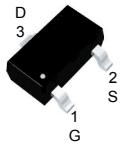
N-Channl Enhancement Mode MOSFET

- 20V/4.2A
- $R_{DS(ON)}$=35mΩ (typ) @VGS=4.5V
  $R_{DS(ON)}$=44mΩ (typ) @VGS=2.5V
- 100% UIS & RG Tested
- Reliableand Rugged
- Lead Freeand Green Devices Available
  (RoHS Compliant)

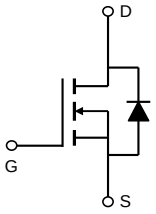
Applications

- Power Management for Industrial DC/DC
  Converters

Pin Description



Top View of SOT-523



N-Channel MOSFET

Absolute Maximum Ratings (T_A= 25°C unless otherwise noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V_{DSS}	Drain-Source Voltage		20	V
V_{GSS}	Gate-Source Voltage		±12	
ID	Continuous Drain Current	T_A=25°C	4.2	A
		T_A=70°C	3.3	
I_{DM}	Pulsed Drain Current [C]		18	
I_S	Diode Continuous Forward Current	Tc=25°C	-2	A
T_{STG}, T_j	Storage Temperature Range		-55 to 150	°C
PD	Power Dissipation [B]	T_A=25°C	1.25	W
		T_A=70°C	0.8	
$R_{\theta JL}$	Thermal Resistance-Junction to Lead		80	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient [A D]	t≤10S	90	°C/W
		Steady-State	125	

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0V	20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20V, V_{GS}=0V			1	μA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±12V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=$V_{GS,}$ I_D=250μA	0.5	0.8	1.1	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=4.5V, I_D=4.2A		35	40	mΩ
		T_J=125°C		40	43.6	
		V_{GS}=2.5V, I_D=5A		44	55	mΩ
		V_{GS}=1.8V, I_D=5A		55	67	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=6.5A		50		S
V_{SD}	Diode Forward Voltage	I_S=1A, V_{GS}=0V		0.6	1	V
I_S	Maximum Body-Diode Continuous Current				2	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=10V, f=1MHz		660		pF
C_{oss}	Output Capacitance			100		pF
C_{rss}	Reverse Transfer Capacitance			80		pF
R_g	Gate resistance	f=1MHz	2	4	6	Ω
SWITCHING PARAMETERS						
Q_g(4.5V)	Total Gate Charge	V_{GS}=4.5V, V_{DS}=10V, I_D=6.5A		7	14	nC
Q_{gs}	Gate Source Charge			1		nC
Q_{gd}	Gate Drain Charge			2		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=4.5V, V_{DS}=10V, R_L=1.54Ω, R_{GEN}=3Ω		7		ns
t_r	Turn-On Rise Time			10		ns
$t_{D(off)}$	Turn-Off DelayTime			32		ns
t_f	Turn-Off Fall Time			11		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=6.5A, di/dt=500A/μs		8		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=6.5A, di/dt=500A/μs		6		nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A =25° C. The value in any given application depends on the user's specific board design.
B. The power dissipation P_D is based on $T_{J(MAX)}$=150° C, using ≤ 10s junction-to-ambient thermal resistance.
C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150° C. Ratings are based on low frequency and duty cycles to keep initialT_J=25° C.
D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}$=150° C. The SOA curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

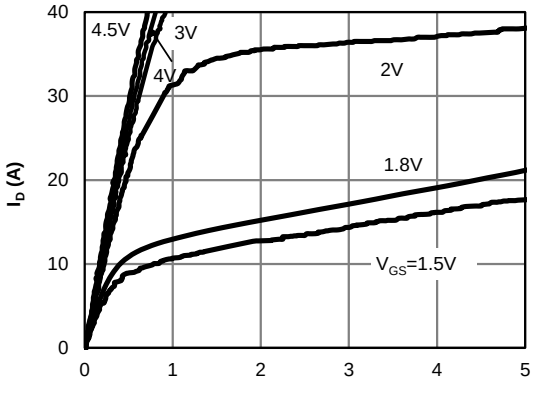


Figure 1: On-Region Characteristics (Note E)

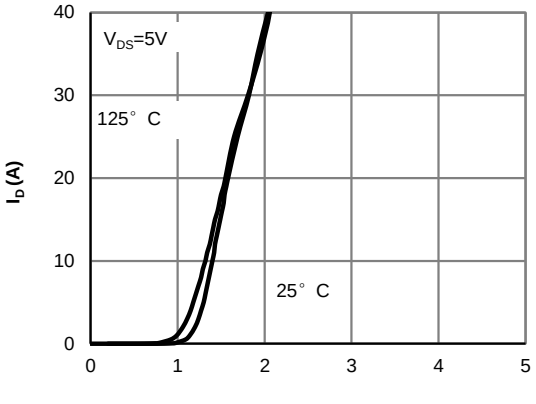


Figure 2: Transfer Characteristics (Note E)

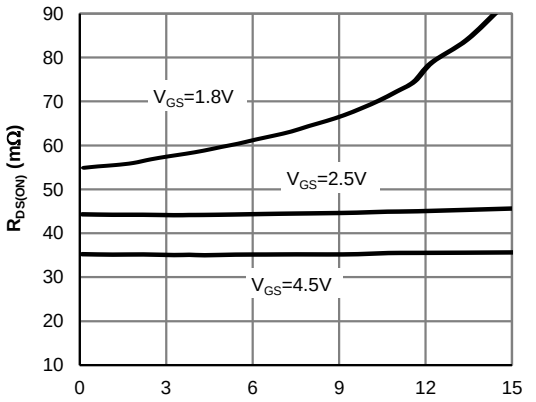


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

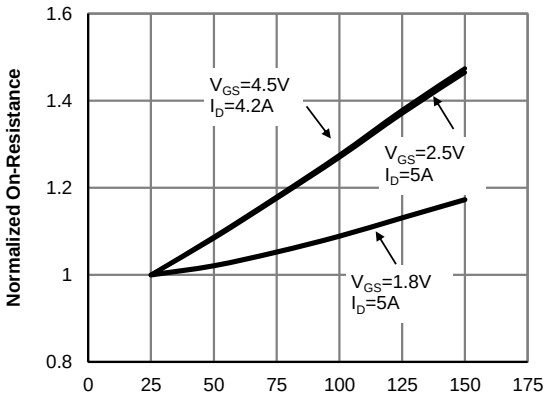


Figure 4: On-Resistance vs. Junction Temperature (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

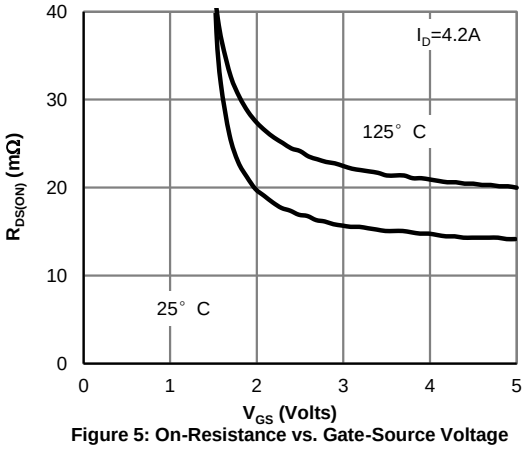


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

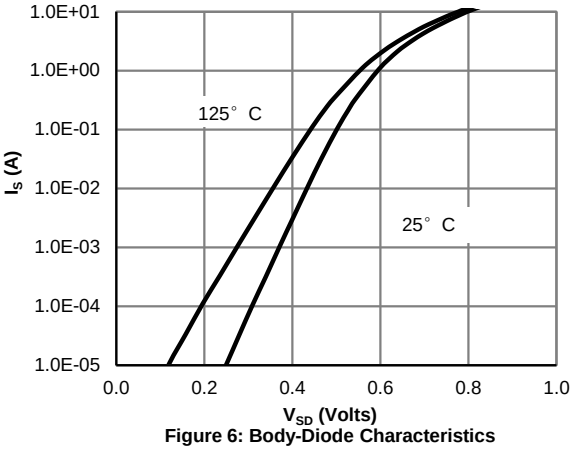


Figure 6: Body-Diode Characteristics (Note E)

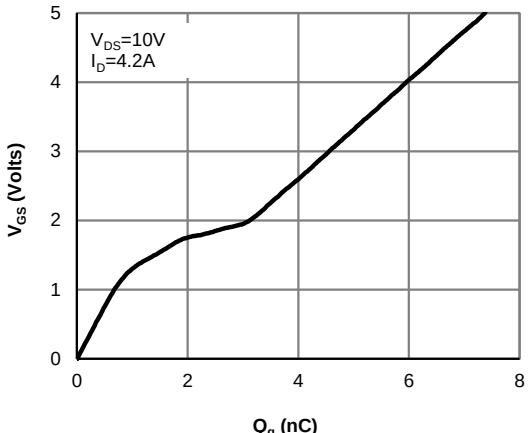


Figure 7: Gate-Charge Characteristics

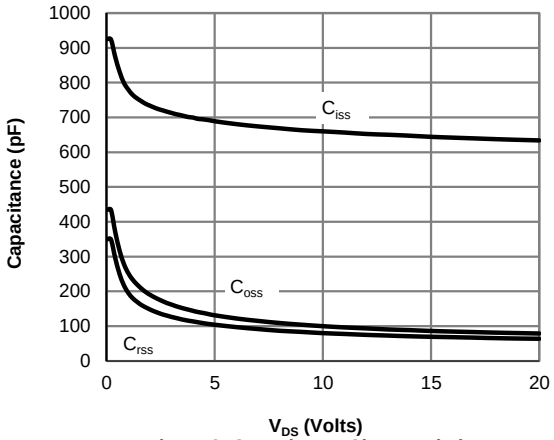
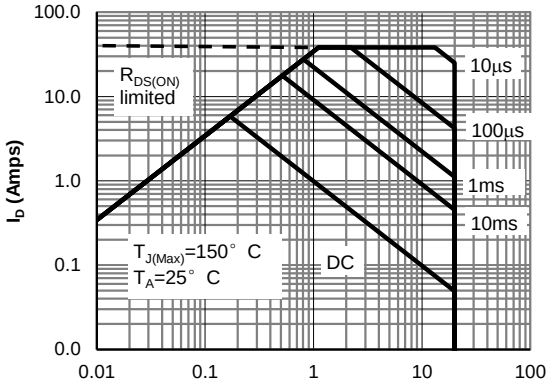


Figure 8: Capacitance Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



V_{GS}> or equal to 1.8V

Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

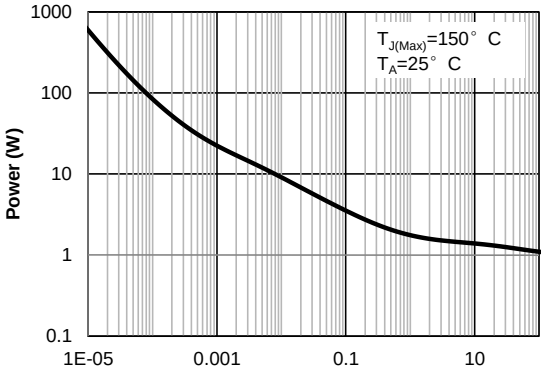


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

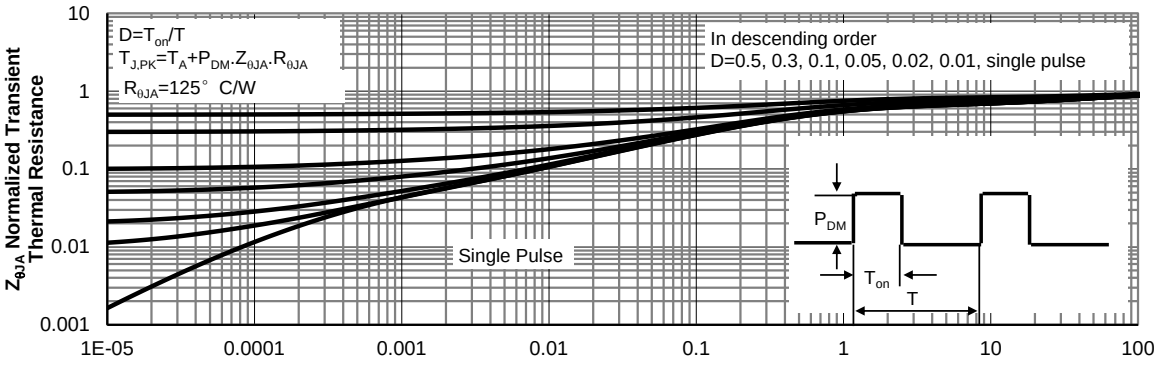
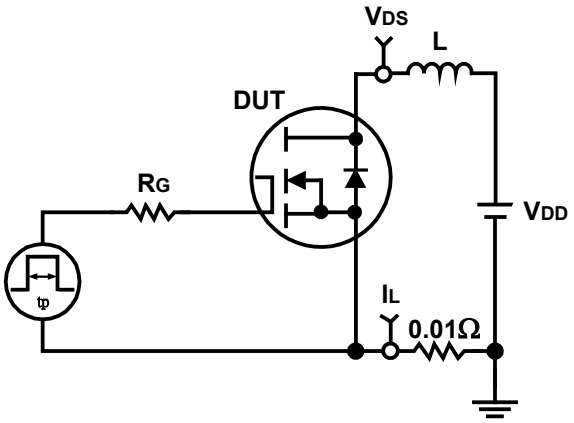
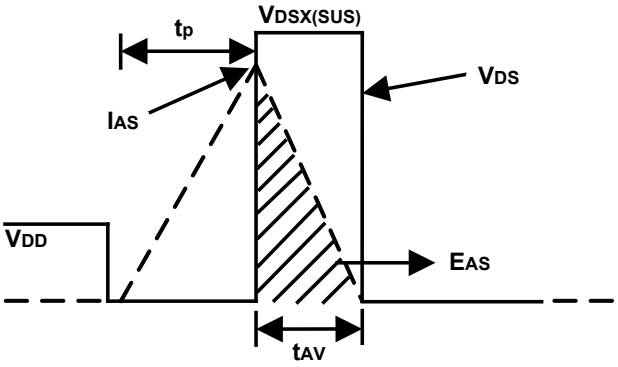


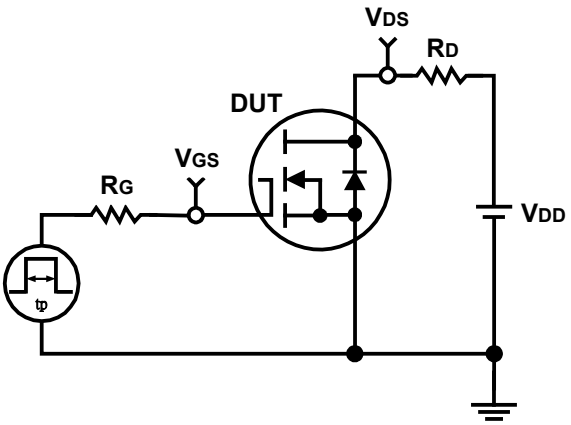
Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

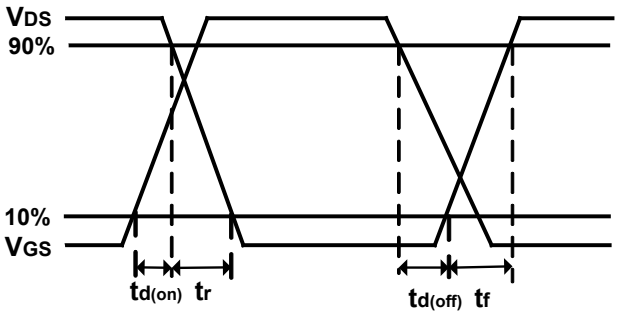
Avalanche Test Circuit and Waveforms

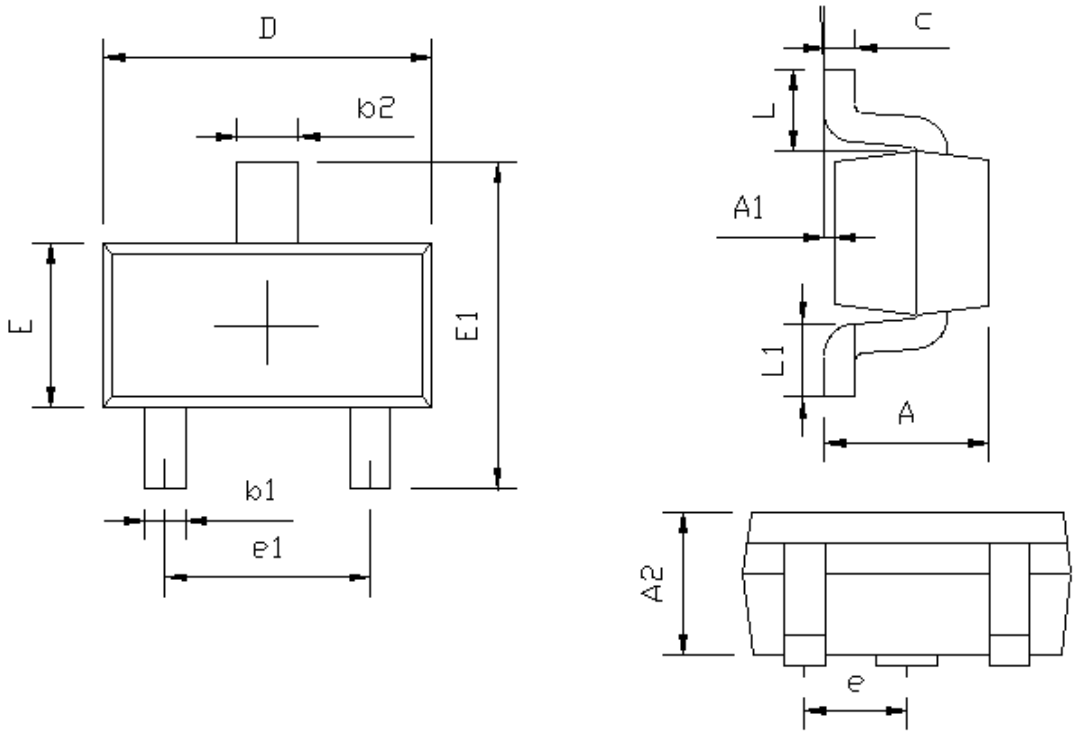




Switching Time Test Circuit and Waveforms







RECOMMENDED LAND PATTERN