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TPM2302GS3

20V N-Channel MOSFET

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Product Summary

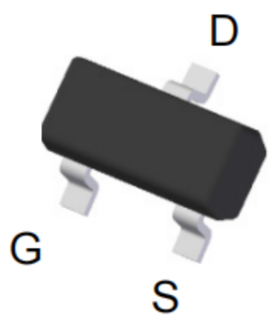
BV_{DSS}	20V
$R_{DS(ON)}$	45mΩ
I_D	4A

Application

* Load/Power switch
* Interfacing, logic switching
* Battery management for ultra protable electronics

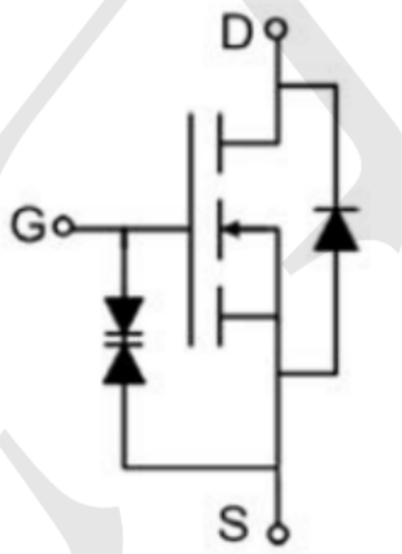
Package and Pin Configuration

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Marking: 2302 Or 2302x

Circuit diagram



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

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	4	A
Drain Current-Pulsed[1]	I_{DM}	10	A
Maximum Power Dissipation	P_D	1	W
Thermal Resistance, Junction-to-Ambient[2]	$R_{\theta JA}$	125	°C/W
Storage Temperature Range	T_{STG}	-55 To +150	°C
Operating Junction Temperature Range	T_J	-55 To +150	°C

Electrical Characteristics (T_A=25°C unless otherwise specified)

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Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	20	22	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V , V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V, V_{DS}=0V	-	-	±100	nA
On Characteristics[3]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.5	0.85	1.2	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=2.5V, I_D=2.5A	-	37	59	mΩ
		V_{GS}=4.5V, I_D=2.9A	-	30	45	
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=2.9A	-	8	-	S
Dynamic Characteristics[4]						
Input Capacitance	C_{lss}	V_{DS}=10V, V_{GS}=0V, F=1MHz	-	300	-	pF
Output Capacitance	C_{oss}		-	120	-	
Reverse Transfer Capacitance	C_{rss}		-	80	-	
Switching Characteristics[4]						
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=10V, V_{GS}=4.5V, I_D=2.9A, R_{GEN}=6Ω	-	10	15	nS
Turn-On Rise Time	t_r		-	50	85	
Turn-Off Delay Time	$t_{d(off)}$		-	17	45	
Turn-Off Fall Time	t_f		-	10	20	
Total Gate Charge	Q_g	V_{DS}=10V, I_D=2.9A, V_{GS}=4.5V	-	4	10	nC
Gate-Source Charge	Q_{gs}		-	0.65	-	
Gate-Drain Charge	Q_{gd}		-	1.2	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage[3]	V_{SD}	V_{GS}=0V, I_S=2.9A	-	0.75	1.2	V
Continuous Source Current[2]	I_S		-	-	4	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design

Typical Electrical and Thermal Characteristic Curves

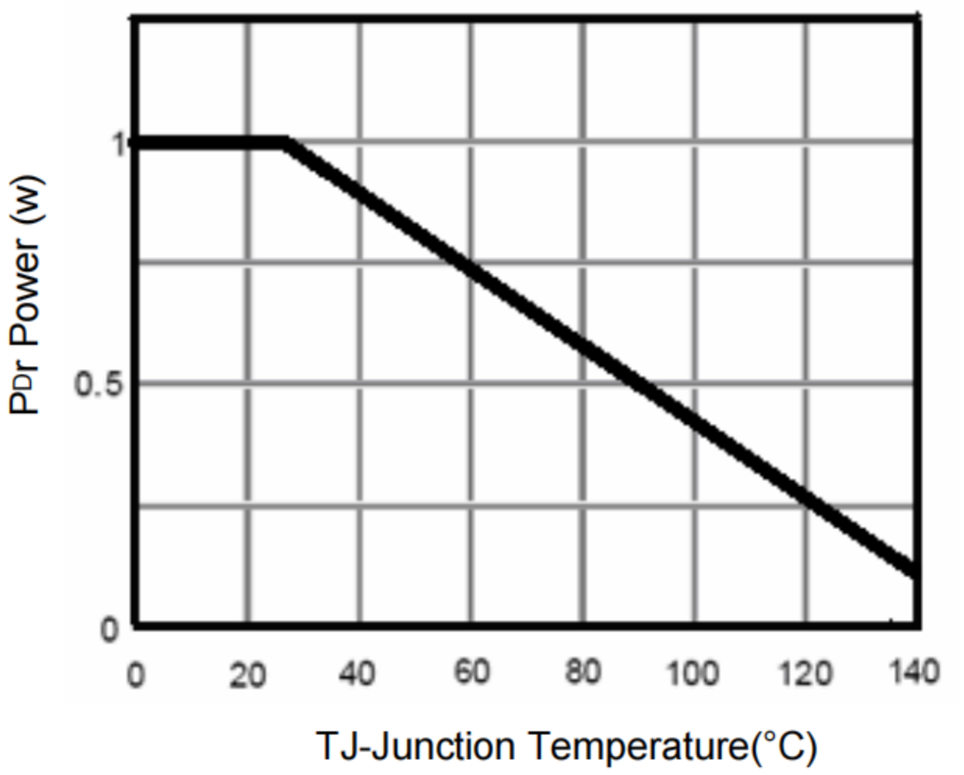


Figure 1. Power Dissipation

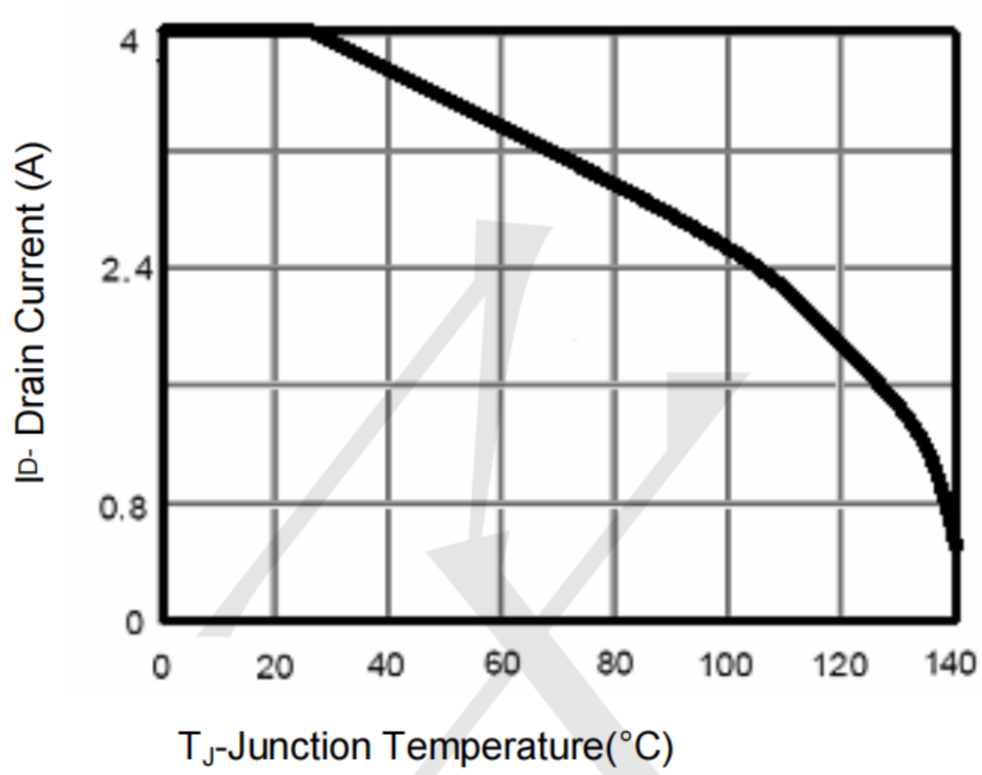


Figure 2. Drain Current

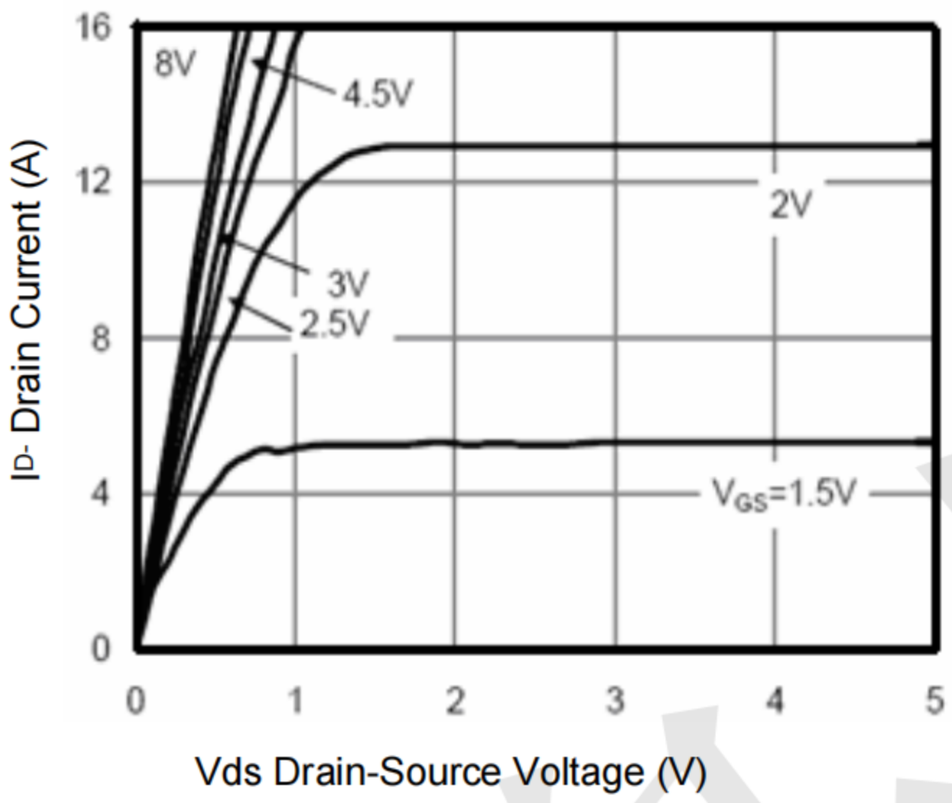


Figure 3. Output Characteristics

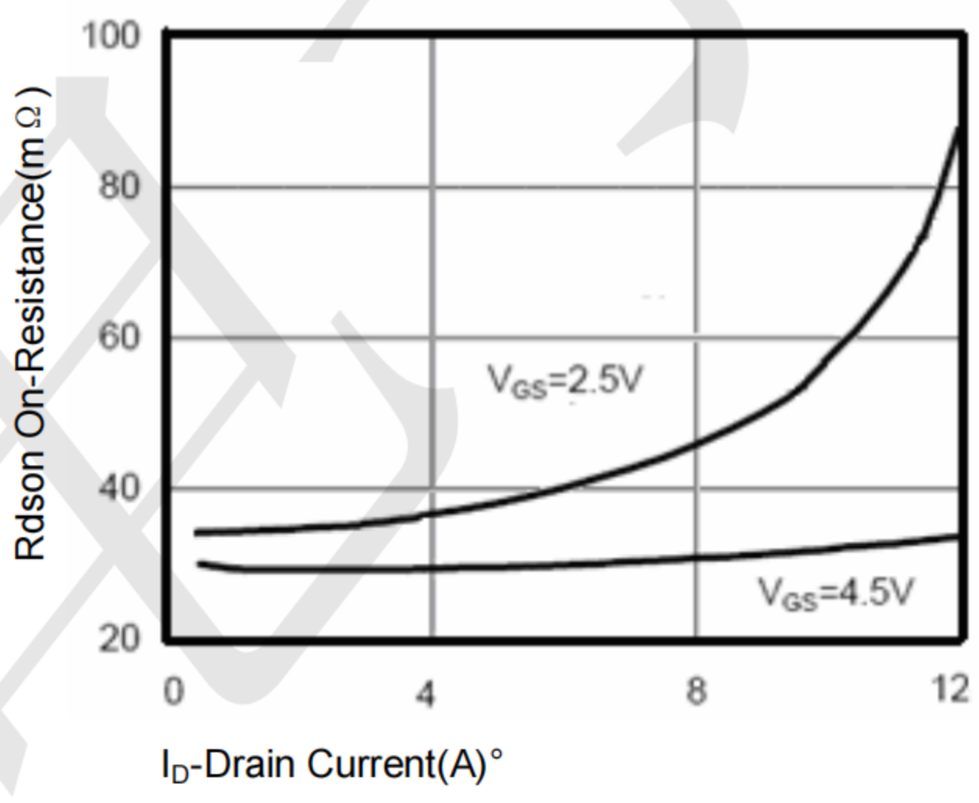


Figure 4. Drain-Source On-Resistance

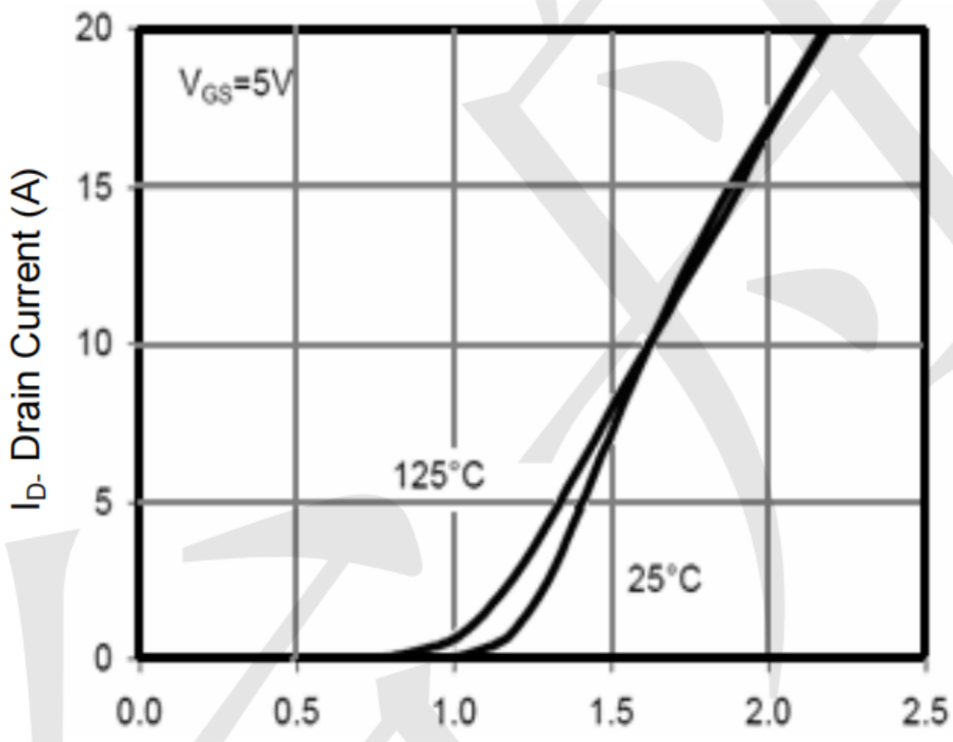


Figure 5. Transfer Characteristics

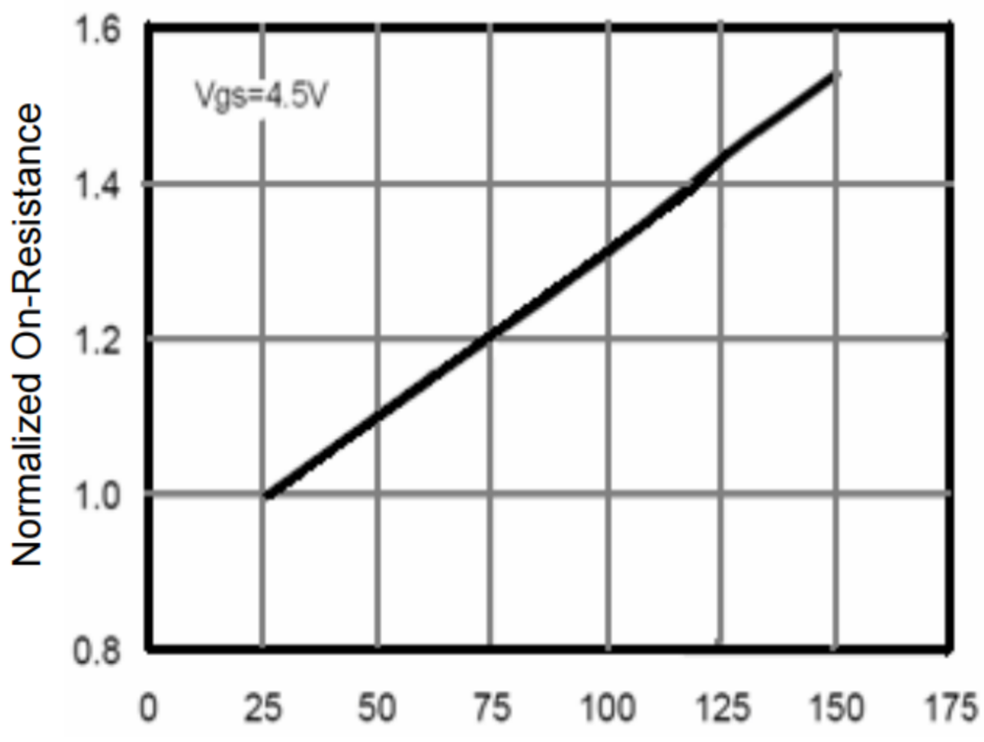


Figure 6. Drain-Source On-Resistance

Typical Electrical and Thermal Characteristic Curves

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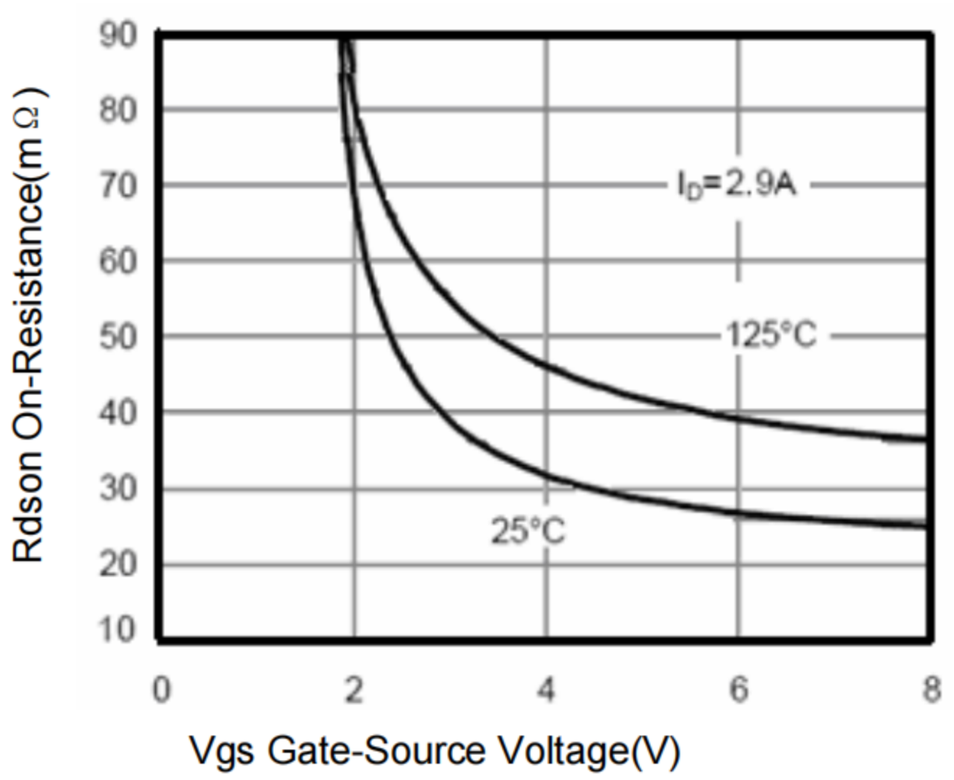


Figure 7. Rdson vs. V_{GS}

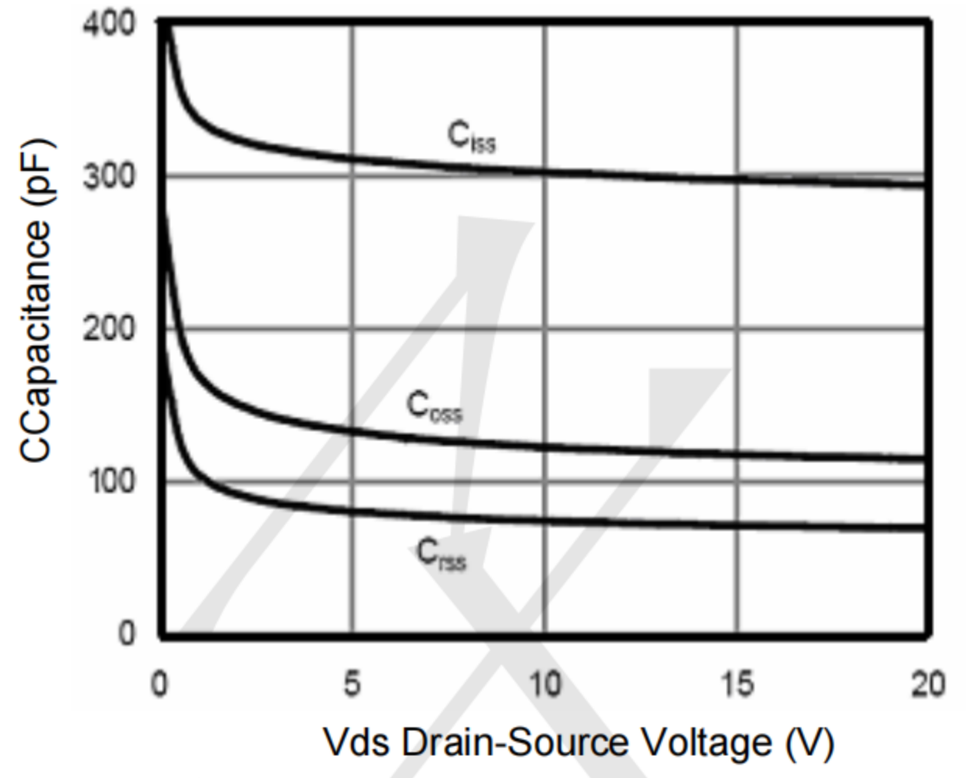


Figure 8. Capacitance vs V_{ds}

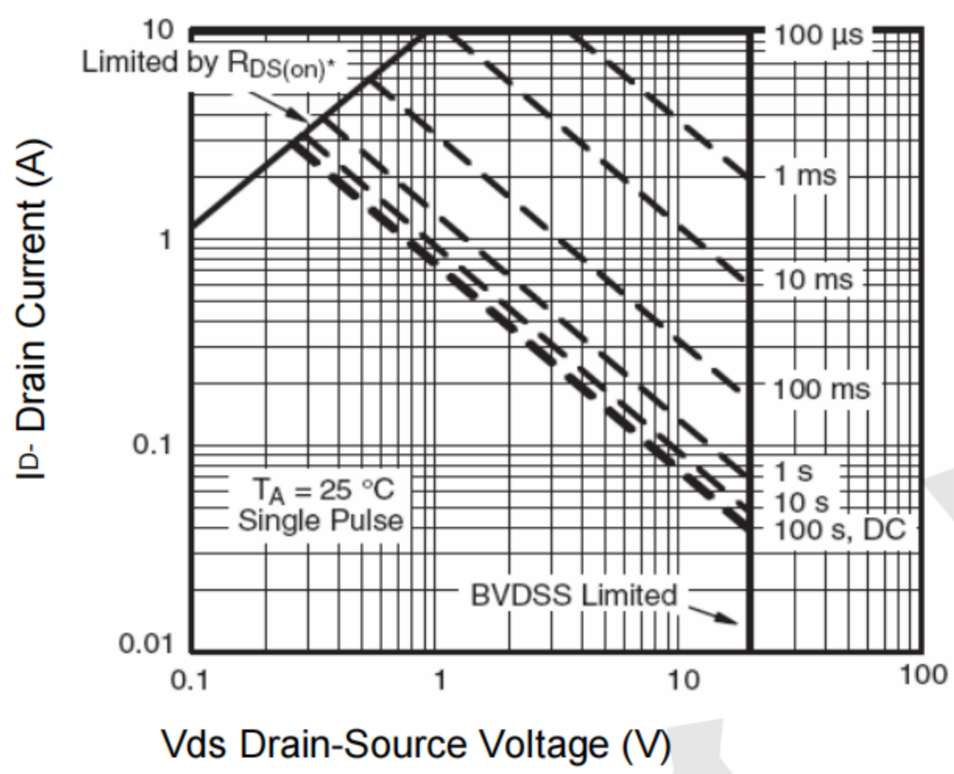


Figure 9. Safe Operation Area

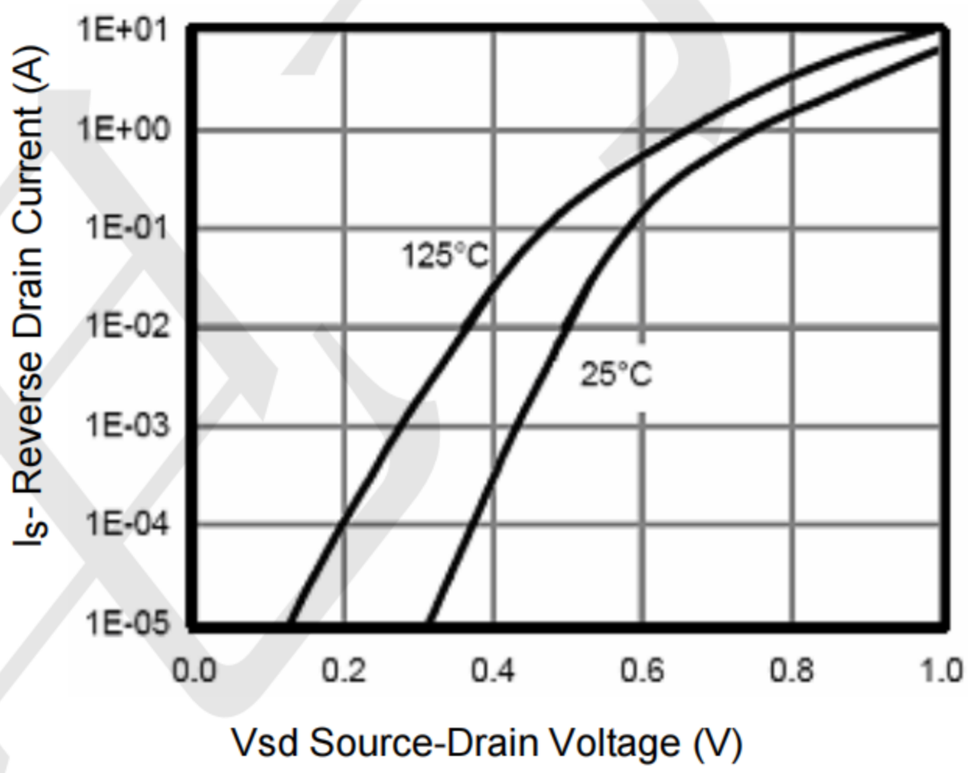


Figure 10. Source- Drain Diode Forward

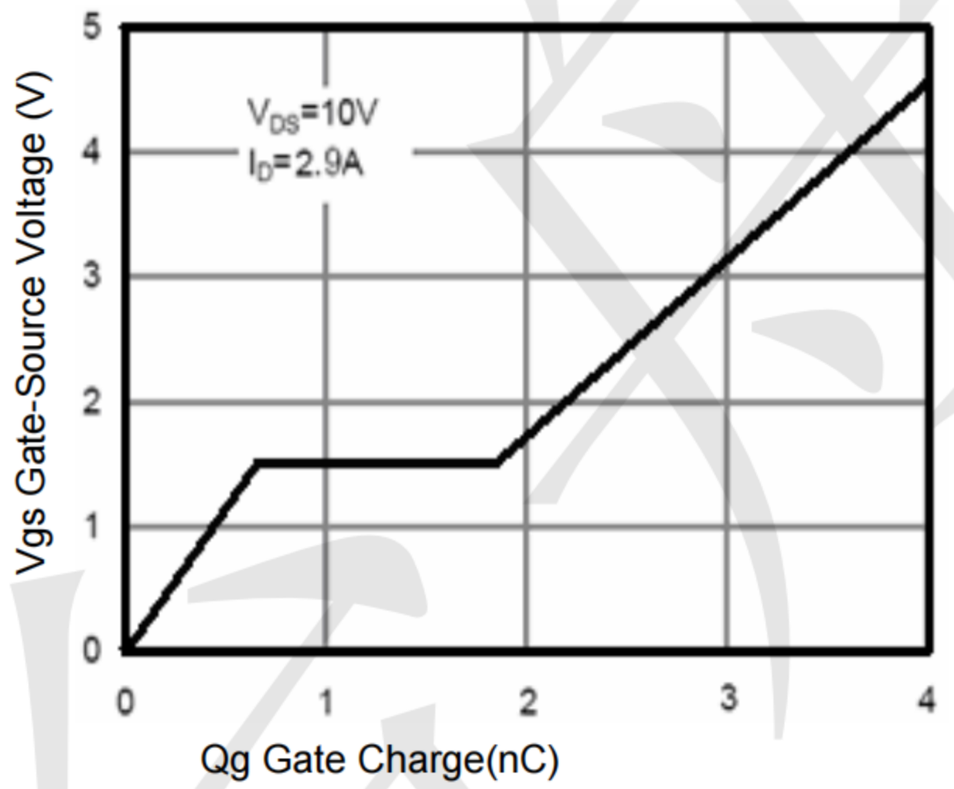


Figure 11. Gate Charge

Typical Electrical and Thermal Characteristic Curves

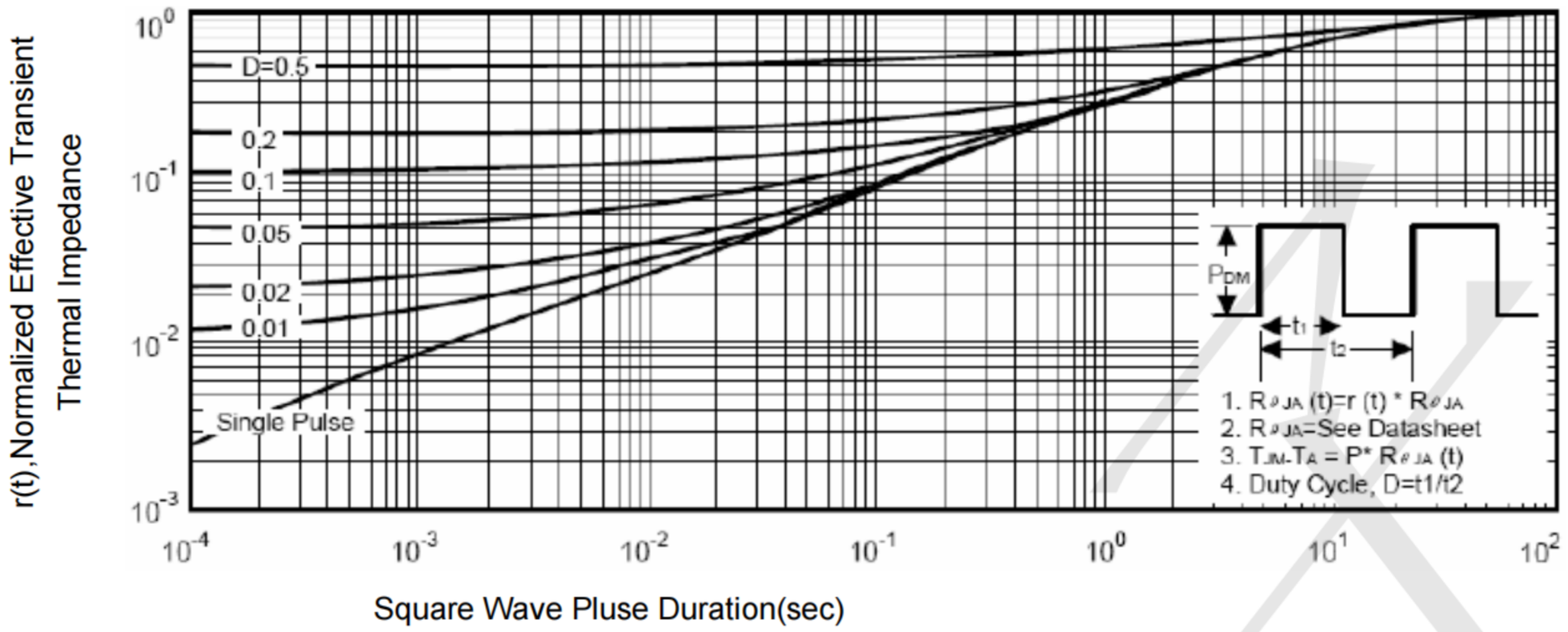


Figure 12. Normalized Maximum Transient Thermal Impedance

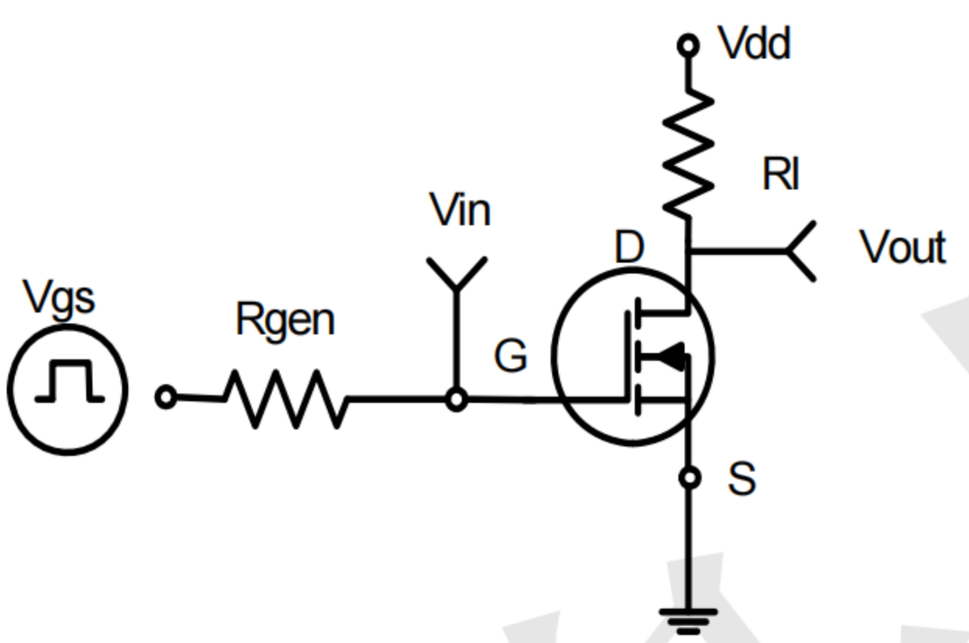


Figure 13. Switching Test Circuit

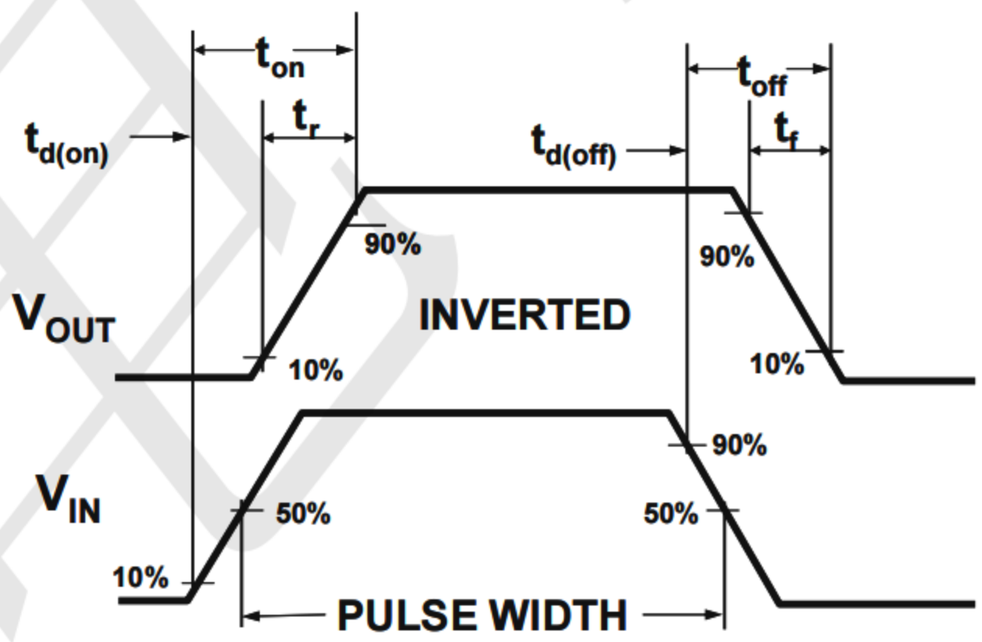
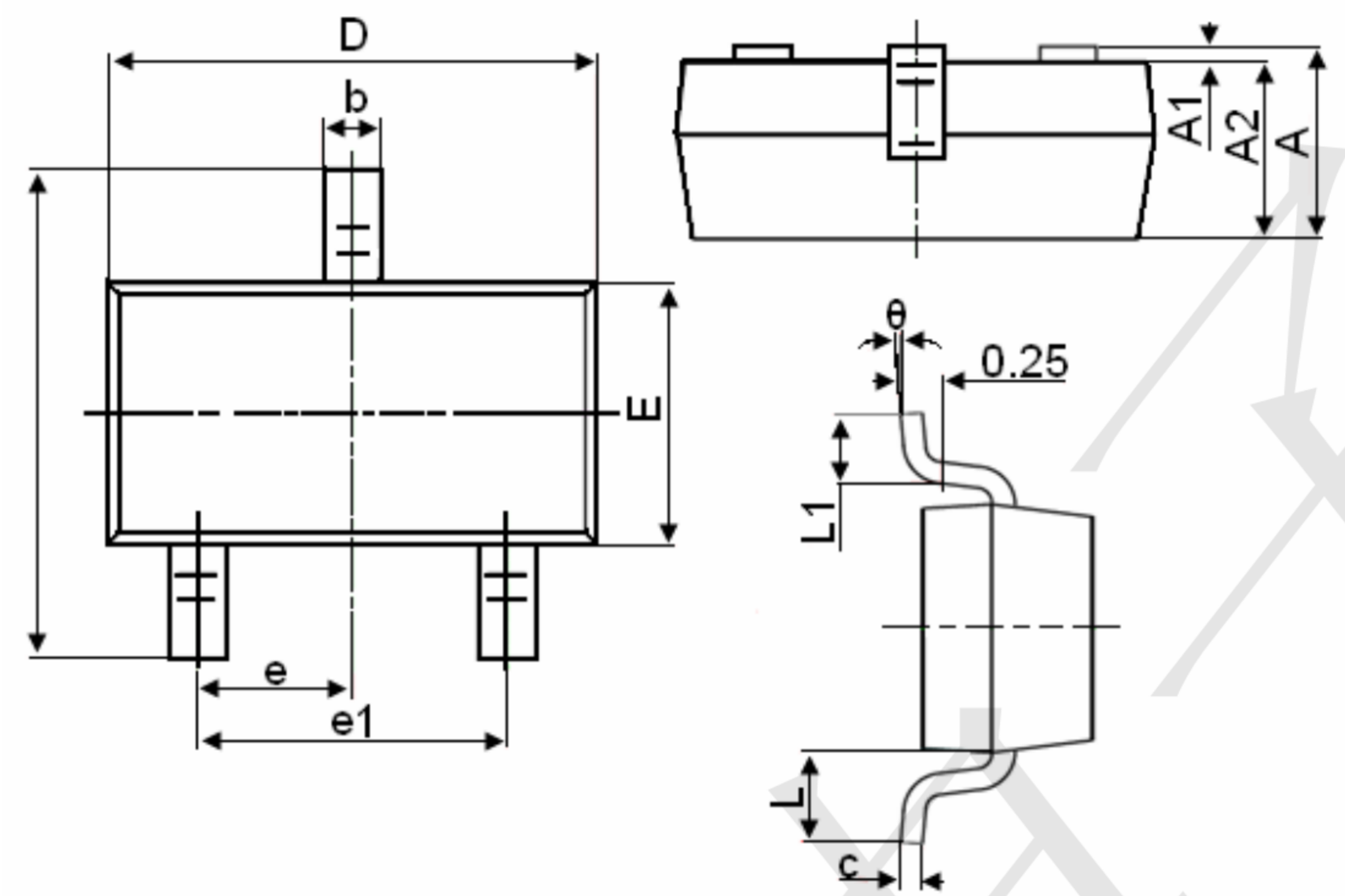


Figure 14. Switching Waveforms

Package Outline Dimensions (SOT-23)

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Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

Notes

1. All dimensions are in millimeters.
2. Tolerance ±0.10mm (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.