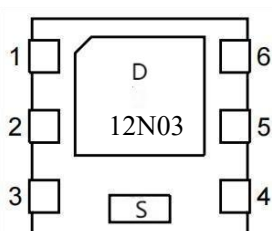
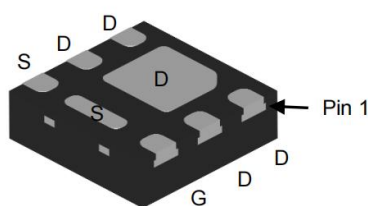


Features	<i>Bvdss</i>	<i>Rdson</i>	<i>ID</i>
	30V	10mΩ	12A
➤ Super Low Gate Charge ➤ Green Device Available ➤ Excellent Cdv/dt effect decline ➤ Advanced high cell density Trench technology	Application ➤ PWM applications ➤ Load Switch ➤ Power management		

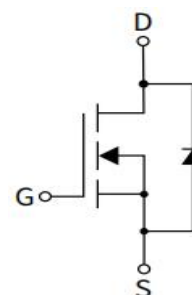
Package



Marking and pin assignment



DFN2x2-6L top view



Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
12N03	12N03M	DFN2x2-6L	3000

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V _{DS}	30	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current, V _{GS} @ -10V ¹	I _D @T _A =25°C	12	A
	I _D @T _A =70°C	8	A
Pulsed Drain Current ²	I _{DM}	29.4	A
Single Pulse Avalanche Energy	E _{AS}	-	mJ
Avalanche Current	I _{AS}	-	A
Total Power Dissipation ³	P _D @T _C =25°C	-	W
	P _D @T _A =25°C	3	W
Storage Temperature Range	T _{STG}	-55 ~ 150	°C
Operating Junction Temperature Range	T _J	-55 ~ 150	°C



Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	85	$^{\circ}\text{C/W}$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	-	$^{\circ}\text{C/W}$

Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HL12N03M	DFN2x2-6L	3	1,2,5,6	4	Tape Reel

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.5	2.5	V
Static Drain-Source On-Resistance ³	$R_{DS(on)}$	$V_{GS}=10V, I_D=10A$	-	10	13	m Ω
		$V_{GS}=4.5V, I_D=5A$	-	14	20	
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, f=1.0\text{MHz}$	-	614	-	pF
Output Capacitance	C_{oss}		-	118	-	
Reverse Transfer Capacitance	C_{rss}		-	98	-	
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=11A, V_{GS}=10V$	-	16	-	nC
Gate Source Charge	Q_{gs}		-	2.7	-	
Gate Drain("Miller")Charge	Q_{gd}		-	4.5	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=15V, R_L=1.35\Omega, R_G=3\Omega, V_{GS}=10V$	-	6	-	ns
Turn-On Rise Time	t_r		-	10	-	
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	
Turn-Off Fall Time	t_f		-	6.5	-	
Drain to Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=15A$	-	-	1.2	V
Maximum Continuous Drain to Source Diode Forward Current	I_S	-	-	-	12	A
Maximum Pulsed Drain to Source Diode Forward Current	I_{SM}	-	-	-	30	A
Reverse Recovery Time	t_{rr}	$I_F=-11A, di/dt=100A/\mu s$	-	7	-	ns
Reverse Recovery Charge	Q_{rr}		-	10	-	nC

Typical Performance Characteristics

Figure 1: Output Characteristics

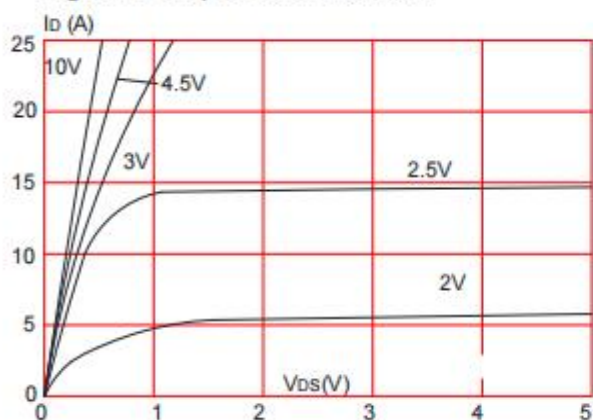


Figure 2: Typical Transfer Characteristics

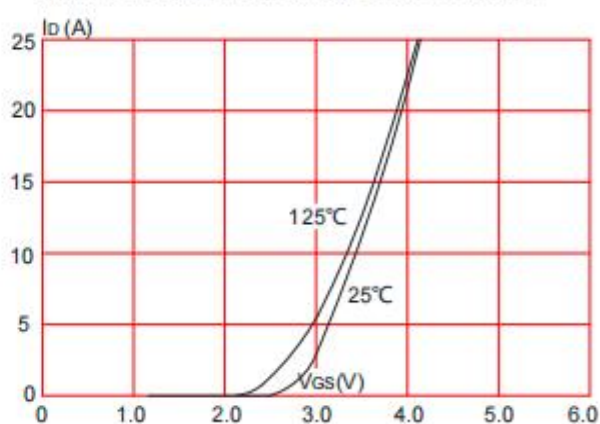


Figure 3: On-resistance vs. Drain Current

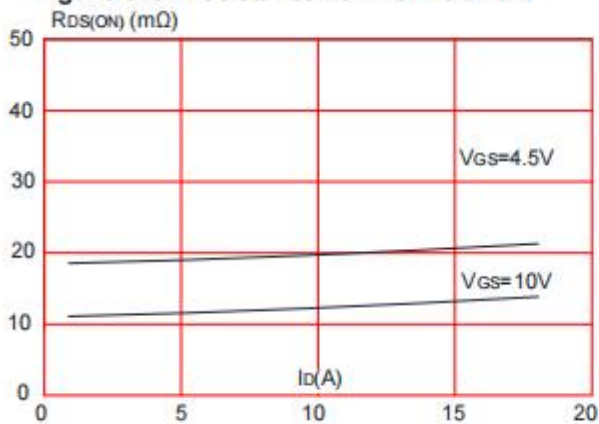


Figure 4: Body Diode Characteristics

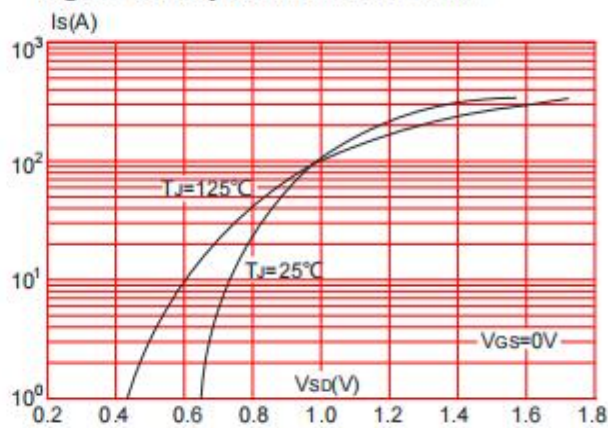


Figure 5: Gate Charge Characteristics

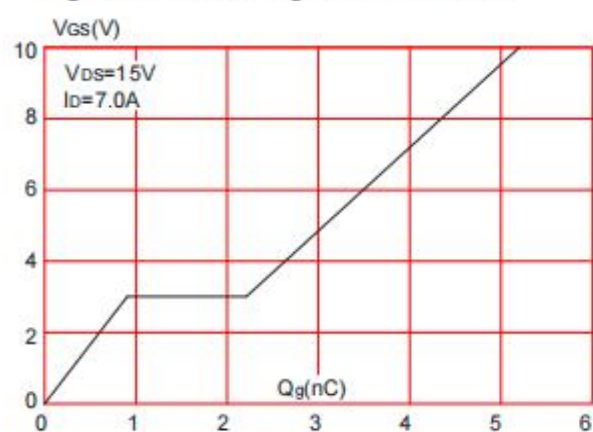


Figure 6: Capacitance Characteristics

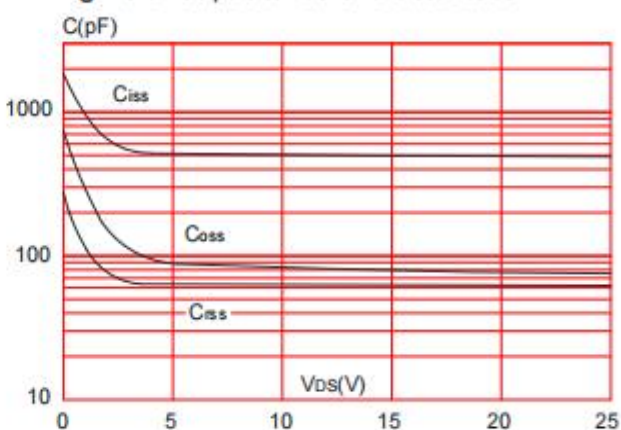


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

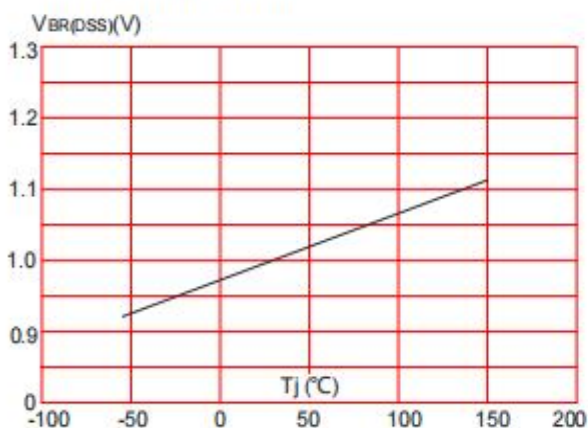


Figure 8: Normalized on Resistance vs. Junction Temperature

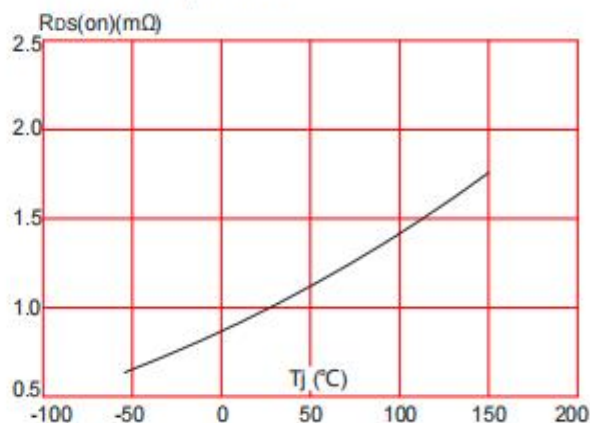


Figure 9: Maximum Safe Operating Area

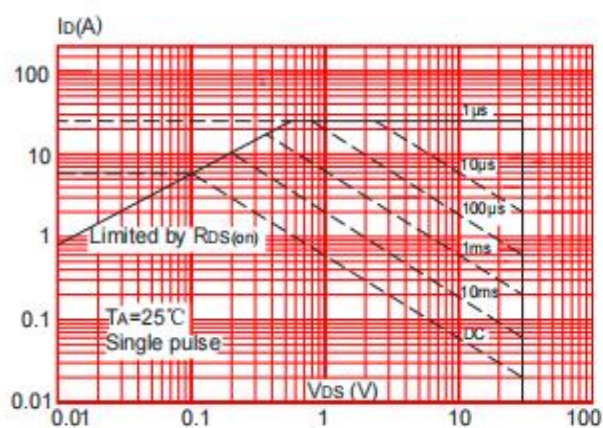


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

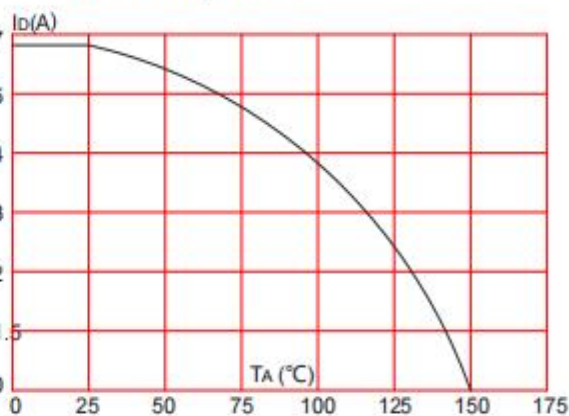
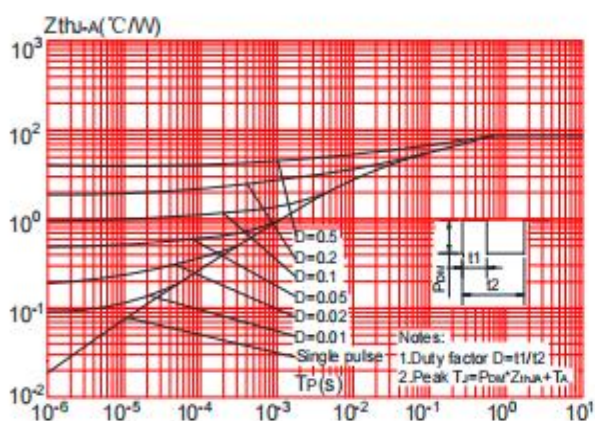
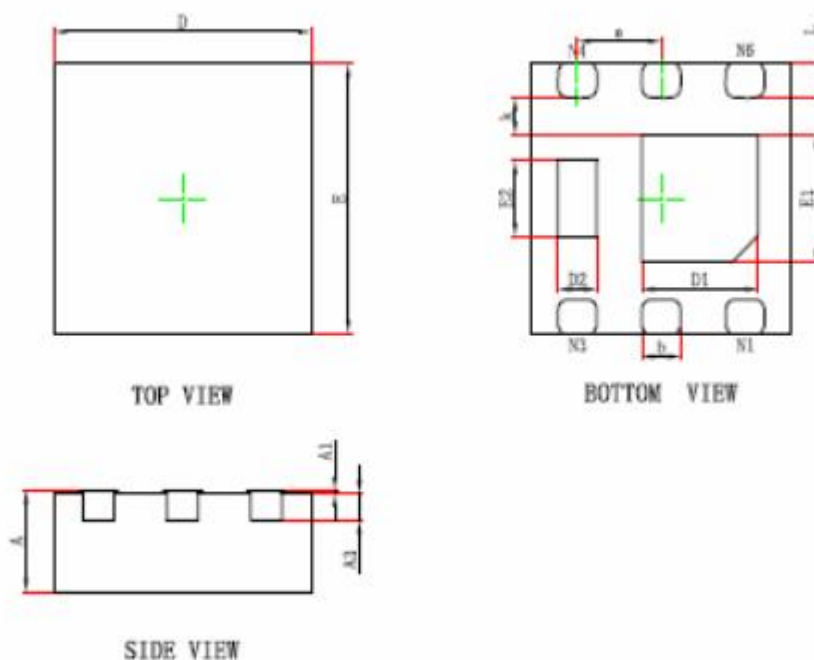


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Package Dimensions DFN2x2-6L


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	1.924	2.076	0.076	0.082
E	1.924	2.076	0.076	0.082
D1	0.800	1.000	0.031	0.039
E1	0.850	1.050	0.033	0.041
D2	0.200	0.400	0.008	0.016
E2	0.460	0.660	0.018	0.026
k	0.200MIN.		0.008MIN.	
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
L	0.174	0.326	0.007	0.013



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