

HT4407

General Description

The HT4407/L uses advanced trench technology to provide excellent RDS(ON), and ultra-low low gate charge with a 25V gate rating. This device is suitable for use as a load switch or in PWM applications. O4407 and HT4407L are electrically identical.

-RoHS Compliant

-HT4407L is Halogen Free

Features

VDS (V) = -30V

ID = -12 A (VGS = -20V)

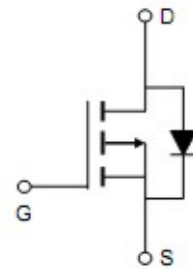
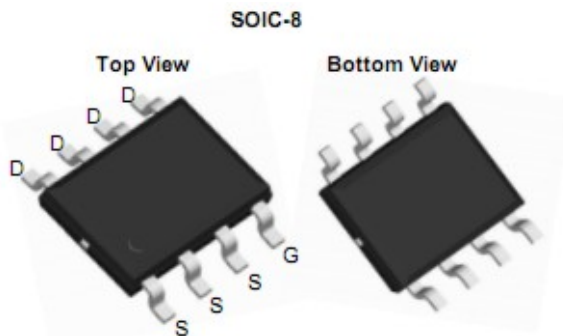
R_{DS(ON)} < 13mΩ (VGS = -20V)

R_{DS(ON)} < 14mΩ (VGS = -10V)

R_{DS(ON)} < 38mΩ (VGS = -5V)

100% UIS Tested

100% Rg Tested



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	VDS	-30	V
Gate-Source Voltage	VGS	+25	V
Continuous Drain Current AF	ID	TA=25°C	-12
		TA=70°C	-10
Pulsed Drain Current B	IDM	-60	
Avalanche Current G	IAR	-30	A
Repetitive avalanche energy L=0.3mH G	EAR	135	mJ
Power Dissipation A	PD	TA=25°C	3.1
		TA=70°C	2
Junction and Storage Temperature Range	TJ, TSTG	-50 to 150	°C

Thermal Characteristics						
Parameter			Symbol	Typ	Max	Units
Maximum Junction-to-Ambient	A	$t \leq 10s$	R θ JA	32	40	$^{\circ}C/W$
Maximum Junction-to-Ambient	A	Steady-State		60	75	$^{\circ}C/W$
Maximum Junction-to-Lead	C	Steady-State	R θ JL	17	24	$^{\circ}C/W$

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BVDSS		ID=-250μA, VGS=0V	-30			V
IDSS	Zero Gate Voltage Drain Current	VDS=-30V, VGS=0V			-1	μA
				T _J =55°C	-5	
IGSS	Gate-Body leakage current	VDS=0V, VGS=±25V			±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS ID=-250μA	-1.7	-2.5	-3	V
ID(ON)	On state drain current	VGS=-10V, VDS=-5V	60			A
RDS(ON)	Static Drain-Source On-Resistance	VGS=-10V, ID=-10A		11	14	mΩ
		T _J =125°C		15	19	
		VGS=-20V, ID=-10A		10	13	mΩ
		VGS=-5V, ID=-10A		27	38	S
gFS	Forward Transconductance	VDS=-5V, ID=-10A		26		S
VSD	Diode Forward Voltage	IS=-1A, VGS=0V		-0.72	-1	V
IS					-4.2	A
DYNAMIC PARAMETERS						
Ciss	Input capacitance	VGS=0V, VDS=-15V, f=1MHz		2076	2500	pF
Coss	Output Capacitance			503		pF
Crss	Reverse Transfer Capacitance			302	423	pF
Rg	Gate resistance	VGS=0V, VDS=0V, f=1MHz	1	2	3	Ω
SWITCHING PARAMETERS						
Qg	Total Gate Charge	VGS=-10V, VDS=-15V, ID=-12A	30	37.2	45	nC
Qgs	Gate Source Charge			7		nC
Qgd	Gate Drain Charge			10.4		nC
tD(on)	Turn-On delayTime	VGS=-10V, VDS=-15V, RL=1.25Ω, RGEN=3Ω		12.4		ns
tr	Turn-On Rise Time			8.2		ns
tD(off)	Turn-Off delayTime			25.6		ns
tf	Turn-Off Fall Time			12		ns
trr	Body Diode Reverse Recovery Time	IF=-12A, di/dt=100A/μs		33	40	ns
Qrr	Body Diode Reverse Recovery Charge	IF=-12A, di/dt=100A/μs		23		nC

HT4407

- A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}C$. The value in any given application depends on the user's specific board design.
- 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 are obtained using $<300 \mu s$ 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 $T_A=25^{\circ}C$. The SOA curve provides a single pulse rating.
- F: The current rating is based on the $t \leq 10s$ junction to ambient thermal resistance rating.
- G: EAR and IAR ratings are based on low frequency and duty cycles such that $T_j(\text{start})=25C$ for each pulse.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

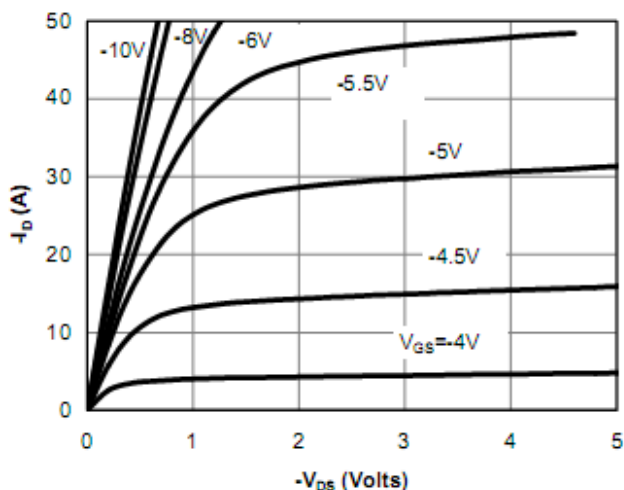


Fig 1: On-Region Characteristics

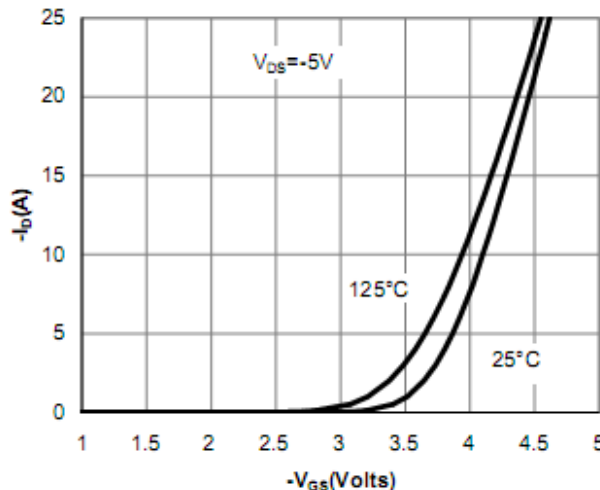


Figure 2: Transfer Characteristics

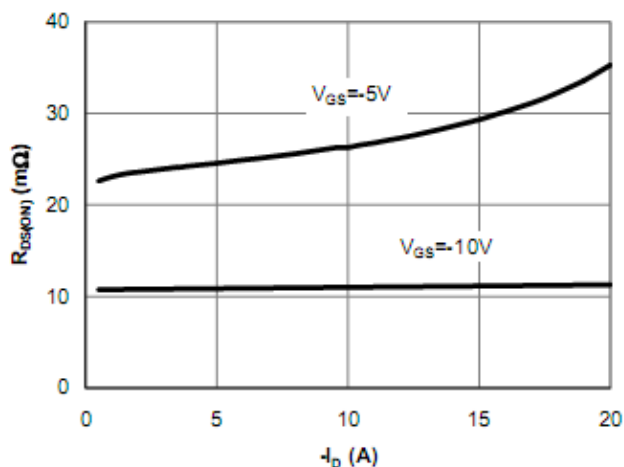


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

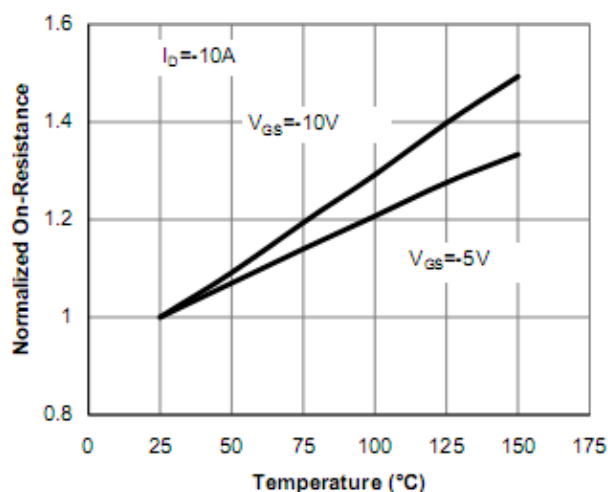


Figure 4: On-Resistance vs. Junction Temperature

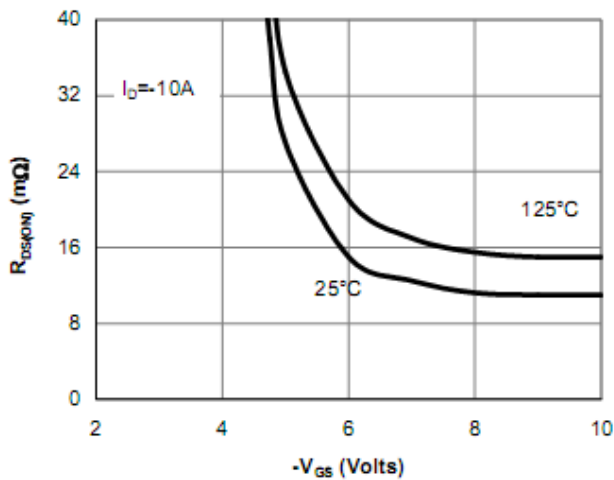


Figure 5: On-Resistance vs. Gate-Source Voltage

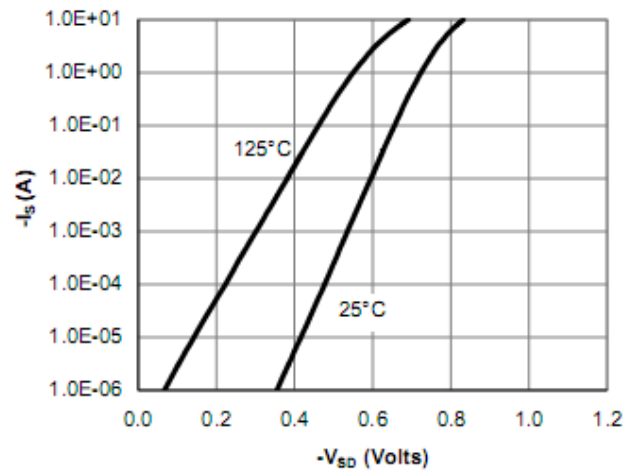


Figure 6: Body-Diode Characteristics

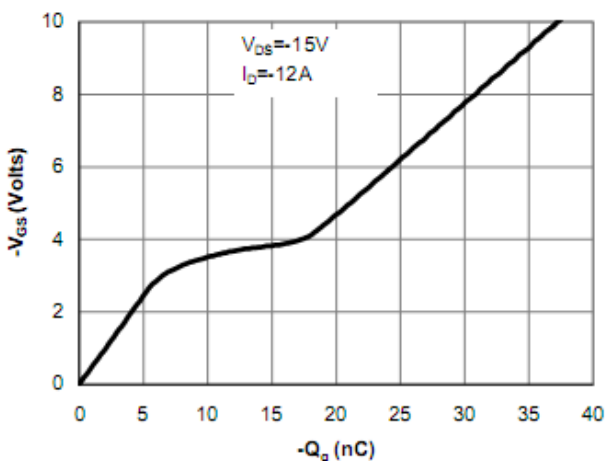


Figure 7: Gate-Charge Characteristics

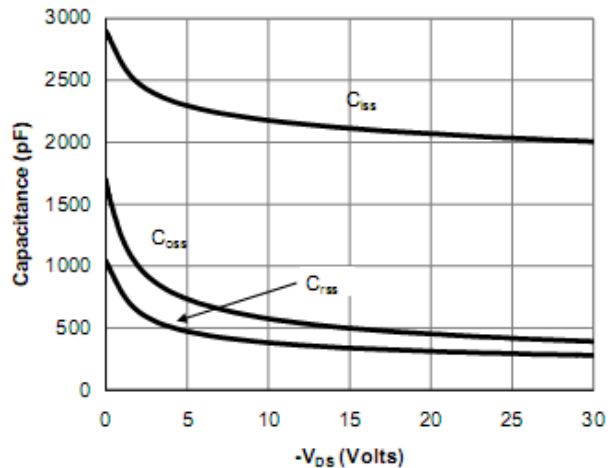


Figure 8: Capacitance Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

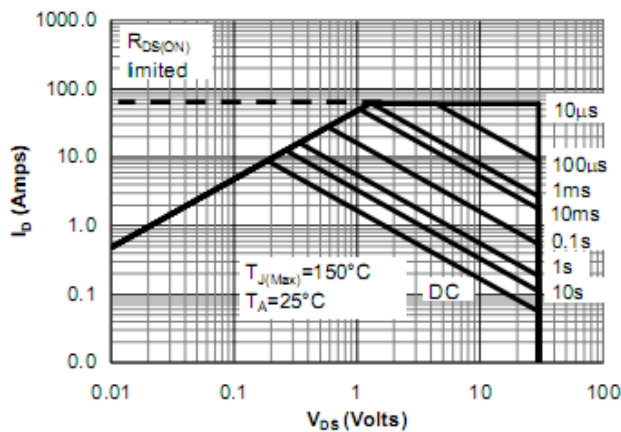


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

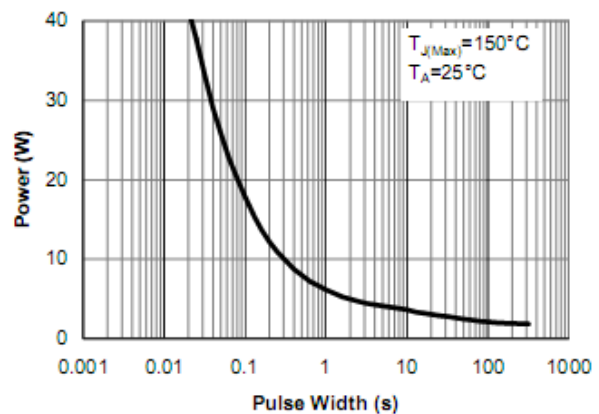


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

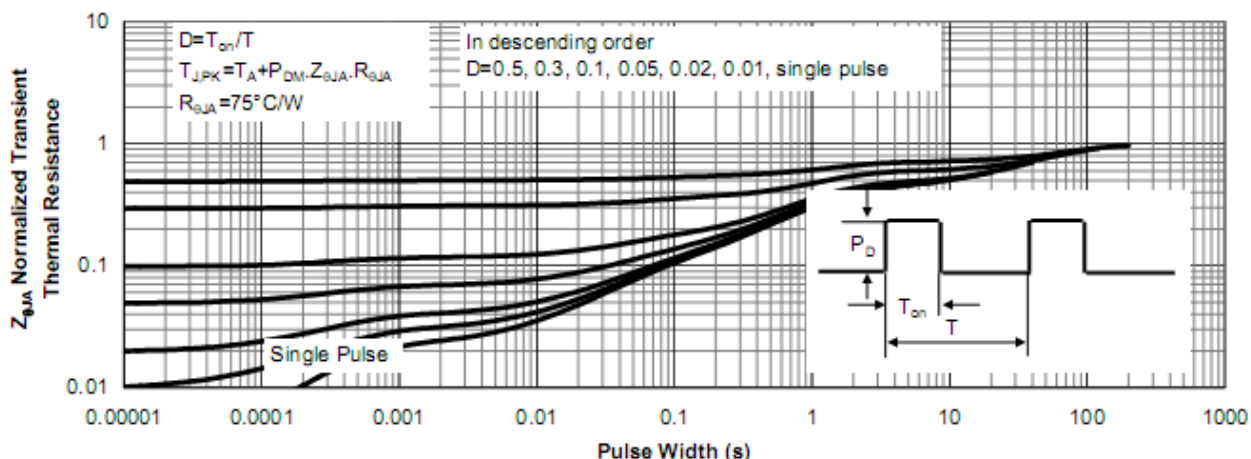
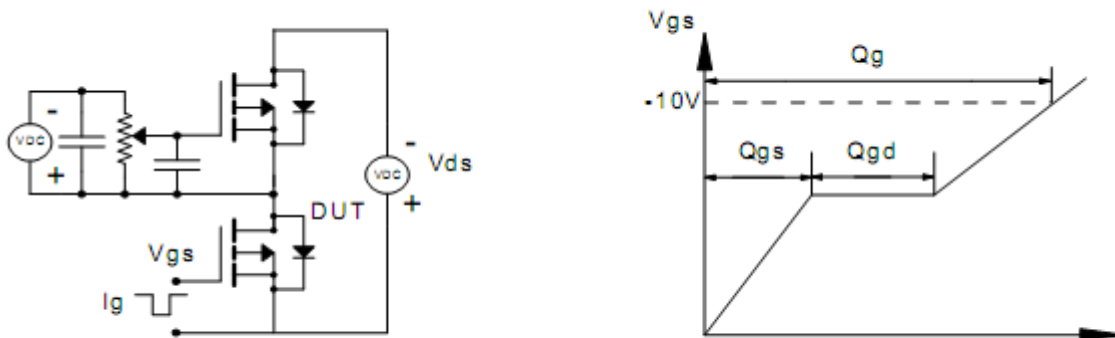
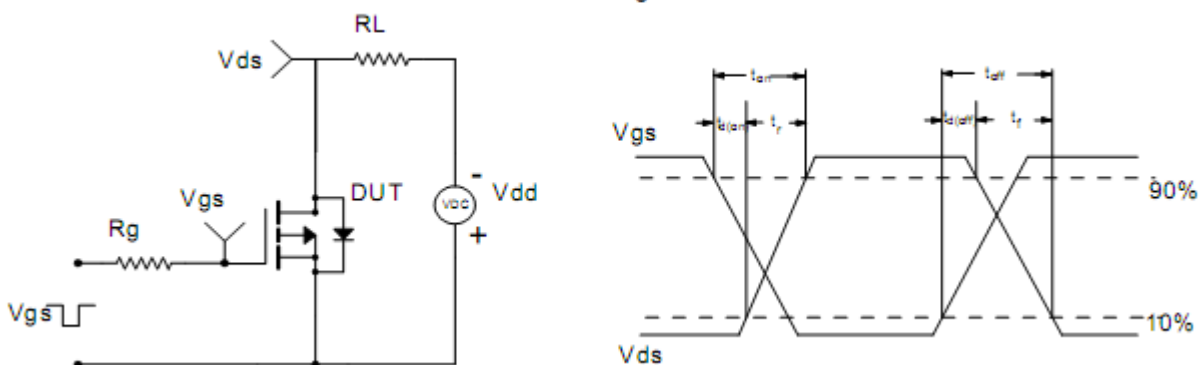


Figure 11: Normalized Maximum Transient Thermal Impedance

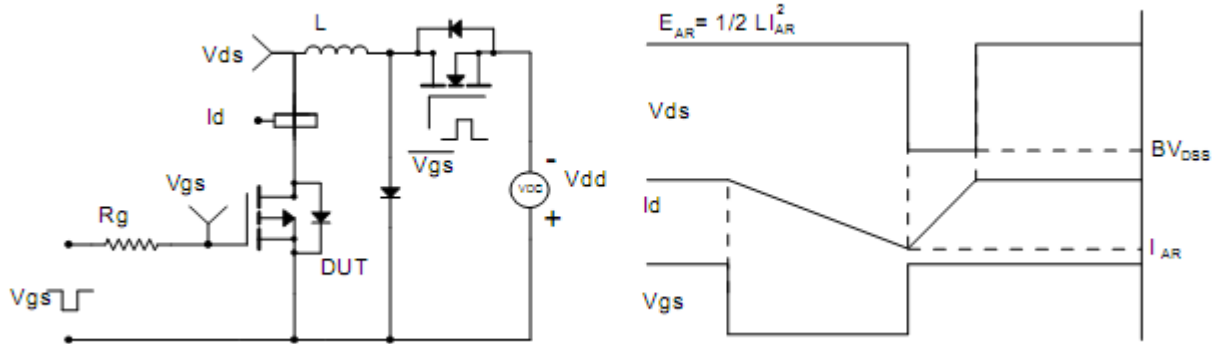
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

