HC1503

30V N-Channel MOSFET

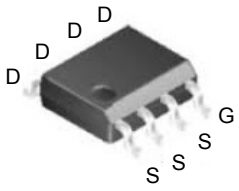
General Description

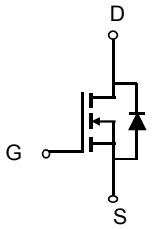
The HC1503 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.

Features

V_{DS}	30V
I_D (at V_{GS}=10V)	13A
$R_{DS(ON)}$ (at V_{GS}=10V)	15mΩ(Max)
$R_{DS(ON)}$ (at V_{GS}=4.5V)	20mΩ(Max)

SOP8





Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous	TC=25°C	I_D	13	A
	TC=100°C	I_D	10	A
Drain Current – Pulsed		I_{DM}	52	A
Maximum Power Dissipation		P_D	2.1	W
Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance junction-case	$R_{\theta Jc}$		7	℃ /W
Thermal Resistance unction-to-Ambient	$R_{\theta JA}$		62	℃ /W

Electrical Characteristics (TJ=25℃ unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	0.6	1.0	1.5	V
$R_{DS(ON)}$	Drain-Source On-State esistance	V_{GS}=10V, I_D=10A		12	15	mΩ
		V_{GS}=4.5V, I_D=5A		14	20	mΩ
DYNAMIC PARAMETERS						
C_{lss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, F=1.0MHz		620		pF
C_{oss}	Output Capacitance			85		pF
C_{rss}	Reverse Transfer Capacitance			60		pF
SWITCHING PARAMETERS						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=10V V_{DS}=15V R_L=2.6Ω R_{GEN}=3Ω		2.6		nS
t_r	Turn-on Rise Time			8.5		nS
$t_{d(off)}$	Turn-Off Delay Time			18		nS
t_f	Turn-Off Fall Time			5		nS
Q_g	Total Gate Charge	V_{DS}=15V,I_D=3A, V_{GS}=4.5V		7.1		nC
Q_{gs}	Gate-Source Charge			1.4		nC
Q_{gd}	Gate-Drain Charge			1.5		nC
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_{SD}=1A		0.72	1.3	V
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		2		Ω

Note：

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

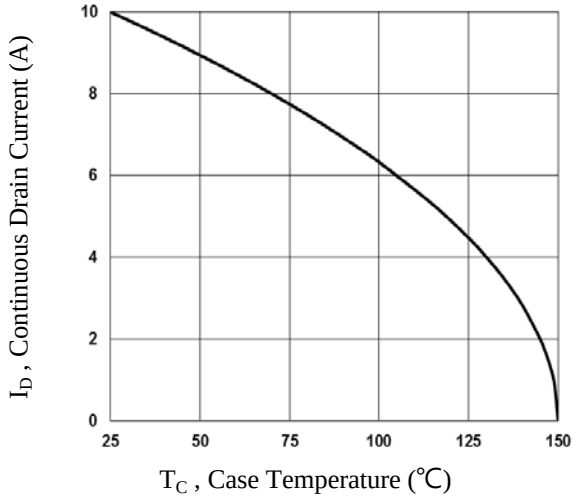


Fig.1 Continuous Drain Current vs. T_C

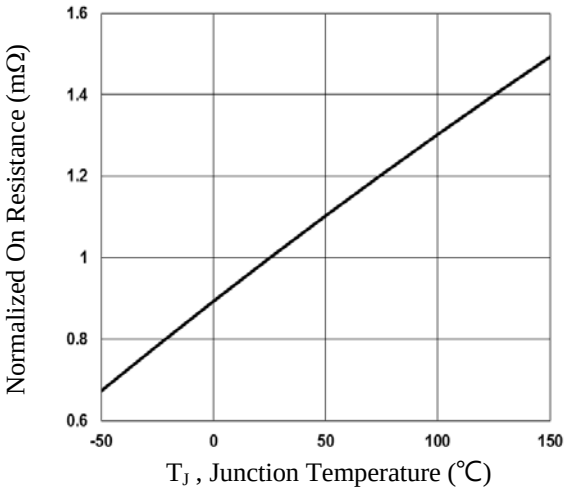


Fig.2 Normalized RDSON vs. T_J

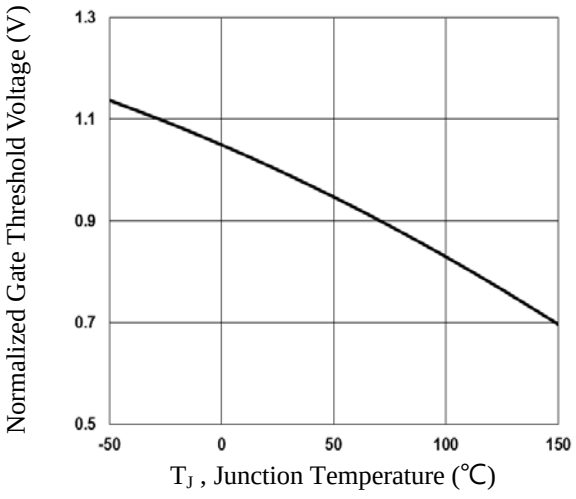


Fig.3 Normalized V_{th} vs. T_J

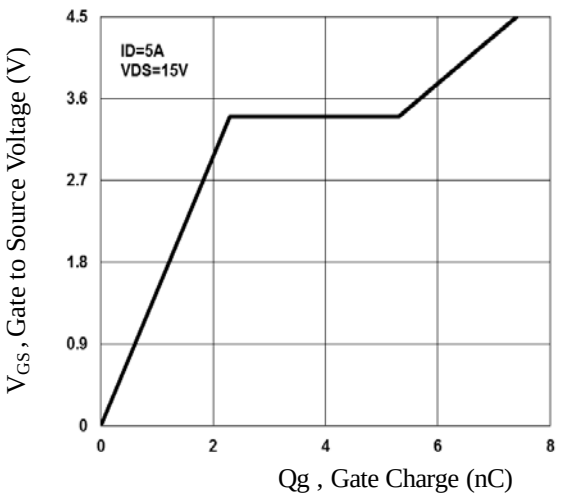


Fig.4 Gate Charge Waveform

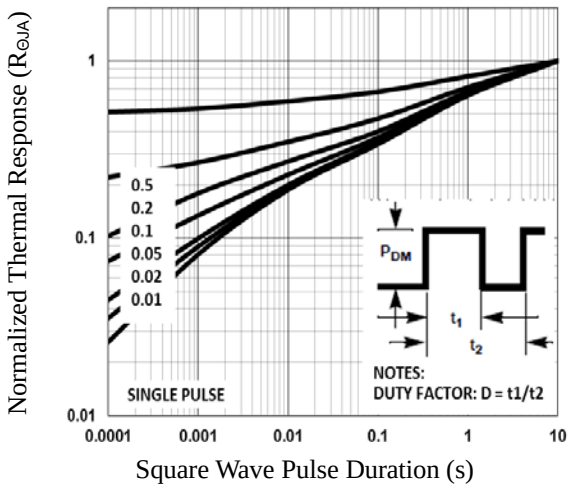


Fig.5 Normalized Transient Response

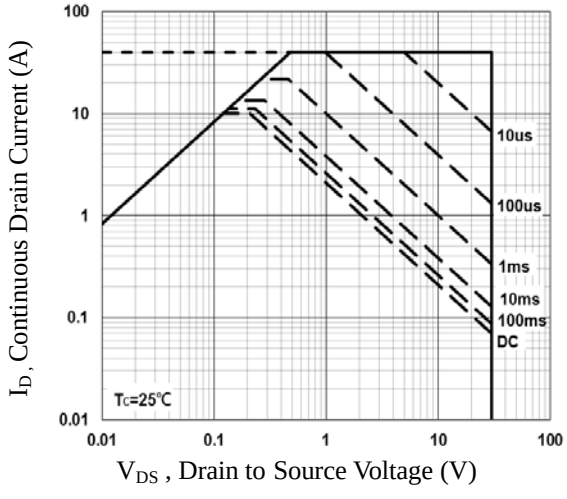


Fig.6 Maximum Safe Operation Area

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

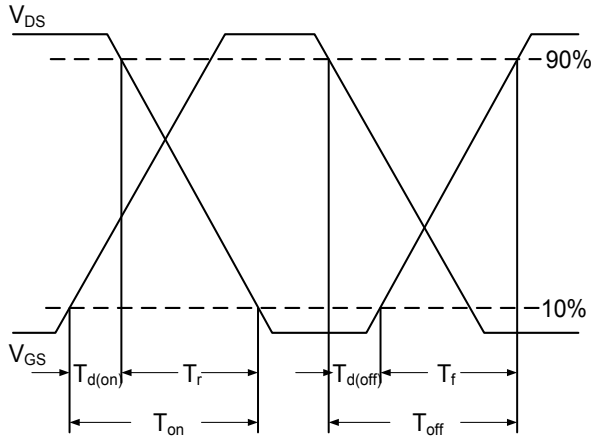


Fig.7 Switching Time Waveform

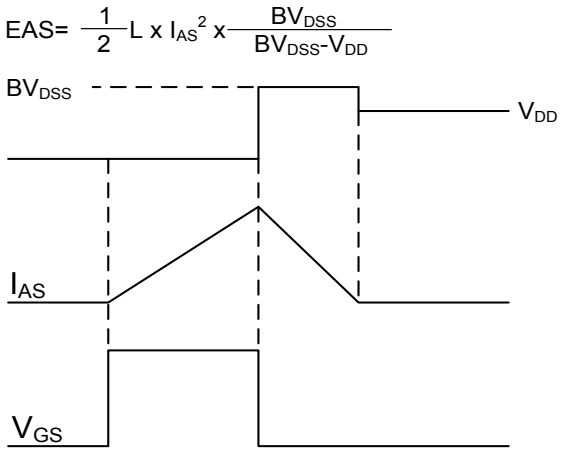
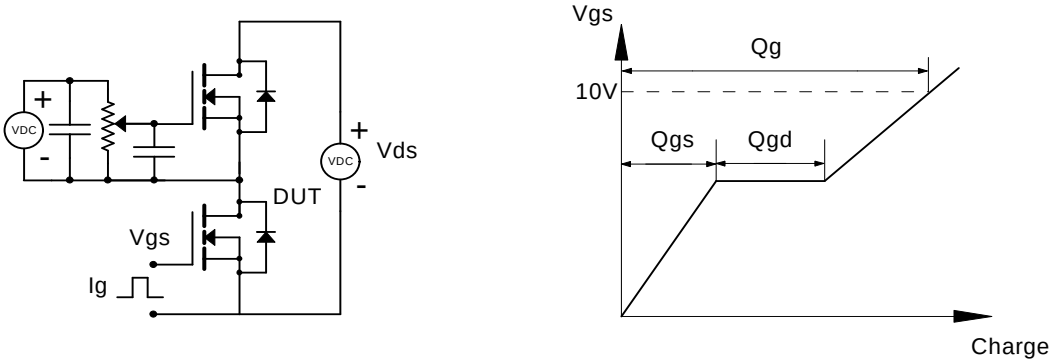
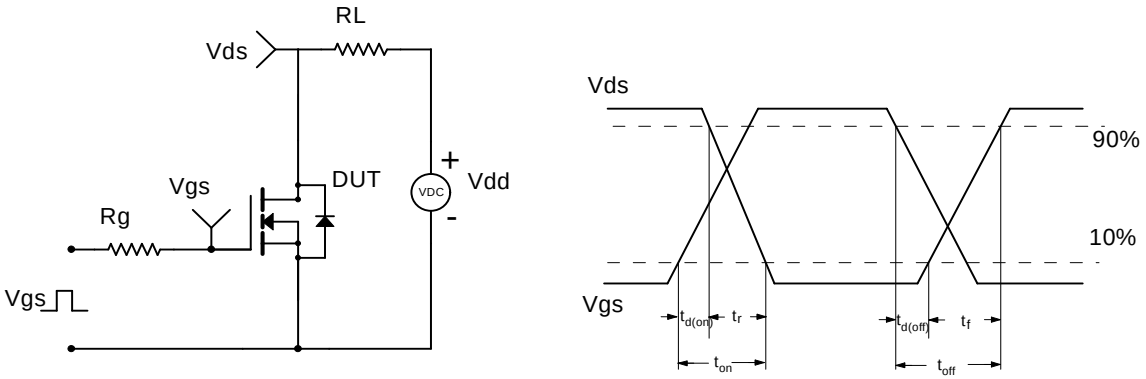


Fig.8 EAS Waveform

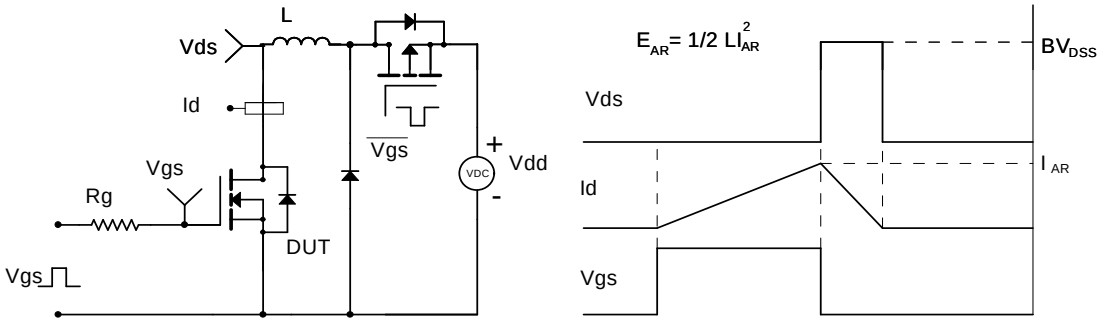
Gate Charge Test Circuit & Waveform



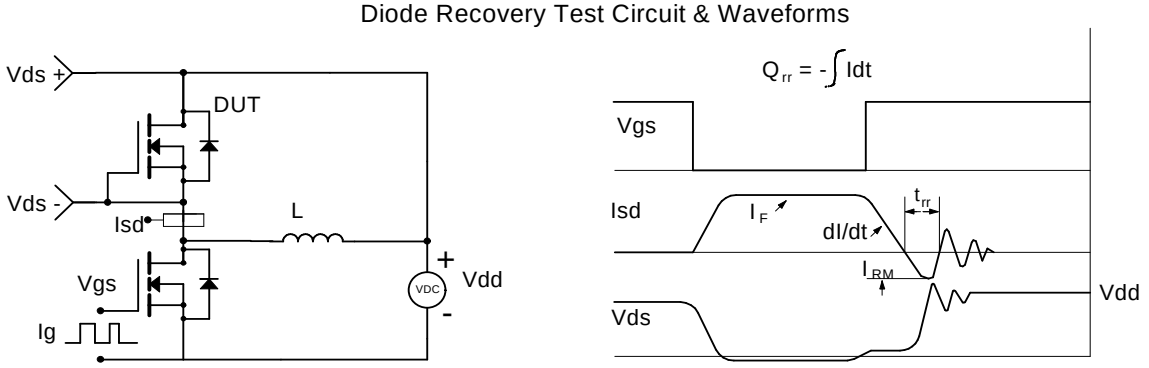
Resistive Switching Test Circuit & Waveforms



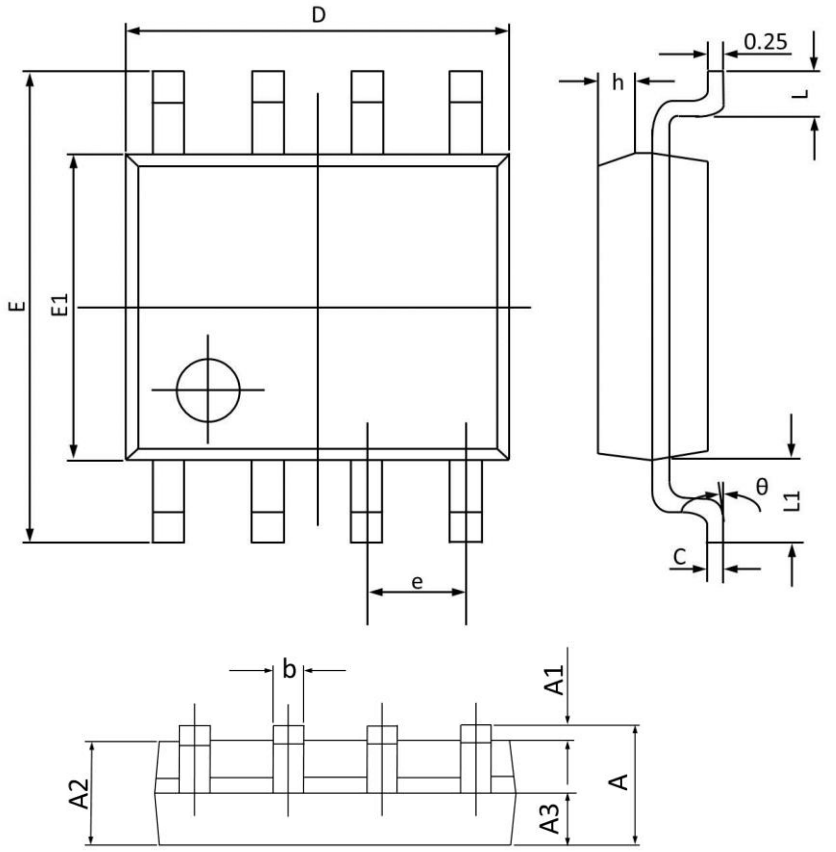
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



SOP8 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.068
A1	0.100	0.250	0.004	0.009
A2	1.300	1.500	0.052	0.059
A3	0.600	0.700	0.024	0.027
b	0.390	0.480	0.016	0.018
c	0.210	0.260	0.009	0.010
D	4.700	5.100	0.186	0.200
E	5.800	6.200	0.229	0.244
E1	3.700	4.100	0.146	0.161
e	1.270(BSC)		0.050(BSC)	
h	0.250	0.500	0.010	0.019
L	0.500	0.800	0.019	0.031
L1	1.050(BSC)		0.041(BSC)	
θ	0°	8°	0°	8°