

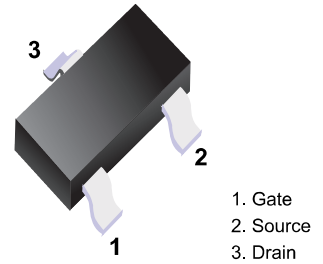
■ P-Channel Enhancement Mode MOSFET

■ Features

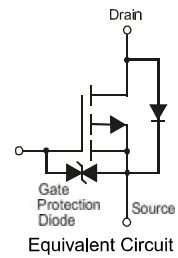
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Lead Free By Design/RoHS Compliant (Note 2)
- ESD Protected Up To 3kV

■ MARKING

Marking	PA1
---------	-----



■ Simplified outline(SOT-523)



■ Absolute Maximum Ratings Ta = 25°C

Characteristic		Symbol	Value	Units	
Drain-Source Voltage		V_{DSS}	-20	V	
Gate-Source Voltage		V_{GSS}	±6	V	
Drain Current (Note 1)	Steady State	I_D	$T_A = 25^\circ\text{C}$	-0.46	A
			$T_A = 85^\circ\text{C}$	-0.33	
Pulsed Drain Current		I_{DM}	-6	A	
Characteristic		Symbol	Value	Units	
Total Power Dissipation (Note 1)		P_D	0.27	W	
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	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 Ta = 25°C

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 $T_J = 25^\circ C$	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.

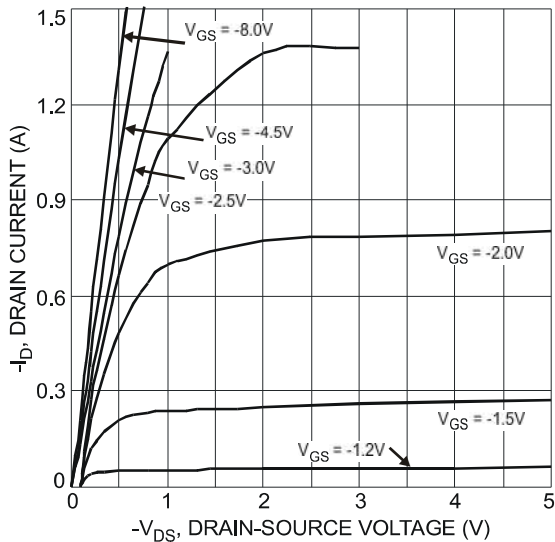


Fig. 1 Typical Output Characteristic

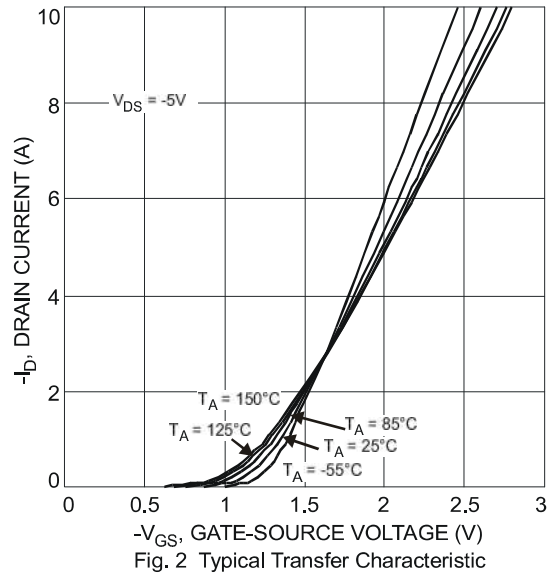
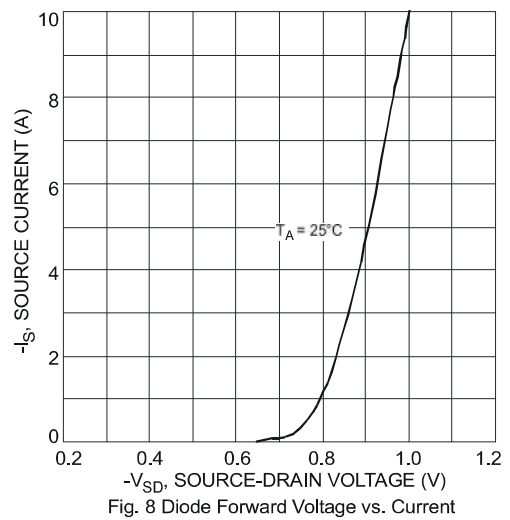
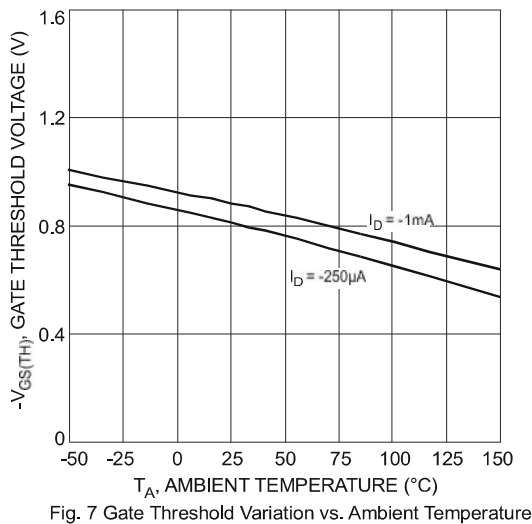
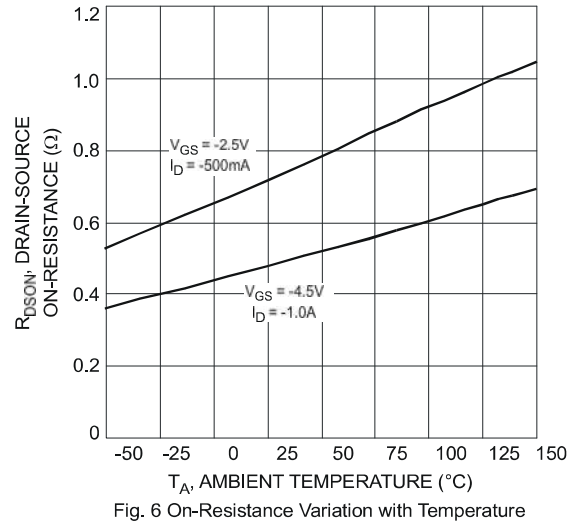
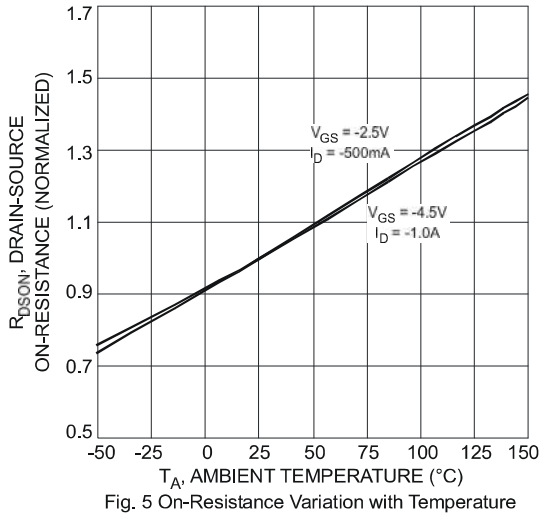
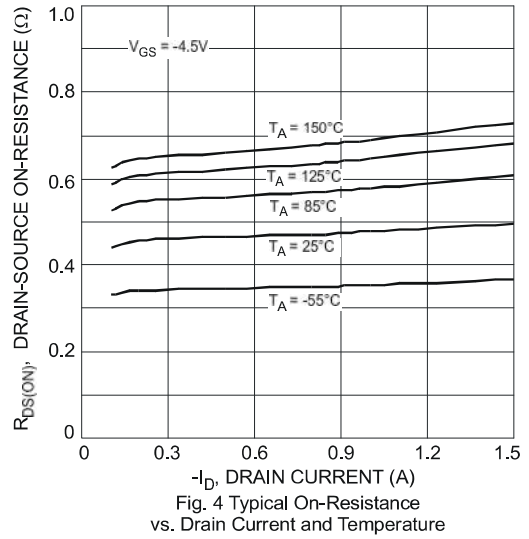
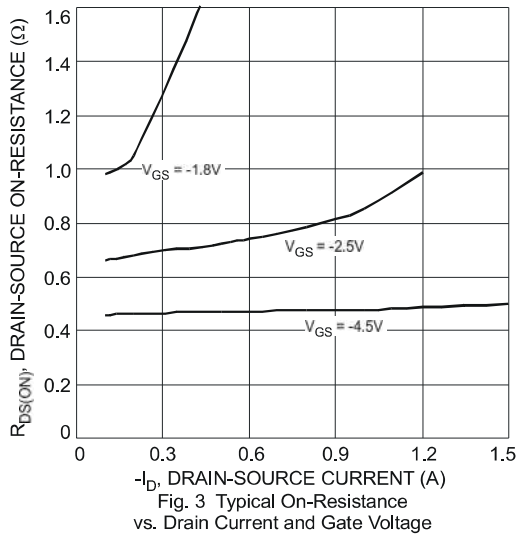


Fig. 2 Typical Transfer Characteristic



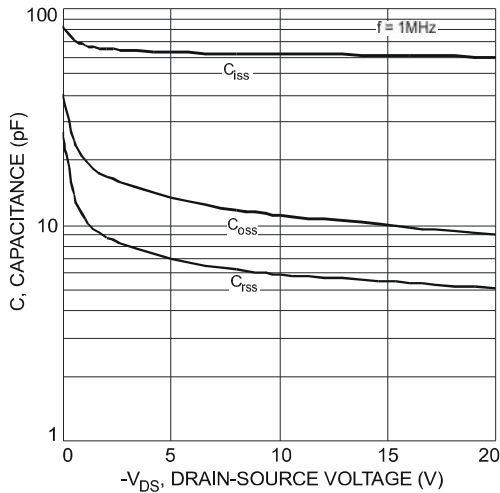


Fig. 9 Typical Total Capacitance

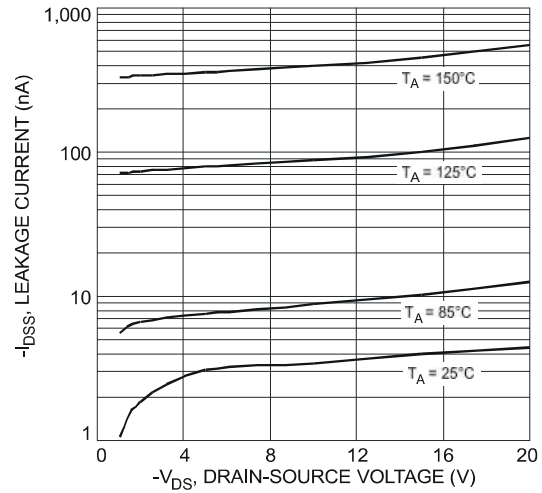


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

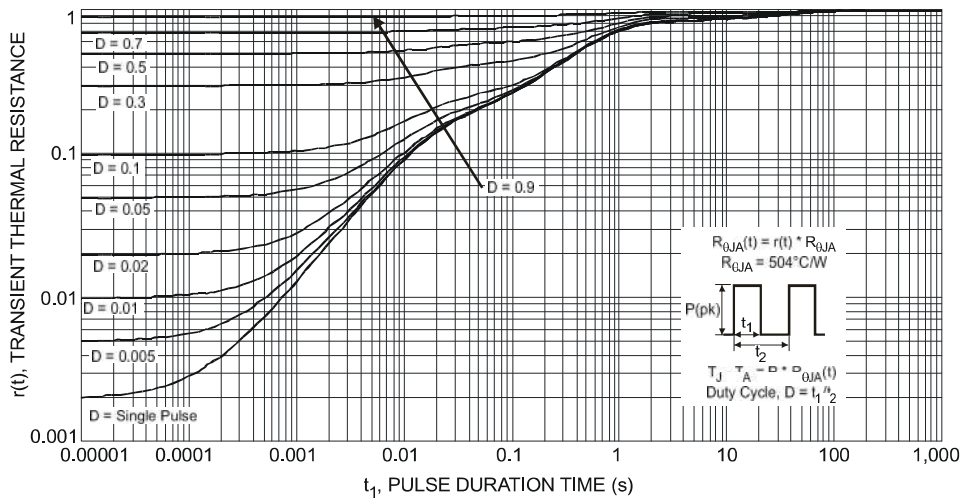
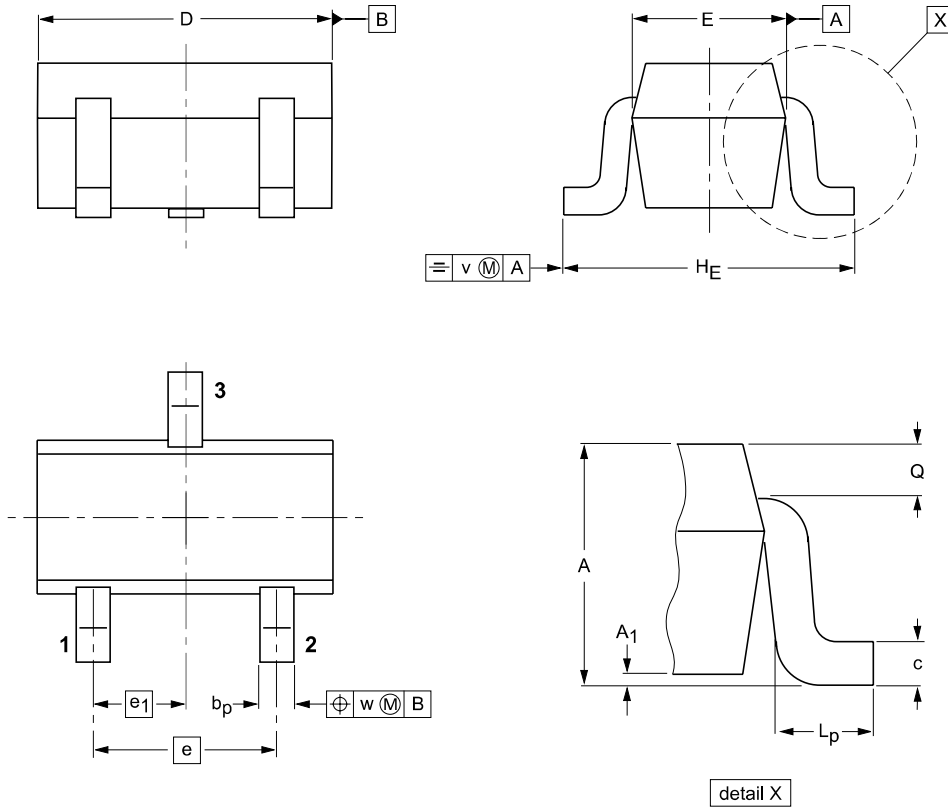


Fig. 11 Transient Thermal Response

Package Outline

SOT-523



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁ max	b _p	c	D	E	e	e ₁	H _E	L _p	Q	v	w
mm	0.95 0.60	0.1	0.30 0.15	0.25 0.10	1.8 1.4	0.9 0.7	1	0.5	1.75 1.45	0.45 0.15	0.23 0.13	0.2	0.2

Summary of Packing Options

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