HT3402

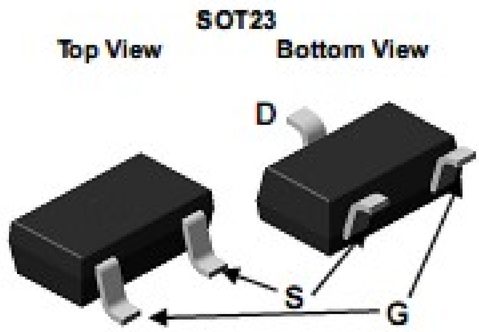
30V N-Channel MOSFET

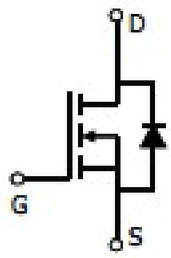
General Description

The HT3402 uses advanced trench technology to Provide excellent $R_{DS(ON)}$,low gate change and Operation with gate voltages as low as 2.5V.This Device is suitable for use as a load switch applications.

Product Summary

V_{DS}	30V
I_D (at V_{GS}=10V)	4A
$R_{DS(ON)}$ (at V_{GS}=-10V)	<55mΩ
$R_{DS(ON)}$ (at V_{GS}=-4.5V)	<70mΩ
$R_{DS(ON)}$ (at V_{GS}=-2.5V)	<110mΩ





Absolute Maximum Ratings TA=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current (A)	T_A=25°C	I_D	4	A
	T_A=70°C		3.4	
Junction and Storage Temperature Range		I_{DM}	15	
Power Dissipation (A)	TA=25°C	P_D	1.4	W
	TA=70°C		1	
Junction and Storage Temperature Range		T_J,T_{STG}	-55 to 150	℃

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum junction-to-Ambient(A)	t≤ 10s	RθJA	70	90	° C/W
Maximum junction-to-Ambient(A)	Steady-State		100	125	° C/W
Maximum junction-to-Lead(C)	Steady-State	RθJL	63	80	° C/W

Electrical Characteristics

(TJ=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=-250μA, V_{GS}=0V	30			V
IDSS	Zero Gate Voltage Drain Current	V_{DS}=24V,V_{GS}=0V			1	μA
		TJ=55℃			5	
IGSS	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±12V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=-250μA	0.6	1	1.4	V
ID(ON)	On state drain current	V_{GS}=4.5V, V_{DS}=5V	10			A
RDS(ON)	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=4A		45	55	mΩ
		T_J=125°C		66	80	
		V_{GS}=4.5V, I_D=3A		55	70	mΩ
		V_{GS}=2.5V, I_D=2A		83	110	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=4A		8		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.8	1	V
Is	Maximum Body-Diode Continuous Current				2.5	A
DYNAMIC PARAMETERS						
Ciss	Input Capacitance	VGS=0V, VDS=-15V, f=1MHz		390		pF
Coss	Output Capacitance			54.5		pF
Crss	Reverse Transfer Capacitance			41		pF
Rg	Gate resistance	VGS=0V, VDS=0V, f=1MHz		3		Ω
SWITCHING PARAMETERS						
Qg	Total Gate Charge	VGS=4.5V, VDS=15V, ID=4A		4.34		nC
Qgs	Gate Source Charge			0.6		nC
Qgd	Gate Drain Charge			1.38		nC
tD(on)	Turn-On DelayTime	VGS=10V,VDS=15V, R_L=3.75Ω, R_{GEN}=6Ω		3.3		nC
tr	Turn-On Rise Time			1		ns
tD(off)	Turn-Off DelayTime			21.7		ns
tf	Turn-Off Fall Time			2.1		ns
trr	Body Diode Reverse Recovery Time	I_F=-4A, dI/dt=100A/μs		12		ns
Qrr	Body Diode Reverse Recovery Charge	I_F=-4A, dI/dt=100A/μs		6.3		nC

A: The value of RθJA is measured with the device mounted on 1in ^{2} FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The value in any given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermalresistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C. The RθJA is the sum of the thermal impedence from junction to lead R θJL and lead to ambient.

D. The static characteristics in Figures 1 to 6,12,14 are obtained using <300 μs pulses, duty cycle 0.5% max.

E. These tests are performed with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T A=25°C. The SOA

curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

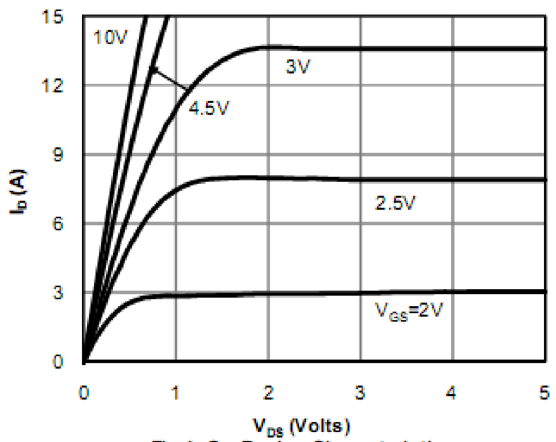


Fig 1: On-Region Characteristics

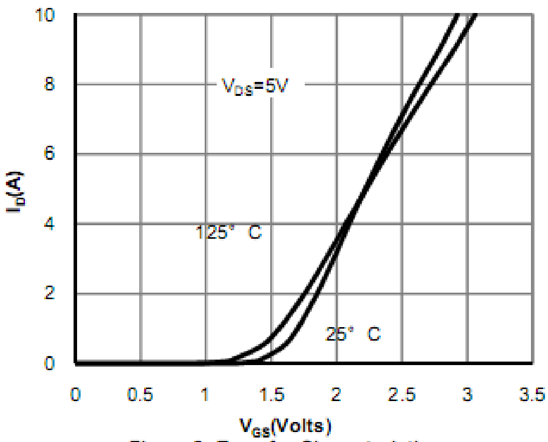


Figure 2: Transfer Characteristics

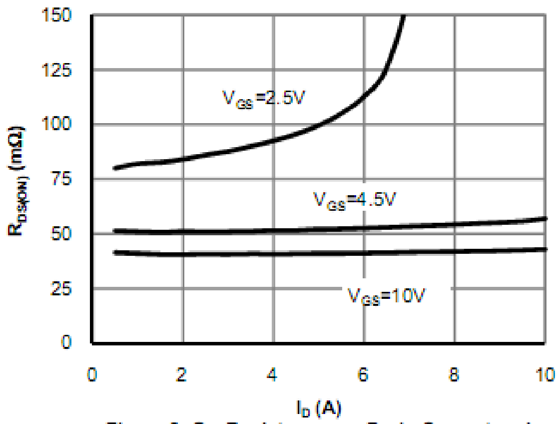


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

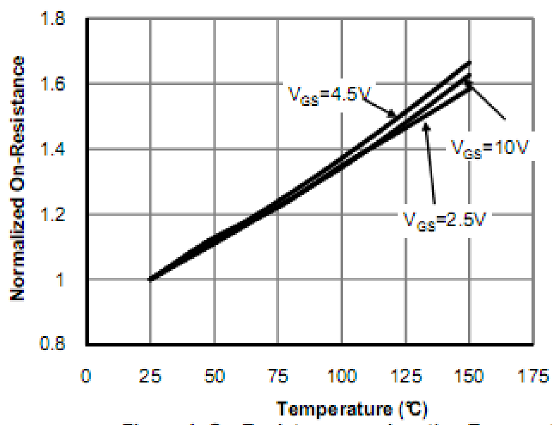


Figure 4: On-Resistance vs. Junction Temperature

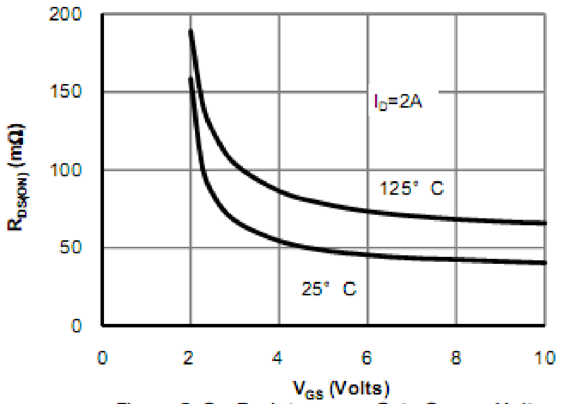


Figure 5: On-Resistance vs. Gate-Source Voltage

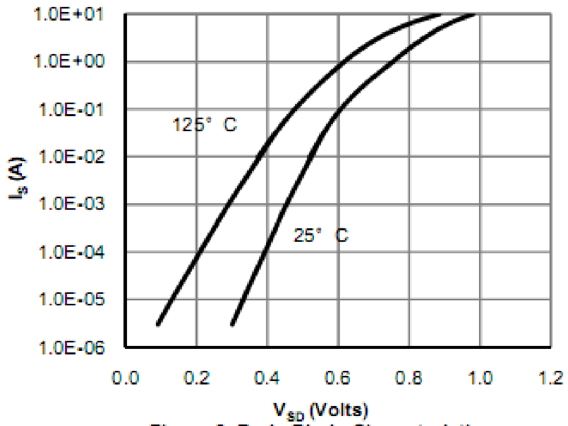


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

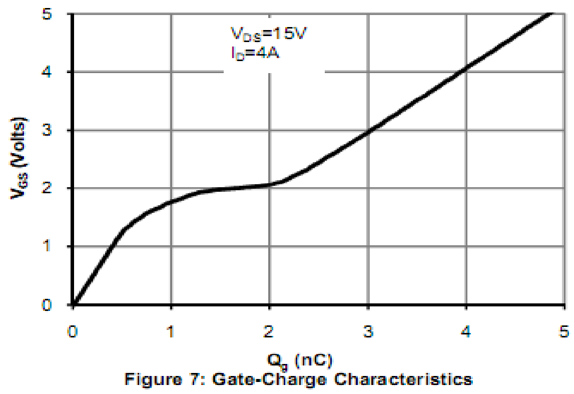


Figure 7: Gate-Charge Characteristics

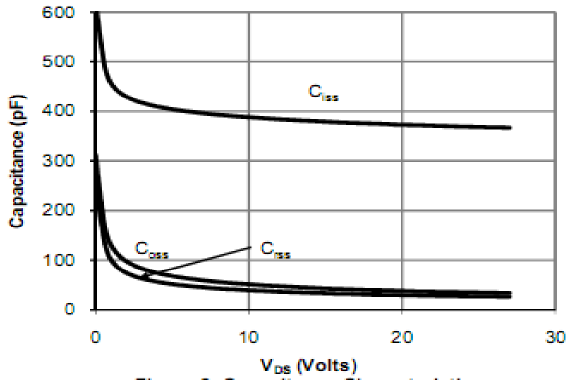


Figure 8: Capacitance Characteristics

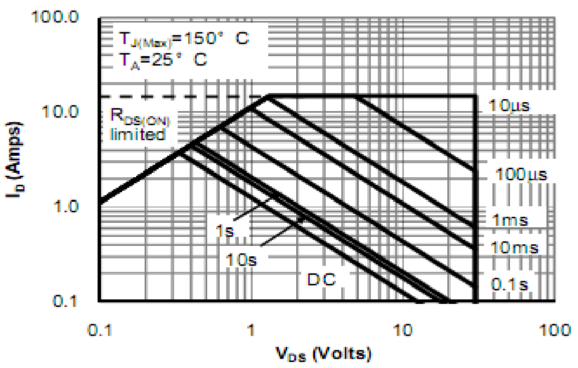


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

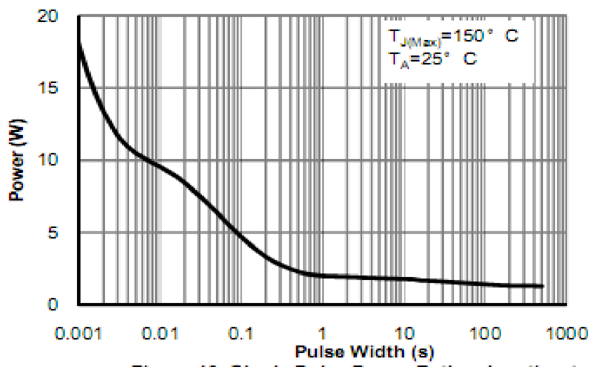


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

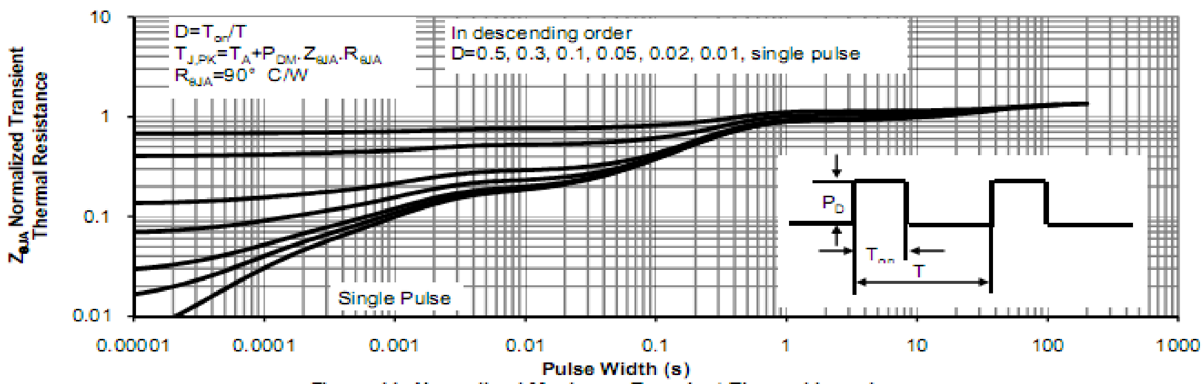


Figure 11: Normalized Maximum Transient Thermal Impedance