

HC1503

30V N-Channel MOSFET

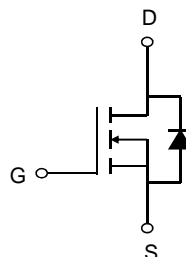
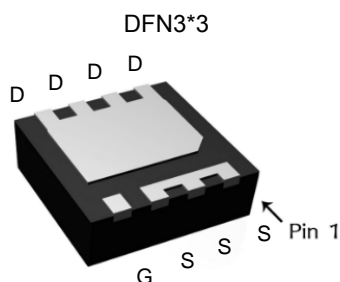
General Description

The HC1503 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ 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 $V_{GS}=10V$)	30A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	15m Ω (Max)
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	20m Ω (Max)

100% UIS TESTED!
100% ΔV_{ds} TESTED!



Absolute Maximum Ratings $T_A=25^\circ\text{C}$ 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 $^\circ\text{C}$	I_D	30	A
	TC=100 $^\circ\text{C}$	I_D	18	A
Drain Current – Pulsed	I_{DM}	120	A	
Maximum Power Dissipation	P_D	25	W	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ\text{C}$	

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance junction-case	$R_{\theta Jc}$		3.8	$^\circ\text{C}/\text{W}$
Thermal Resistance junction-to-Ambient	$R_{\theta JA}$		62	$^\circ\text{C}/\text{W}$

Electrical Characteristics (T_J=25°C 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 Resistance	V _{GS} =10V, I _D =10A		12	15	mΩ
		V _{GS} =4.5V, I _D =5A		14	20	mΩ
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =3A		6		S
DYNAMIC PARAMETERS						
C _{ISS}	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

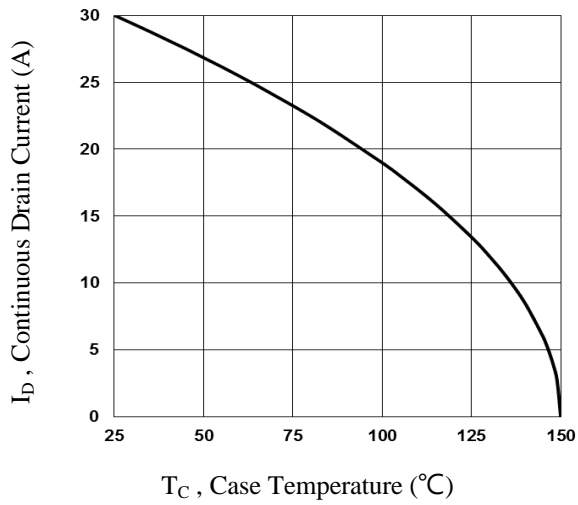


Fig.1 Continuous Drain Current vs. T_c

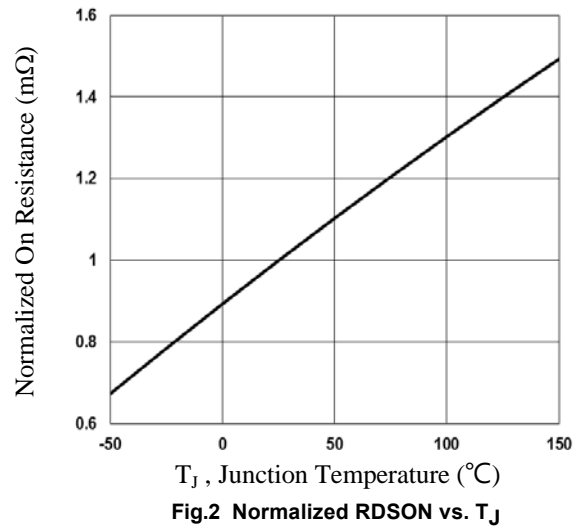


Fig.2 Normalized R_{DS(on)} vs. T_j

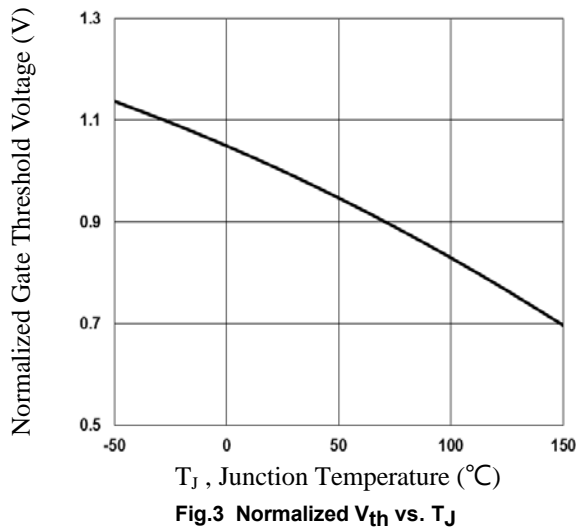


Fig.3 Normalized V_{th} vs. T_j

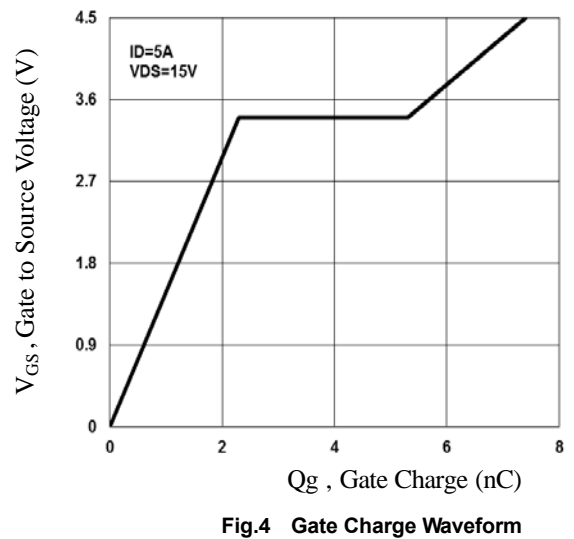


Fig.4 Gate Charge Waveform

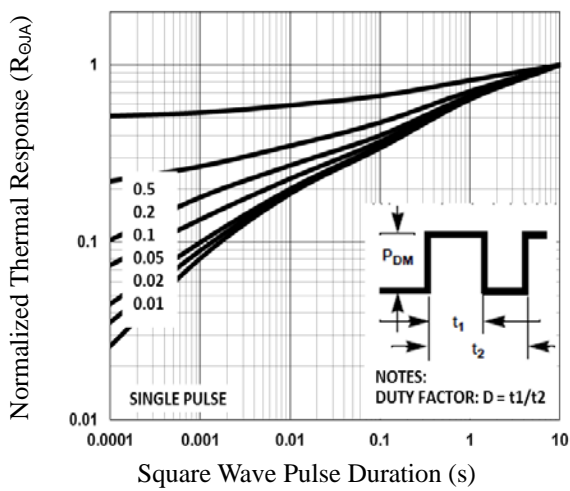


Fig.5 Normalized Transient Response

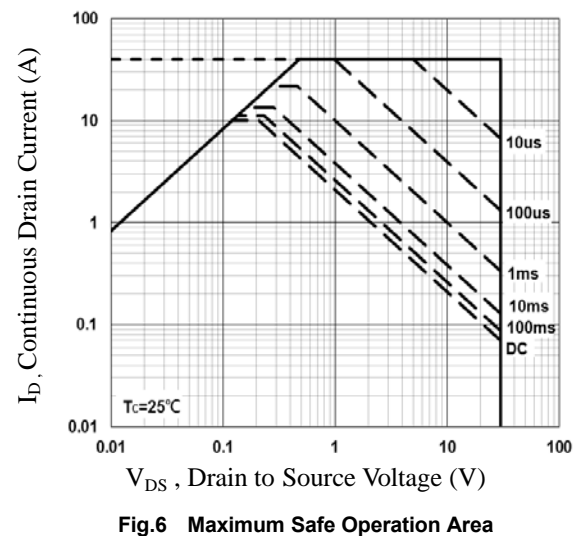


Fig.6 Maximum Safe Operation Area

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

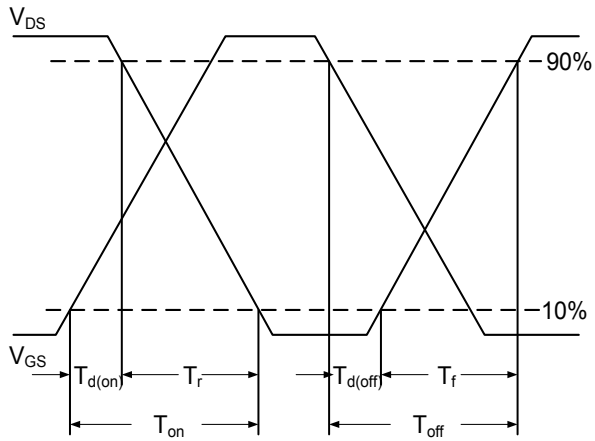


Fig.7 Switching Time Waveform

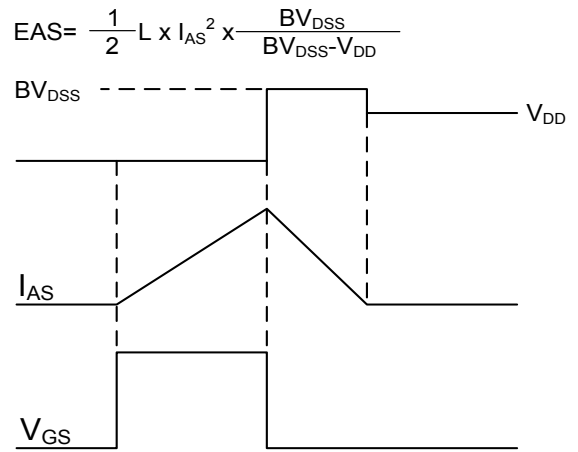
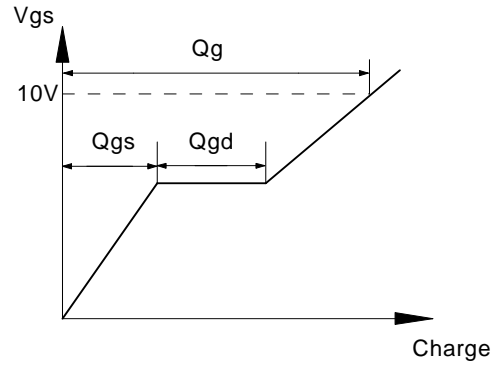
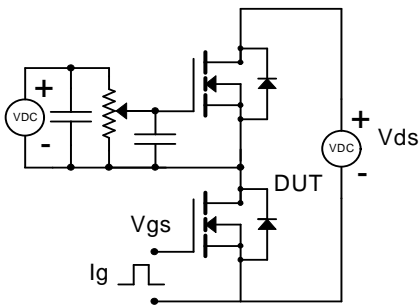
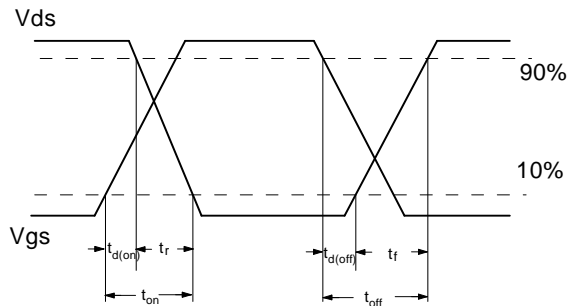
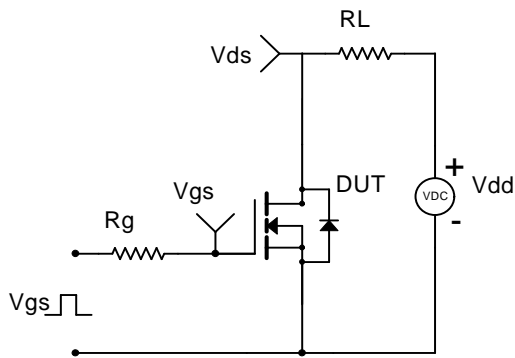


Fig.8 EAS Waveform

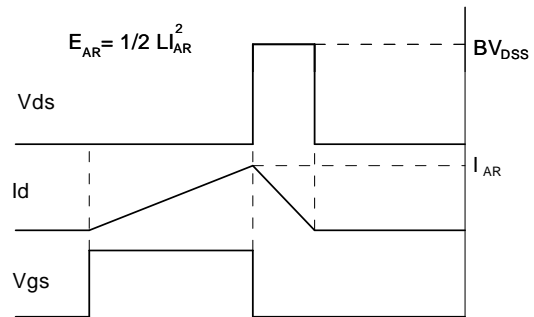
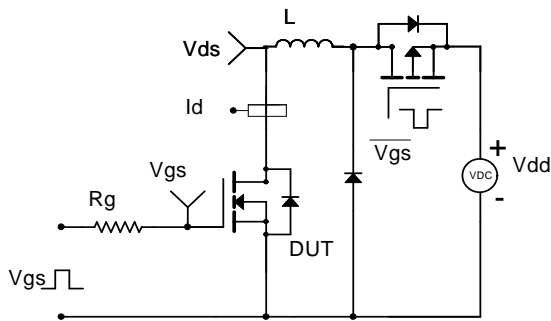
Gate Charge Test Circuit & Waveform



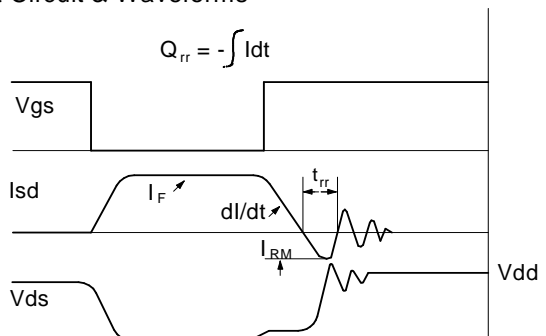
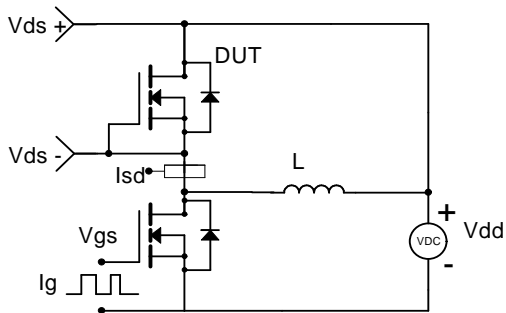
Resistive Switching Test Circuit & Waveforms



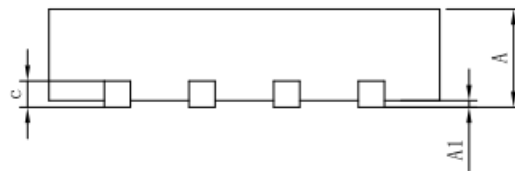
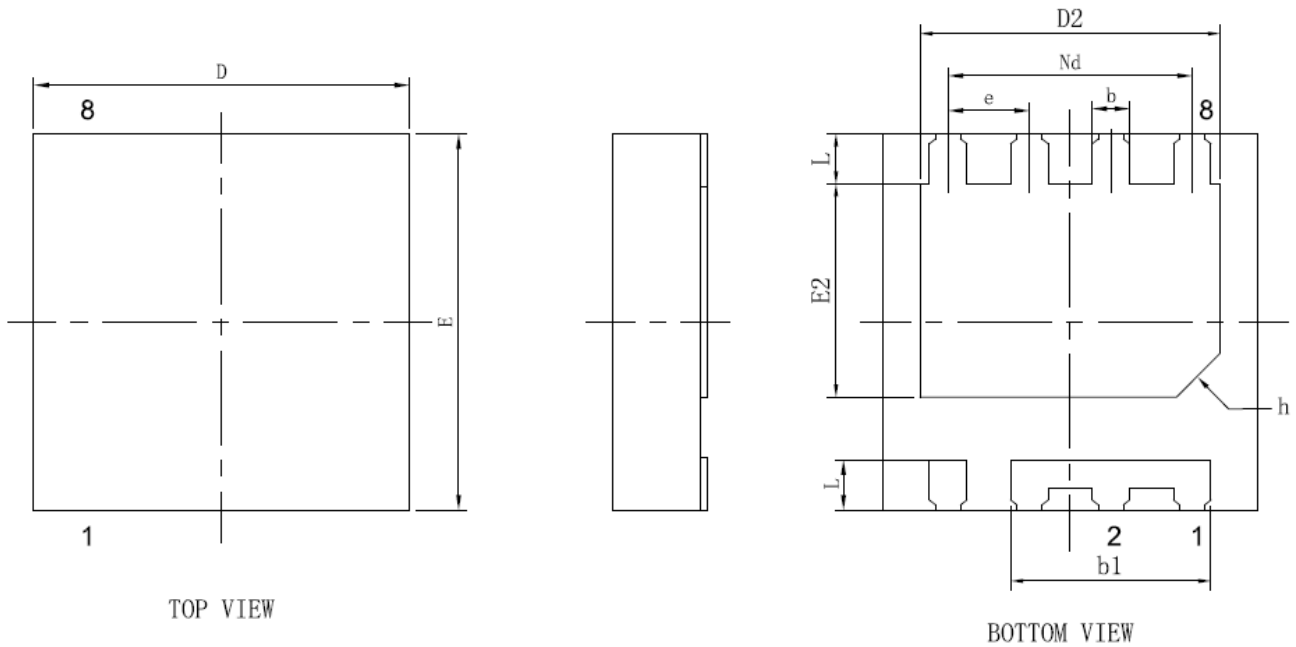
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



DFN3*3 PACKAGE INFORMATION



SIDE VIEW

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
b	0.25	0.30	0.35
b1	1.55	1.60	1.65
c	0.19	0.20	0.21
D	2.90	3.00	3.10
D2	2.30	2.40	2.50
Nd	1.90	1.95	2.00
E	2.90	3.00	3.10
E2	1.60	1.70	1.80
e	0.65BSC		
L	0.35	0.40	0.45
h	0.30	0.35	0.40