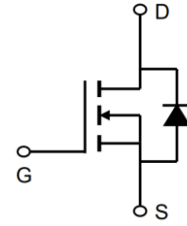


20V N-Channel Enhancement Mode MOSFET

Description

The AP2300AI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

$V_{DS} = 20V, I_D = 3.3A$

$R_{DS(ON)} < 60m @ V_{GS}=2.5V$

$R_{DS(ON)} < 45m @ V_{GS}=4.5V$

High power and current handling capability

Lead free product is acquired

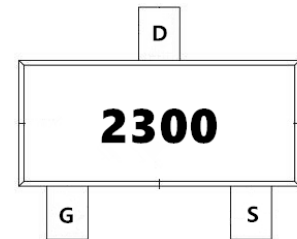
Surface mount package

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP2300AI	SOT-23	2300	3000

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current-Continuous	I_D	3.3	A
Drain Current-Pulsed ^(Note 1)	I_{DM}	16	A
Maximum Power Dissipation	P_D	0.9	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$
Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	139	$^\circ C/W$



20V N-Channel Enhancement Mode MOSFET

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	20	22	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=20V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.75	1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=2.5V, I_D=2.8A$	-	35	60	m Ω
		$V_{GS}=4.5V, I_D=3A$	-	29	45	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=3A$	-	8	-	S
Input Capacitance	C_{ISS}	$V_{DS}=10V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	260	-	PF
Output Capacitance	C_{OSS}		-	48	-	PF
Reverse Transfer Capacitance	C_{RSS}		-	27	-	PF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, R_L=3.3\Omega$ $V_{GS}=4.5V, R_{GEN}=6\Omega$	-	2.5	-	nS
Turn-on Rise Time	t_r		-	3.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	21	-	nS
Turn-Off Fall Time	t_f		-	3	-	nS
Total Gate Charge	Q_g	$V_{DS}=10V, I_D=3A,$ $V_{GS}=4.5V$	-	2.9	5	nC
Gate-Source Charge	Q_{gs}		-	0.4	-	nC
Gate-Drain Charge	Q_{gd}		-	0.6	-	nC
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=3.3A$	-	0.75	1.2	V
Diode Forward Current ^(Note 2)	I_S		-	-	3.3	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

20V N-Channel Enhancement Mode MOSFET

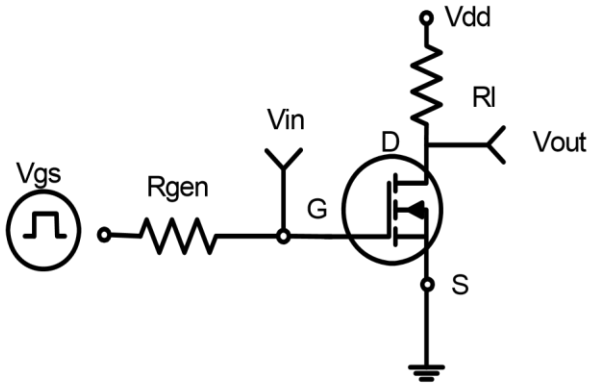


Figure 1: Switching Test Circuit

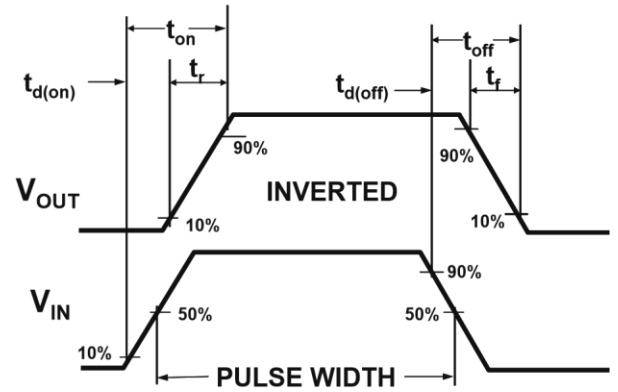


Figure 2: Switching Waveforms

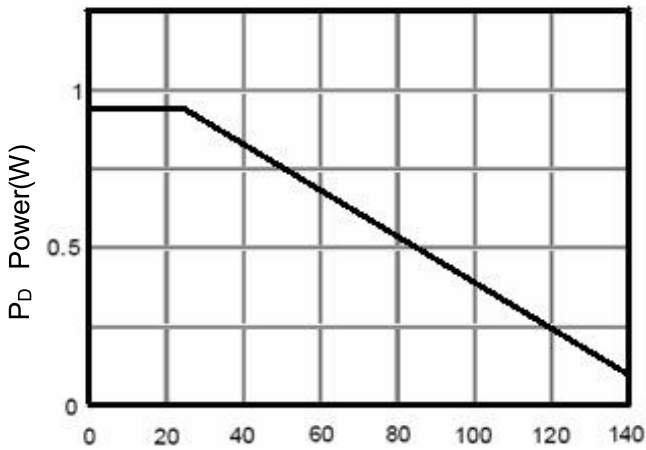
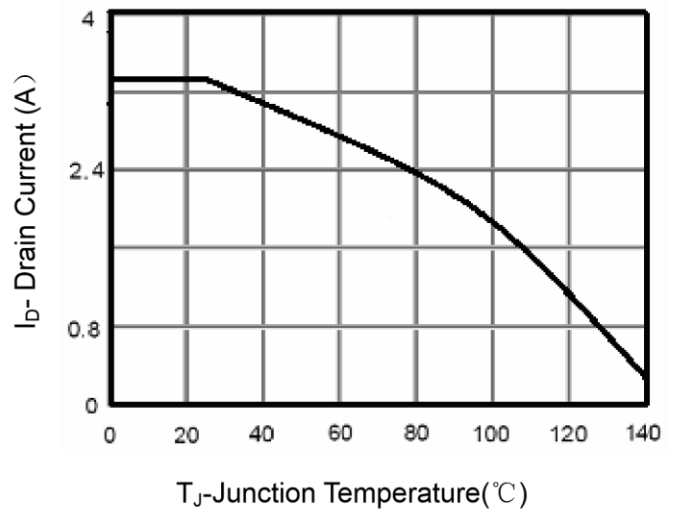


Figure 3 Power Dissipation



T_J-Junction Temperature(°C)

Figure 4 Drain Current

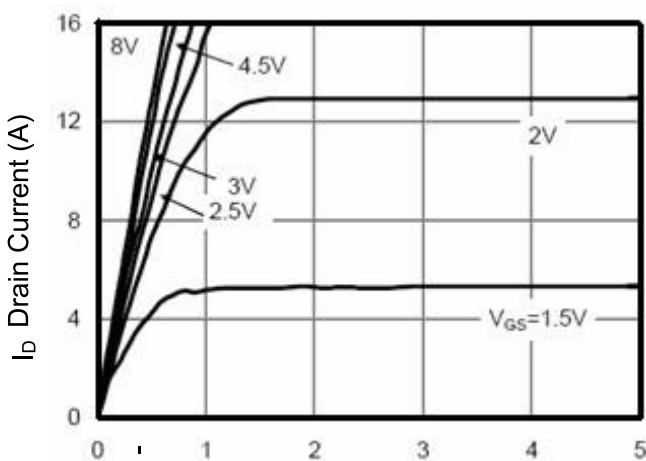


Figure 5: V_{ds} Drain-Source Voltage (V)

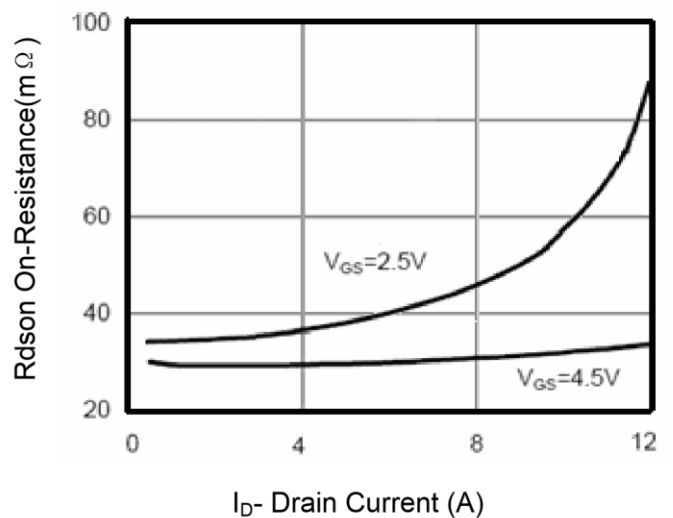


Figure 6 Drain-Source On-Resistance

20V N-Channel Enhancement Mode MOSFET

Figure 5 Output Characteristics

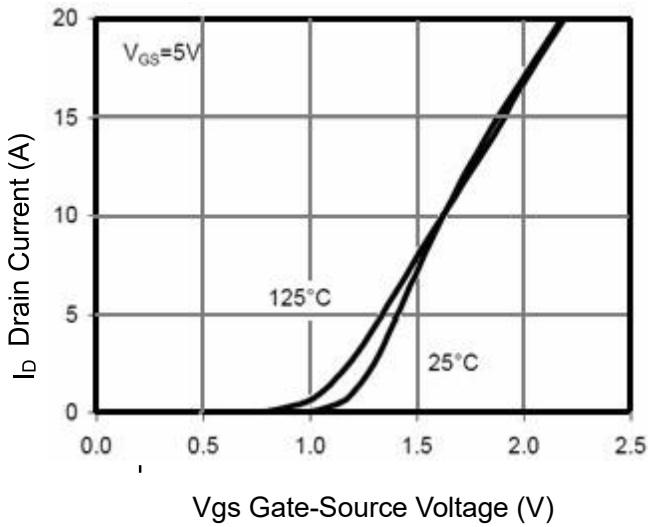


Figure 7 Transfer Characteristics

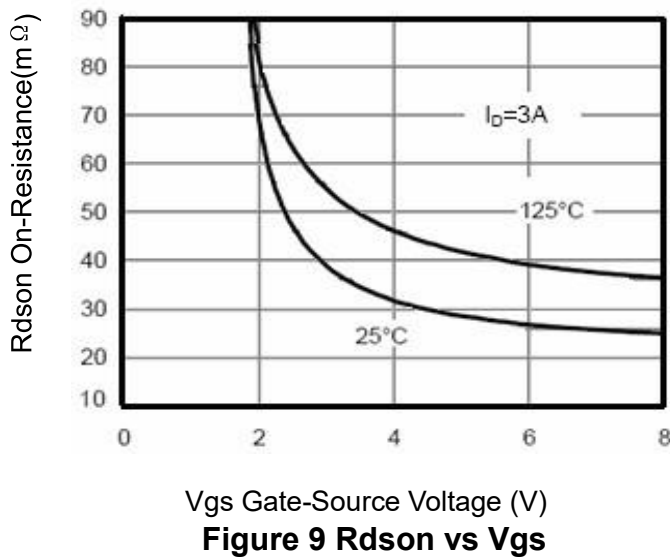


Figure 9 Rds(on) vs Vgs

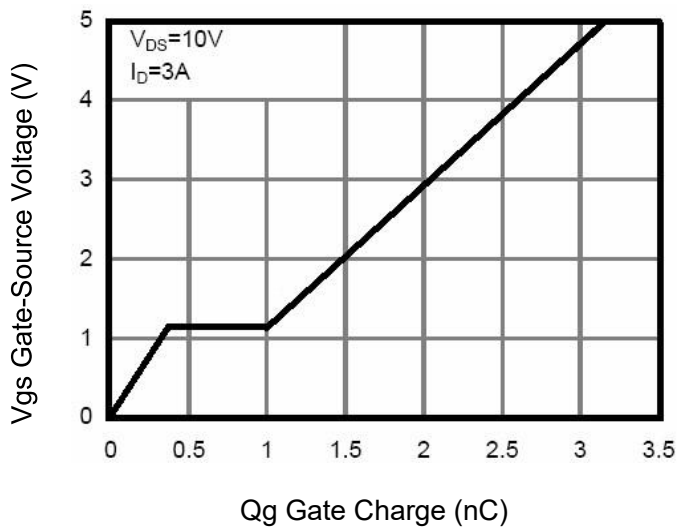


Figure 11 Gate Charge

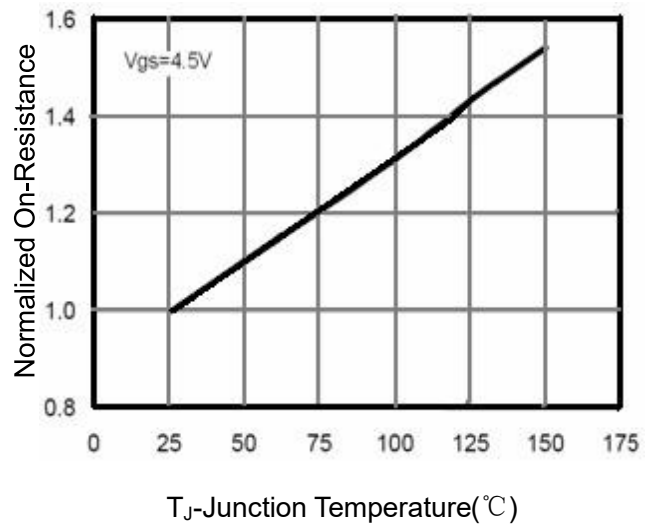


Figure 10 Capacitance vs Vds

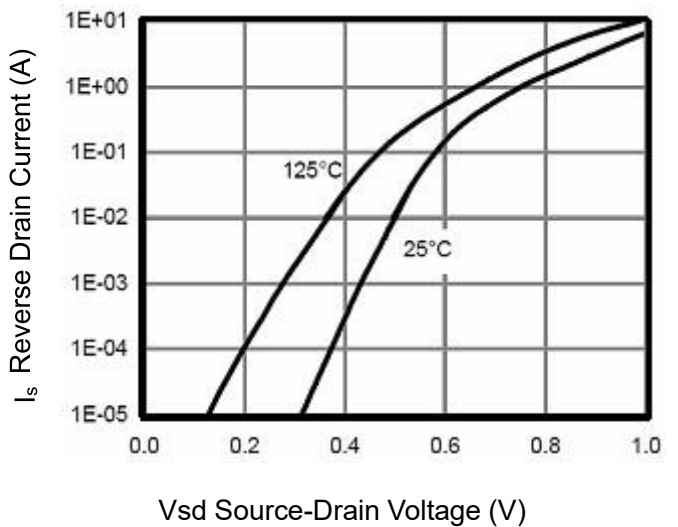
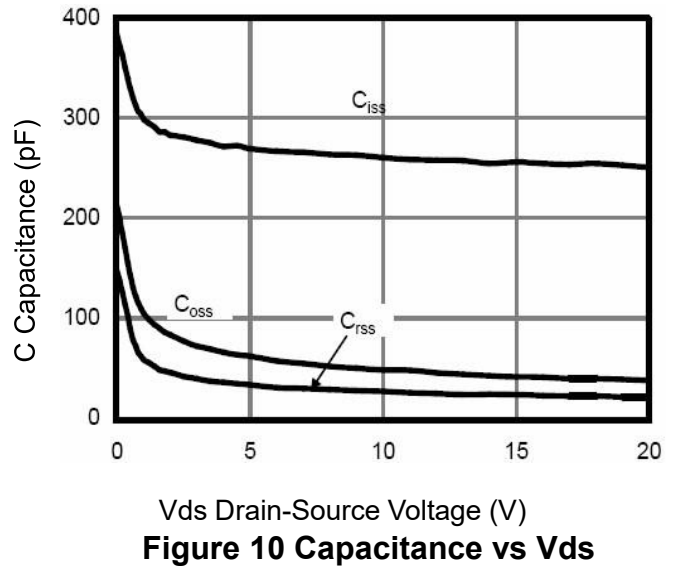


Figure 12 Source- Drain Diode Forward

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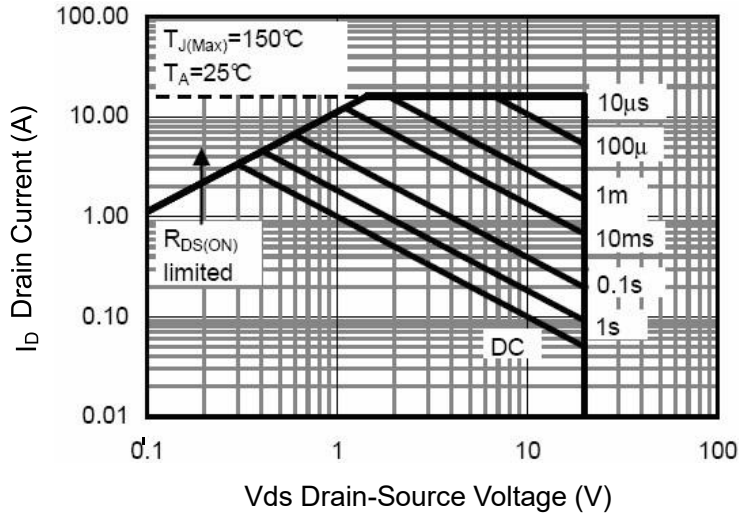


Figure 13 Safe Operation Area

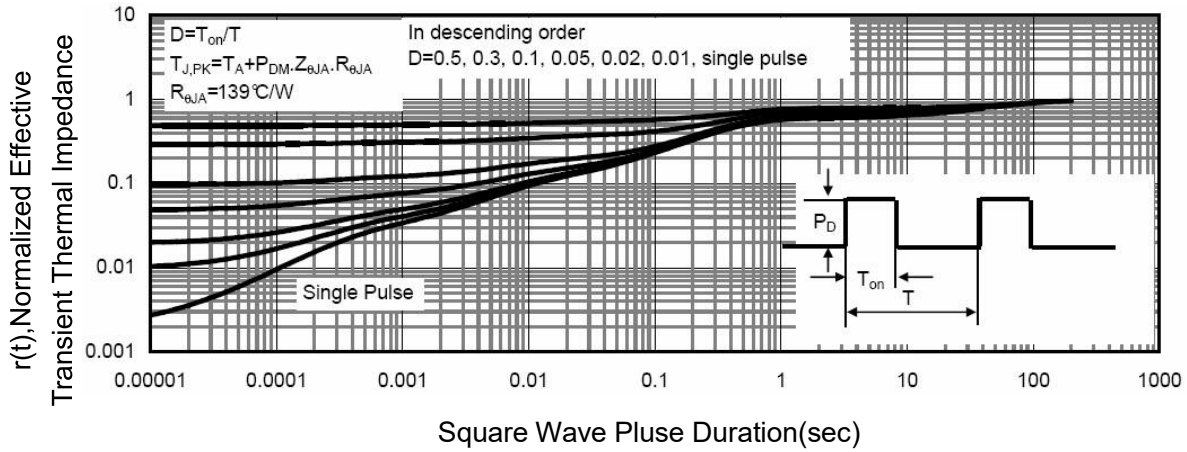
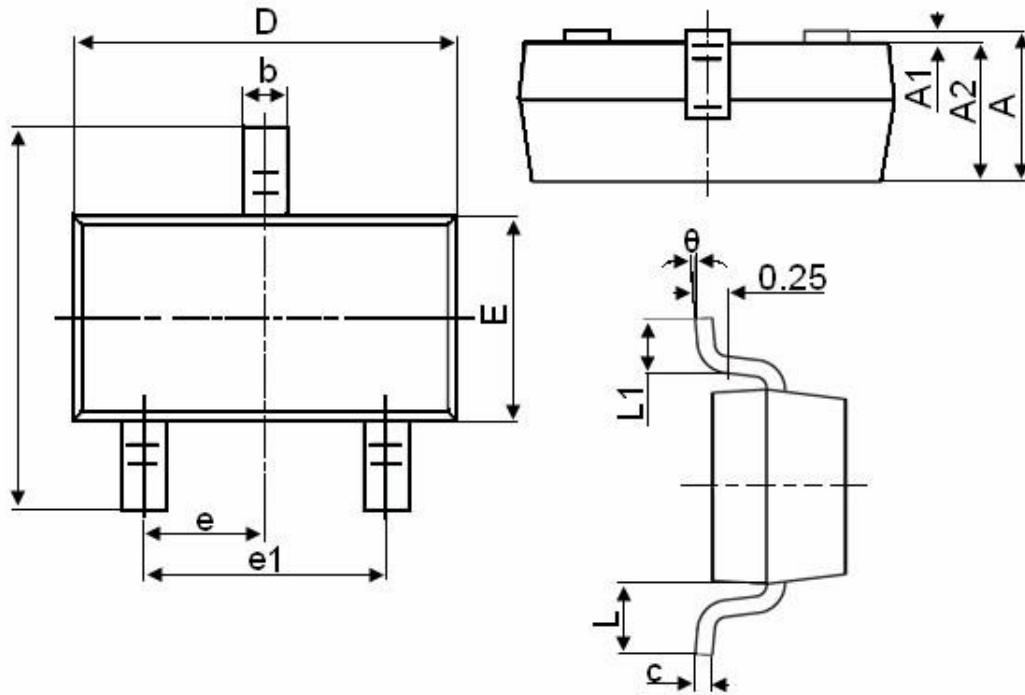


Figure 14 Normalized Maximum Transient Thermal Impedance

20V N-Channel Enhancement Mode MOSFET

SOT-23 Package Information



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°

20V N-Channel Enhancement Mode MOSFET**Attention**

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