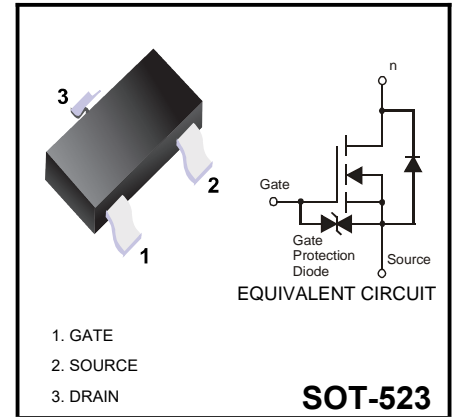


**Plastic-Encapsulate MOSFETS**  
**N-CHANNEL ENHANCEMENT MODE MOSFET**
**FEATURES**

- ◆ 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)
- ◆ ESD Protected up to 2kV


**MARKING:NA1**
**Maximum Ratings @TA = 25°C unless otherwise specified**

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	20	V
Gate-Source Voltage			$V_{GSS}$	±6	V
Continuous Drain Current (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	$I_D$	0.63	A
		$T_A = 85^\circ\text{C}$		0.45	
Pulsed Drain Current			$I_{DM}$	6	A

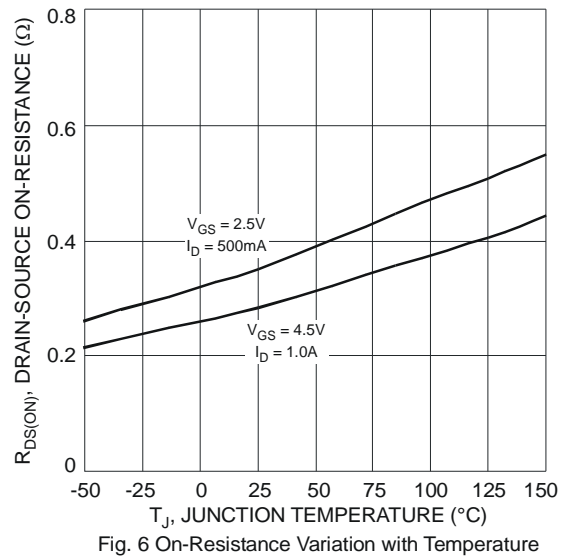
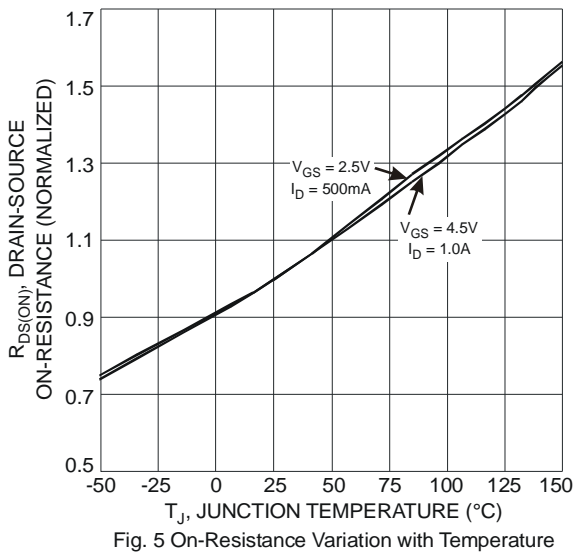
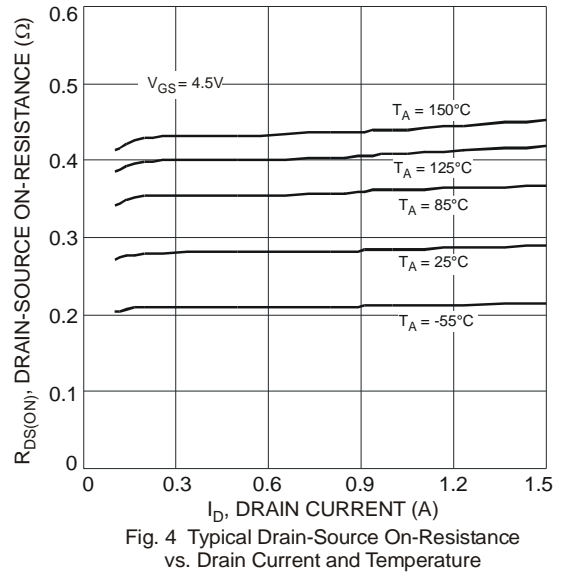
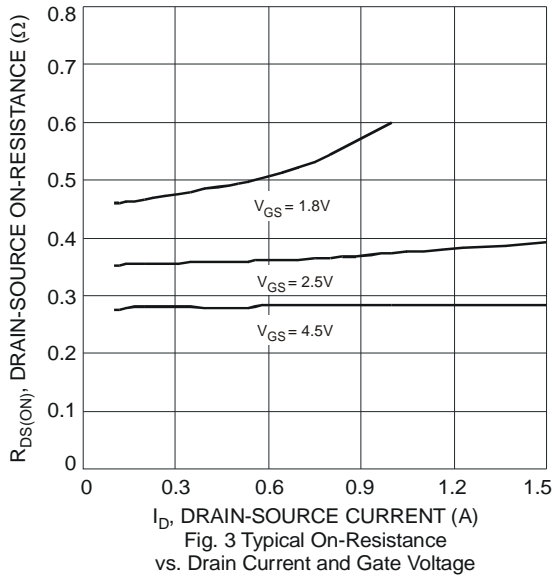
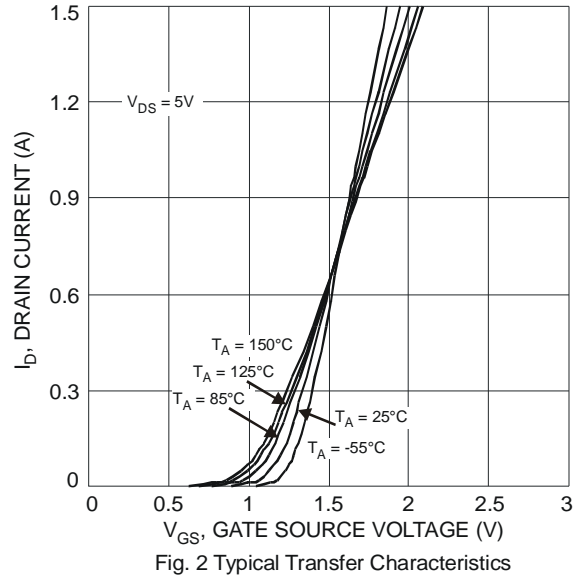
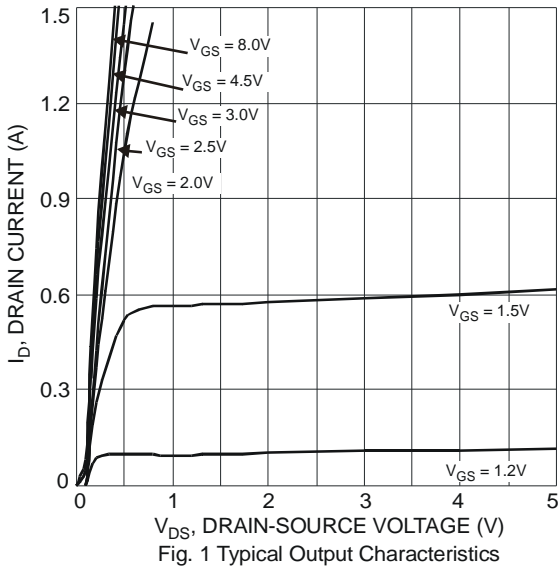
**Thermal Characteristics @TA = 25°C unless otherwise specified**

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 1)		$P_D$	0.28	W
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	452	°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 @TA = 25°C unless otherwise specified**

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 4)</b>						
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	$I_{GSS}$	-	-	±1.0	μA	$V_{GS} = \pm 4.5V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 4)</b>						
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	$R_{DS(on)}$	-	0.3	0.4	Ω	$V_{GS} = 4.5V, I_D = 600mA$
			0.4	0.5		$V_{GS} = 2.5V, I_D = 500mA$
			0.5	0.7		$V_{GS} = 1.8V, I_D = 350mA$
Forward Transfer Admittance	$ Y_{fs} $	-	1.4	-	S	$V_{DS} = 10V, I_D = 400mA$
Diode Forward Voltage (Note 4)	$V_{SD}$	-	0.7	1.2	V	$V_{GS} = 0V, I_S = 150mA$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{iss}$	-	60.67	-	pF	$V_{DS} = 16V, V_{GS} = 0V, f = 1.0MHz$
Output Capacitance	$C_{oss}$	-	9.68	-	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	5.37	-	pF	
Total Gate Charge	$Q_g$	-	736.6	-	pC	$V_{GS} = 4.5V, V_{DS} = 10V, I_D = 250mA$
Gate-Source Charge	$Q_{gs}$	-	93.6	-	pC	
Gate-Drain Charge	$Q_{gd}$	-	116.6	-	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	$t_r$	-	7.4	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	26.7	-	ns	
Turn-Off Fall Time	$t_f$	-	12.3	-	ns	



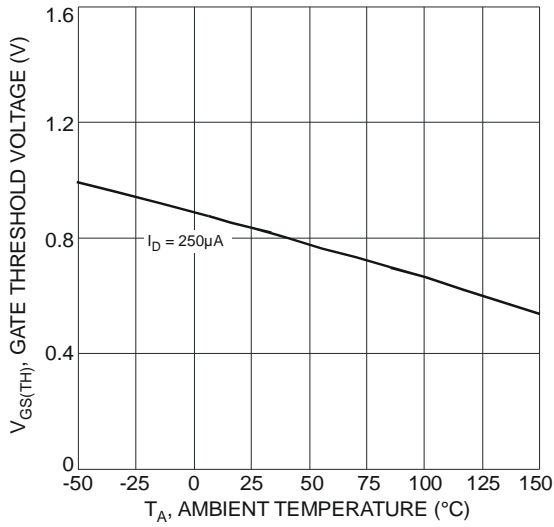


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

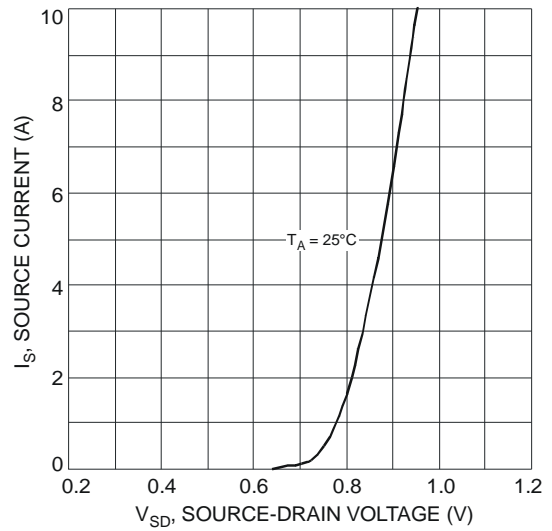


Fig. 8 Diode Forward Voltage vs. Current

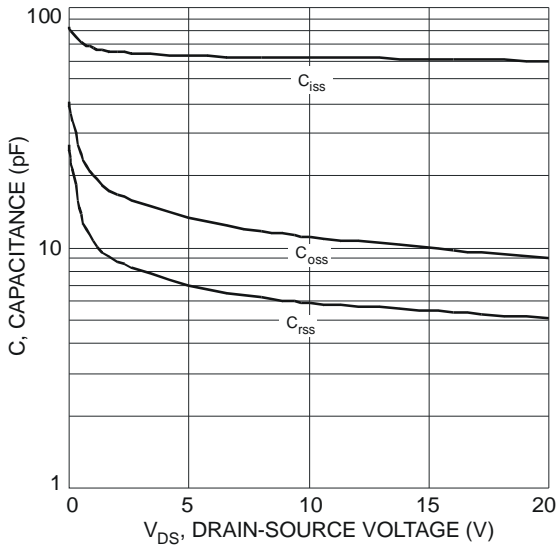


Fig. 9 Typical Capacitance

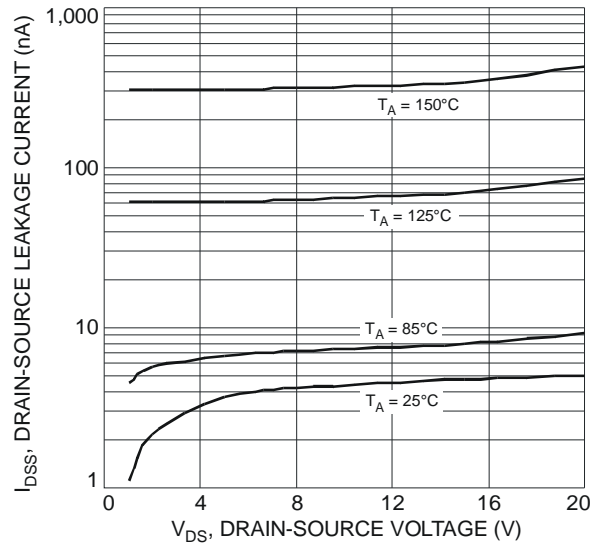


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

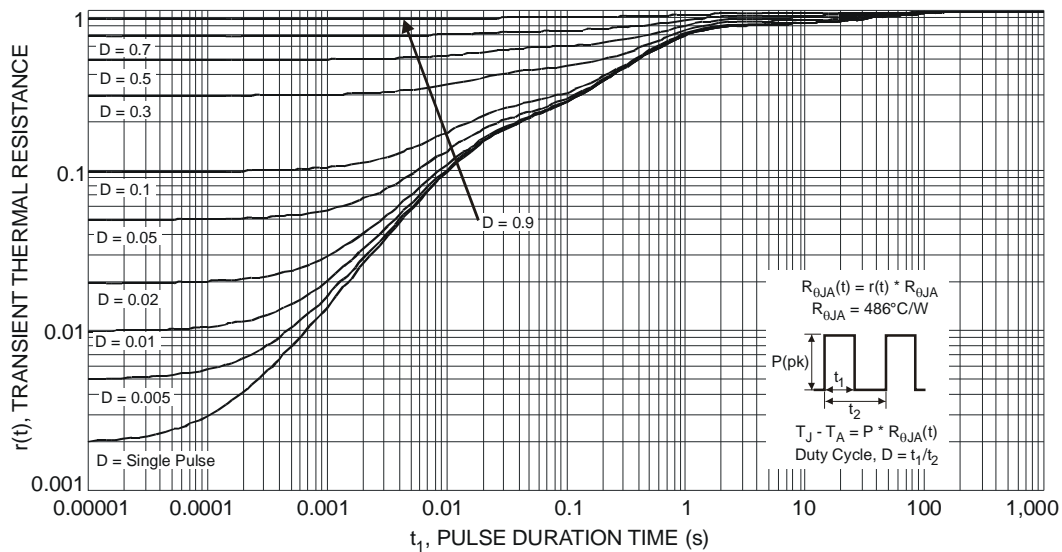
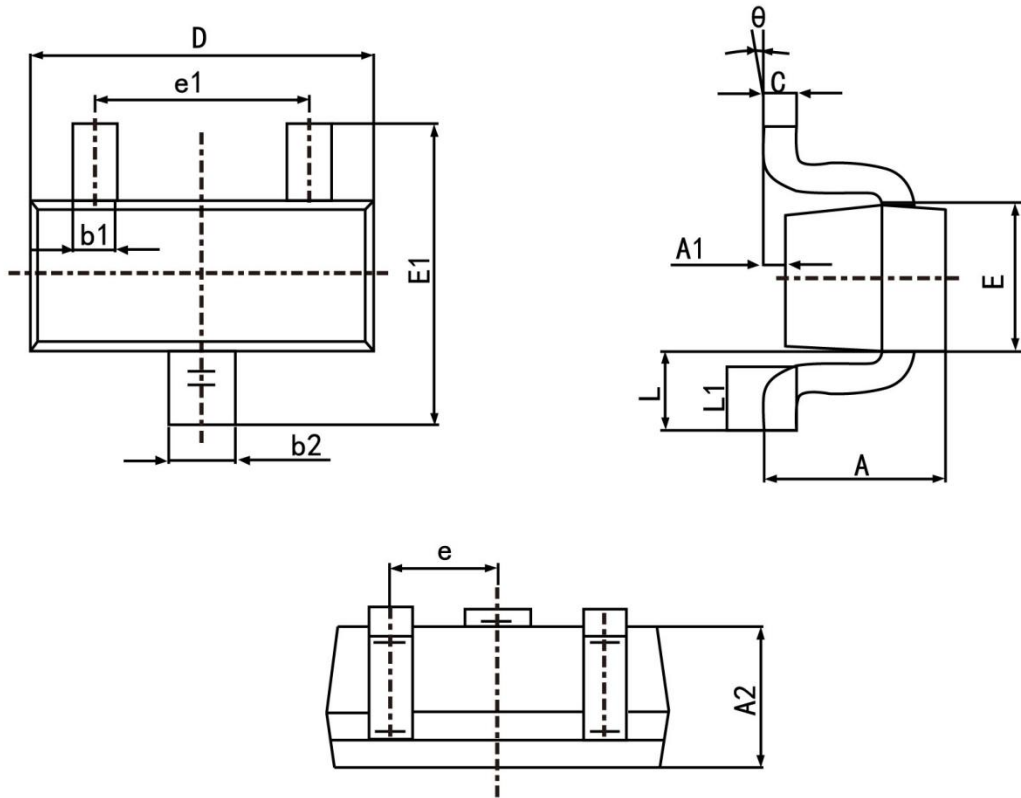


Fig. 11 Transient Thermal Response

**Package Outline**

**SOT-523**

Plastic surface mounted package; 3 leads



Symbol	Dimension in Millimeters	
	Min	Max
A	0.700	0.900
A1	0.000	0.100
A2	0.700	0.800
b1	0.150	0.250
b2	0.250	0.350
c	0.100	0.200
D	1.500	1.700
E	0.700	0.900
E1	1.450	1.750
e	0.500	TYP.
e1	0.900	1.100
L	0.400 REF.	
L1	0.260	0.460
$\theta$	0°	8°

**Summary of Packing Options**

Package	Packing Description	Packing Quantity	Industry Standard
SOT-523	Tape/Reel, 7" reel	3000	EIA-481-1

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