

N-Channel Enhancement Mode Power MOSFET

Description

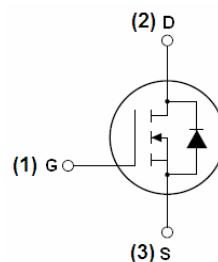
The HM75N80D uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.

General Features

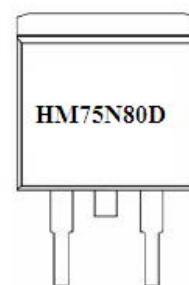
- $V_{DS} = 75V, I_D = 80A$
 $R_{DS(ON)} < 8m\Omega @ V_{GS}=10V$ (Typ: $6.5m\Omega$)
- Special process technology for high ESD capability
- Special designed for Convertors and power controls
- High density cell design for ultra low R_{dson}
- Fully characterized Avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Application

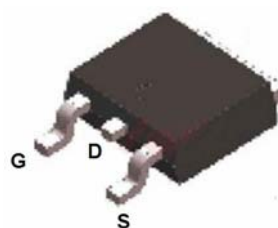
- Power switching application
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply



Schematic diagram



Marking and pin assignment



TO-263-2L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
HM75N80D	HM75N80D	TO-263-2L	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	75	V
Gate-Source Voltage	V_{GS}	± 25	V
Drain Current-Continuous	I_D	80	A
Drain Current-Continuous ($T_C=100^\circ C$)	$I_D (100^\circ C)$	60	A
Pulsed Drain Current	I_{DM}	320	A
Maximum Power Dissipation	P_D	170	W
Peak diode recovery voltage	dv/dt	15	V/ns
Derating factor		1.13	W/°C
Single pulse avalanche energy (Note 5)	E_{AS}	580	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	°C

Thermal Characteristic

Thermal Resistance, Junction-to- Case (Note 2)	$R_{\theta jc}$	0.88	$^{\circ}\text{C/W}$
--	-----------------	------	----------------------

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

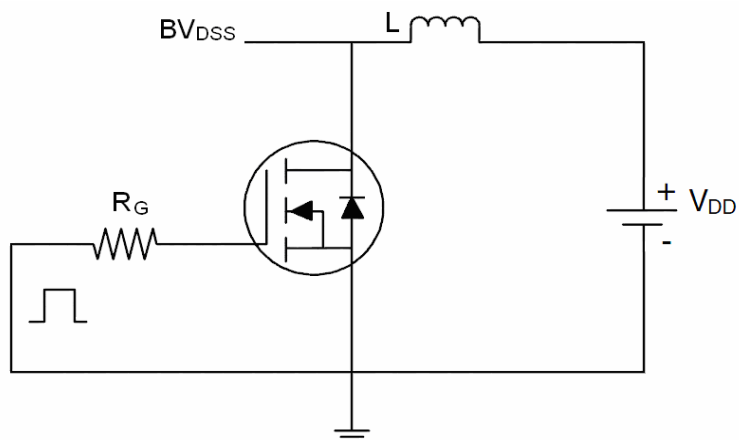
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	75	84	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±25V, V _{DS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	2.85	4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =30A	-	6.5	8	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =30A	-	60	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, F=1.0MHz		4400		PF
Output Capacitance	C _{OSS}			340		PF
Reverse Transfer Capacitance	C _{RSS}			260		PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V, I _D =2A, R _L =15Ω V _{GS} =10V, R _G =2.5Ω		17.8		nS
Turn-on Rise Time	t _r			11.8		nS
Turn-Off Delay Time	t _{d(off)}			56		nS
Turn-Off Fall Time	t _f			14.6		nS
Total Gate Charge	Q _g	V _{DS} =30V, I _D =30A, V _{GS} =10V		100		nC
Gate-Source Charge	Q _{gs}			20		nC
Gate-Drain Charge	Q _{gd}			30		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V, I _S =40A	-	-	1.2	V
Diode Forward Current ^(Note 2)	I _S		-	-	80	A
Reverse Recovery Time	t _{rr}	T _j =25℃, I _{SD} =40A, V _{GS} =0V			36	nS
Reverse Recovery Charge	Q _{rr}	T _j =25℃, I _F =75A, di/dt=100A/μs			56	nC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

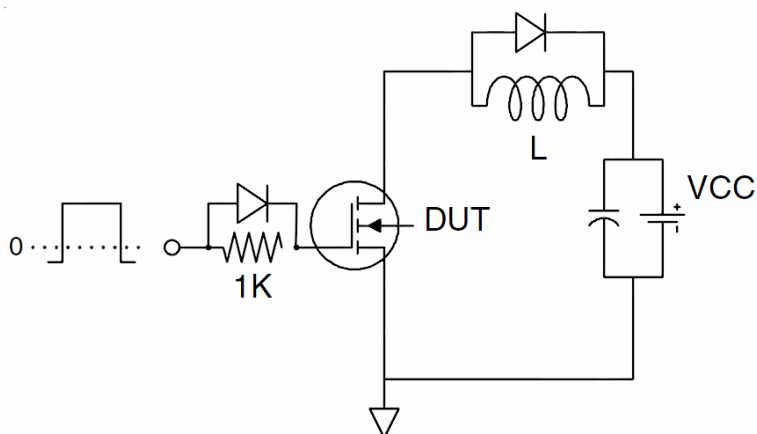
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_j=25^{\circ}\text{C}, V_{DD}=50V, V_G=10V, L=0.5\text{mH}, I_D=62A$

Test circuit

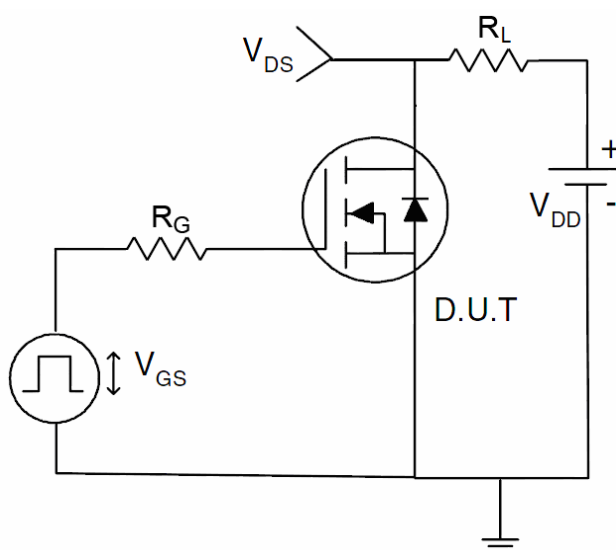
1) E_{AS} test Circuits



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (curves)

Figure1. Safe operating area

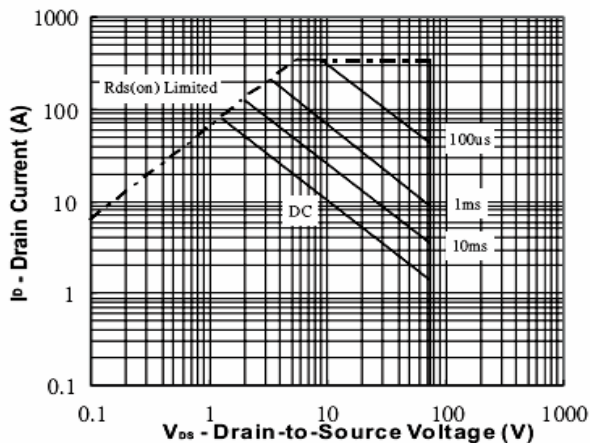


Figure2. Source-Drain Diode Forward Voltage

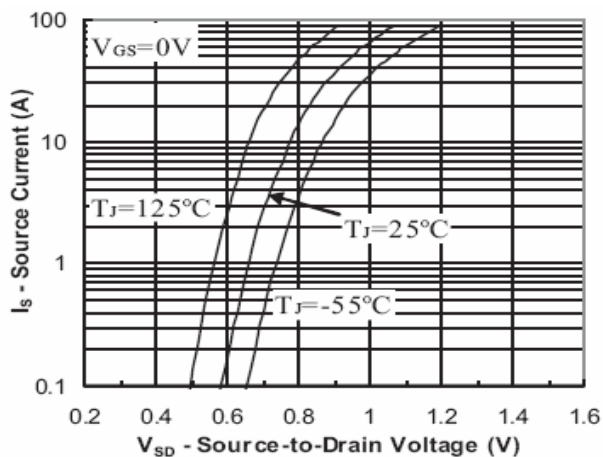


Figure3. Output characteristics

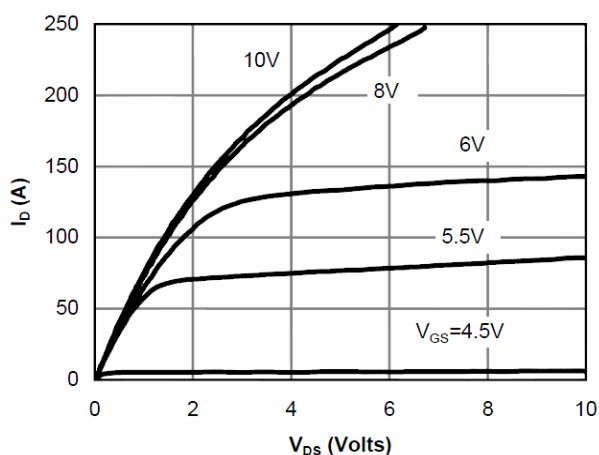


Figure4. Transfer characteristics

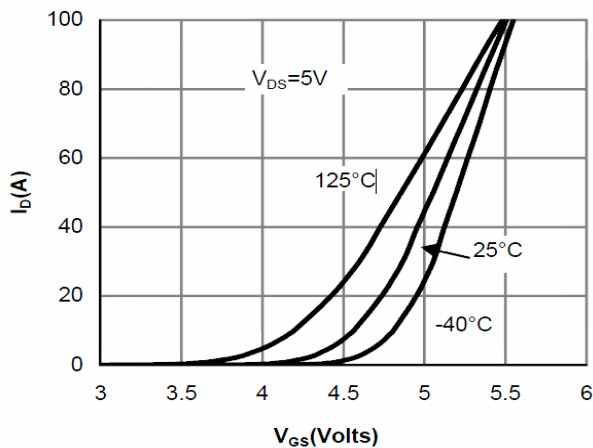


Figure5. Static drain-source on resistance

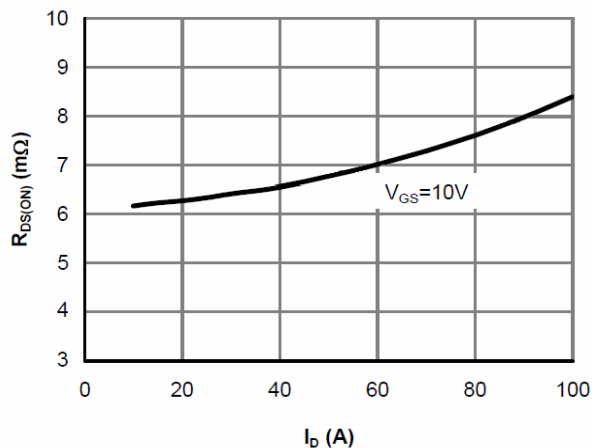


Figure6. $R_{DS(ON)}$ vs Junction Temperature

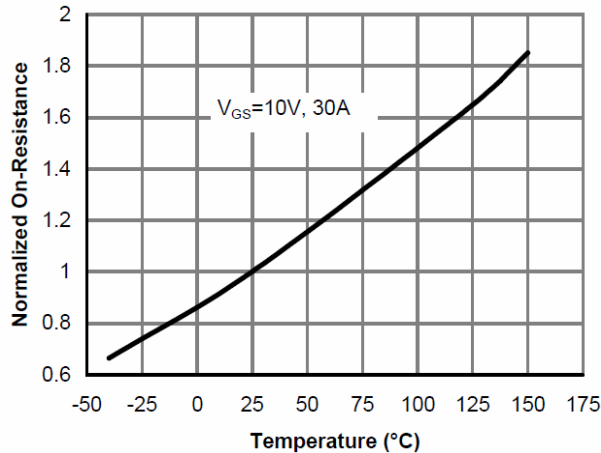


Figure7. BV_{DSS} vs Junction Temperature

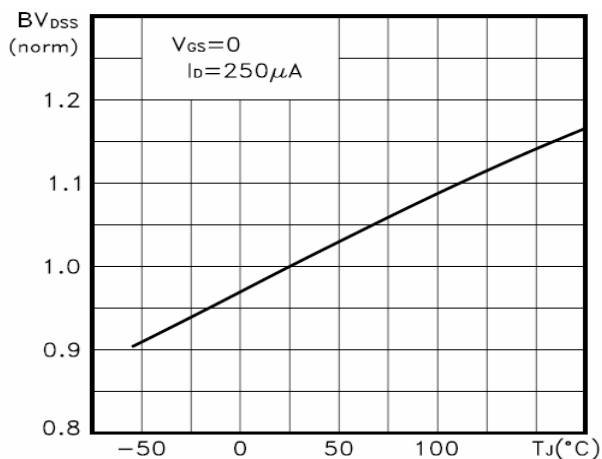


Figure8. $V_{GS(th)}$ vs Junction Temperature

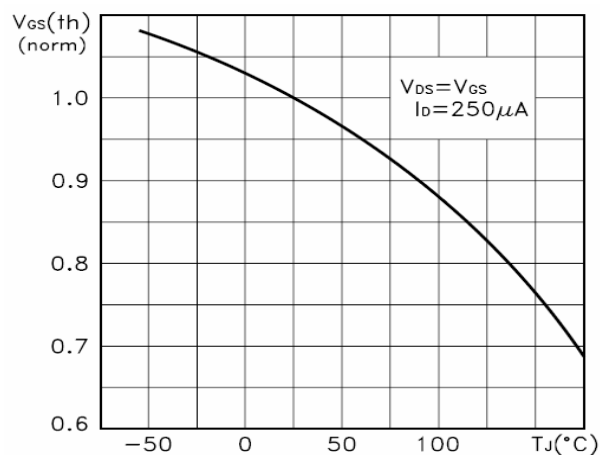


Figure9. Gate charge waveforms

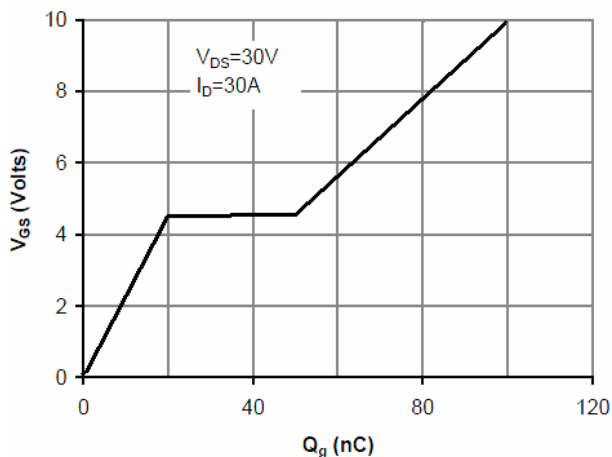
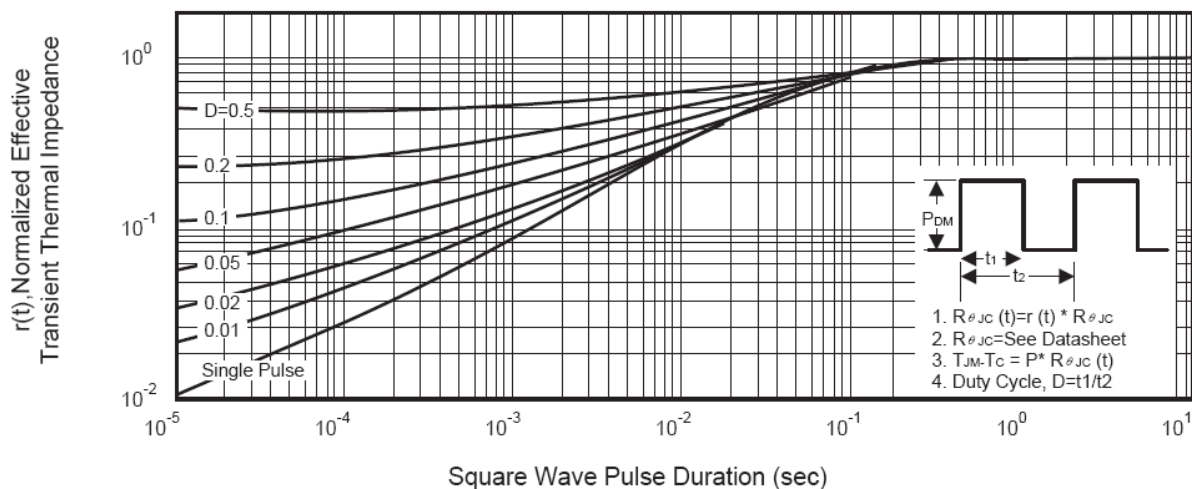
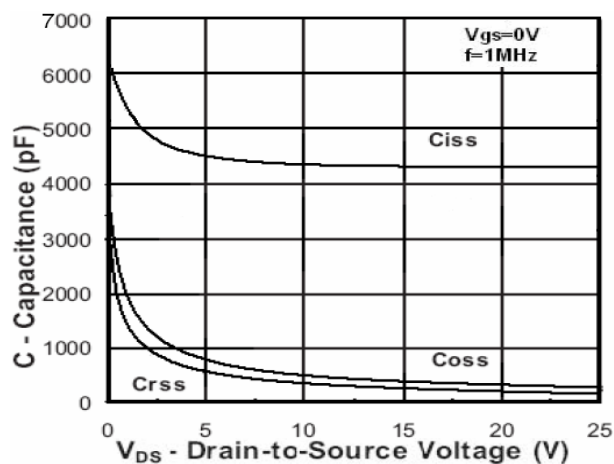
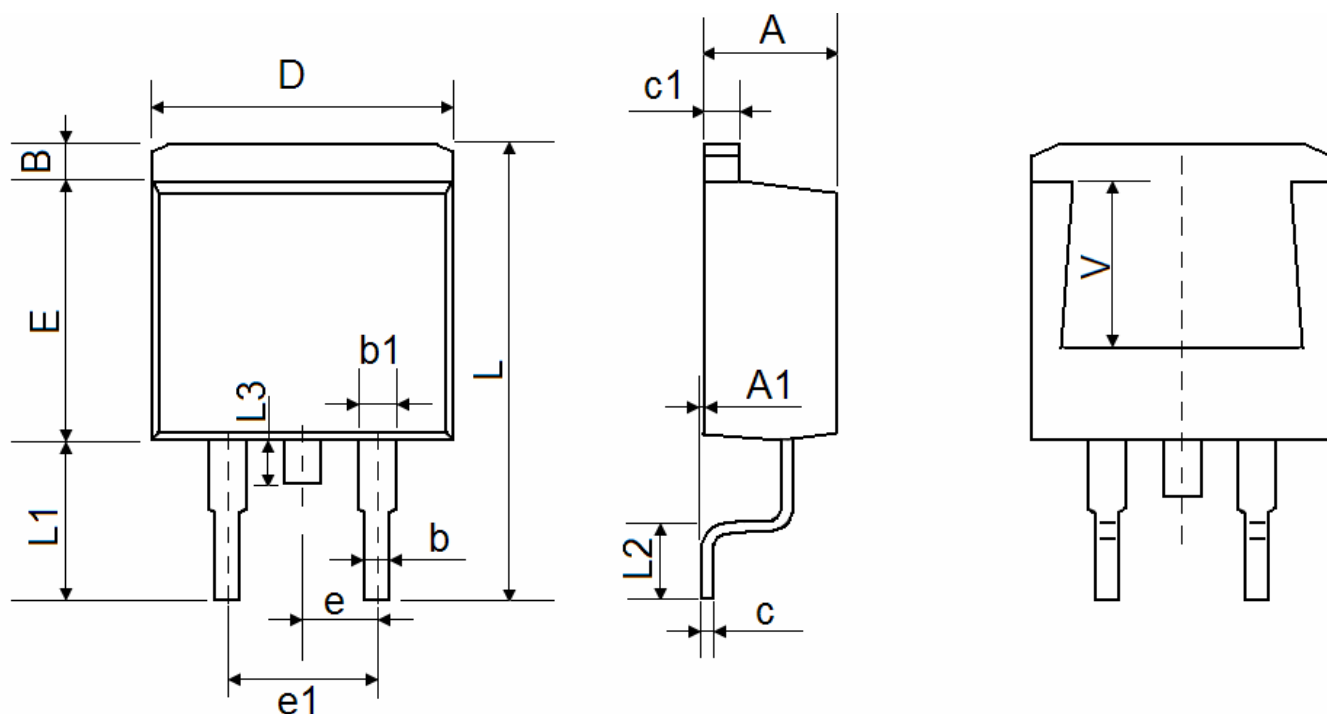


Figure10. Capacitance



TO-263-2L Package Information



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	