

FH3306B

N-Channel Enhancement Mode MOSFET

Description

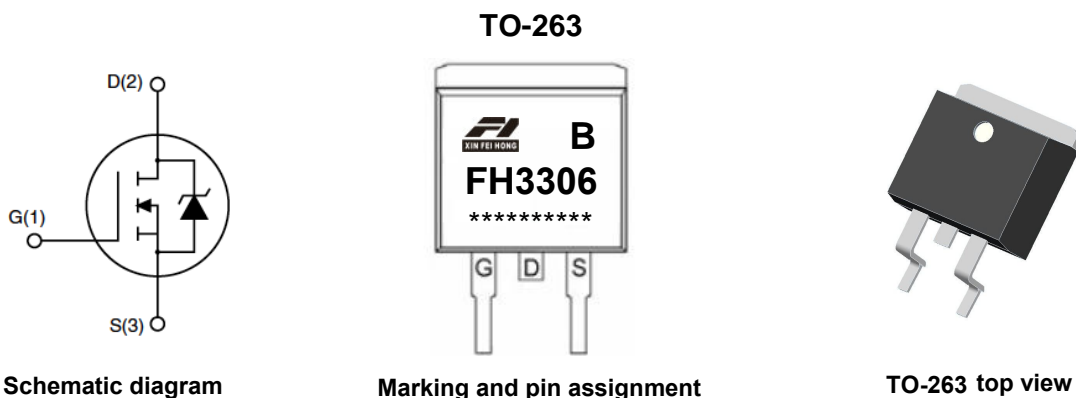
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and with stand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Features

- ◆ 60V,130A, $R_{DS(on).max}=6.2m\Omega@V_{GS}=10V$
- ◆ Improved dv/dt capability
- ◆ Fast switching
- ◆ 100% EAS Guaranteed
- ◆ Green device available

Applications

- ◆ Motor Drives
- ◆ UPS
- ◆ DC-DC Converter



Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	60	V
Continuous drain current ($T_C = 25^{\circ}C$) ¹⁾	I_D	130	A
Continuous drain current ($T_C = 100^{\circ}C$) ¹⁾		87	A
Pulsed drain current ²⁾	I_{DM}	480	A
Gate-Source voltage	V_{GSS}	± 20	V
Avalanche energy ³⁾	E_{AS}	320	mJ
Power Dissipation ($T_C = 25^{\circ}C$)	P_D	120	W
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.0	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W

Electrical Characteristics

 $T_J = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0 V, I _D =250uA	60	---	---	V
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.0	---	3.0	V
Drain-source leakage current	I _{DSS}	V _{DS} =60 V, V _{GS} =0 V, T _J = 25°C	---	---	1	μA
		V _{DS} =60 V, V _{GS} =0 V, T _J = 125°C	---	---	5	μA
Gate leakage current, Forward	I _{GSSF}	V _{GS} =20 V, V _{DS} =0 V	---	---	100	nA
Gate leakage current, Reverse	I _{GSSR}	V _{GS} =-20 V, V _{DS} =0 V	---	---	-100	nA
Drain-source on-state resistance	R _{DS(on)}	V _{GS} =10 V, I _D =20 A	---	4.5	6.2	mΩ
		V _{GS} =4.5 V, I _D =10 A	---	6.7	10	mΩ
Forward transconductance	g _{fs}	V _{DS} =5 V , I _D =50A	---	56	---	S
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} = 30 V, V _{GS} = 0 V, F = 1MHz	---	6080	---	pF
Output capacitance	C _{oss}		---	393	---	
Reverse transfer capacitance	C _{rss}		---	192	---	
Turn-on delay time	t _{d(on)}	V _{DD} = 30V,V _{GS} =10V, I _D = 10A	---	15	---	ns
Rise time	t _r		---	13	---	
Turn-off delay time	t _{d(off)}		---	50	---	
Fall time	t _f		---	36	---	
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	2.44	---	Ω
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DS} =30 V, I _D =40A, V _{GS} = 10 V	---	26.6	---	nC
Gate to drain charge	Q _{gd}		---	37.9	---	
Gate charge total	Q _g		---	130	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I _S		---	---	130	A
Pulsed Source Current ⁴⁾	I _{SM}		---	---	480	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =50A, T _J =25°C	---	0.95	1.4	V
Reverse Recovery Time	t _{rr}	I _S =100A, di/dt=100A/us,	---	50	---	ns
Reverse Recovery Charge	Q _{rr}	T _J =25°C	---	80	---	nC

Notes:

- 1: The maximum junction current rating is package limited.
- 2: Repetitive Rating: Pulse width limited by maximum junction temperature.
- 3: $V_{DD}=50\text{ V}, V_{GS}=10\text{ V}, L=0.1\text{ mH}, I_{AS}=80\text{ A}, R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$.
- 4: Pulse Test: Pulse Width $\leq 300\mu\text{ s}$, Duty Cycle $\leq 2\%$.

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

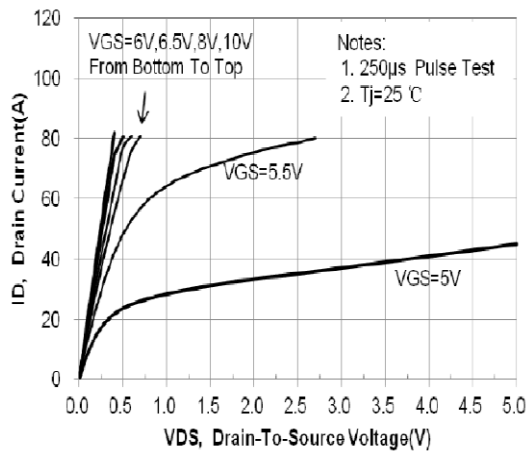


Figure 2. Transfer Characteristics

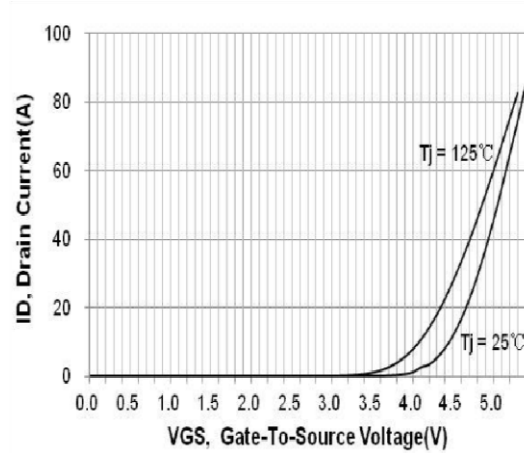


Figure 3. Capacitance Characteristics

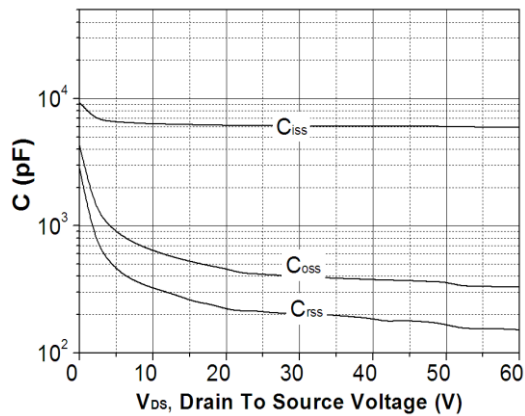


Figure 4. Gate Charge Waveform

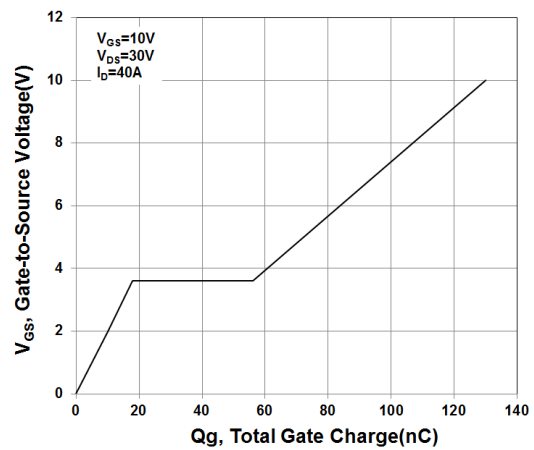


Figure 5. Body-Diode Characteristics

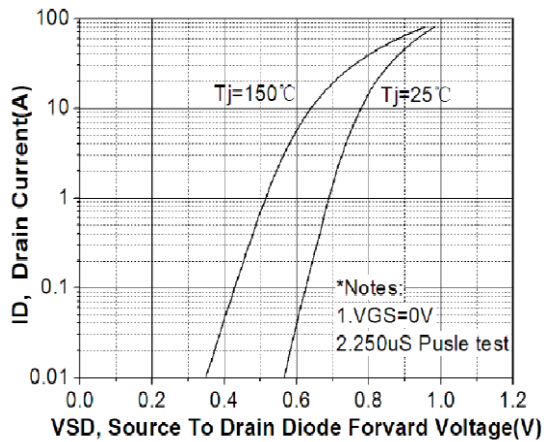


Figure 6. Normalized Maximum Transient Thermal Impedance (RthJC)

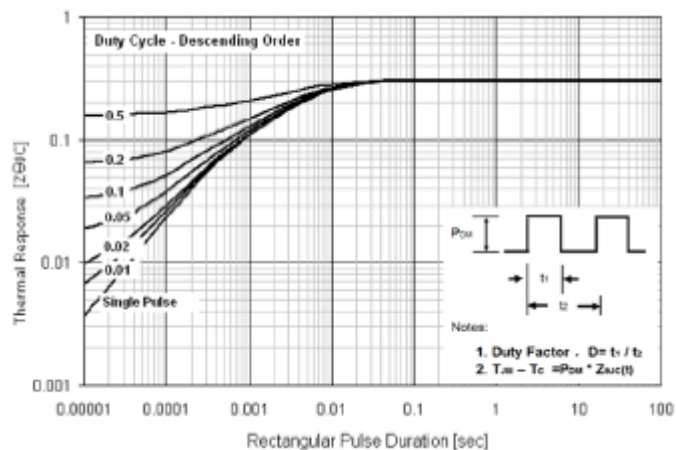
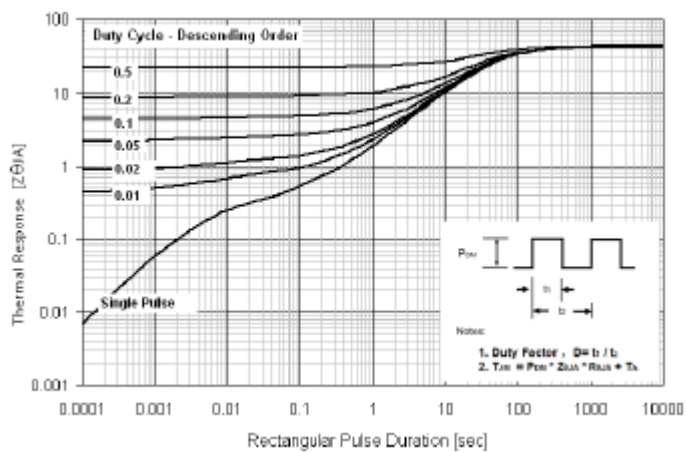


Figure 7. Normalized Maximum Transient Thermal Impedance (RthJA)



Test Circuit & Waveform

Figure 8. Gate Charge Test Circuit & Waveform

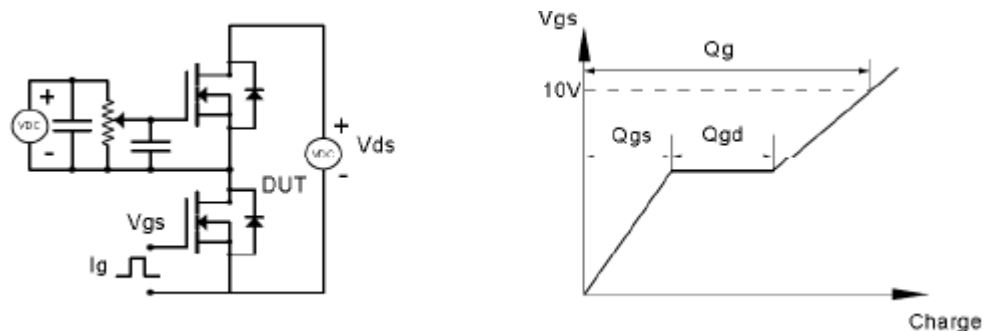


Figure 9. Resistive Switching Test Circuit & Waveforms

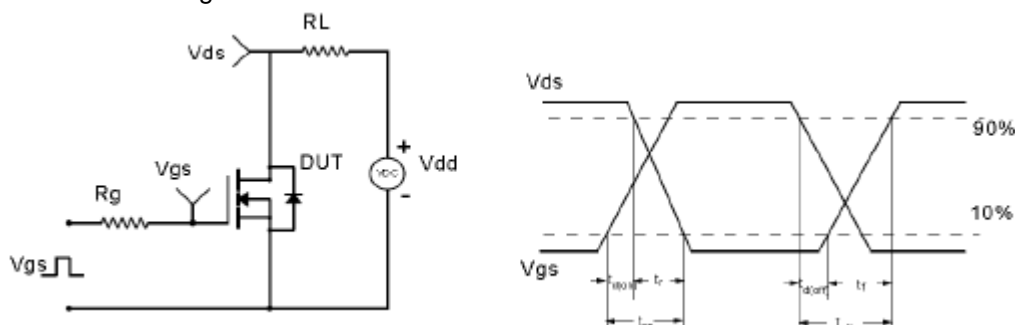


Figure 10. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

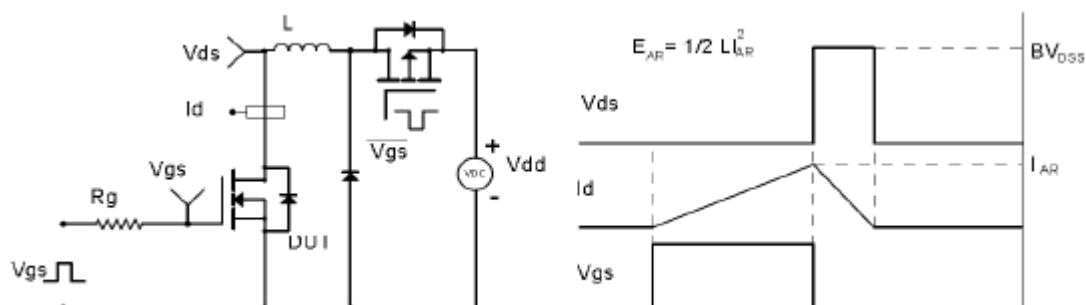
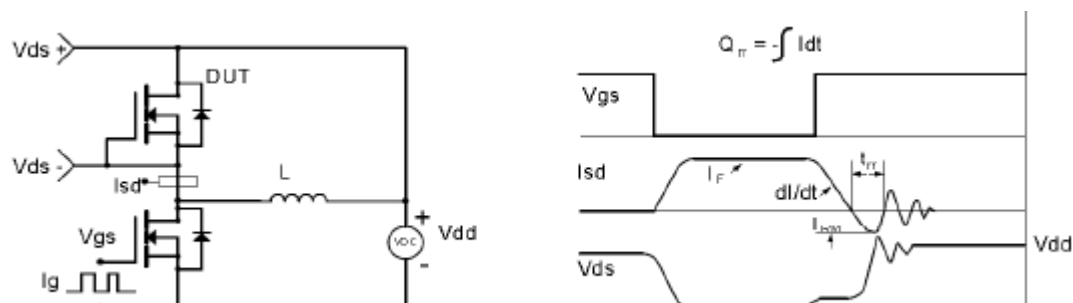
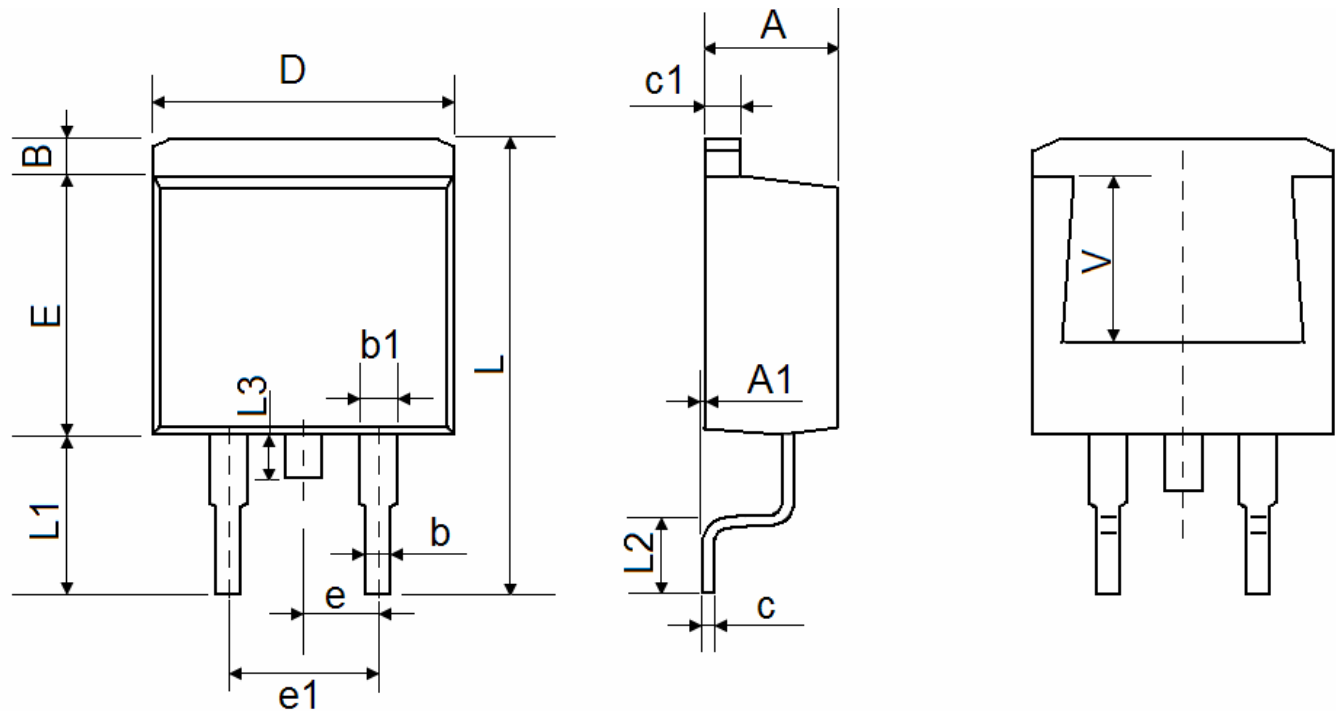


Figure 11. Diode Recovery Circuit & Waveform



Package Information : TO-263



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.170	1.370	0.046	0.054
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
L	15.050	15.450	0.593	0.608
L1	5.080	5.480	0.200	0.216
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
V	5.600 REF		0.220 REF	