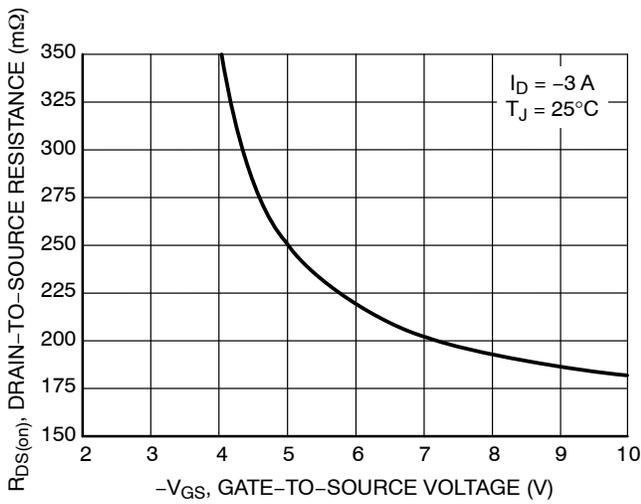
Forward Diode Voltage	$V_{SD}$	$V_{GS} = 0\text{ V}, I_S = -3\text{ A}$	$T_J = 25^\circ\text{C}$		-0.88	-1.0	V
			$T_J = 125^\circ\text{C}$		-0.76		
Reverse Recovery Time	$t_{RR}$	$V_{GS} = 0\text{ V}, dI_S/dt = 100\text{ A}/\mu\text{s}, I_S = -3\text{ A}$		15		ns	
Charge Time	$t_a$			13			
Discharge Time	$t_b$			2.4			
Reverse Recovery Charge	$Q_{RR}$			10			nC



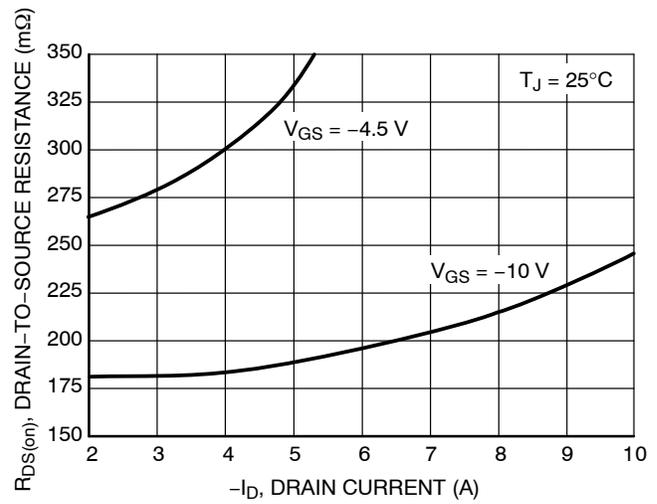
**Figure 1. On-Region Characteristics**



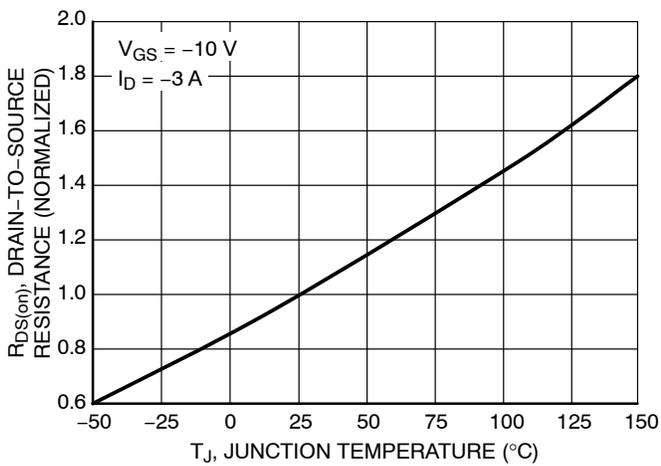
**Figure 2. Transfer Characteristics**



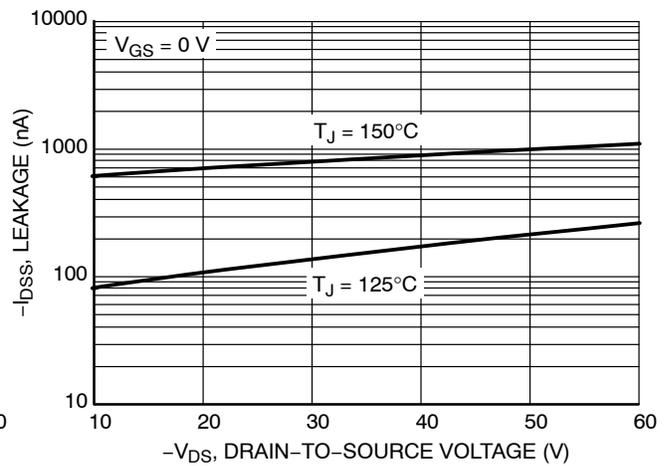
**Figure 3. On-Resistance vs. Gate-to-Source Voltage**



**Figure 4. On-Resistance vs. Drain Current and Gate Voltage**



**Figure 5. On-Resistance Variation with Temperature**



**Figure 6. Drain-to-Source Leakage Current vs. Voltage**

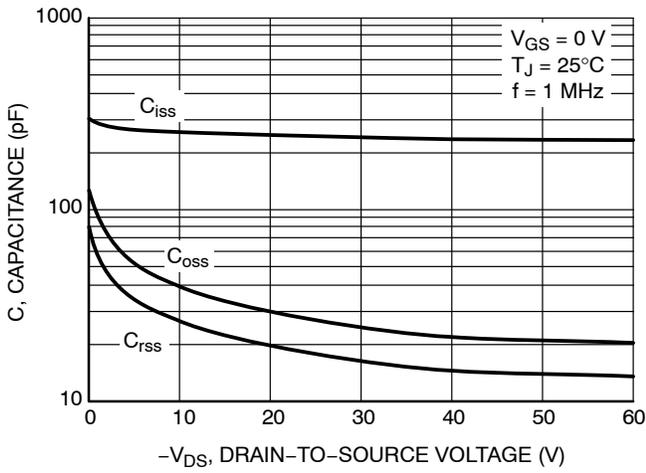


Figure 7. Capacitance Variation

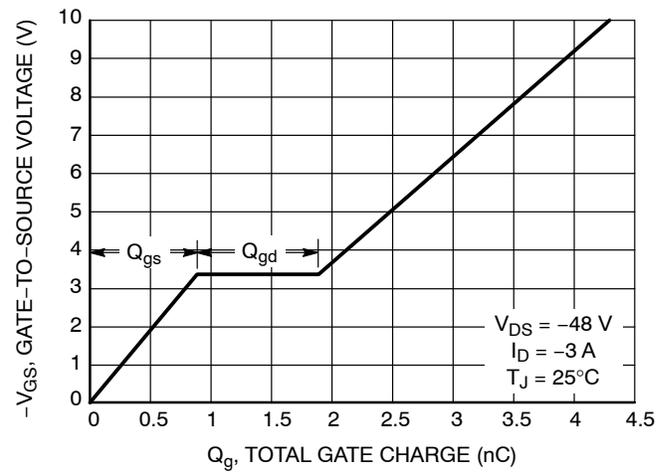


Figure 8. Gate-to-Source Voltage vs. Total Charge

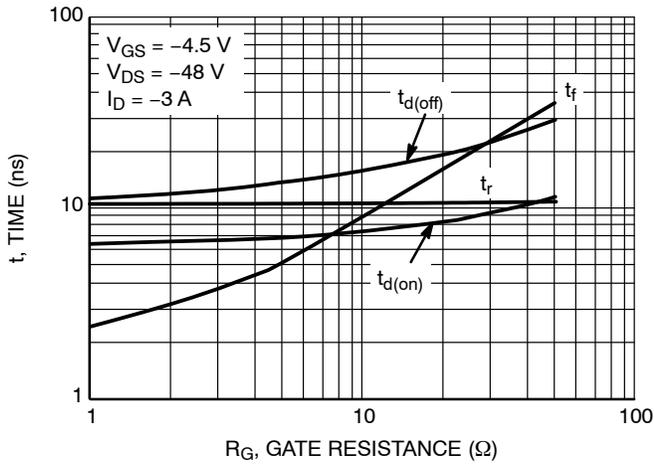


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

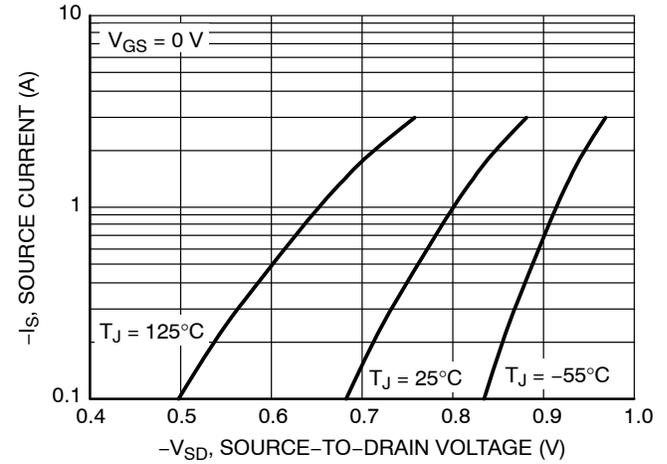


Figure 11. Diode Forward Voltage vs. Current

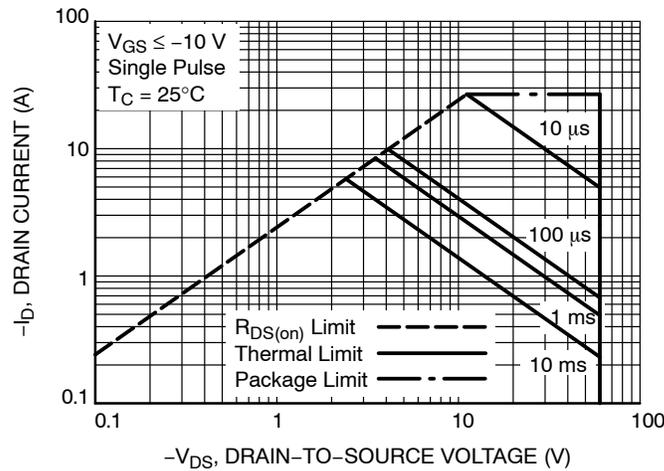


Figure 10. Maximum Rated Forward Biased Safe Operating Area

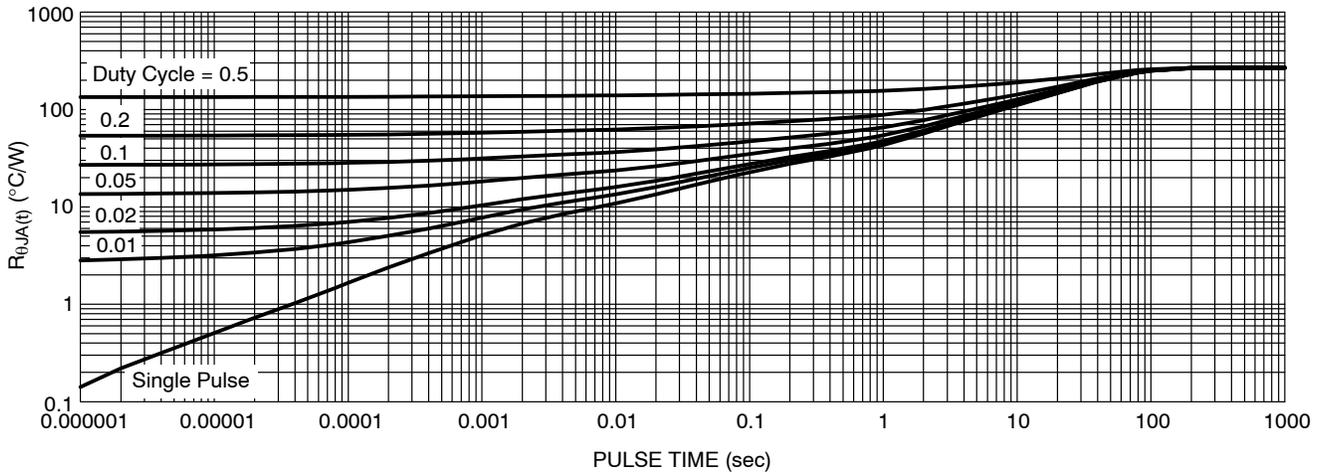
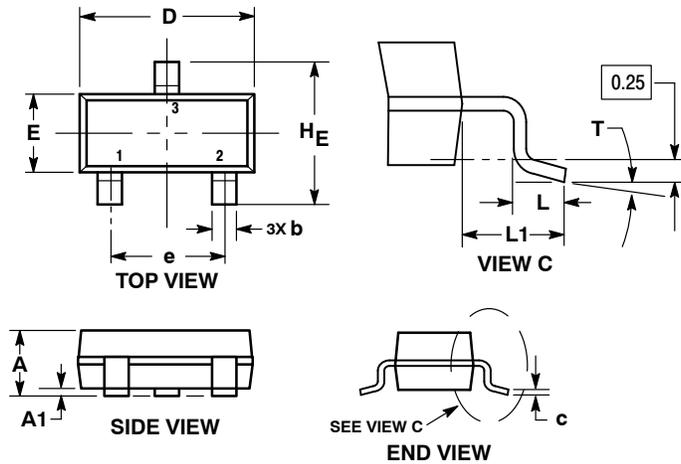


Figure 12. Thermal Response

SOT-23



DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.039	0.044
A1	0.01	0.06	0.10	0.000	0.002	0.004
b	0.37	0.44	0.50	0.015	0.017	0.020
c	0.08	0.14	0.20	0.003	0.006	0.008
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.080
L	0.30	0.43	0.55	0.012	0.017	0.022
L1	0.35	0.54	0.69	0.014	0.021	0.027
HE	2.10	2.40	2.64	0.083	0.094	0.104
T	0°	---	10°	0°	---	10°

RECOMMENDED SOLDERING FOOTPRINT

