UDF®

SI 2320A

★ Green Device Available
★ Super Low Gate Charge
★ Excellent CdV/dt effect decline
★ Advanced high cell density Trench technology

Product Summary

RoHS
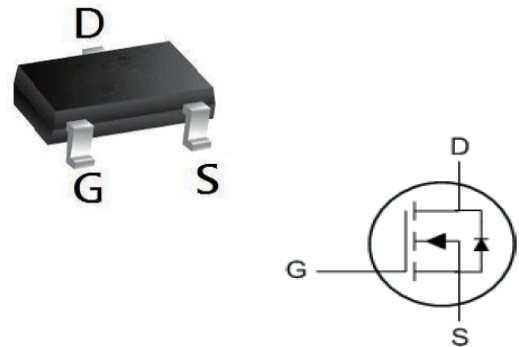
BVDSS	RDSON	ID
20V	12mΩ	7.5A

Description

The 2320A is the high cell density trenched N ch MOSFETs, which provides excellent RDSON and efficiency for m ost of the small power switching and load switch applications. The 2320A meets the RoHS and Green Product requirement with full function reliability approved.

SOT-23 Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ 4.5V[1]	7.5	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ 4.5V[1]	5	A
I_{DM}	Pulsed Drain Current[2]	32	A
P_D@T_A=25°C	Total Power Dissipation[3]	2	W
P_D@T_A=70°C	Total Power Dissipation[3]	0.66	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	120	°C/W

## Electrical Characteristics (T$_J$ =25 °C unless otherwise specified)

| Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V$_{(BR)DSS}$	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 to Body Leakage Current	V$_{DS}$=0V, V$_{GS}$ =±12V	-	-	±100	nA
On Characteristics						
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=250μA	0.5	0.75	1.2	V
R$_{DS(on)}$	Static Drain-Source on-Resistance note2	V$_{GS}$=4.5V, I$_D$=8A	-	12	14	mΩ
		V$_{GS}$=2.5V, I$_D$=5A	-	16	22.5	
Dynamic Characteristics						
C$_{iss}$	Input Capacitance	V$_{DS}$=10V, V$_{GS}$=0V, f=1.0MHz	-	700	-	pF
C$_{oss}$	Output Capacitance		-	132	-	pF
C$_{rss}$	Reverse Transfer Capacitance		-	114	-	pF
Q$_g$	Total Gate Charge	V$_{DS}$=10V, I$_D$=4A, V$_{GS}$=4.5V	-	15	-	nC
Q$_{gs}$	Gate-Source Charge		-	2	-	nC
Q$_{gd}$	Gate-Drain("Miller") Charge		-	5.2	-	nC
Switching Characteristics						
t$_{d(on)}$	Turn-on Delay Time	V$_{DS}$=10V,I$_D$=4A, R$_{GEN}$=3Ω, V$_{GS}$=4.5V	-	9	-	ns
t$_r$	Turn-on Rise Time		-	25	-	ns
t$_{d(off)}$	Turn-off Delay Time		-	37	-	ns
t$_f$	Turn-off Fall Time		-	14	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I$_s$	Maximum Continuous Drain to Source Diode Forward Current		-	-	7.5	A
I$_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	32	A
V$_{SD}$	Drain to Source Diode Forward Voltage	V$_{GS}$=0V, I$_s$=8A	-	-	1.2	V

Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

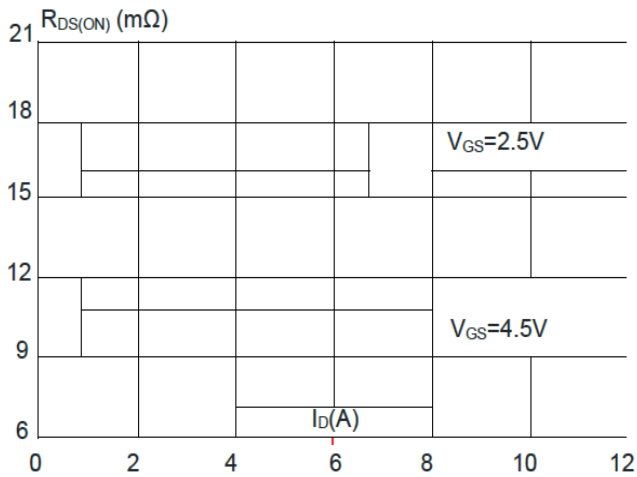## Typical Electrical and Thermal Characteristics (Curves)
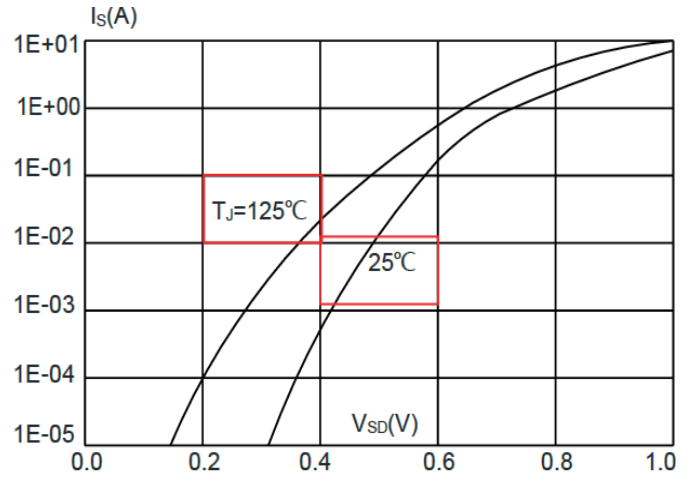
Figure1: Output Characteristics
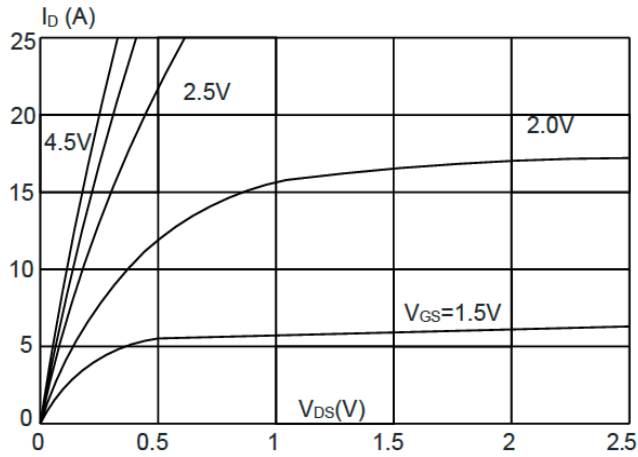
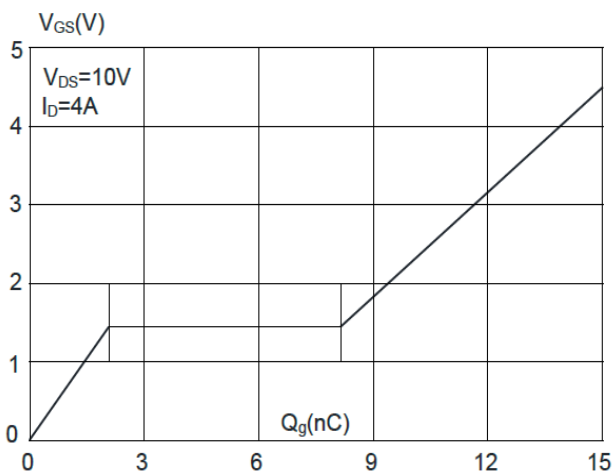

Figure 2: Typical Transfer Characteristics
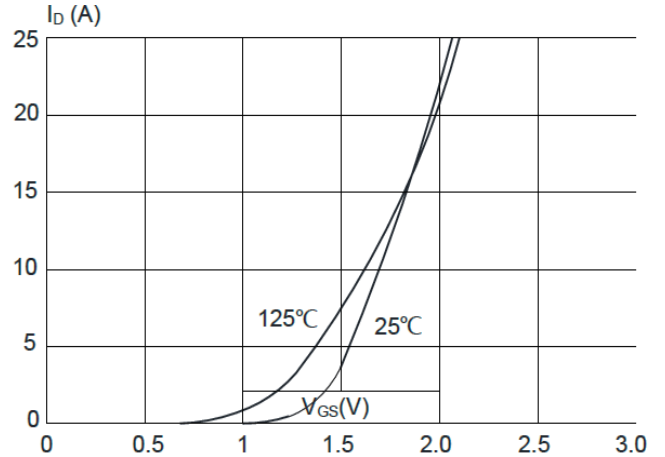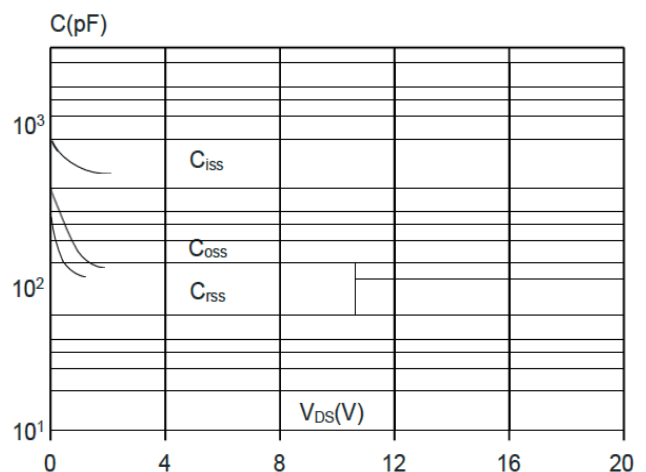

Figure 3:On-resistance vs. Drain Current

Figure 4: Body Diode Characteristics

Figure 5: Gate Charge Characteristics

Figure 6:Capacitance Characteristics

Typical Performance Characteristics

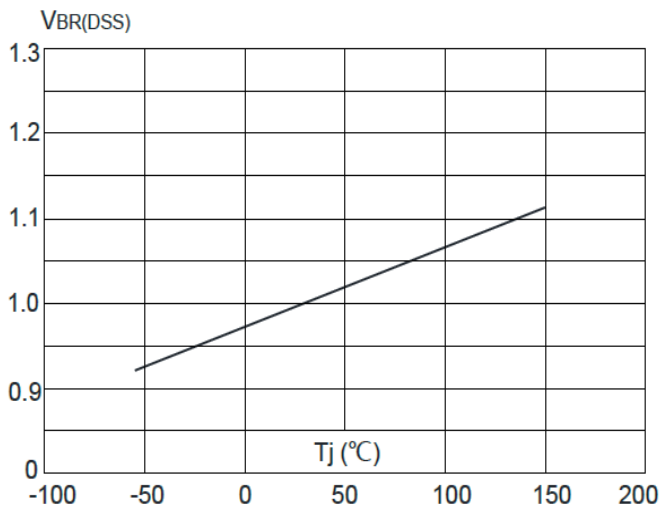### Figure 7: Normalized Breakdown Voltage Junction Temperature

Figure 8: Normalized on Resistance vs. Junction Temperature
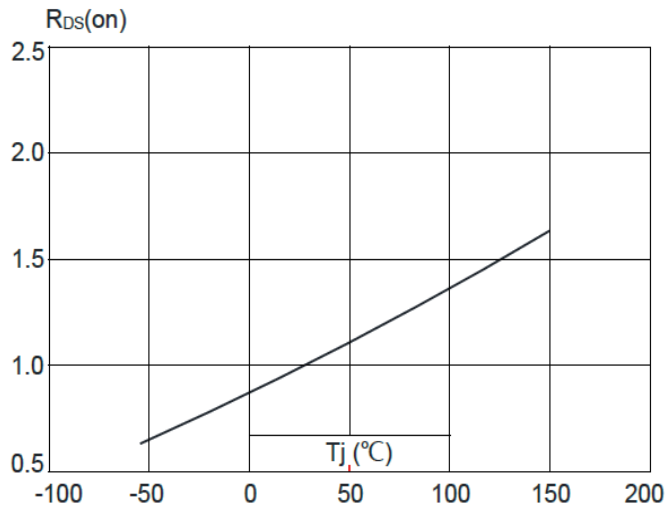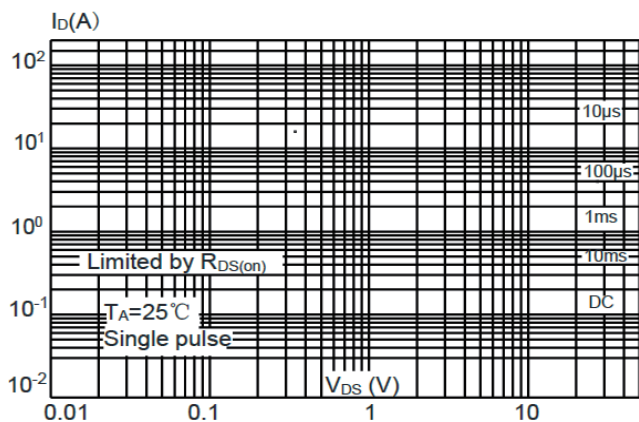

Figure 9: Maximum Safe Operating Area

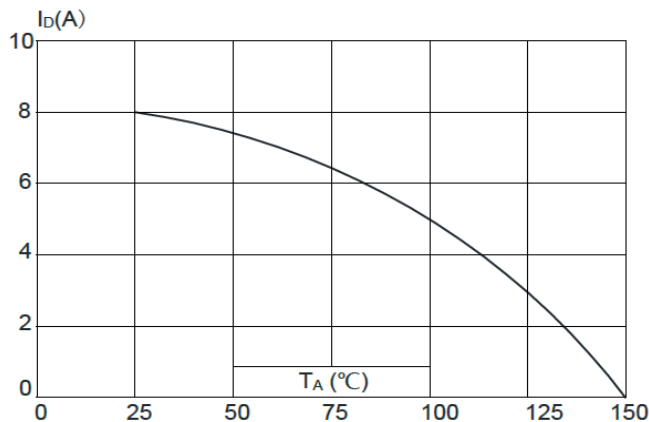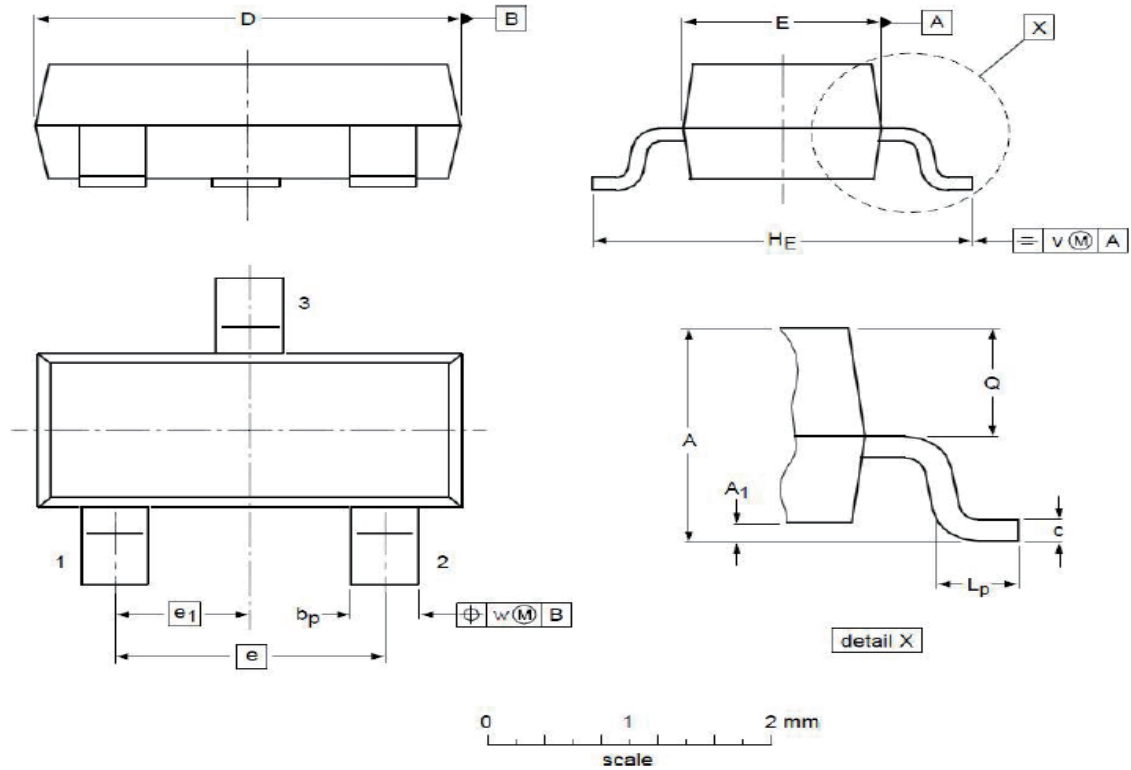### Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

Figure 11: Maximum Effective Transient Thermal Impedance, Junction to Ambient

Notes:
Single pulse 1.Duty factor D=t1/t2
2.Peak $T_J=P_{DM}*Z_{thJA}+T_A$
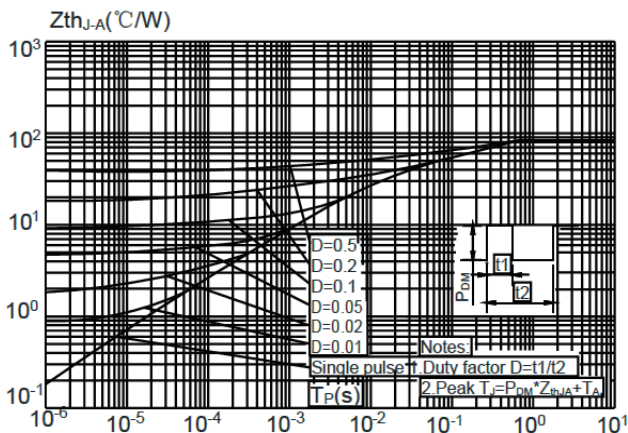
SOT23 Mechanical Data

DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.01	1.15	A_1	0.01	0.05	0.10
b_p	0.30	0.42	0.50	c	0.08	0.13	0.15
D	2.80	2.92	3.00	E	1.20	1.33	1.40
e	--	1.90	--	e_1	--	0.95	--
H_E	2.25	2.40	2.55	L_p	0.30	0.42	0.50
Q	0.45	0.49	0.55	v	--	0.20	--
W	--	0.10	--				