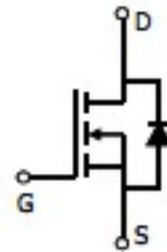
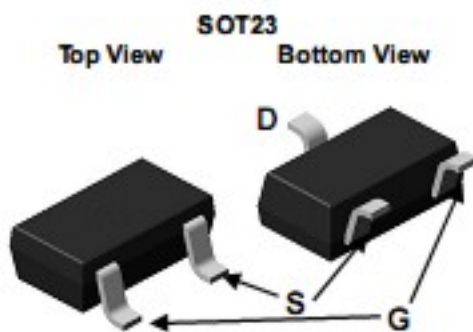


### General Description

The HT3402 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 load switch application.

### Product Summary

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



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

Parameter		Symbol	Maximum	Units	
Drain-Source Voltage		$V_{DS}$	-30	V	
Gate-Source Voltage		$V_{GS}$	$\pm 12$	V	
Continuous Drain Current (A)	$T_A=25^\circ C$	$I_D$	4	A	
	$T_A=70^\circ C$		3.4		
Junction and Storage Temperature Range		$I_{DM}$	15		
Power Dissipation (A)	$T_A=25^\circ C$	$P_D$	1.4	W	
	$T_A=70^\circ C$		1		
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 to 150	$^\circ C$	
<b>Thermal Characteristics</b>					
Parameter		Symbol	Typ	Max	Units
Maximum junction-to-Ambient(A)	$t \leq 10s$	$R\theta_{JA}$	70	90	$^\circ C/W$
	Steady-State		100	125	$^\circ C/W$
Maximum junction-to-Lead(C)	Steady-State	$R\theta_{JL}$	63	80	$^\circ C/W$

## Electrical Characteristics

(T<sub>J</sub>=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> =-250μA, V <sub>GS</sub> =0V	30			V
IDSS	Zero Gate Voltage Drain Current	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V			1	μA
		T <sub>J</sub> =55°C			5	
IGSS	Gate-Body leakage current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V			100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =-250μA	0.6	1	1.4	V
ID(ON)	On state drain current	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =5V	10			A
RDS(ON)	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =4A		45	55	mΩ
		T <sub>J</sub> =125°C		66	80	
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A		55	70	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =2A		83	110	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =4A		8		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1A, V <sub>GS</sub> =0V		0.8	1	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current				2.5	A
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V, f=1MHz		390		pF
C <sub>oss</sub>	Output Capacitance			54.5		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			41		pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz		3		Ω
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =15V, I <sub>D</sub> =4A		4.34		nC
Q <sub>gs</sub>	Gate Source Charge			0.6		nC
Q <sub>gd</sub>	Gate Drain Charge			1.38		nC
t <sub>D(on)</sub>	Turn-On Delay Time	V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, R <sub>L</sub> =3.75Ω, R <sub>GEN</sub> =6Ω		3.3		nC
t <sub>r</sub>	Turn-On Rise Time			1		ns
t <sub>D(off)</sub>	Turn-Off Delay Time			21.7		ns
t <sub>f</sub>	Turn-Off Fall Time			2.1		ns
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =-4A, di/dt=100A/μs		12		ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =-4A, di/dt=100A/μs		6.3		nC

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^{\circ}\text{C}$ . The value in any given application depends on the user's specific board design. The current rating is based on the  $t \leq 10\text{s}$  thermalresistance rating.

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

C. The  $R_{\theta JA}$  is the sum of the thermal impedance from junction to lead  $R_{\theta JL}$  and lead to ambient.

D. The static characteristics in Figures 1 to 6,12,14 are obtained using  $<300\ \mu\text{s}$  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  $T_A = 25^{\circ}\text{C}$ . The SOA curve provides a single pulse rating.

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

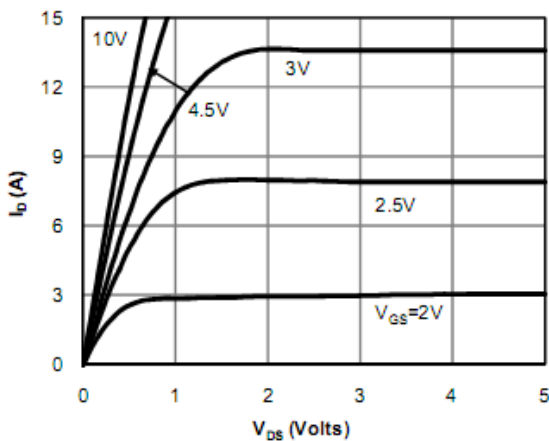


Fig 1: On-Region Characteristics

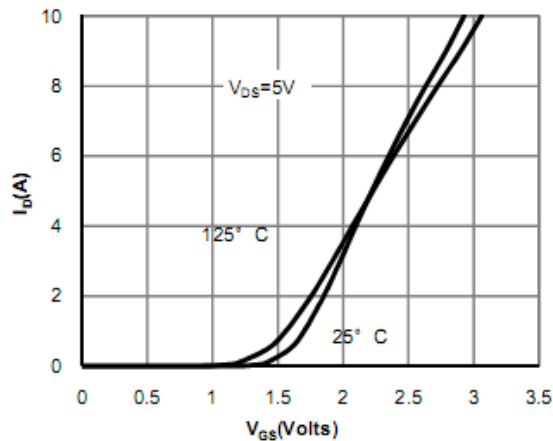


Figure 2: Transfer Characteristics

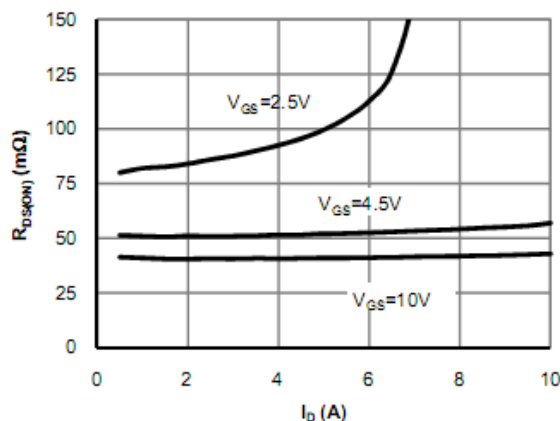


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

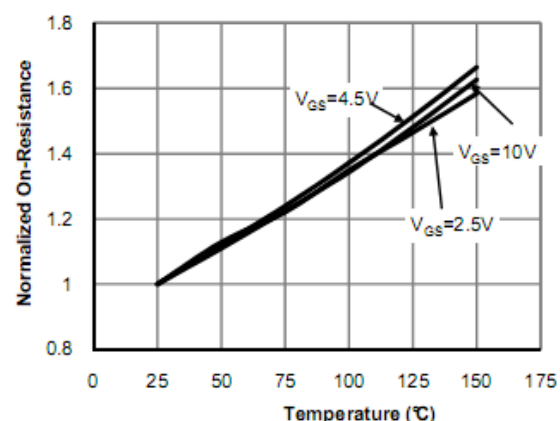


Figure 4: On-Resistance vs. Junction Temperature

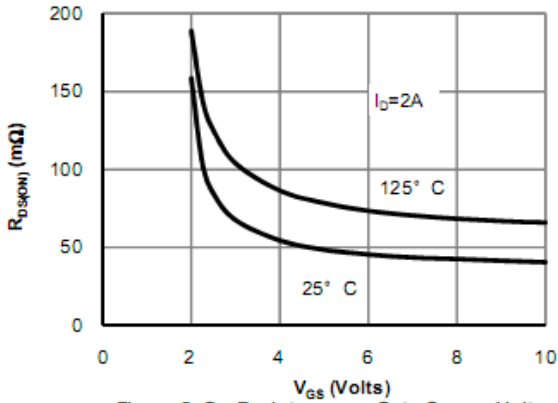


Figure 5: On-Resistance vs. Gate-Source Voltage

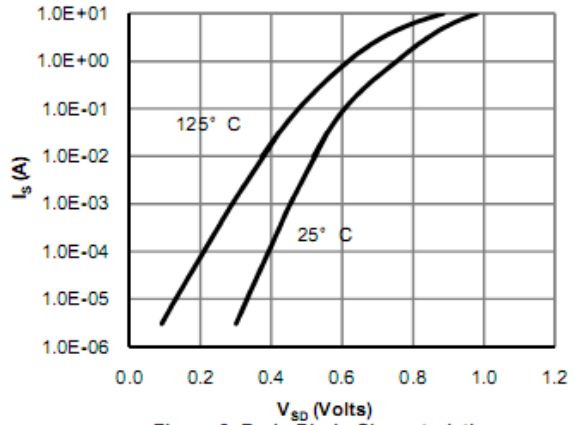


Figure 6: Body-Diode Characteristics

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

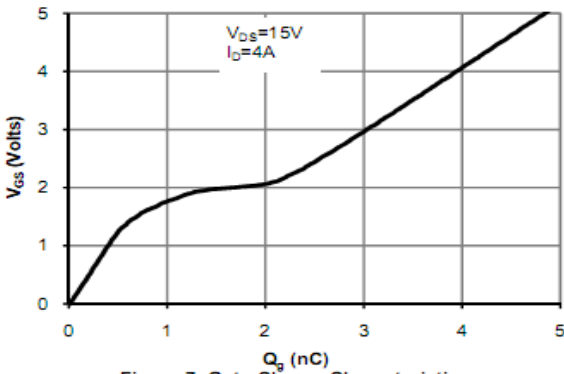


Figure 7: Gate-Charge Characteristics

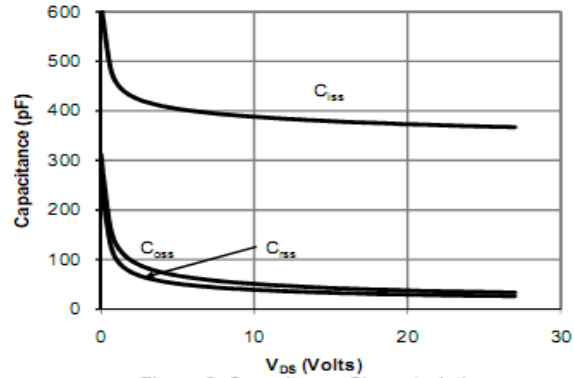


Figure 8: Capacitance Characteristics

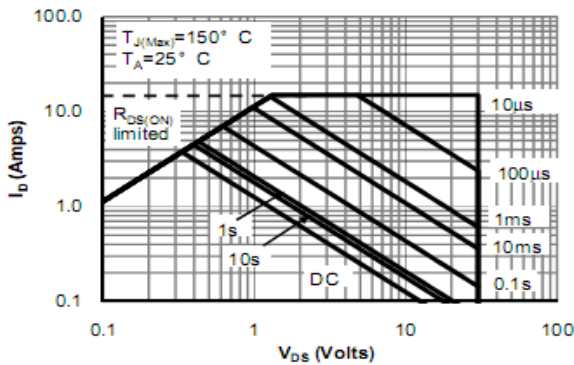


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

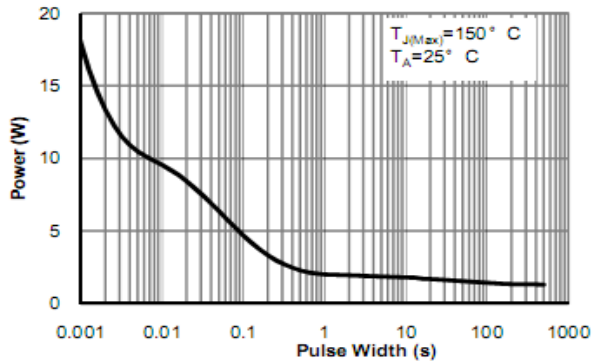


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

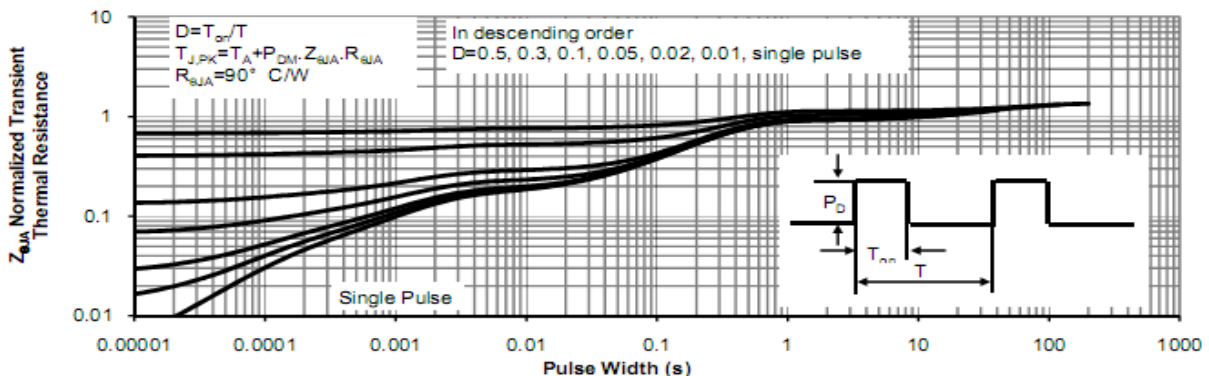


Figure 11: Normalized Maximum Transient Thermal Impedance

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