MMV03N032LS

N-Channel Enhancement Mode MOSFET

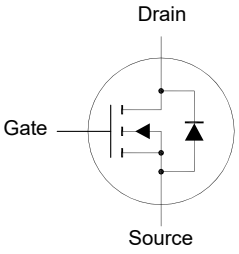
Features

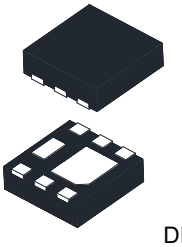
• Surface-mounted package

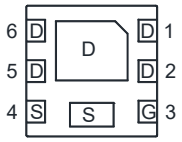
Applications

• Portable appliances

• Battery management







1. Drain 2. Drain 3. Gate
4. Sourse 5. Drain 6. Drain
DFN2020-6HMA Plastic Package

Absolute Maximum Ratings (T_a = 25℃ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Drain-Gate Voltage	V_{GS}	± 20	V
Drain Current	I_D	10	A
Peak Drain Current, Pulsed [1]	I_{DM}	40	A
Total Power Dissipation [2]	P_{tot}	700	mW
Operating Junction and Storage Temperature Range	T_j, T_{stg}	- 55 to + 150	℃

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance-Junction to Ambient [2] Steady State	$R_{\theta JA}$	178	℃/W

[1] Pulse Test: Pulse Width ≤ 100 μs, Duty Cycle ≤ 2%, Repetitive rating, pulse width limited by junction temperature T_J(MAX) = 150°C.

[2] Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.

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Characteristics at T_a = 25℃ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at I_D = 250 µA	$V_{(BR)DSS}$	30	-	-	V
Drain-Source Leakage Current at V_{DS} = 24 V	I_{DSS}	-	-	1	µA
Gate-Source Leakage Current at V_{GS} = ± 16 V	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at V_{GS} = V_{DS}, I_D = 250 µA	$V_{GS(th)}$	1	-	2.5	V
Drain-Source On-State Resistance at V_{GS} = 10 V, I_D = 10 A at V_{GS} = 4.5 V, I_D = 8 A	$R_{DS(on)}$	- -	- -	20 32	mΩ
DYNAMIC PARAMETERS					
Gate Resistance at V_{DS} = 0 V, V_{GS} = 0 V, f = 1 MHz	R_g	-	1.7	-	Ω
Forward Transconductance at V_{DS} = 5 V, I_D = 4 A	g_{fs}	-	6	-	S
Input Capacitance at V_{GS} = 0 V, V_{DS} = 15 V, f = 1 MHz	C_{iss}	-	448	-	pF
Output Capacitance at V_{GS} = 0 V, V_{DS} = 15 V, f = 1 MHz	C_{oss}	-	63	-	pF
Reverse Transfer Capacitance at V_{GS} = 0 V, V_{DS} = 15 V, f = 1 MHz	C_{rss}	-	40	-	pF
Total Gate Charge at V_{DS} = 20 V, I_D = 4 A, V_{GS} = 10 V at V_{DS} = 20 V, I_D = 4 A, V_{GS} = 4.5 V	Q_g	- -	11.7 5.8	- -	nC
Gate Source Charge at V_{DS} = 20 V, I_D = 4 A, V_{GS} = 10 V	Q_{gs}	-	1.7	-	nC
Gate Drain Charge at V_{DS} = 20 V, I_D = 4 A, V_{GS} = 10 V	Q_{gd}	-	2.9	-	nC
Turn-On Delay Time at V_{DD} = 20 V, V_{GS} = 10 V, I_D = 4 A, R_g = 4.7 Ω	$t_{d(on)}$	-	10.2	-	nS
Turn-On Rise Time at V_{DD} = 20 V, V_{GS} = 10 V, I_D = 4 A, R_g = 4.7 Ω	t_r	-	17	-	nS
Turn-Off Delay Time at V_{DD} = 20 V, V_{GS} = 10 V, I_D = 4 A, R_g = 4.7 Ω	$t_{d(off)}$	-	10	-	nS
Turn-Off Fall Time at V_{DD} = 20 V, V_{GS} = 10 V, I_D = 4 A, R_g = 4.7 Ω	t_f	-	9.6	-	nS
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at I_S = 1 A	V_{SD}	-	-	1	V
Body-Diode Continuous Current	I_S	-	-	10	A
Body Diode Reverse Recovery Time at I_S = 4 A, di/dt = 100 A / µs	t_{rr}	-	6.6	-	nS
Body Diode Reverse Recovery Charge at I_S = 4 A, di/dt = 100 A / µs	Q_{rr}	-	2	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

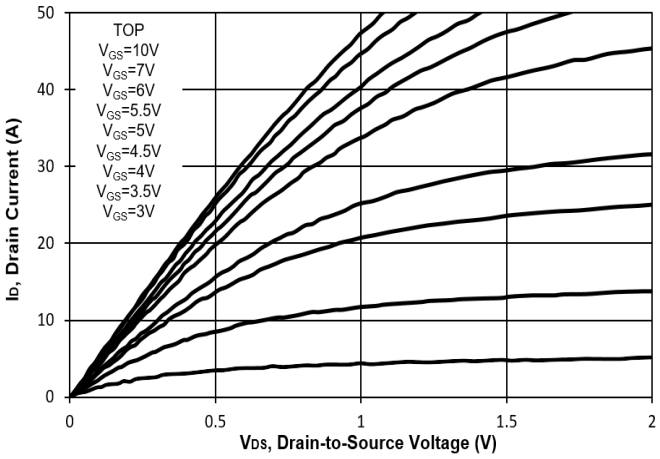


Fig. 2 Typical Transfer Characteristics

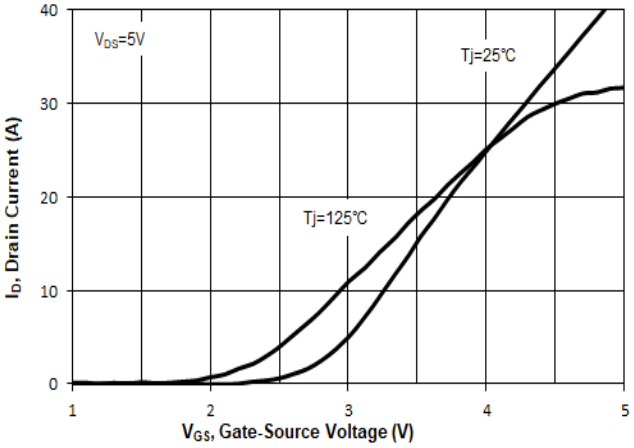


Fig. 3 on-Resistance vs. Drain Current

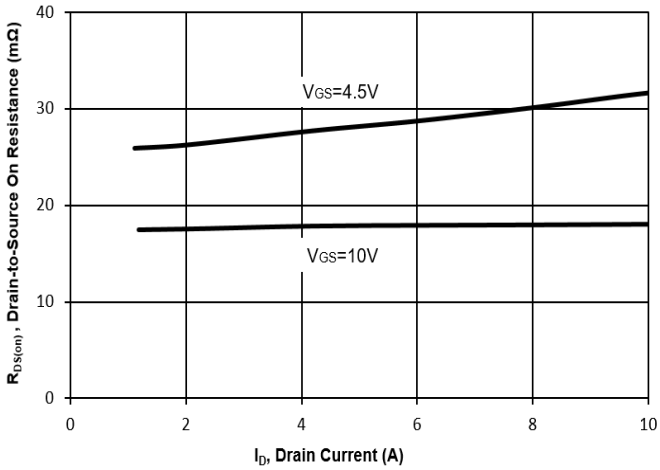


Fig. 4 on-Resistance vs. Gate-Source Voltage

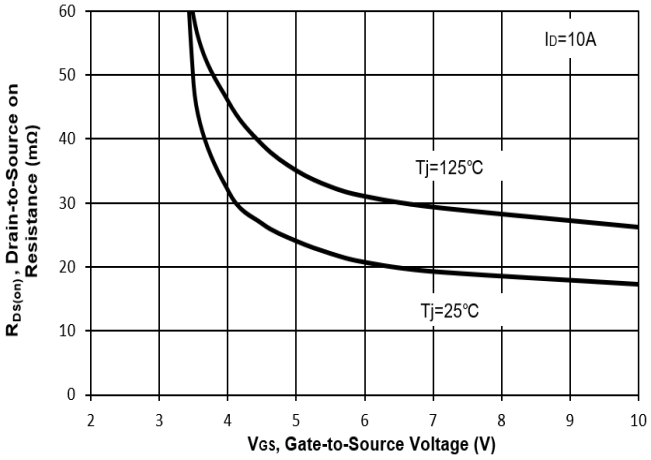


Fig. 5 on-Resistance vs.T_j

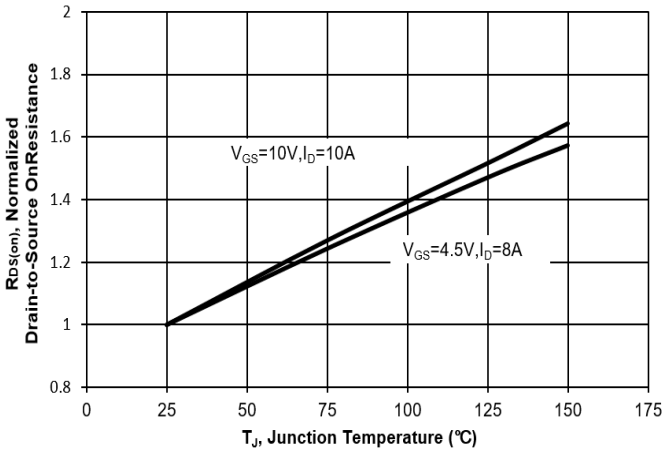
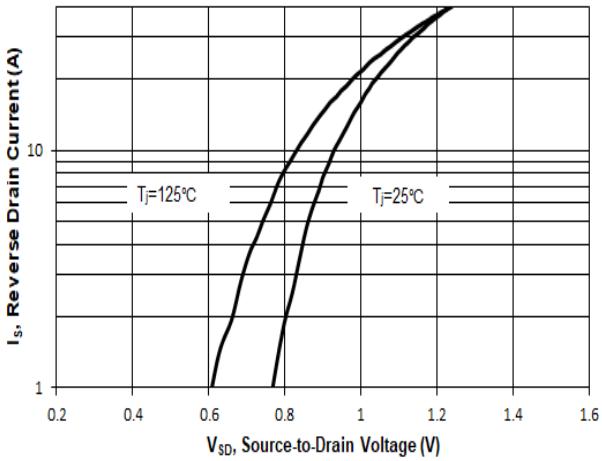


Fig. 6 Body Diodes Forward Characteristics



Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

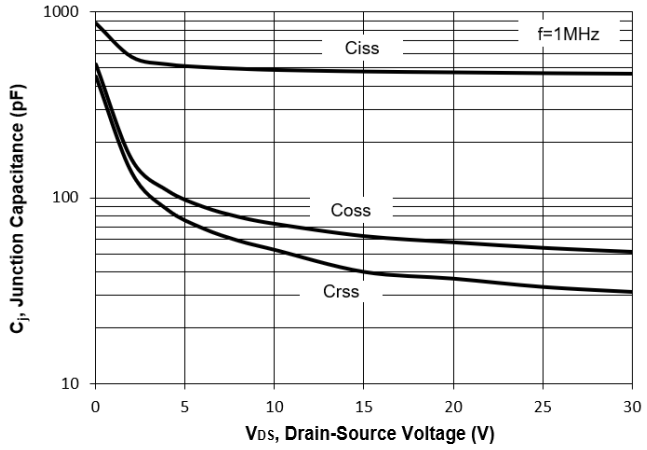


Fig. 8 Drain-Source Leakage Current vs. T_j

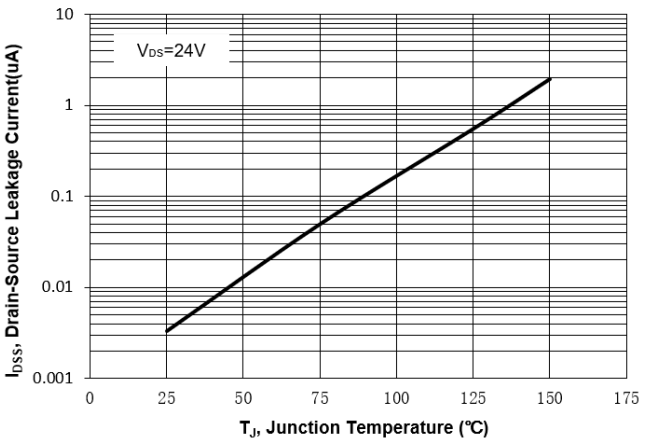


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

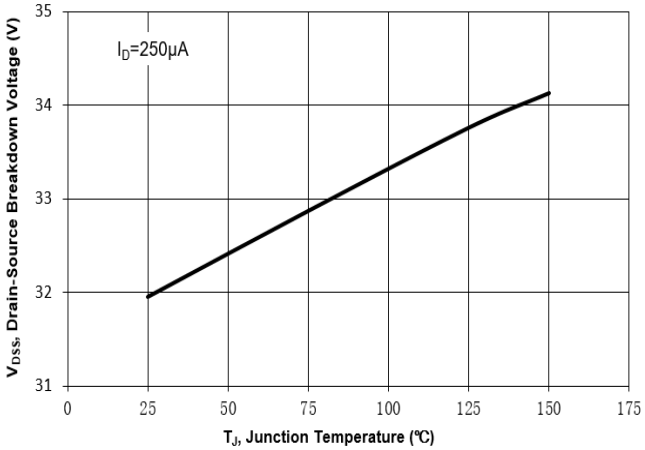


Fig. 10 Gate Threshold Variation vs. T_j

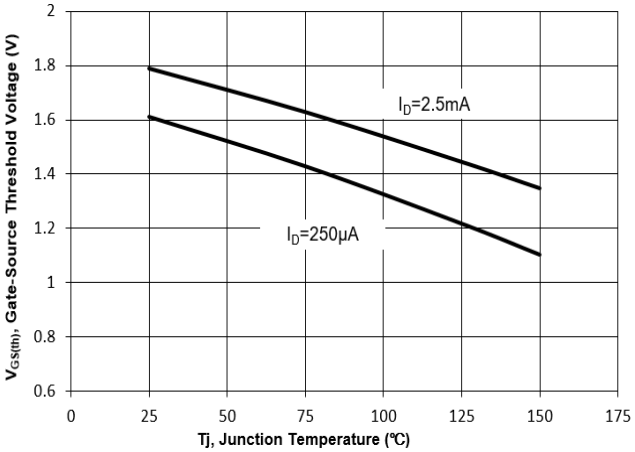
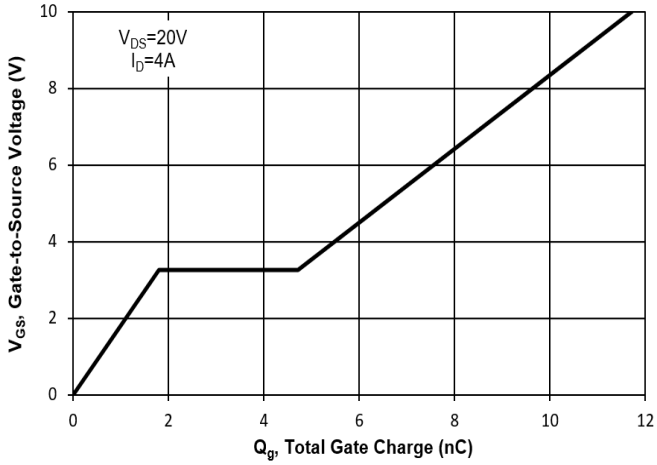


Fig. 11 Gate Charge



Test Circuits

Fig.1-1 Switching times test circuit

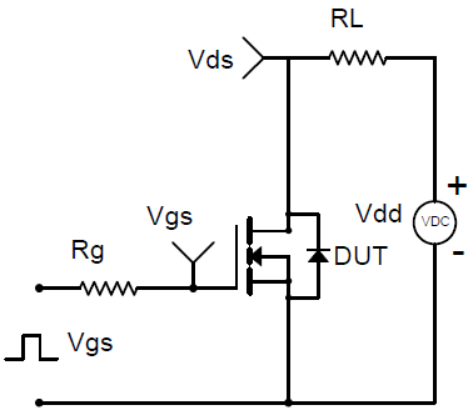


Fig.1-2 Switching Waveform

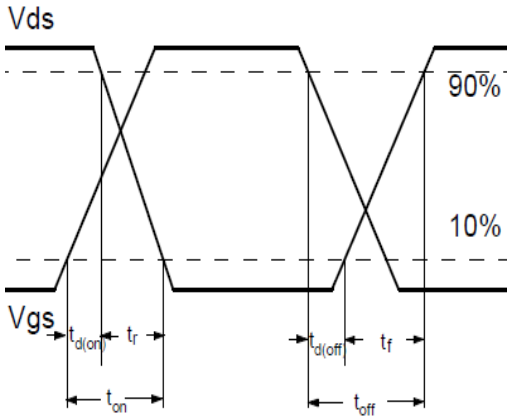


Fig.2-1 Gate charge test circuit

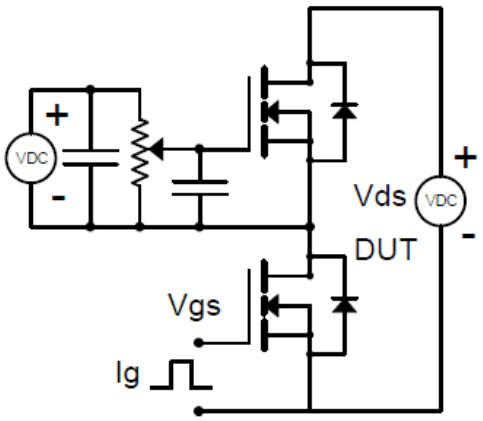
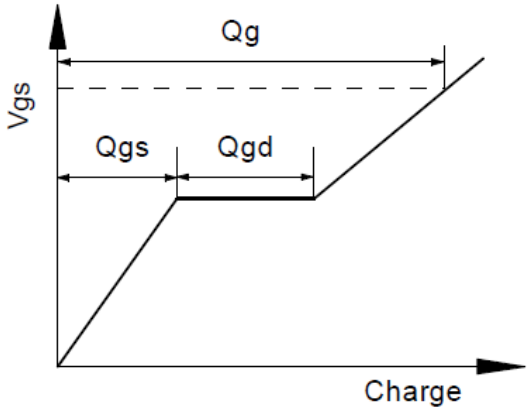
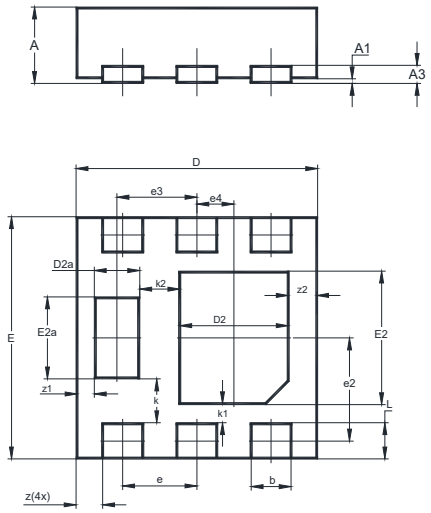


Fig.2-2 Gate charge waveform



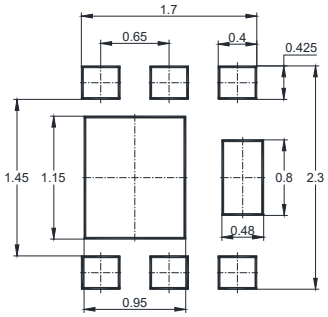
Package Outline Dimensions (Units: mm) **DFN2020-6HMA**



UNIT	A	A1	A3	b	D	D2	D2a	E	E2	E2a	L
mm	0.55 0.65	0 0.05	0.15 Typ.	0.25 0.35	1.95 2.05	0.85 1.05	0.33 0.43	1.95 2.05	1.05 1.25	0.65 0.75	0.225 0.325

UNIT	e	e2	e3	e4	k	k1	k2	z	z1	z2
mm	0.65 BSC	0.863 BSC	0.7 BSC	0.325 BSC	0.37 BSC	0.15 BSC	0.36 BSC	0.2 BSC	0.11 BSC	0.2 BSC

Recommended Soldering Footprint



Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
DFN2020-6HMA	8	4 ± 0.1	0.157 ± 0.004	178	7	4,000

Marking information

" NH " = Part No.

" YYWW " = Date Code Marking

" Y " = Year (ex: 19 = 2019)

" W " = Week (ex: 09 = the 9th week of the year)

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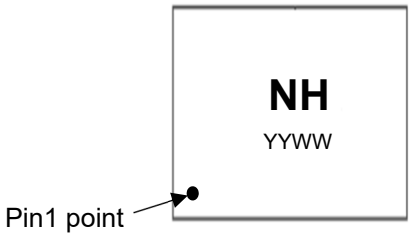

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