HC2300

20V N-Channel MOSFET

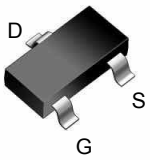
General Description

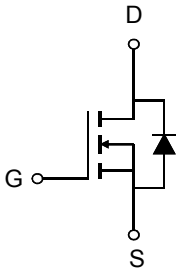
The HC2300 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is suitable for use as a load switch or in PWM applications.

Features

V_{DS}	20V
I_D (at V_{GS}=4.5V)	4.5A
$R_{DS(ON)}$ (at V_{GS}=4.5V)	19mΩ(Typ)

SOT23





Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±12	V
Drain Current-Continuous	TC=25°C	I_D	4.5	A
	TC=100°C	I_D	2.7	A
Drain Current – Pulsed		I_{DM}	18	A
Maximum Power Dissipation		P_D	1.56	W
Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance junction-case	$R_{\theta Jc}$		80	℃ /W
Thermal Resistance junction-to-Ambient	$R_{\theta JA}$		125	℃ /W

Electrical Characteristics (TJ=25℃ unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20V,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±12V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	0.45	0.65	1.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=4.5V, I_D=3.0A		19	25	mΩ
		V_{GS}=2.5V, I_D=2.0A		25	32	mΩ
		V_{GS}=1.8V, I_D=1.0A		33	49	mΩ
gfs	Forward Transconductance	V_{DS}=5V , I_D=4.5A		10		S
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{DS}=10V,V_{GS}=0V, F=1.0MHz		420		pF
C_{oss}	Output Capacitance			60		pF
C_{rss}	Reverse Transfer Capacitance			34		pF
SWITCHING PARAMETERS						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=4.5V V_{DS}=10V R_G=25Ω I_D=1A		4.1		nS
t_r	Turn-on Rise Time			11.6		nS
$t_{d(off)}$	Turn-Off Delay Time			23.9		nS
t_f	Turn-Off Fall Time			7.6		nS
Q_g	Total Gate Charge	V_{DS}=10V,I_D=4A, V_{GS}=4.5V		7.7		nC
Q_{gs}	Gate-Source Charge			0.9		nC
Q_{gd}	Gate-Drain Charge			2.4		nC
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_{SD}=1A		0.70	1.3	V

Note：

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

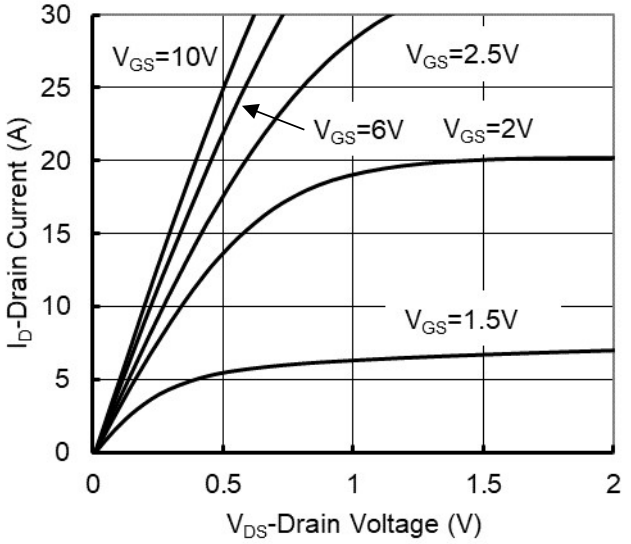


Figure1. Output Characteristics

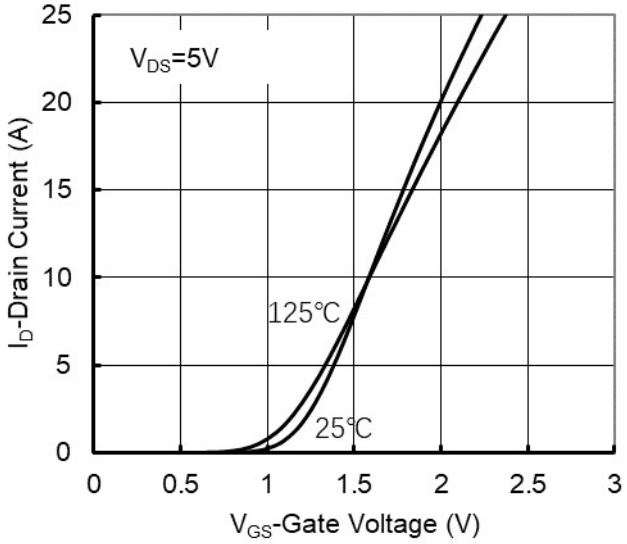


Figure2. Transfer Characteristics

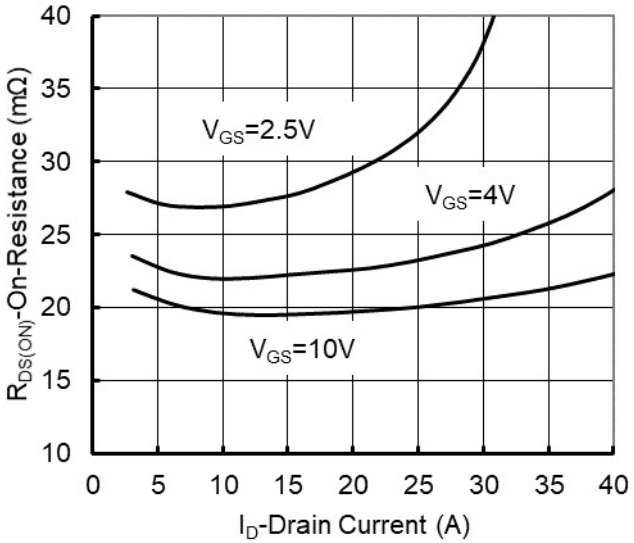


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

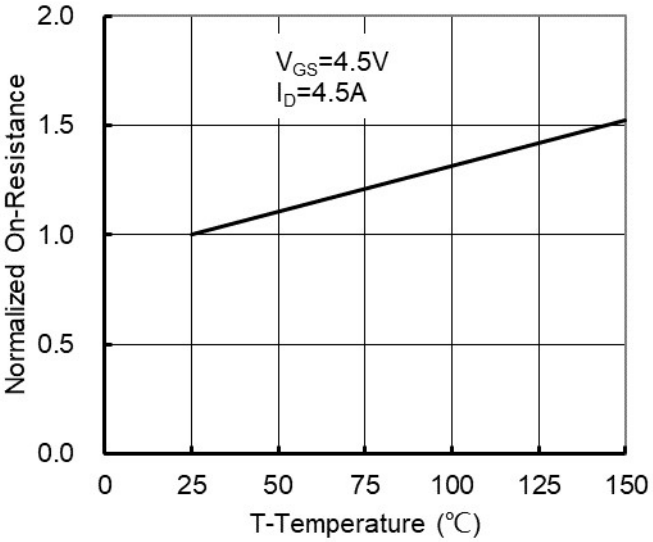


Figure 4: On-Resistance vs. Junction Temperature

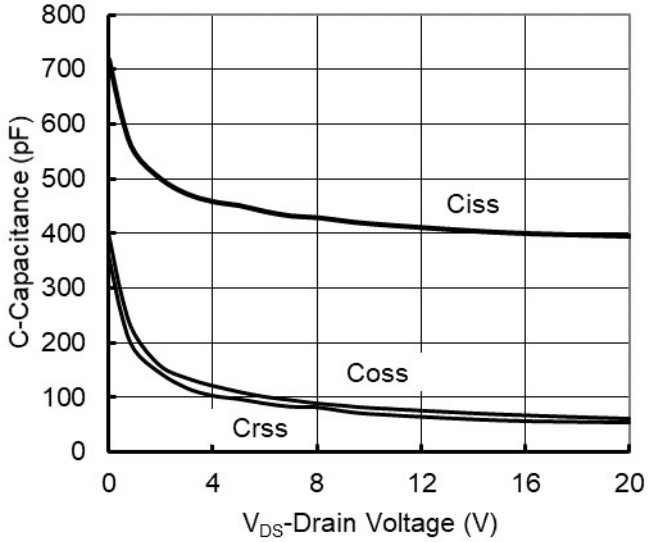


Figure5. Capacitance Characteristics

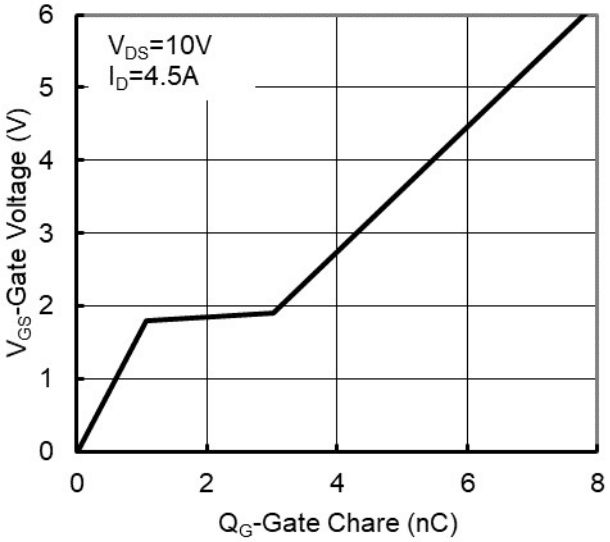


Figure6. Gate Charge

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

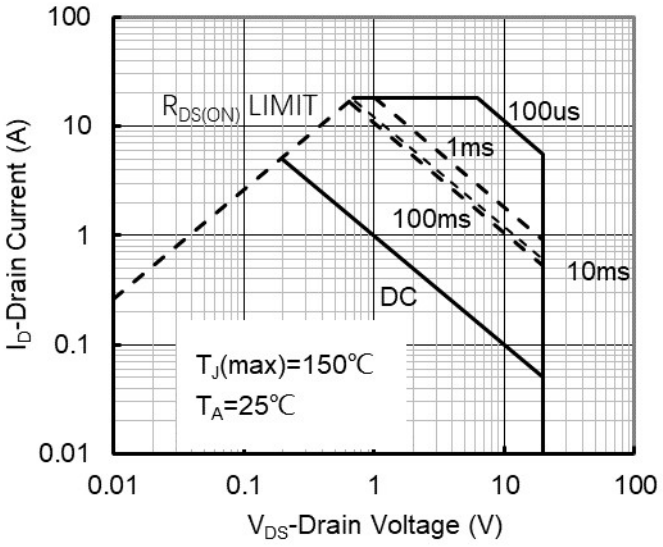


Figure7. Safe Operation Area

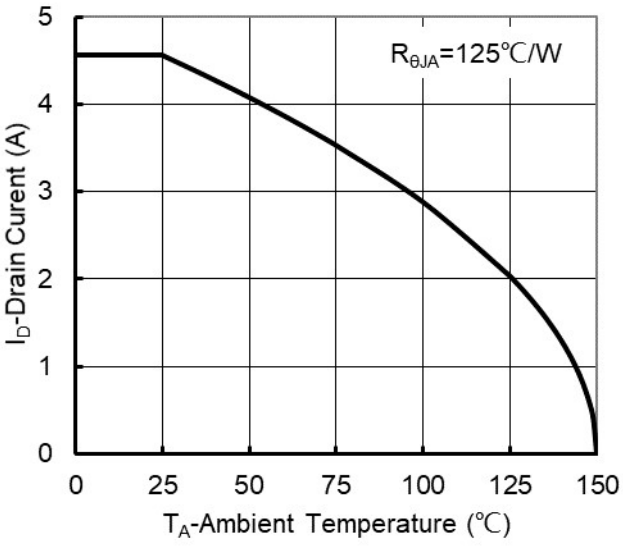


Figure8. Maximum Continuous Drain Current vs Ambient Temperature

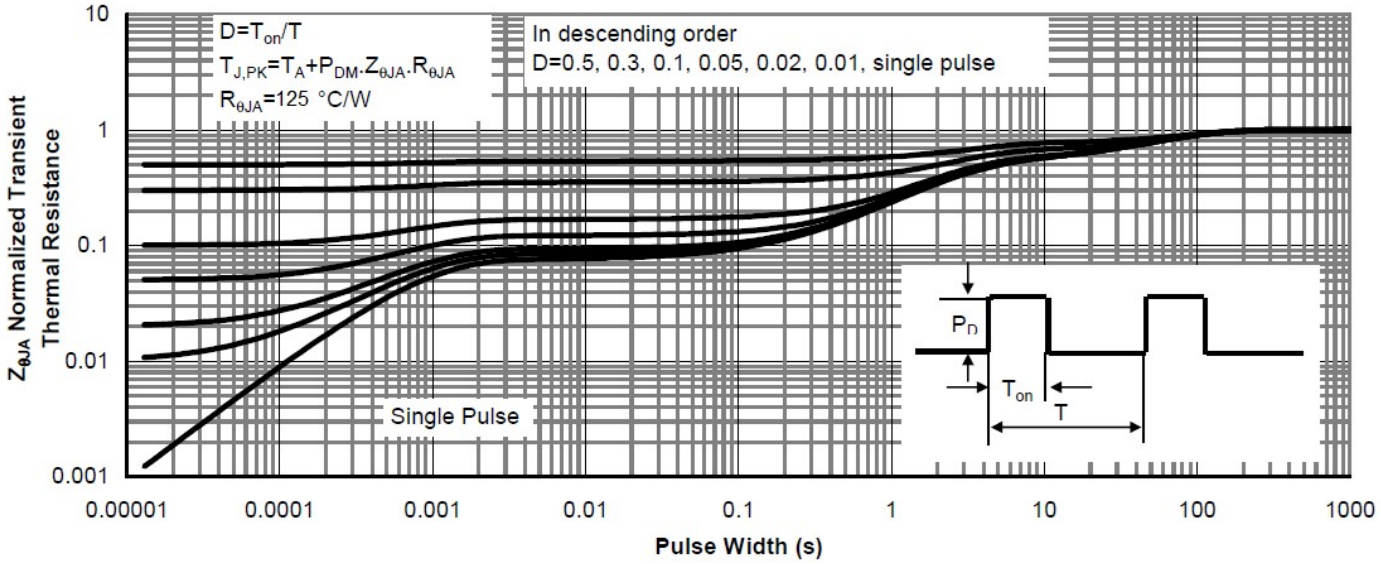
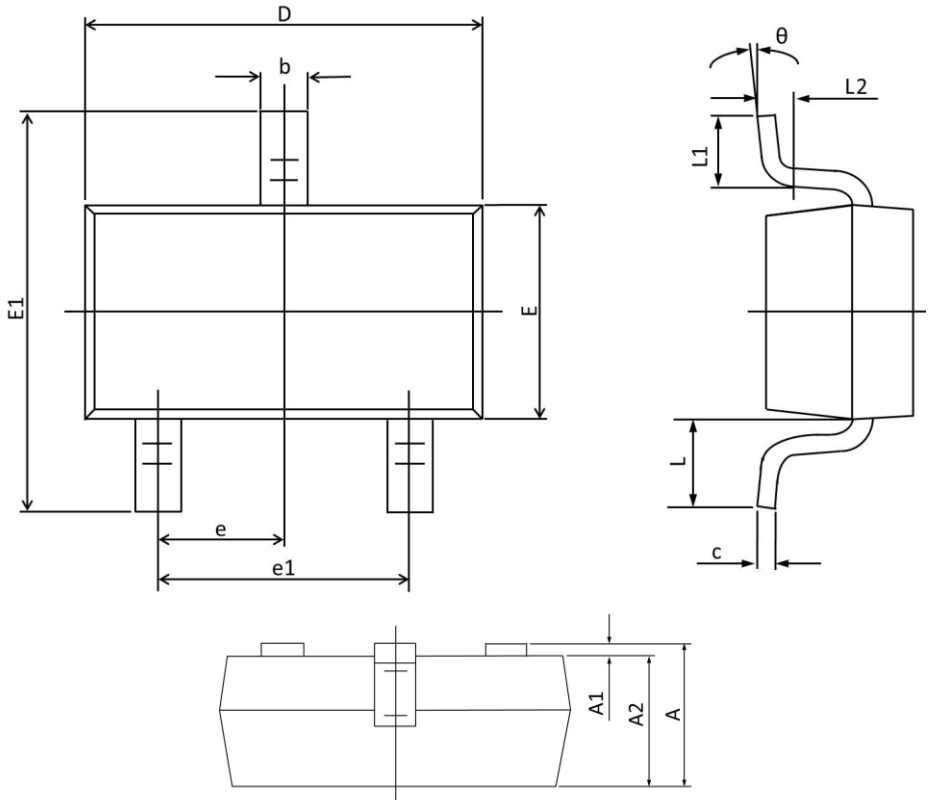


Figure9. Normalized Maximum Transient Thermal Impedance

SOT23 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Max	Min	Max	Min
A	1.150	0.900	0.045	0.035
A1	0.100	0.000	0.004	0.000
A2	1.050	0.900	0.041	0.035
b	0.500	0.300	0.020	0.012
c	0.150	0.080	0.006	0.003
D	3.000	2.800	0.118	0.110
E	1.400	1.200	0.055	0.047
E1	2.550	2.250	0.100	0.089
e	0.95 TYP.		0.037 TYP.	
e1	2.000	1.800	0.079	0.071
L	0.55 REF.		0.022 REF.	
L1	0.500	0.300	0.020	0.012
L2	0.25 TYP.		0.01 TYP.	
θ	8°	0°	8°	0°