



N-Channel Enhancement Mode Power MOSFET

General Features

- $V_{DS} = 50V, I_D = 0.3A$

$$R_{DS(ON)} < 3.5\Omega @ V_{GS}=4.5V$$

$$R_{DS(ON)} < 2.5\Omega @ V_{GS}=10V$$

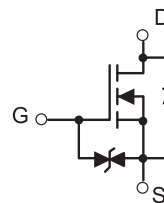
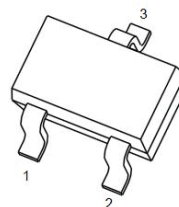
- High power and current handing capability
- Lead free product
- Surface mount package

Application

- Direct logic-level interface: TTL/CMOS
- Drivers: relays, solenoids, ILamps, hammers, display, memories, transistors, etc.
- Battery operated systems
- Solid-state relays

SOT-323

1. GATE
2. SOURCE
3. DRAIN

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	50	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	0.3	A
Drain Current-Pulsed (Note 1)	I_{DM}	1.2	A
Maximum Power Dissipation @25 °C	P_D	0.2	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	620	°C/W
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Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	50		-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=50V, V_{GS}=0V$	-	-	1	μA



Gate-Body Leakage Current	I _{GSS}	V _{GS} =±10V,V _{DS} =0V	-	±110	±500	nA
		V _{GS} =±12V,V _{DS} =0V	-	±0.3	±10	uA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	0.6	1.0	1.4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = 4.5V, I _D =0.2A	-		3.5	Ω
		V _{GS} =10V, I _D =0.2A	-	1	2.5	Ω
Forward Transconductance	g _{FS}	V _{DS} =10V,I _D =0.2A	0.2	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{ISS}	V _{DS} =25V,V _{GS} =0V, F=1.0MHz	-	30	-	PF
Output Capacitance	C _{OSS}		-	15	-	PF
Reverse Transfer Capacitance	C _{RSS}		-	6	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V,I _D =0.22A V _{GS} =10V,R _{GEN} =6Ω	-	-	5	nS
Turn-on Rise Time	t _r		-	-	5	nS
Turn-Off Delay Time	t _{d(off)}		-	-	60	nS
Turn-Off Fall Time	t _f		-	-	35	nS
Total Gate Charge	Q _g	V _{DS} =25V,I _D =0.2A, V _{GS} =10V	-	-	2.4	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V,I _S =0.22A	-	-	1.0	V
Diode Forward Current (Note 2)	I _S		-	-	0.22	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production



Typical Electrical and Thermal Characteristics

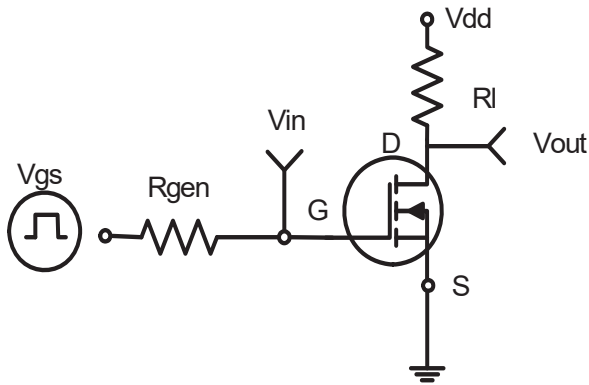


Figure 1: Switching Test Circuit

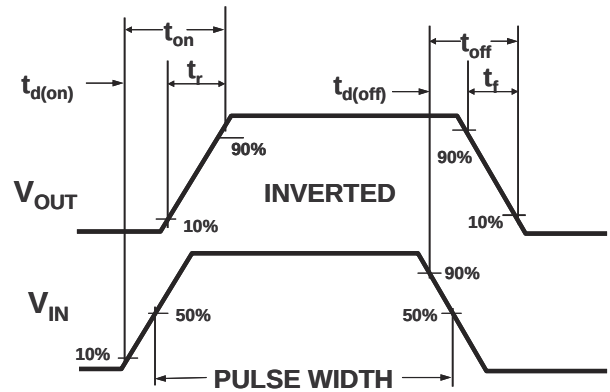


Figure 2: Switching Waveforms

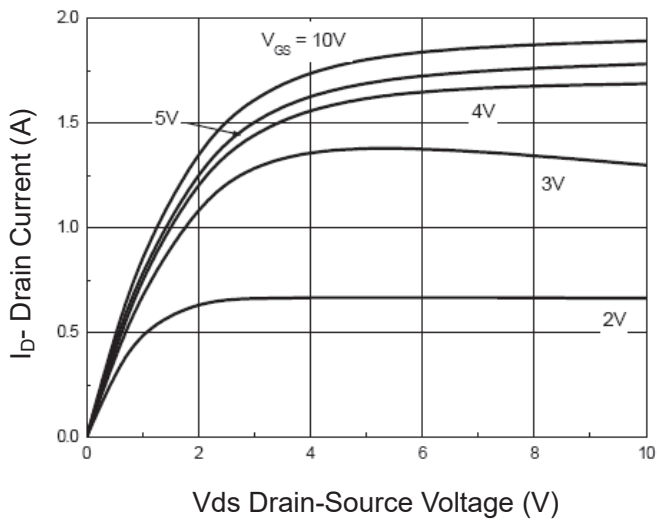


Figure 3 Output Characteristics

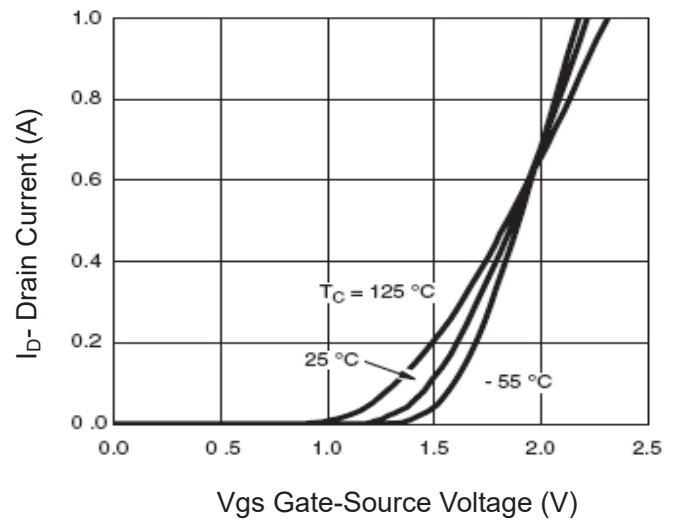


Figure 4 Transfer Characteristics

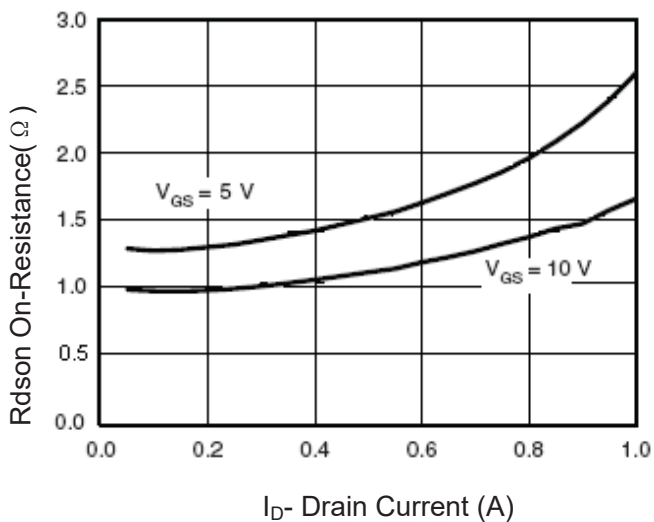


Figure 5 Drain-Source On-Resistance

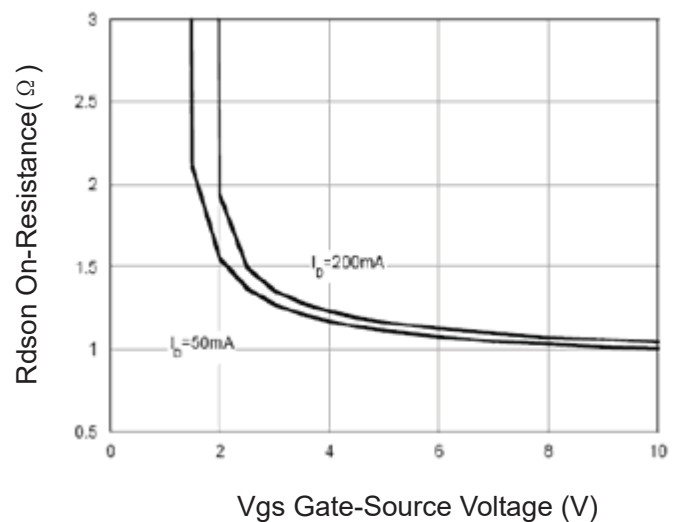


Figure 6 Rdson vs Vgs

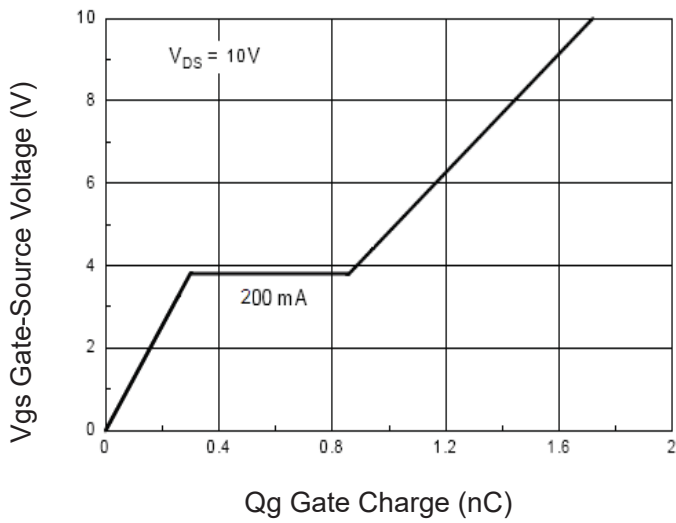


Figure 7 Gate Charge

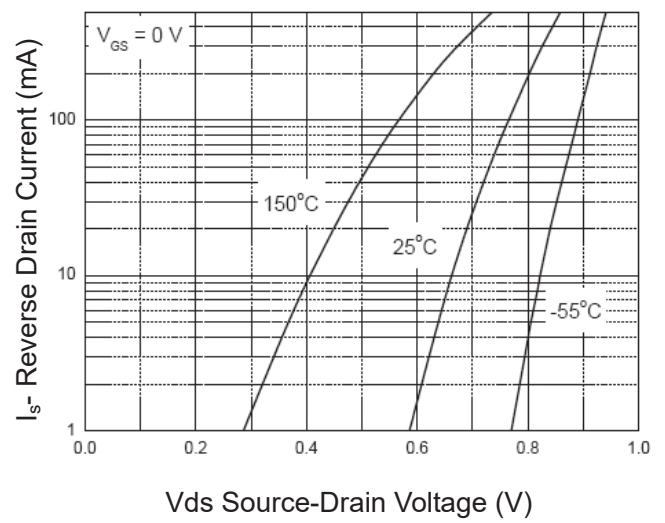


Figure 8 Source-Drain Diode Forward

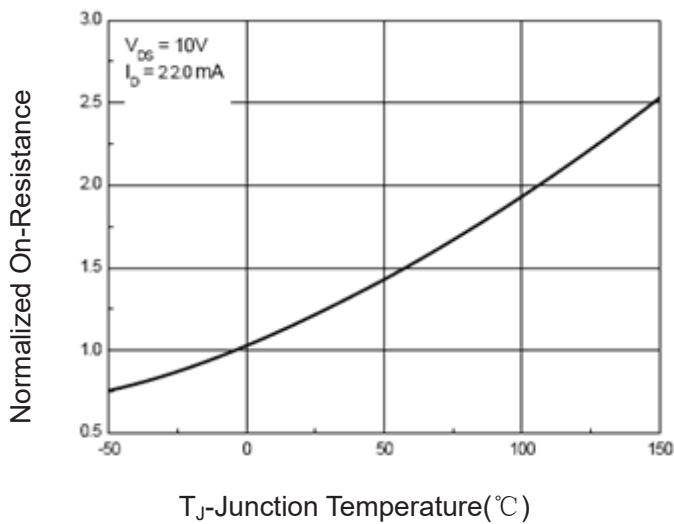


Figure 9 Drain-Source On-Resistance

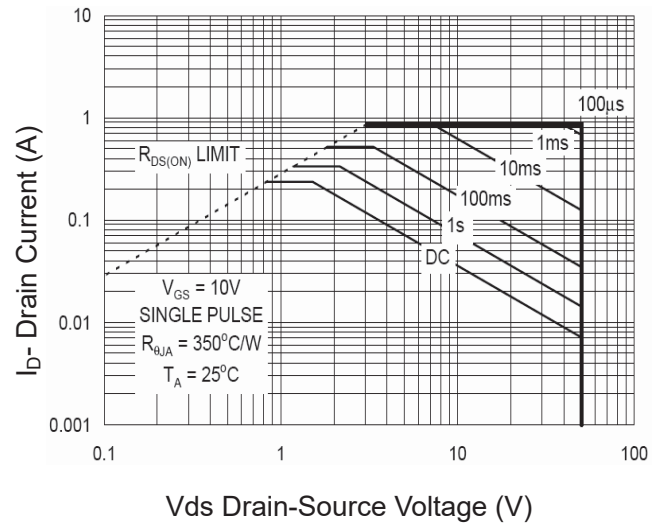


Figure 10 Safe Operation Area

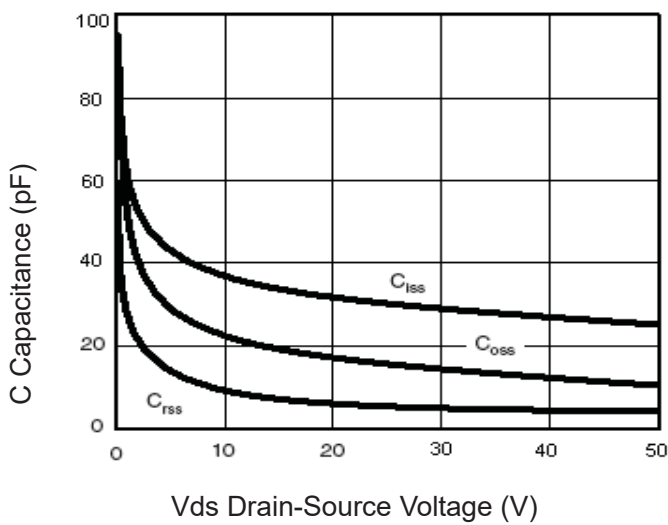


Figure 11 Capacitance vs Vds

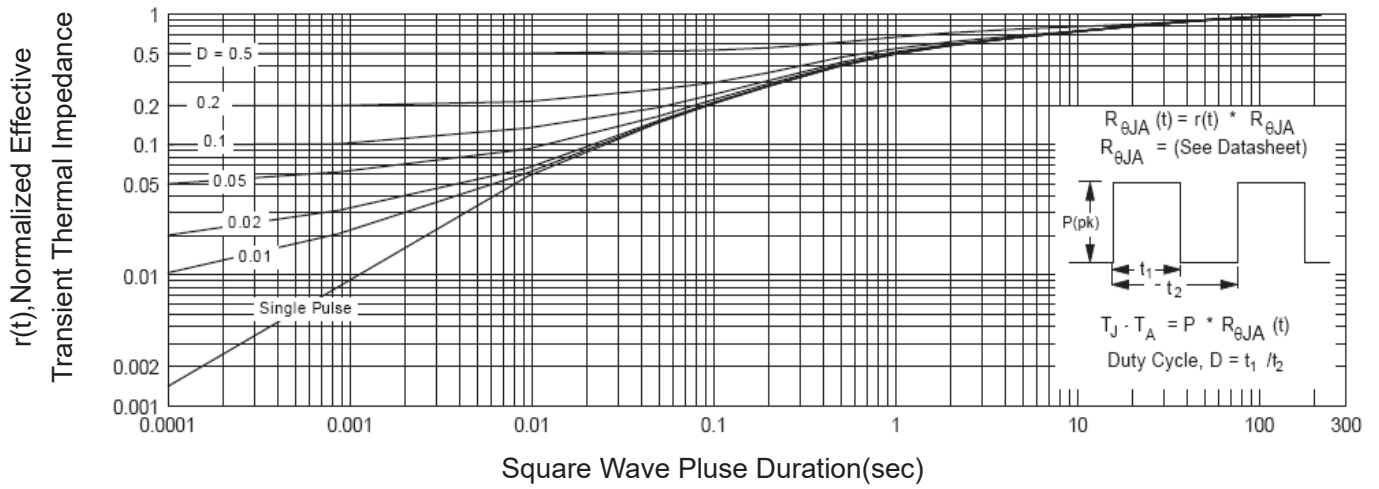
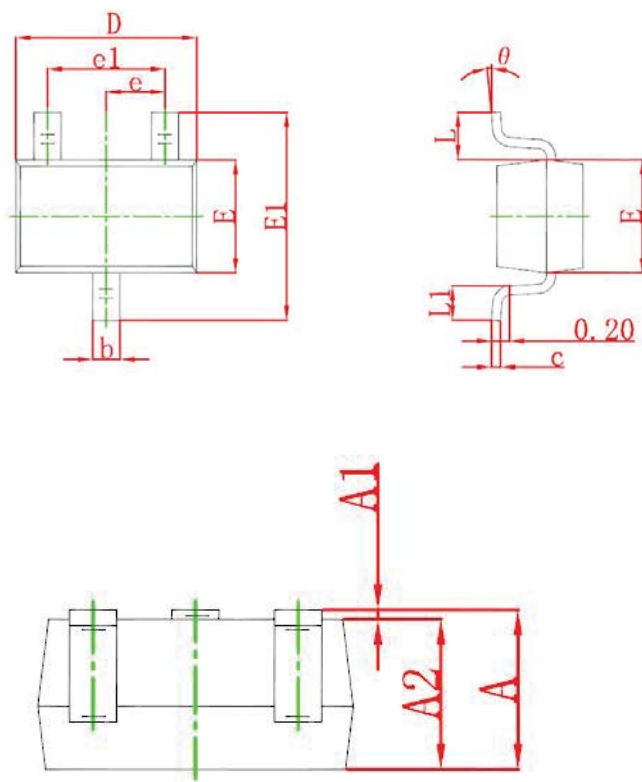


Figure 12 Normalized Maximum Transient Thermal Impedance



SOT-323 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°