

N-Channel Enhancement Mode Power MOSFET

General Description

The HM75N75K 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

- $V_{DS}=75V$; $I_D=75A@V_{GS}=10V$;
 $R_{DS(ON)}<9m\Omega @V_{GS}=10V$
- Special process technology for high ESD capability
- Special designed for Convertors and power controls
- High density cell design for ultra low Rdson
- Fully characterized Avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

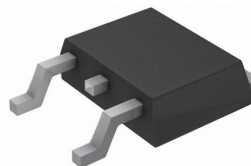
Application

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

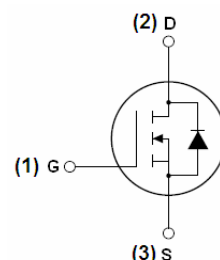
Product Summary

BV_{DSS}	typ.	75	V
$R_{DS(ON)}$	typ.	7.0	m Ω
	max.	9.0	m Ω
I_D		75	A

100% UIS TESTED!



TO-252 top view



Schematic diagram

Package Marking And Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
HM75N75K	HM75N75K	TO-252			-

Table 1. Absolute Maximum Ratings (TA=25°C)

Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS}=0V$)	V_{DS}	75	V
Gate-Source Voltage ($V_{DS}=0V$)	V_{GS}	± 25	V
Drain Current (DC) at $T_c=25^\circ C$	$I_{D(DC)}$	75	A
Drain Current (DC) at $T_c=100^\circ C$	$I_{D(DC)}$	60	A
Drain Current-Continuous@ Current-Pulsed (Note 1)	$I_{DM(pluse)}$	300	A
Peak diode recovery voltage	dv/dt	30	V/ns
Maximum Power Dissipation($T_c=25^\circ C$)	P_D	170	W
Derating factor		1.13	W/°C
Single pulse avalanche energy (Note 2)	E_{AS}	580	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	°C

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2.EAS condition: $T_J=25^\circ C, V_{DD}=50V, V_G=10V, L=0.3mH, I_D=62A$;

Table 2. Thermal Characteristic

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case (Maximum)	R_{thJC}	0.88	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient (Maximum)	R_{thJA}	63	$^{\circ}\text{C}/\text{W}$

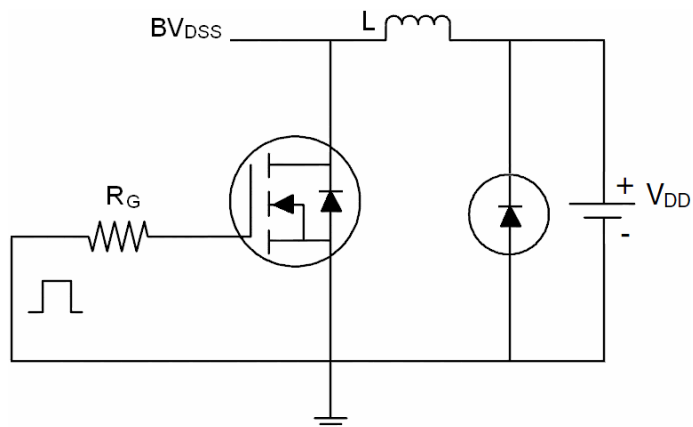
Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
On/off states						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	75	84		V
Zero Gate Voltage Drain Current(Tc=25℃)	I _{DSS}	V _{DS} =75V,V _{GS} =0V			1	μA
Zero Gate Voltage Drain Current(Tc=125℃)	I _{DSS}	V _{DS} =75V,V _{GS} =0V			10	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V			±100	nA
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 =40A		7.0	9	mΩ
Dynamic Characteristics						
Forward Transconductance	g _{FS}	V _{DS} =5V,I _D =30A		66		S
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
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
Switching times						
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
Source- Drain Diode Characteristics						
Source-drain current(Body Diode)	I _{SD}				75	A
Pulsed Source-drain current(Body Diode)	I _{SDM}				320	A
Forward on voltage ^(Note 1)	V _{SD}	Tj=25℃,I _{SD} =40A,V _{GS} =0V			1.2	V
Reverse Recovery Time ^(Note 1)	t _{rr}	Tj=25℃,I _F =75A,di/dt=100A/μs			36	nS
Reverse Recovery Charge ^(Note 1)	Q _{rr}				56	nC
Forward Turn-on Time	t _{on}	Intrinsic turn-on time is negligible(turn-on is dominated by L _S +L _D)				

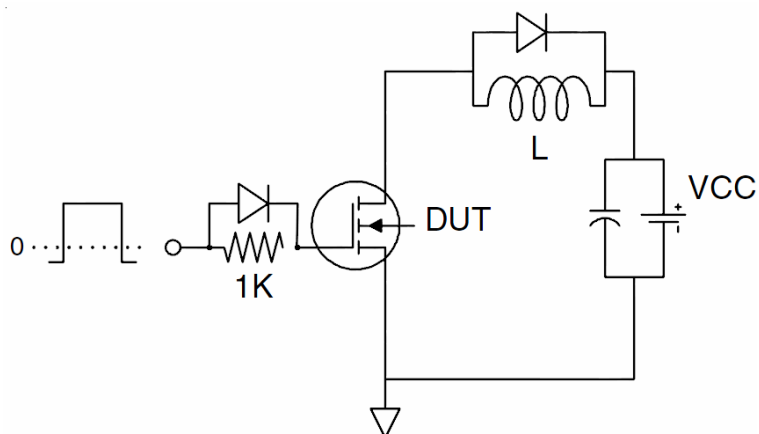
Notes 1. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 1.5\%$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$

Test circuit

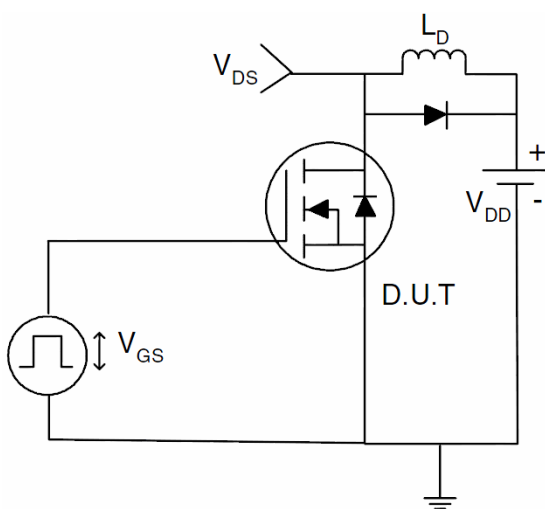
1) E_{AS} test circuits



2) Gate charge test circuit:



3) Switch Time Test Circuit:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (curves)

Figure1. Safe operating area

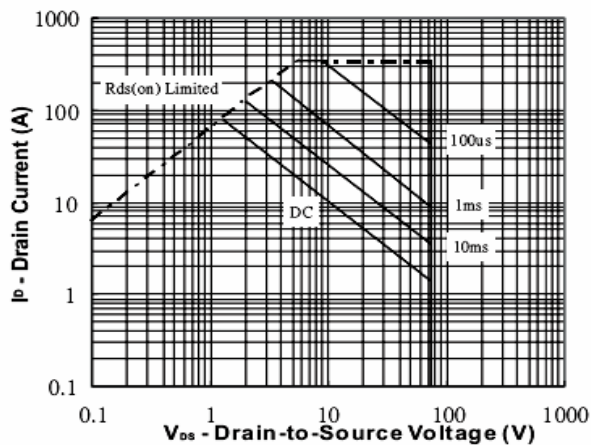


Figure2. Source-Drain Diode Forward Voltage

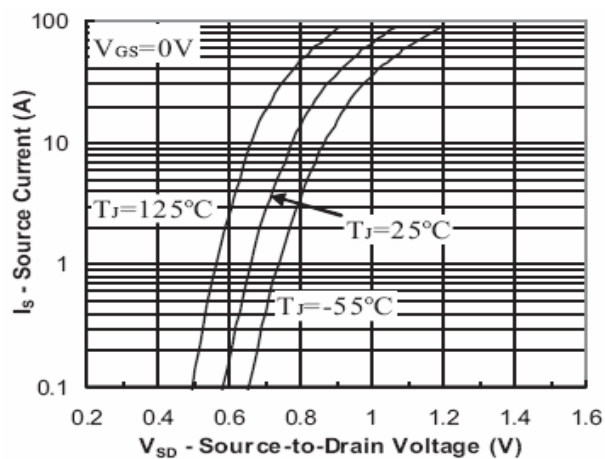


Figure3. Output characteristics

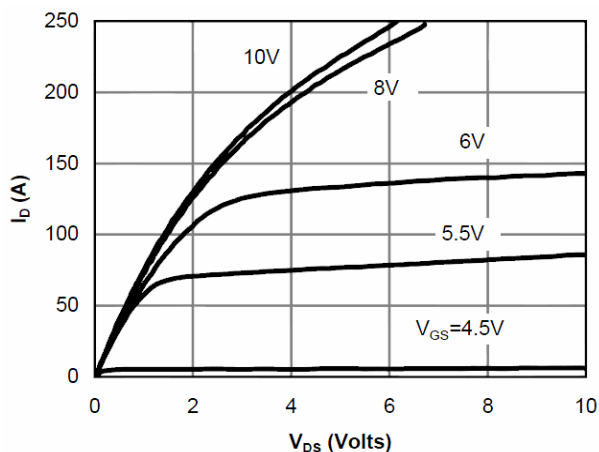


Figure4. Transfer characteristics

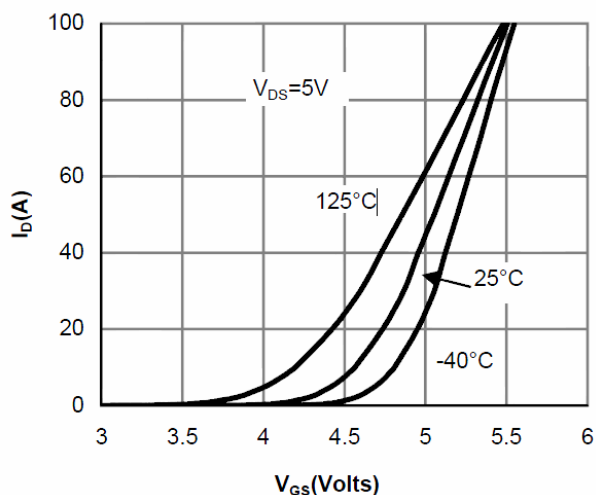


Figure5. Static drain-source on resistance

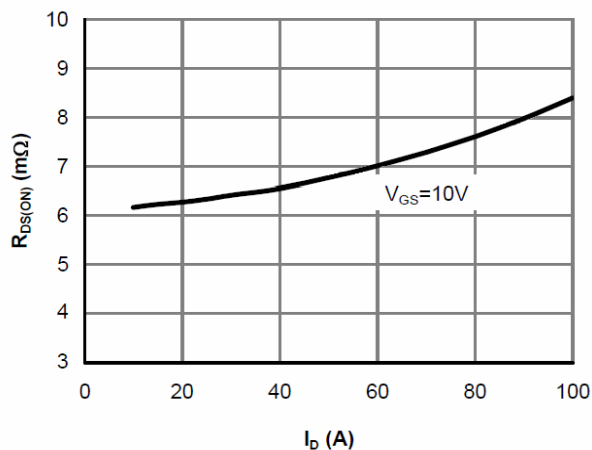


Figure6. $R_{DS(ON)}$ vs Junction Temperature

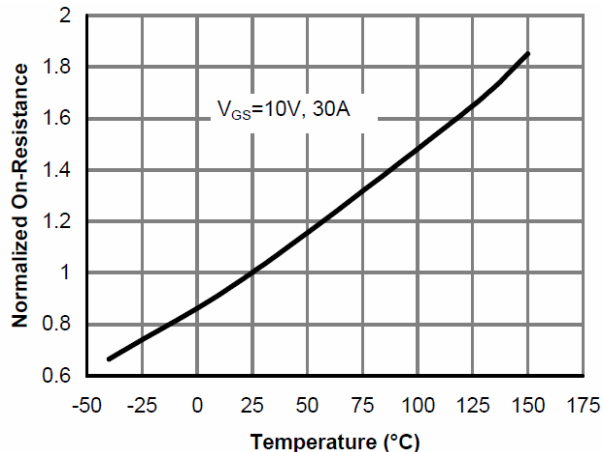


Figure7. BV_{DSS} vs Junction Temperature

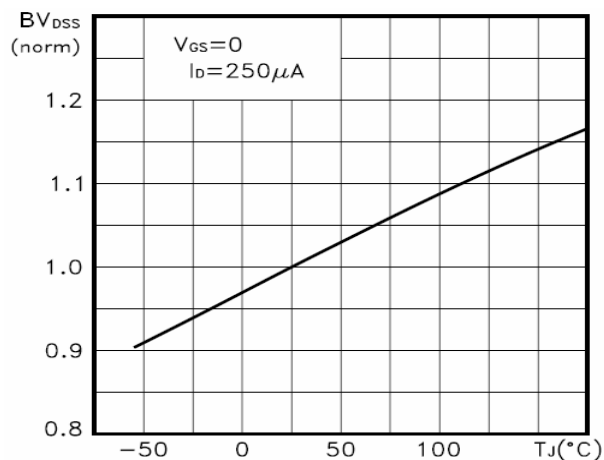


Figure8. $V_{GS(th)}$ vs Junction Temperature

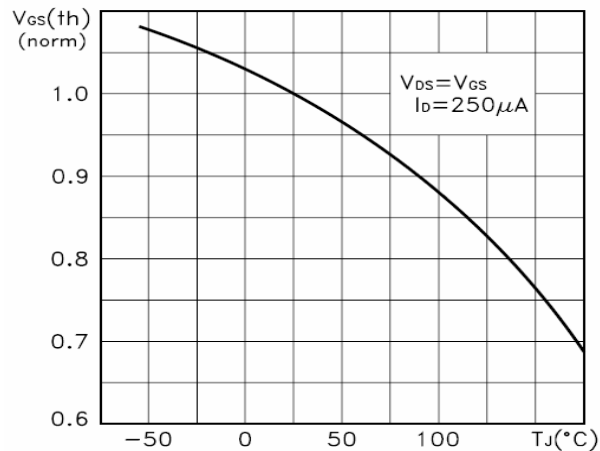


Figure9. Gate charge waveforms

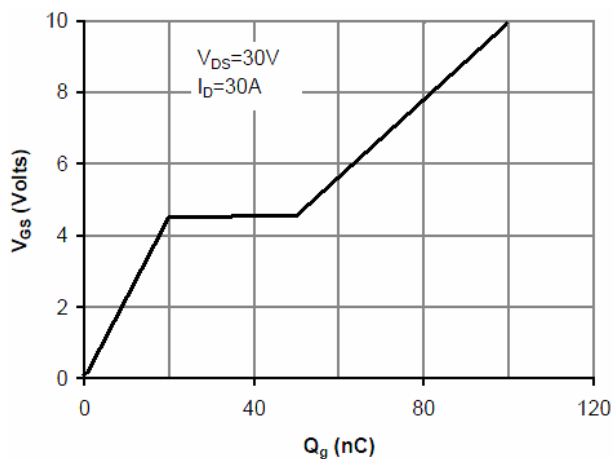
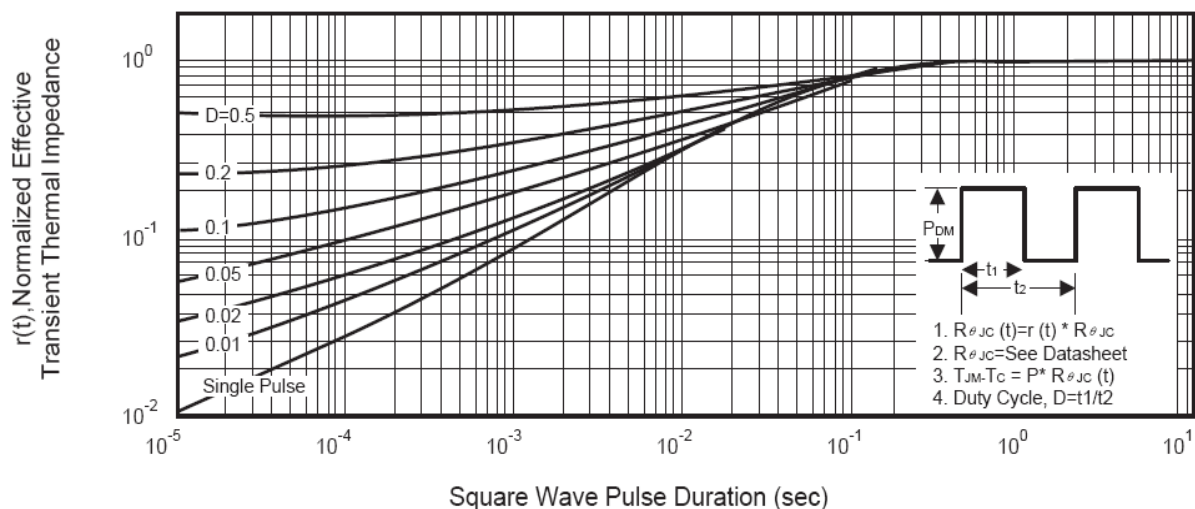
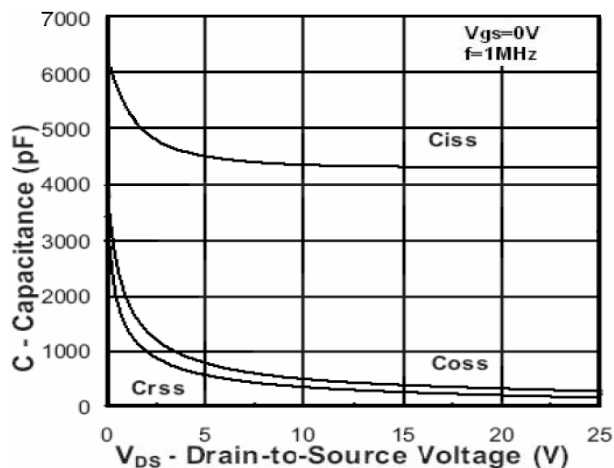
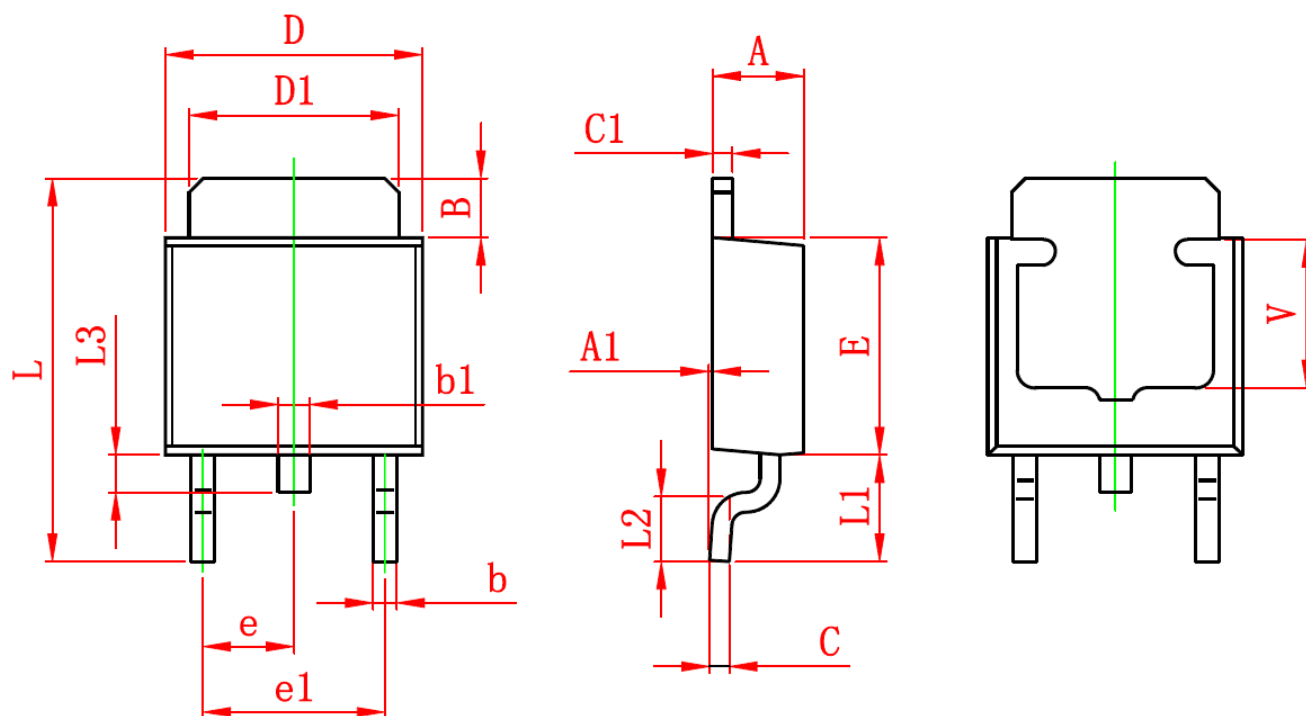


Figure10. Capacitance



TO-252-2L PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF.		0.150 REF.	

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