



WANSEMI
万芯半导体

WX012AN04LL

N-channel Enhancement Mode Power MOSFET

TOLL/NMOS/40V/ ± 20 V/2.8V/275A/1.15m Ω

Rev0.5

40V, 1.15mΩ, 275A, N-channel MOSFET

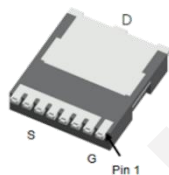
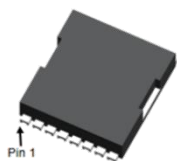
1.Features

- ◆ Ultra-low ON-resistance, RDS(ON)
- ◆ Low Gate Charge
- ◆ 100% UIS Tested
- ◆ 100% ΔVds Tested
- ◆ Halogen-free; RoHS-compliant
- ◆ AEC-Q101 Qualified

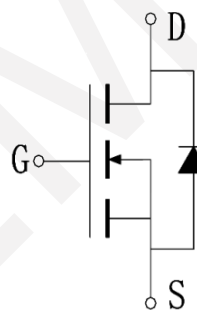
V _{DS}	R _{DS(on)} Typ.	I _D Max.
40V	1.15mΩ @10V	275A

2.Applications

- ◆ Load Switch
- ◆ PWM Application
- ◆ General Automotive Application



TOLL
Pin Description



Schematic Diagram

3.Package Marking and Ordering Information

Part no.	Package	Marking	PCS/Reel	PCS/CTN.
WX012AN04LL	TOLL	012AN04	2,000	16,000

4.Absolute Max Ratings at Ta=25°C (Note1)

Parameter		Symbol	Maximum	Units
Drain to Source Voltage		V _{DSS}	40	V
Gate to Source Voltage		V _{GSS}	±20	V
Drain Current (DC)	T C = 25°C	I _D	275	A
	T C = 100°C	I _D	195	A
Drain Current (Pulse), PW≤300μs		I _{DM}	1100	A
Avalanche Energy, Single Pulsed		E _{AS}	618	mJ
Total Dissipation	T C = 25°C	P _D	188	W
Junction Temperature		T _j	175	°C
Storage Temperature		T _{stg}	-55 to +175	°C

Note 1: Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

5. Thermal Resistance Ratings (Note 2)

Parameter	Symbol	Value	Unit
Junction to case	$R_{\theta JC}$	0.8	$^{\circ}\text{C/W}$
Junction to Ambient	$R_{\theta JA}$	41	$^{\circ}\text{C/W}$

Note 2: When mounted on 1 inch square copper board $t \leq 10\text{sec}$ The value in any given application depends on the user's specific board design.

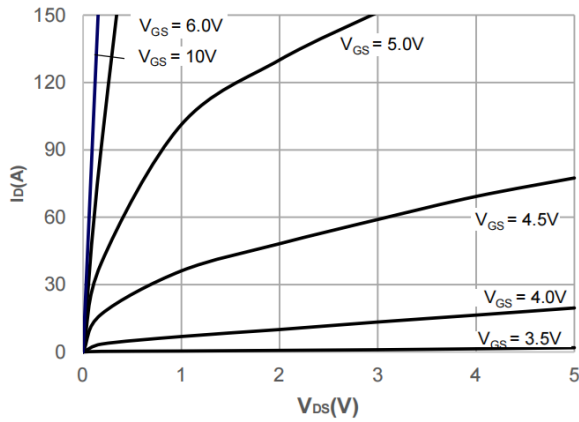
6. Electrical Characteristics at $T_a=25^{\circ}\text{C}$ (Note 3)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$	40	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 40\text{V}$, $V_{GS} = 0\text{V}$	-	-	1	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_{DS}=250\mu\text{A}$	1.8	2.8	3.4	V
Static Drain to Source On-State Resistance	$R_{DS(on)}$	$I_D = 15\text{A}$, $V_{GS} = 10\text{V}$	-	1.15	1.6	m Ω
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=20\text{V}$, Frequency=1.0MHz	3931	5504	7430	pF
Output Capacitance	C_{oss}		2024	2833	3825	pF
Reverse Transfer Capacitance	C_{rss}		77	107	145	pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DS} = 20\text{V}$, $V_{GS} = 10\text{V}$, $I_D = 20\text{A}$, $R_{GEN} = 3\Omega$	-	20	-	ns
Rise Time	t_r		-	30	-	ns
Turn-off Delay Time	$t_{d(off)}$		-	41	-	ns
Fall Time	t_f		-	14	-	ns
Total Gate Charge	Q_g	$V_{DS} = 20\text{V}$, $V_{GS} = 10\text{V}$, $I_D = 20\text{A}$	51	71	96	nC
	Q_{gs}		16	23	31	nC
	Q_{gd}		9	13	17	nC
Diode Forward Voltage	V_{FSD}	$I_S = 1\text{A}$, $V_{GS} = 0$	-	-	1.2	V

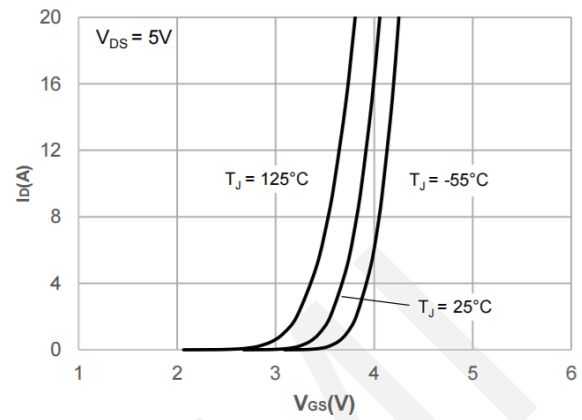
Note 3: Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



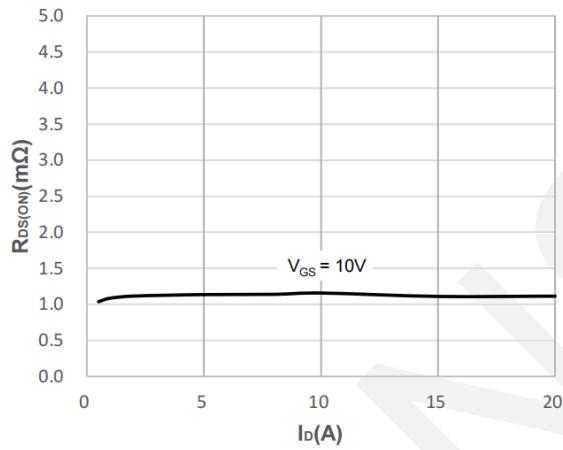
7. Typical electrical and thermal characteristics



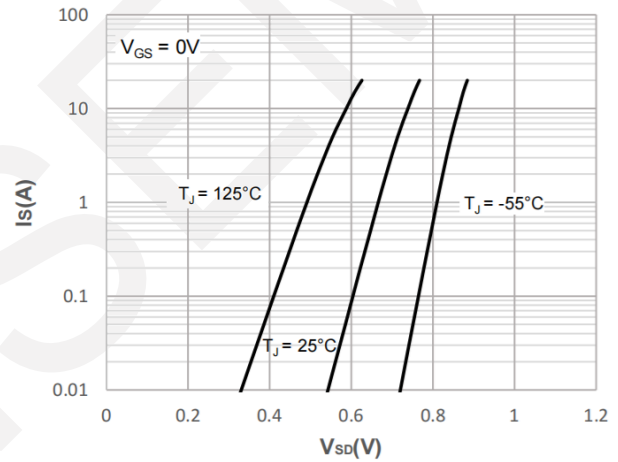
Saturation Characteristics



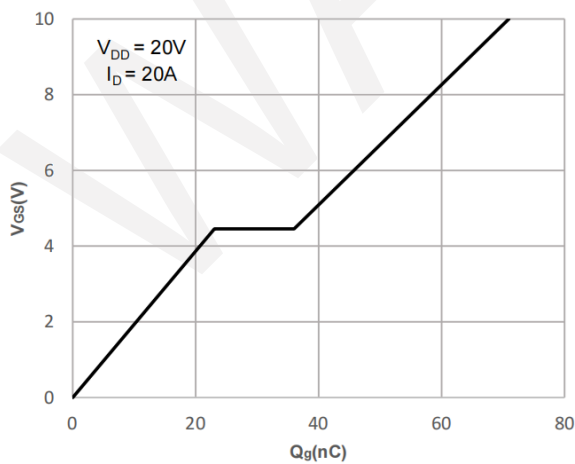
Transfer Characteristics



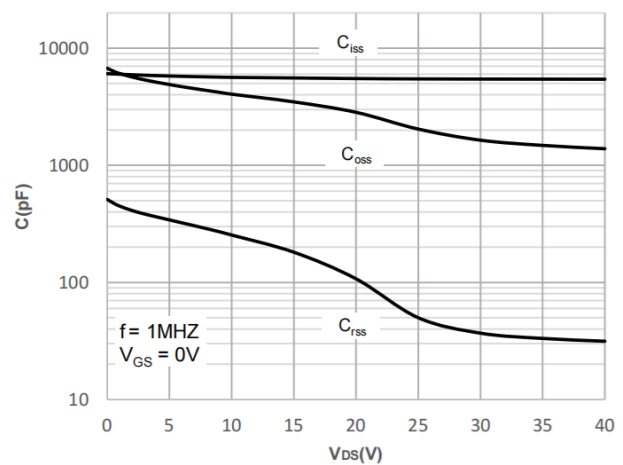
$R_{DS(on)}$ vs. Drain Current



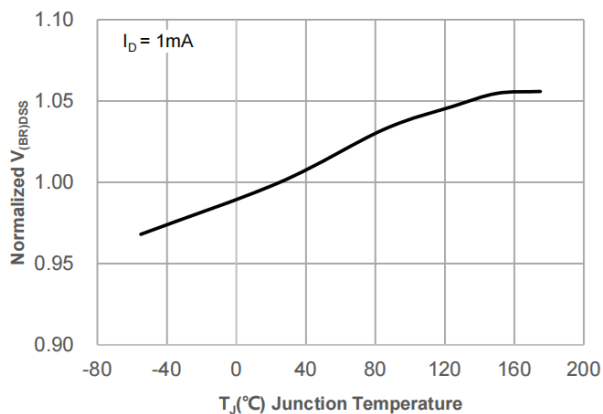
$R_{DS(on)}$ vs. Junction Temperature



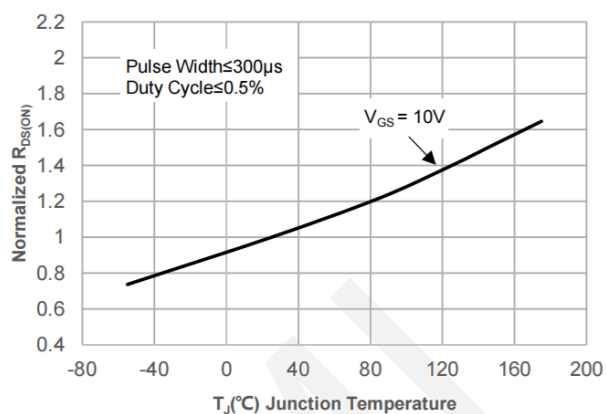
Gate Charge Characteristics



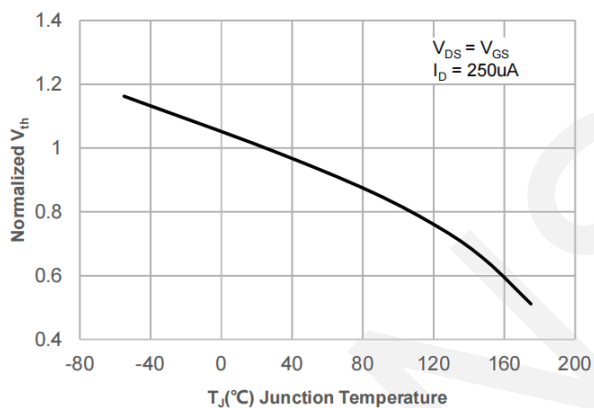
Capacitance Characteristics



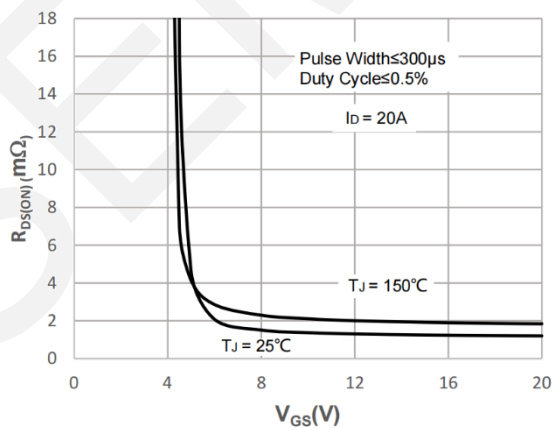
Normalized Breakdown voltage vs.
Junction Temperature



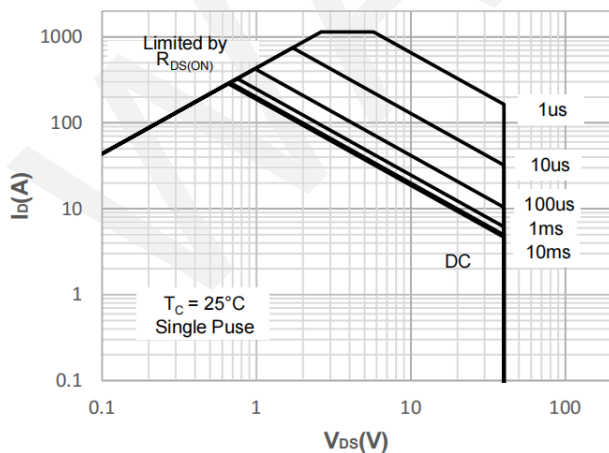
Normalized on Resistance vs.
Junction Temperature



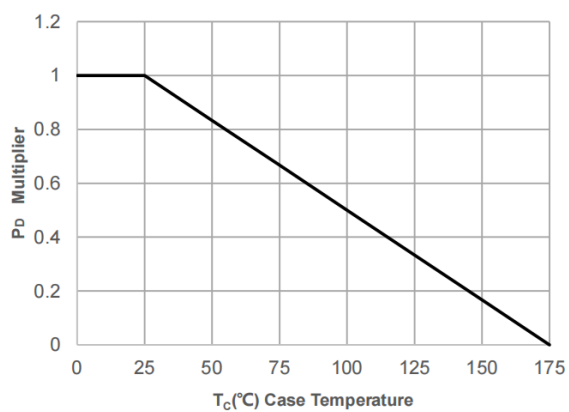
Normalized Threshold Voltage vs.
Junction Temperature



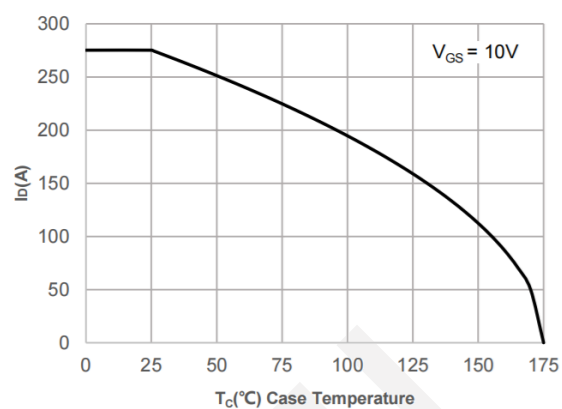
RDS(ON) vs. VGS



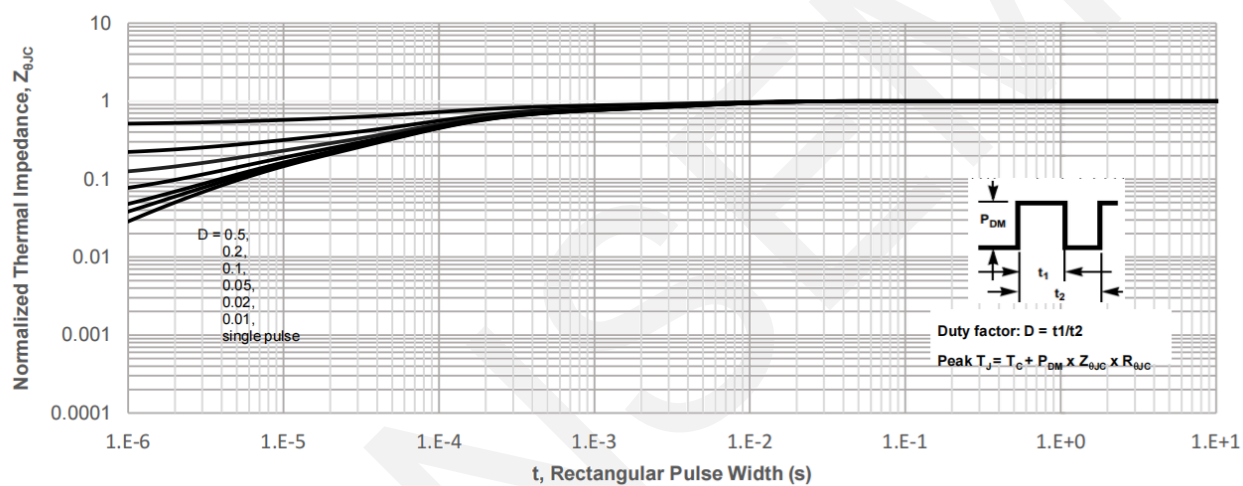
Maximum Safe Operating Area



Power De-rating

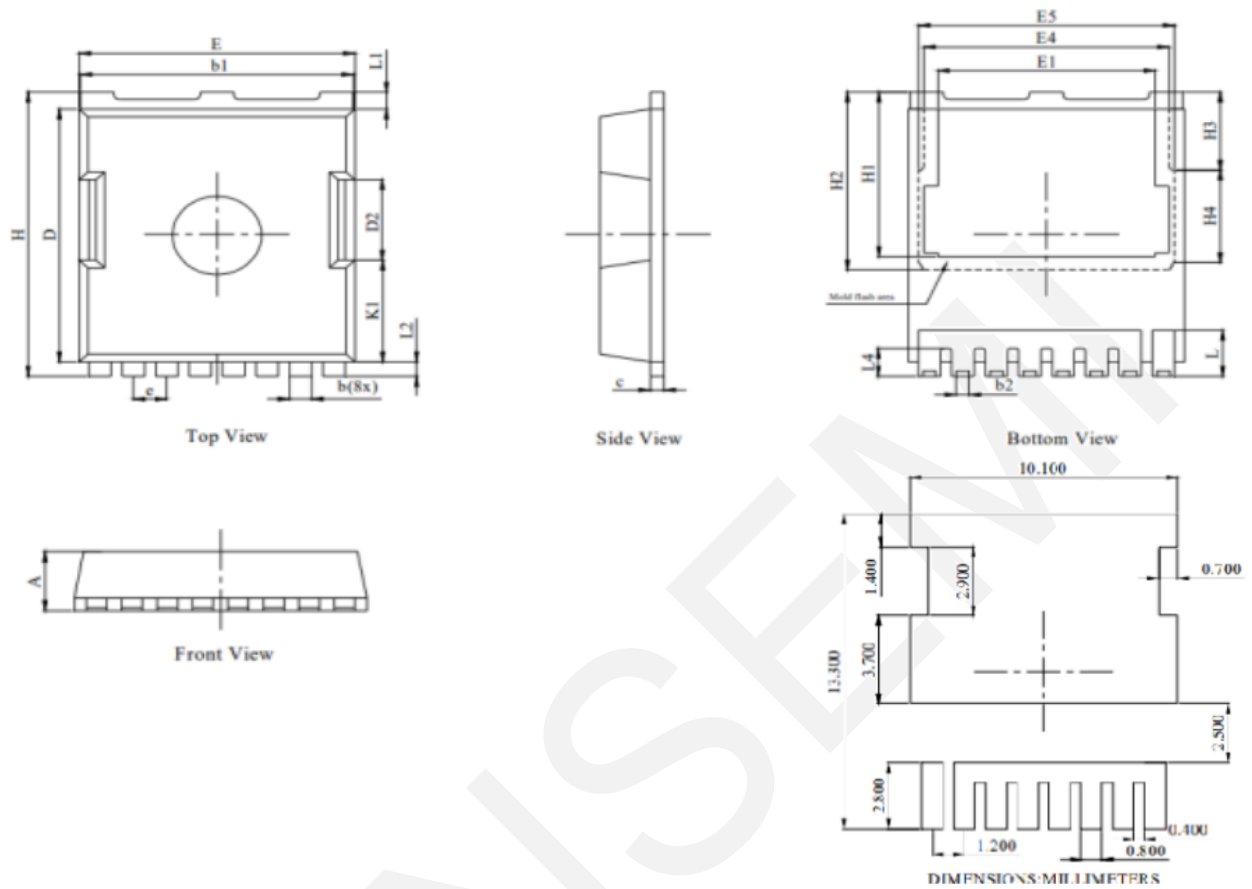


Current De-rating



Normalized Maximum Transient Thermal Impedance

8.Package Dimensions



DIM.	MILLIMETER		
	MIN	NOM	MAX
A	2.20	2.30	2.50
b	0.70	0.80	0.90
b1	9.70	9.80	9.90
b2	0.42	0.46	0.50
C	0.40	0.50	0.65
D	10.28	10.38	10.58
D2	3.30		
E	9.70	9.90	10.10
E1	7.80		
E4	8.80		
E5	9.20		
e	1.20(BSC)		
H	11.48	11.68	11.88
H1	6.55	6.75	6.85
H2	7.30		
H3	3.20		
H4	3.80		
K1	4.18		
L	1.70	1.90	2.10
L1	0.70		
L2	0.60		
L4	1.00	1.15	1.30

9. Important Notice

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