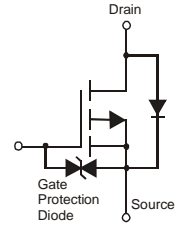




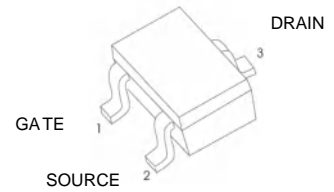
MT1013T Plastic-Encapsulate MOSFETS

Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Lead Free By Design/RoHS Compliant (Note 2)



Marking Code: PA1



SOT - 523

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	-20	V
Gate-Source Voltage			V _{GSS}	±6	V
Drain Current (Note 1)	Steady State	T _A = 25°C	I _D	-0.46	A
		T _A = 85°C		-0.33	
Pulsed Drain Current			I _{DM}	-6	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Units
Total Power Dissipation (Note 1)			P _D	0.27	W
Thermal Resistance, Junction to Ambient			R _{θJA}	461	°C/W
Operating and Storage Temperature Range			T _J , T _{STG}	-55 to +150	°C

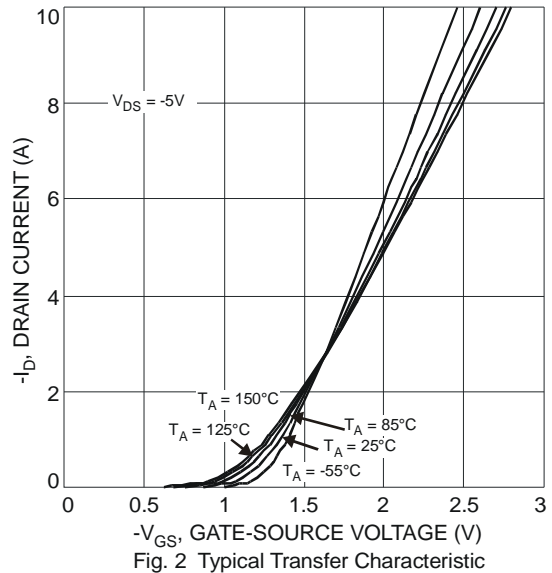
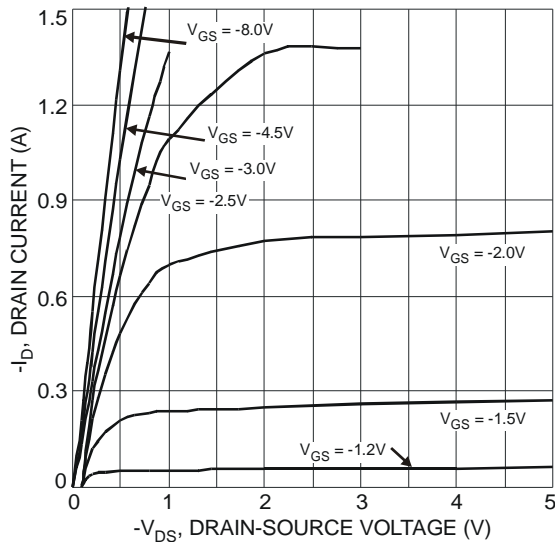
Notes: 1. Device mounted on FR-4 PCB.
2. No purposefully added lead.



Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 4)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	-	-	V	$V_{GS} = 0V, I_D = -250\mu A$
Zero Gate Voltage Drain Current $T_J = 25^\circ\text{C}$	I_{DSS}	-	-	-100	nA	$V_{DS} = -20V, V_{GS} = 0V$
Gate-Source Leakage	I_{GSS}	-	-	± 2.0	μA	$V_{GS} = \pm 4.5V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 4)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	-	-1.0	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
Static Drain-Source On-Resistance	$R_{DS(on)}$	-	0.5	0.7	Ω	$V_{GS} = -4.5V, I_D = -350mA$
			0.7	0.9		$V_{GS} = -2.5V, I_D = -300mA$
			1.0	1.3		$V_{GS} = -1.8V, I_D = -150mA$
Forward Transfer Admittance	$ Y_{fs} $	-	0.9	-	S	$V_{DS} = -10V, I_D = -250mA$
Diode Forward Voltage (Note 4)	V_{SD}	-0.8	-1.2	-	V	$V_{GS} = 0V, I_S = -150mA$
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	-	59.76	-	pF	$V_{DS} = -16V, V_{GS} = 0V, f = 1.0MHz$
Output Capacitance	C_{oss}	-	12.07	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	6.36	-	pF	
Total Gate Charge	Q_g	-	622.4	-	pC	$V_{GS} = -4.5V, V_{DS} = -10V, I_D = -250mA$
Gate-Source Charge	Q_{gs}	-	100.3	-	pC	
Gate-Drain Charge	Q_{gd}	-	132.2	-	pC	
Turn-On Delay Time	$t_{D(on)}$	-	5.1	-	ns	$V_{DD} = -10V, V_{GS} = -4.5V, R_L = 47\Omega, R_G = 10\Omega, I_D = -200mA$
Turn-On Rise Time	t_r	-	8.1	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	28.4	-	ns	
Turn-Off Fall Time	t_f	-	20.7	-	ns	

Notes: 4. Short duration pulse test used to minimize self-heating effect.



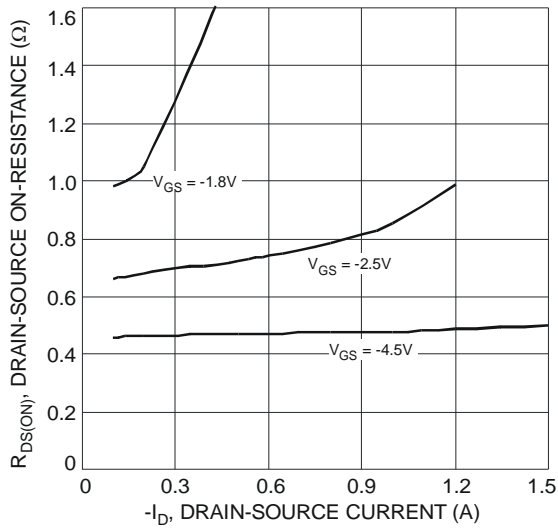


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

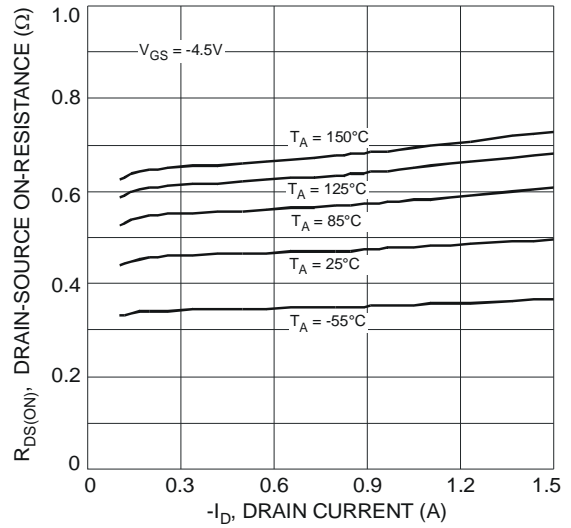


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

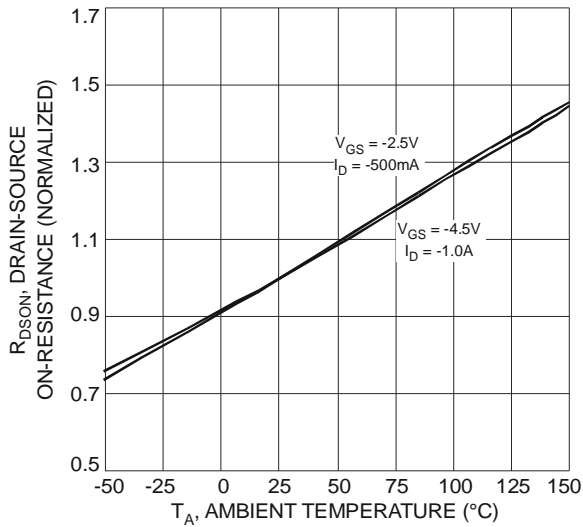


Fig. 5 On-Resistance Variation with Temperature

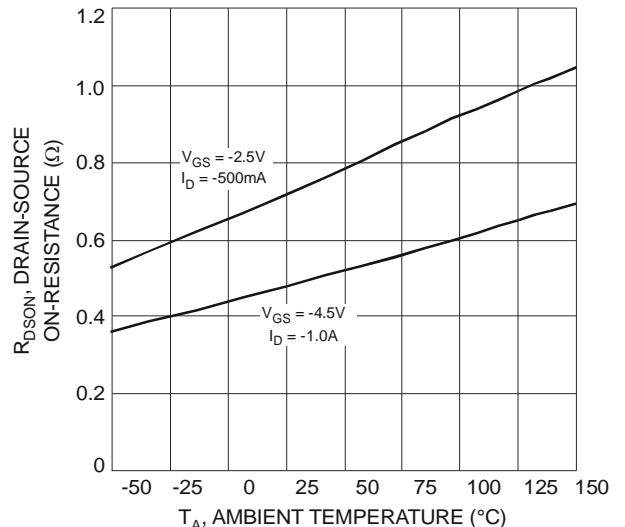


Fig. 6 On-Resistance Variation with Temperature

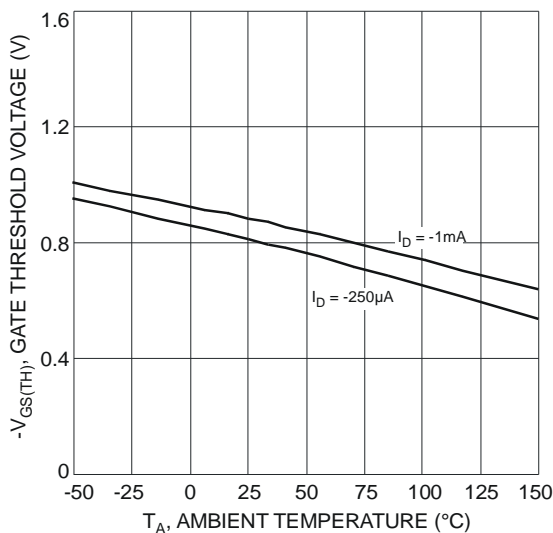


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

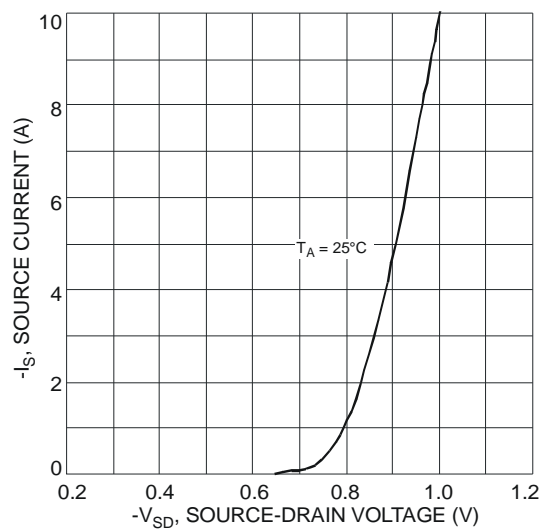


Fig. 8 Diode Forward Voltage vs. Current

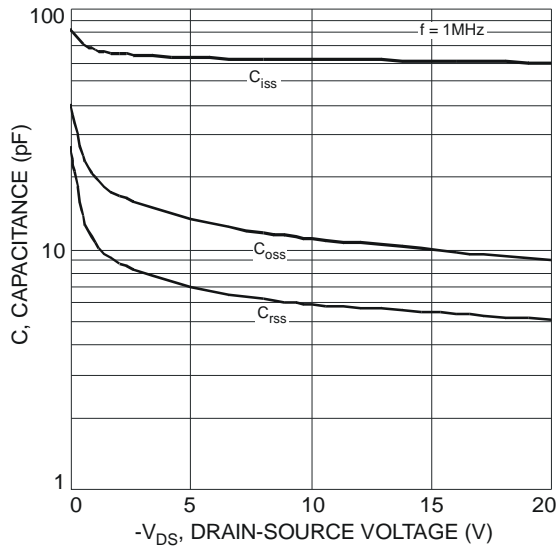


Fig. 9 Typical Total Capacitance

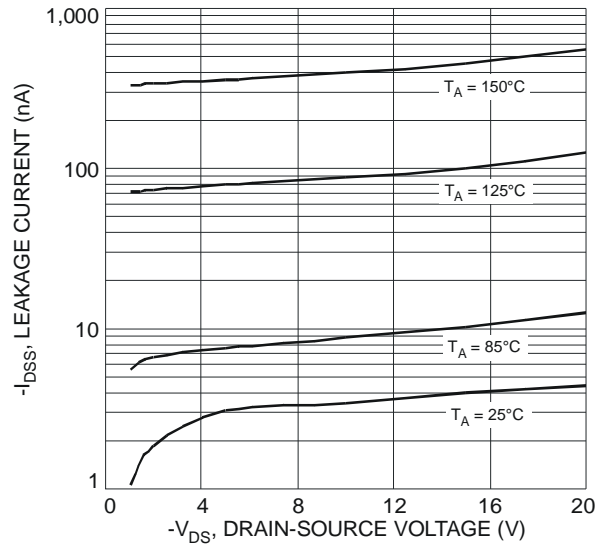


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

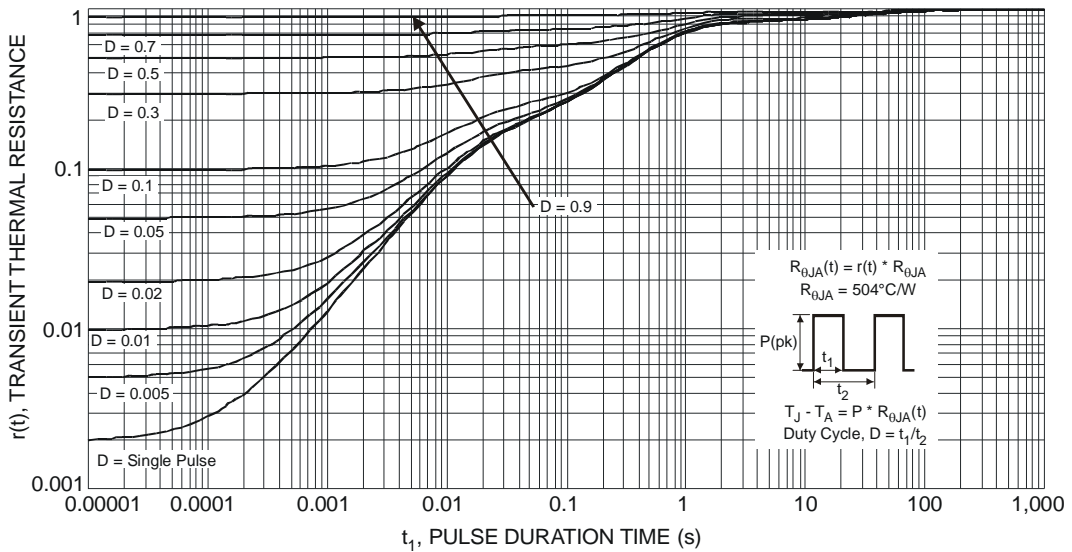
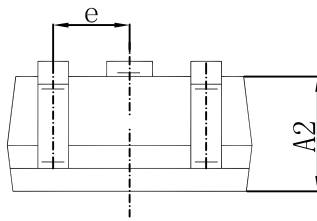
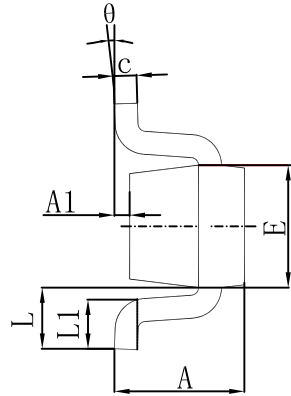
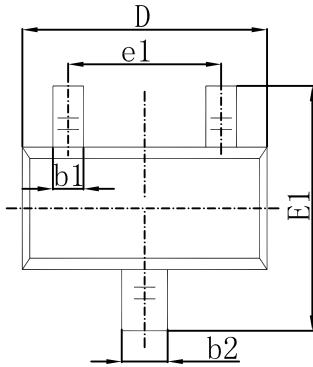


Fig. 11 Transient Thermal Response

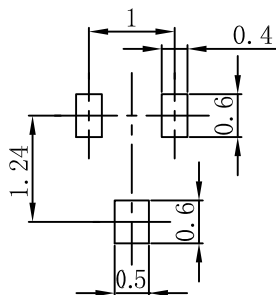


SOT-523 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b1	0.150	0.250	0.006	0.010
b2	0.250	0.350	0.010	0.014
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.700	0.900	0.028	0.035
E1	1.450	1.750	0.057	0.069
e	0.500 TYP.		0.020 TYP.	
e1	0.900	1.100	0.035	0.043
L	0.400 REF.		0.016 REF.	
L1	0.260	0.460	0.010	0.018
theta	0°	8°	0°	8°

SOT-523 Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.