HT3401

General Description

The HT3401 uses advanced trench technology to Provide excellent RDS(ON),low gate change and Operation with gate voltages as low as 2.5V.This Device is suitable for use as a load switch or in PWM applications. Standard product HT3401 is Pb-free (meets ROHS & Sony 259 specifications).

Features

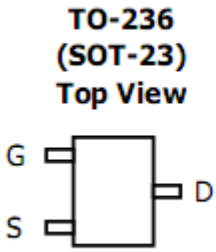
V_{DS}(V)=-30V

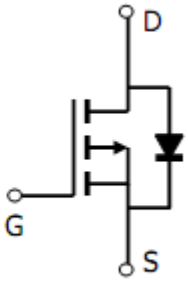
I_D=-4.2A(V_{GS}=-10V)

$R_{DS(ON)}$<50mΩ (V_{GS}=-10V)

$R_{DS(ON)}$<65mΩ (V_{GS}=-4.5V)

$R_{DS(ON)}$<120mΩ (V_{GS}=-2.5V)





Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		VDS	-30	V
Gate-Source Voltage		VGS	±12	V
Continuous Drain Current (A)	TA=25°C	ID	-4.2	A
	TA=70°C		-3.5	
Junction and Storage Temperature Range		IDM	-3.0	
Power Dissipation (A)	TA=25°C	PD	1.4	W
	TA=70°C		1	
Junction and Storage Temperature Range		TJ,TSTG	-55 to 150	℃

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum junction-to-Ambient(A)	t≤ 10s	RθJA	65	90	° C/W
Maximum junction-to-Ambient(A)	Steady-State		85	125	° C/W
Maximum junction-to-Lead(C)	Steady-State	RθJL	43	60	° 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	ID=-250μA, VGS=0V	-30			V
IDSS	Zero Gate Voltage Drain Current	VDS=-24V,VGS=0V			-1	μA
		TJ=55℃			-5	
IGSS	Gate-Body leakage current	VDS=0V, VGS=±12V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	VDS=VGS ID=-250μA	-0.7	-1	-1.3	V
ID(ON)	On state drain current	VGS=-4.5V, VDS=-5V	-25			A
RDS(ON)	Static Drain-Source On-Resistance	VGS=-10V, ID=-4.2A		42	50	mΩ
		TJ=125°C			75	
		VGS=-4.5V, ID=-4A		53	65	mΩ
		VGS=-2.5V, ID=-1A		80	120	mΩ
g_{FS}	Forward Transconductance	VDS=-5V, ID=-5A	7	11		S
V_{SD}	Diode Forward Voltage	IS=-1A,VGS=0V		-0.75	-1	V
Is	Maximum Body-Diode Continuous Current				-2.2	A
I_{SM}	Pulsed Body-Diode Current[B]				-30	A
DYNAMIC PARAMETERS						
Ciss	Input Capacitance	VGS=0V, VDS=-15V, f=1MHz		954		pF
Coss	Output Capacitance			115		pF
Crss	Reverse Transfer Capacitance			77		pF
Rg	Gate resistance	VGS=0V, VDS=0V, f=1MHz		6		Ω
SWITCHING PARAMETERS						
Qg	Total Gate Charge	VGS=4.5V, VDS=-15V, ID=-4A		9.4		nC
Qgs	Gate Source Charge			2		nC
Qgd	Gate Drain Charge			3		nC
tD(on)	Turn-On DelayTime	VGS=-10V,VDS=-15V, RL=3.6Ω, RGEN=6Ω		6.3		nC
tr	Turn-On Rise Time			3.2		ns
tD(off)	Turn-Off DelayTime			38.2		ns
tf	Turn-Off Fall Time			12		ns
trr	Body Diode Reverse Recovery Time	IF=-4A, dI/dt=100A/μs		20.2		ns
Qrr	Body Diode Reverse Recovery Charge	IF=-4A, dI/dt=100A/μs		11.2		nC

A: The value of R θJA 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 a given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.

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

C. The R θJA 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

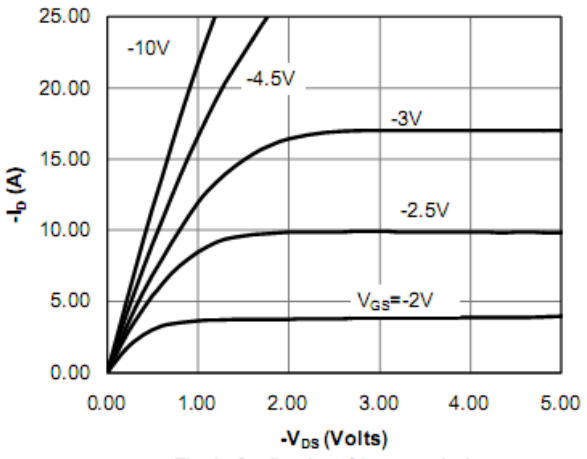


Fig 1: On-Region Characteristics

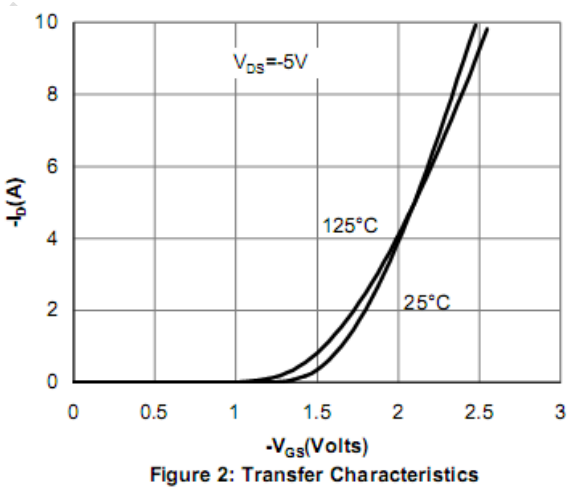


Figure 2: Transfer Characteristics

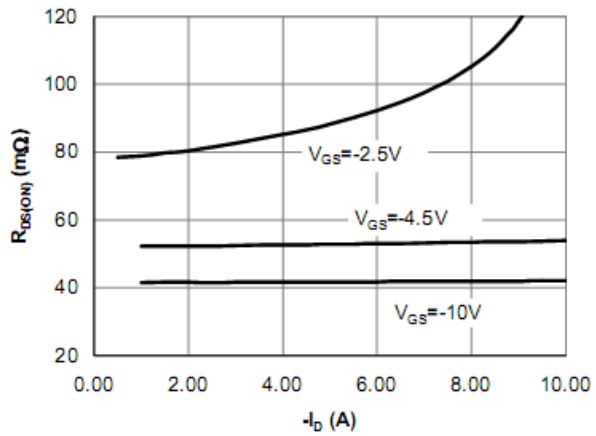


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

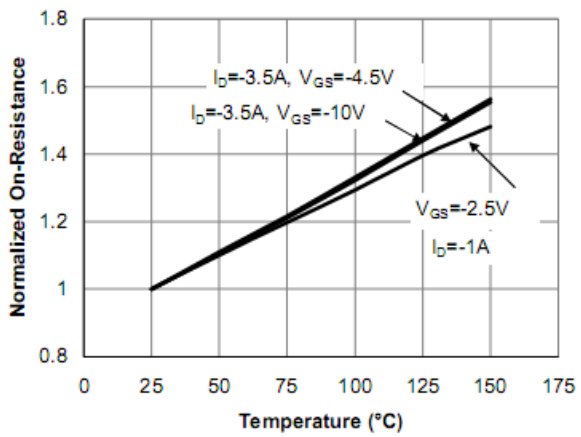


Figure 4: On-Resistance vs. Junction Temperature

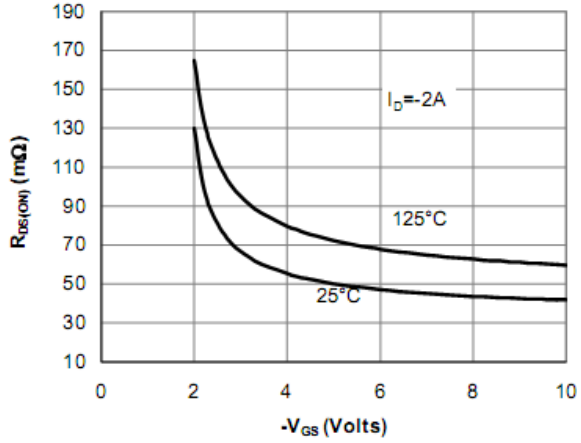


Figure 5: On-Resistance vs. Gate-Source Voltage

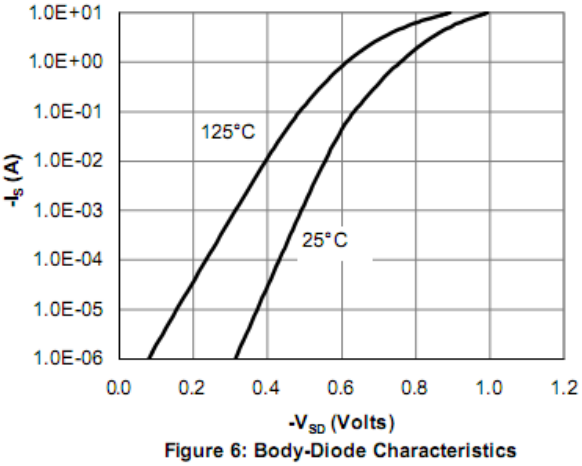


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

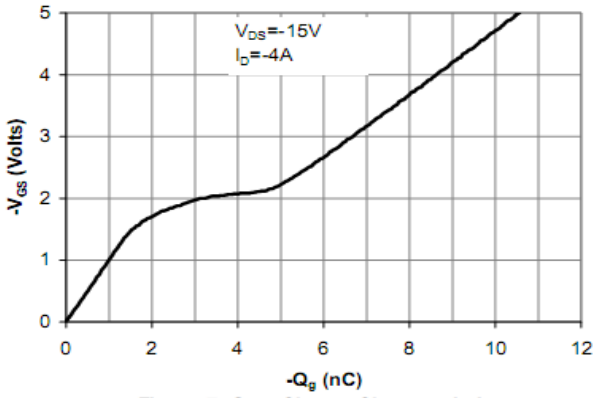


Figure 7: Gate-Charge Characteristics

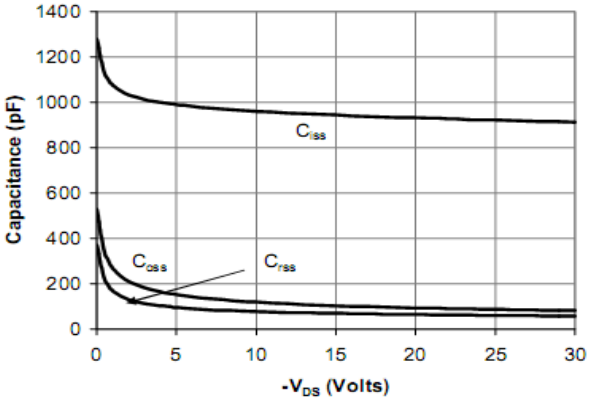


Figure 8: Capacitance Characteristics

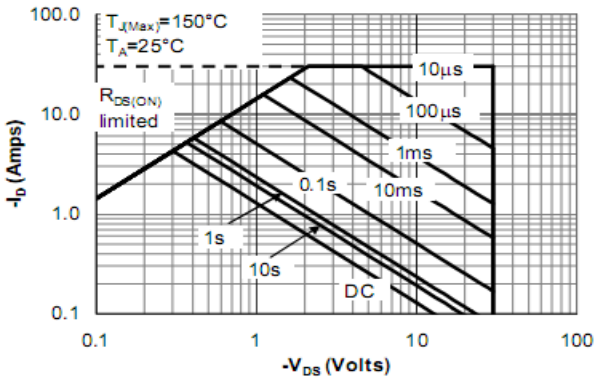


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

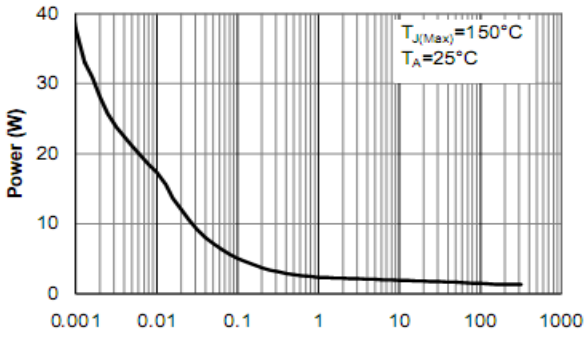


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

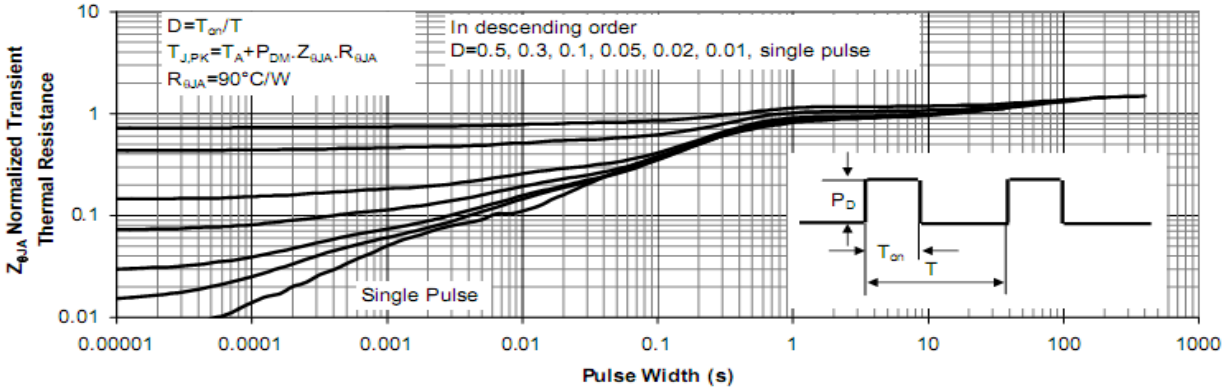


Figure 11: Normalized Maximum Transient Thermal Impedance