

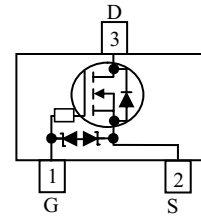
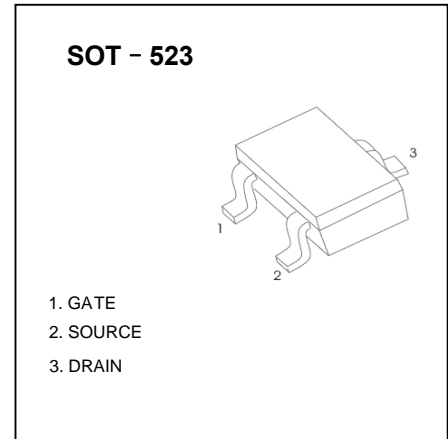
Plastic-Encapsulate MOSFETS

N-Channel, 20V, 0.88A, Small Signal MOSFET

V _{DS} (V)	R _{DS(on)} (Ω)
20	0.220 @ V _{GS} =4.5V
	0.260 @ V _{GS} =2.5V
	0.350 @ V _{GS} =1.8V

Features

- Trench N-Channel
- Super high density cell design for extremely low R_{ds(on)}
- Exceptional ON resistance and maximum DC current capability
- Small package design with SOT-523



Applications

- Driver: Relays, Solenoids, Lamps, Hammers
- Power supply converters circuit
- Load/Power Switching for potable device

Marking: N3

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	10 S	Steady State	Unit	
Drain-Source Voltage	V_{DS}	+20		V	
Gate-Source Voltage	V_{GS}	± 6			
Continuous Drain Current ^a	I_D	$T_A=25^\circ\text{C}$	0.88	0.80	A
		$T_A=70^\circ\text{C}$	0.71	0.64	
Maximum Power Dissipation ^a	P_D	$T_A=25^\circ\text{C}$	0.37	0.30	W
		$T_A=70^\circ\text{C}$	0.23	0.19	
Continuous Drain Current ^b	I_D	$T_A=25^\circ\text{C}$	0.76	0.69	A
		$T_A=70^\circ\text{C}$	0.60	0.55	
Maximum Power Dissipation ^b	P_D	$T_A=25^\circ\text{C}$	0.27	0.22	W
		$T_A=70^\circ\text{C}$	0.17	0.14	
Pulsed Drain Current ^c	I_{DM}	1.4		A	
Operating Junction Temperature	T_J	150		$^\circ\text{C}$	
Lead Temperature	T_L	260		$^\circ\text{C}$	
Storage Temperature Range	T_{stg}	-55 to 150		$^\circ\text{C}$	

Thermal Resistance Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

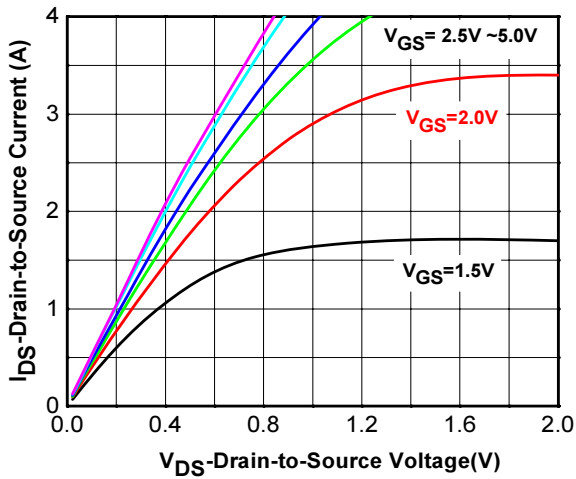
Parameter	Symbol	Typical	Maximum	Unit	
Junction-to-Ambient Thermal Resistance ^a	$R_{\theta JA}$	$t \leq 10$ s	285	335	$^\circ\text{C/W}$
		Steady State	340	405	
Junction-to-Ambient Thermal Resistance ^b	$R_{\theta JA}$	$t \leq 10$ s	385	450	
		Steady State	455	545	
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	260	300		

- a Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper
- b Surface mounted on FR4 board using minimum pad size, 1oz copper
- c Repetitive rating, pulse width limited by junction temperature, $t_p=10\mu\text{s}$, Duty Cycle=1%
- d Repetitive rating, pulse width limited by junction temperature $T_J=150^\circ\text{C}$.

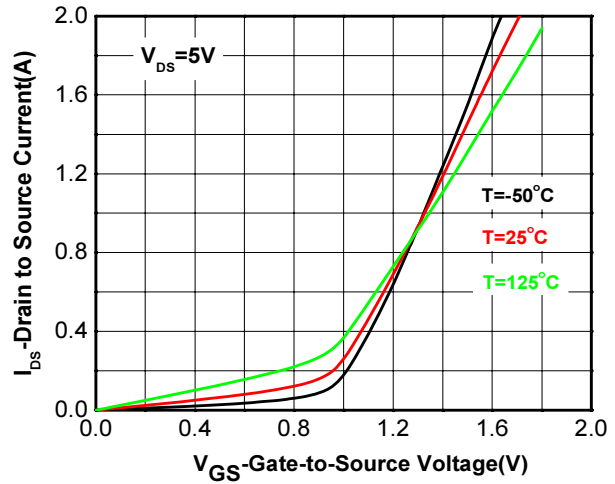
Electronics Characteristics (T_A=25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ.	Max	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =16V, V _{GS} =0V			1	uA
I _{GSS}	Gate –Source leakage current	V _{DS} =0V, V _{GS} =±5V			±5	uA
ON Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =250uA	0.45	0.55	1.0	V
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =4.5V, I _D =0.55A		220	310	mΩ
		V _{GS} =2.5V, I _D =0.45A		260	360	mΩ
		V _{GS} =1.8V, I _D =0.35A		350	490	mΩ
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =0.4A		1.0		S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=100khz		68		pF
C _{oss}	Output Capacitance			9.0		pF
C _{rss}	Reverse Transfer Capacitance			7.5		pF
Q _{G(TOT)}	Total Gate Charge	V _{DS} =10V, V _{GS} =4.5V, I _D =0.55A		1.15		nC
Q _{G(TH)}	Threshold gate charge			0.06		nC
Q _{GS}	Gate-Source Charge			0.15		nC
Q _{GD}	Gate-Drain Charge			0.23		nC
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} =10V, V _{GS} =4.5V, I _D =0.55A, R _G =6Ω		22		ns
t _r	Turn-On Rise Time			80		ns
t _{d(off)}	Turn-Off Delay Time			700		ns
t _f	Turn-Off Fall Time			380		ns
Body Diode Characteristics						
V _{SD}	Forward Diode Voltage	V _{GS} =0V, I _S =0.35A	0.5	0.7	1.5	V

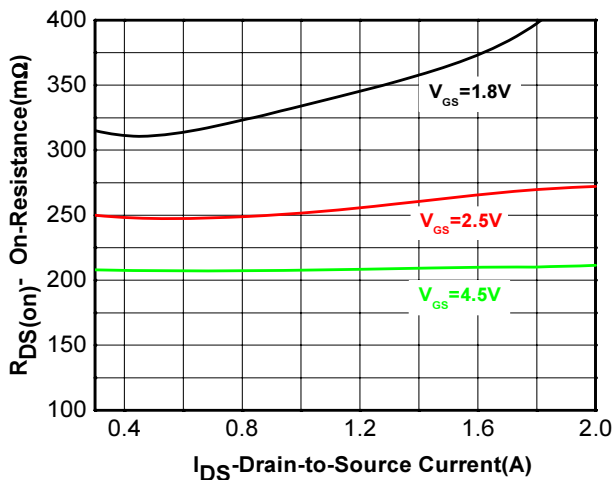
Typical Performance Graph



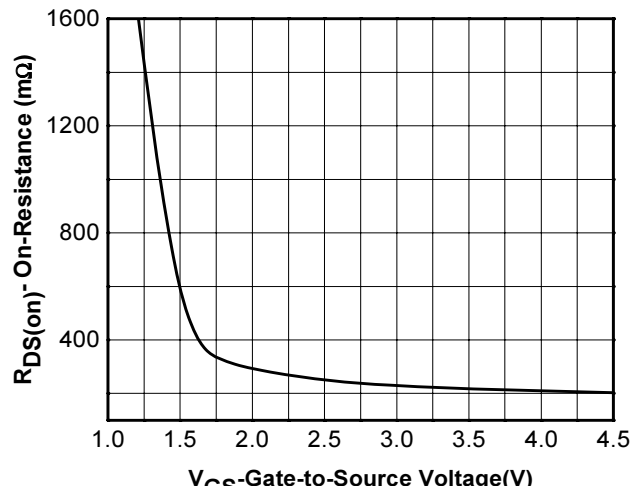
Output Characteristics



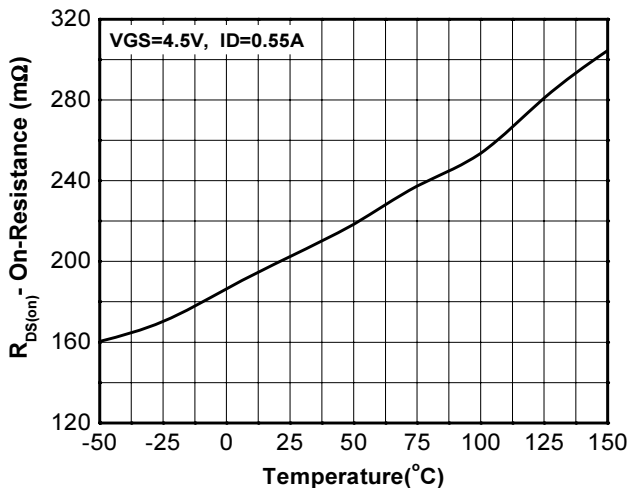
Transfer Characteristics



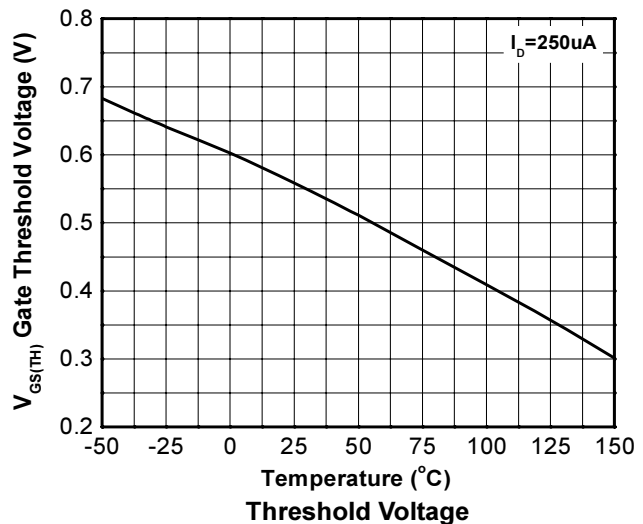
On Resistance vs. Drain Current



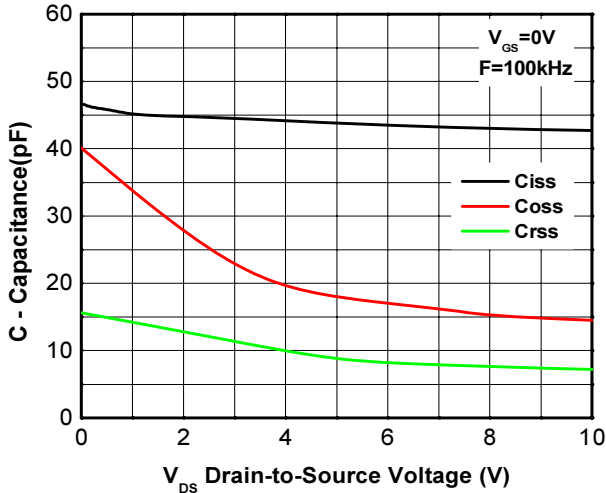
On Resistance vs. V_{GS} vs. Temperature



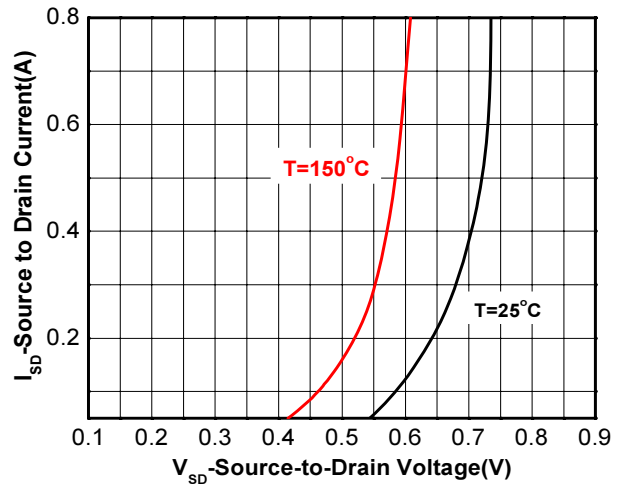
On Resistance vs. Junction Temperature



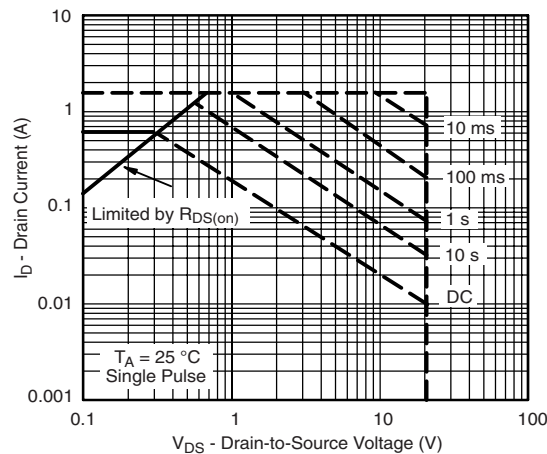
Threshold Voltage



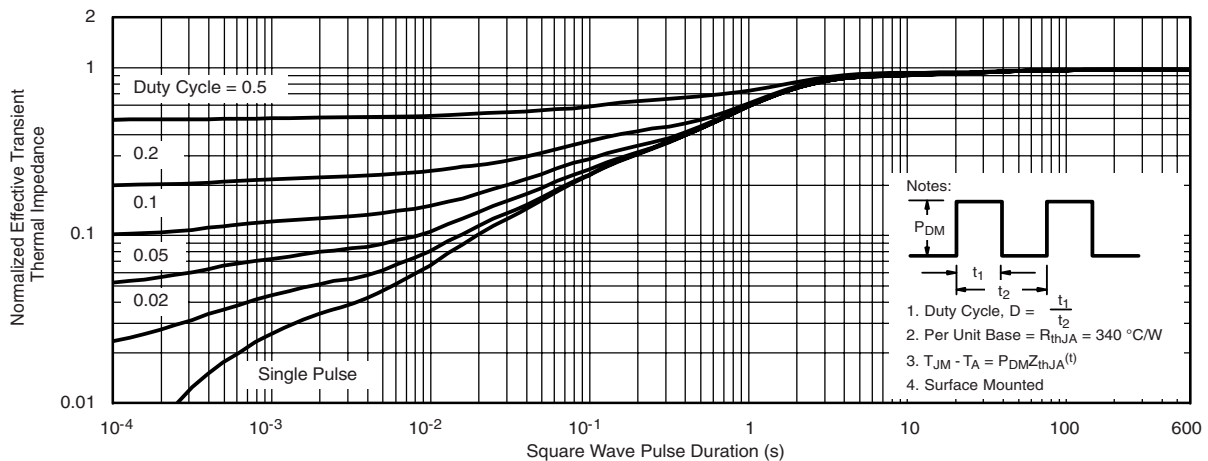
Capacitance



Body Diode Characteristics



Safe Operation Area, Junction-to-Ambient



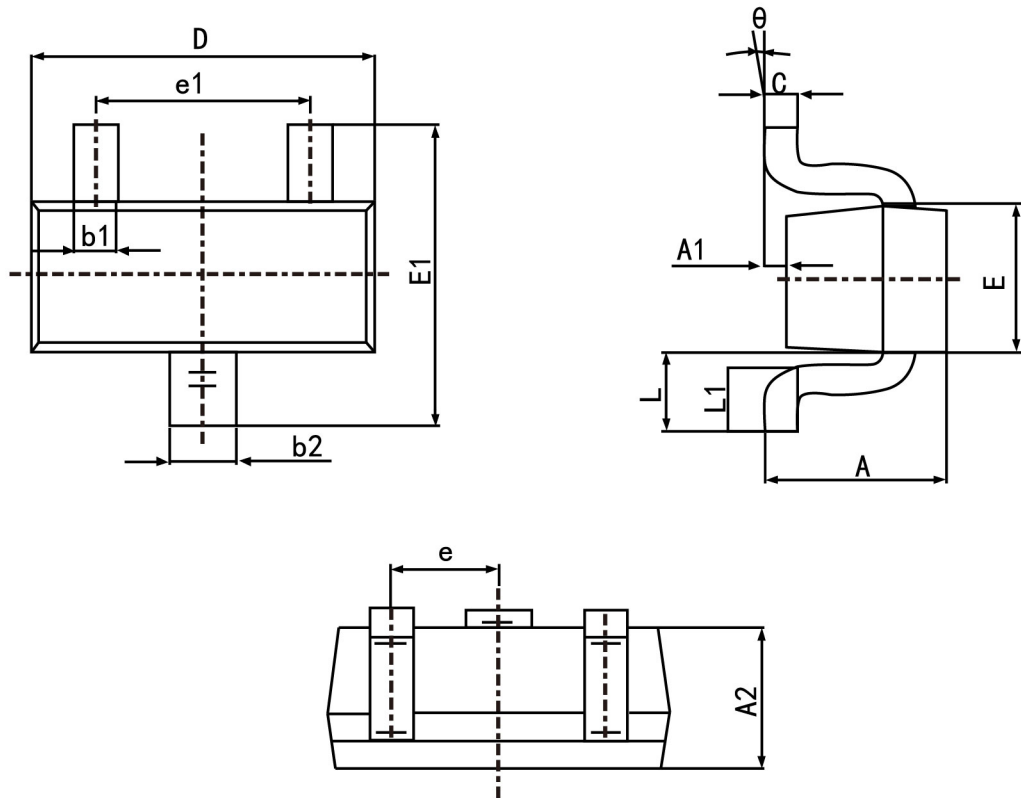
Transient thermal response (Junction-to-Ambient)



PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT-523



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
θ	0°	8°