preliminary

CMA033N12NH-TL

120V N-Channel Power MOSFET

Features

- High Speed Power Switching
- Enhanced Body diode dv/dt capability
- Enhanced Avalanche Ruggedness
- 100% UIS Tested, 100% Rg Tested
- Lead Free, Halogen Free

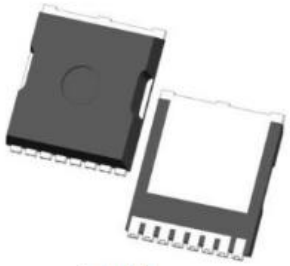
Product Summary

Item	Typical Value	Unit
V_{DS}	120	V
$R_{DS(on)}$ @ V_{GS} =10V (Max)	3.3	mΩ
I_D	225	A

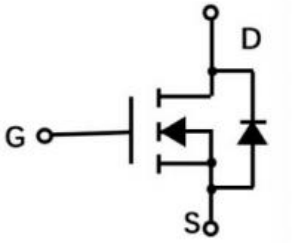
Applications

- DC/DC Converter
- Motor Control
- Power management
- Synchronous Rectification

Pin Description



TOLL



Absolute Ratings (T_A = 25℃ unless otherwise noted)

Parameter	Symbol	Value	Units
Drain-Source Voltage	V_{DS}	120	V
Gate-Source Voltage	V_{GS}	±20	V
Single Pulse UIS Capability, 0.5mH	E_{AS}	625	mJ
Continuous Drain Current, T_C = 25°C/100°C	I_D	225/159	A
Maximum Power Dissipation, T_C = 25°C	P_D	365.8	W
Junction Temperature Maximum	T_{JMAX}	175	°C
Storage Temperature	$T_{Storage}$	-55 to 175	°C

Absolute Ratings

Parameter	Symbol	Value	Units
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	40	°C/W

Electrical Characteristics

Static (T_J=25℃ unless otherwise specified)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Units**
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250uA	120	---	---	V
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	---	---	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 120V, V_{GS} = 0V,T_J=25℃	---	---	1	uA
		V_{DS} = 120V, V_{GS} = 0V,T_J=100℃	---	---	100	
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	---	---	3.3	mΩ
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250uA	2.5	---	3.5	V
Dynamic (T_J=25℃ unless otherwise specified)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Units**
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 60V, f = 1MHz	---	8690	---	pF
Output Capacitance	C_{oss}		---	733	---	
Reverse Transfer Capacitance	C_{rss}		---	16	---	
Total Gate Charge	Q_g	V_{DS} = 60V, I_D = 20A, V_{GS} = 10V	---	144	---	nC
Gate-Source Charge	Q_{gs}		---	38	---	
Gate-Drain Charge	Q_{gd}		---	37	---	
Turn-on delay time	$T_{d(on)}$	V_{DS} = 60V, I_D = 20A, V_{GS} = 10V, R_G = 3Ω,	---	29.6	---	ns
Rise time	T_r		---	50.6	---	
Turn-off delay time	$T_{d(off)}$		---	89	---	
Fall time	T_f		---	54	---	
Reverse Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V, I_F = 20A	---	---	1.2	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V, I_F = 20A, dI_F/dt=100A/us	---	90	---	ns
Reverse Recovery Charge	Q_{rr}		---	217	---	nC

Typical Characteristics

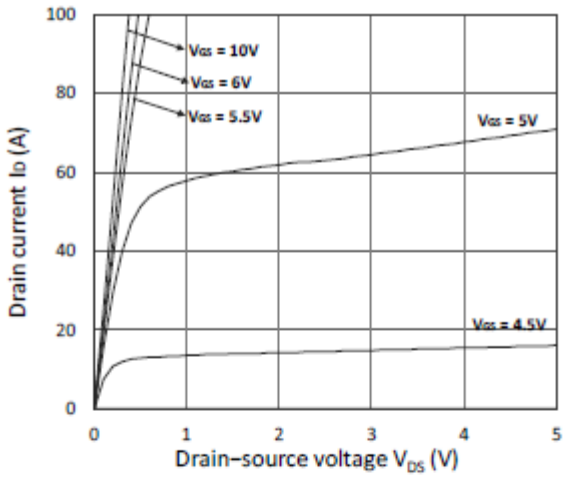


Figure 1. Output Characteristics

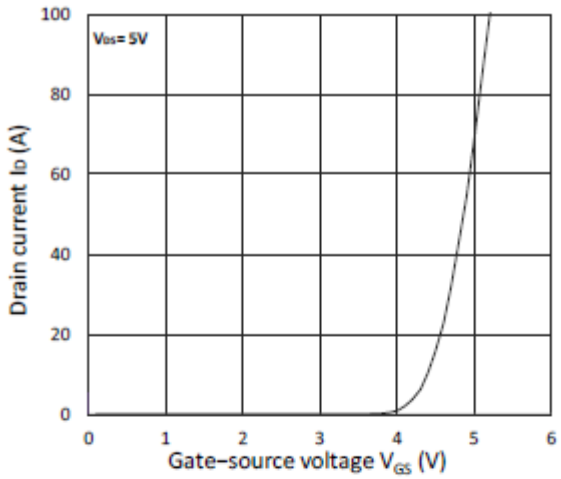


Figure 2. Transfer Characteristics

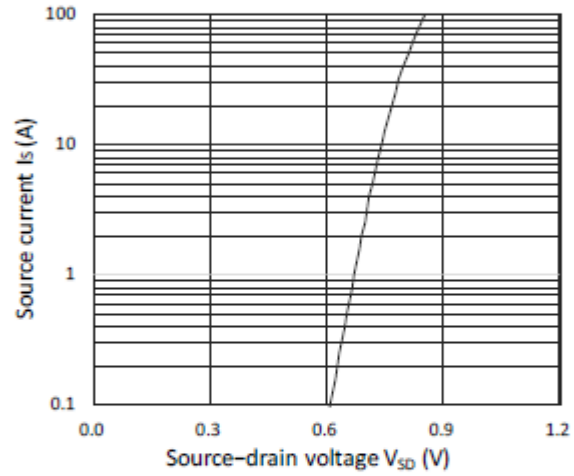


Figure 3. Forward Characteristics of Reverse

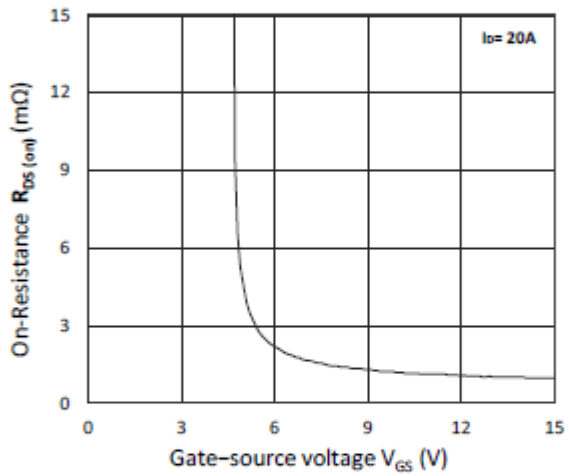


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

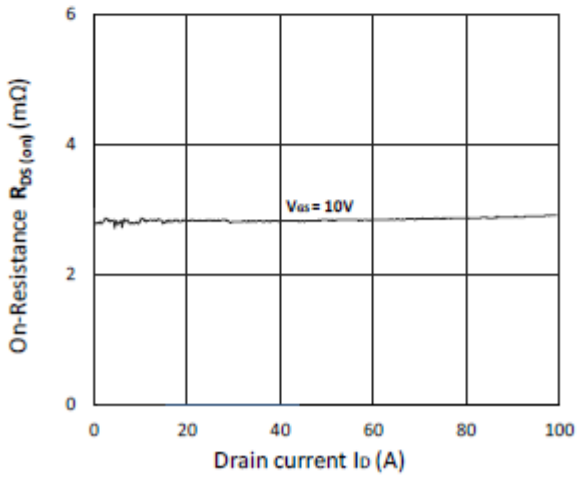


Figure 5. $R_{DS(ON)}$ vs. I_D

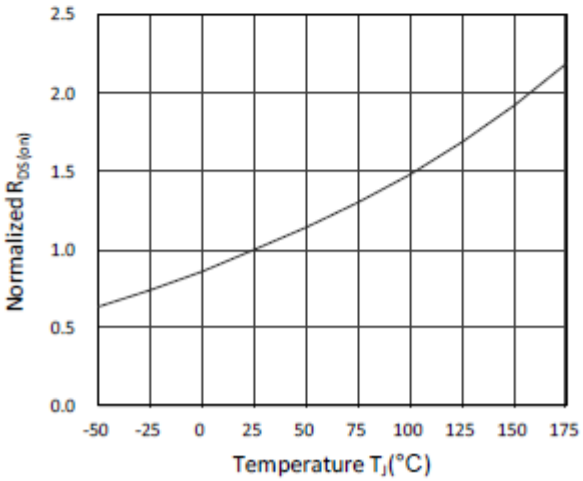


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

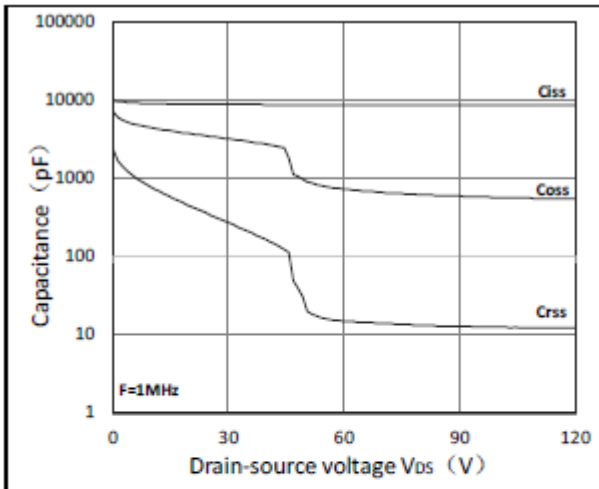


Figure 7. Capacitance Characteristics

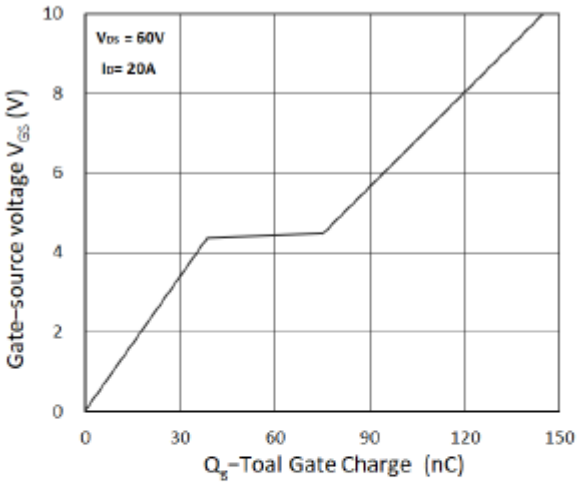


Figure 8. Gate Charge Characteristics

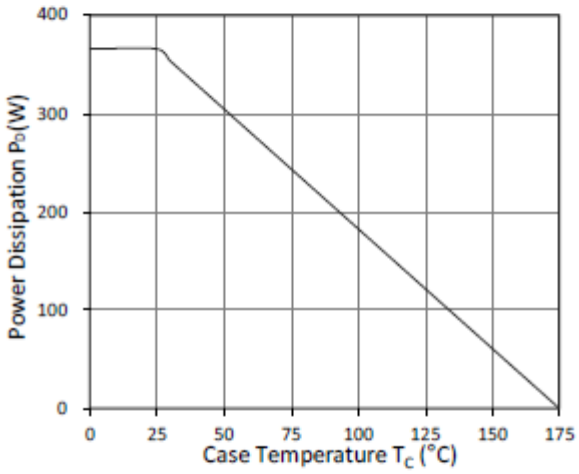


Figure 9. Power Dissipation

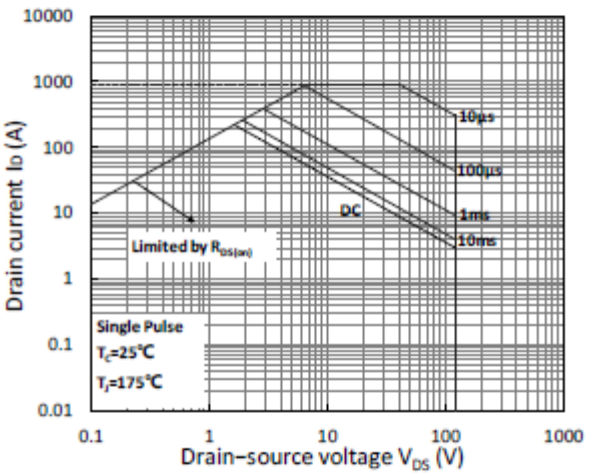


Figure10. Safe Operating Area

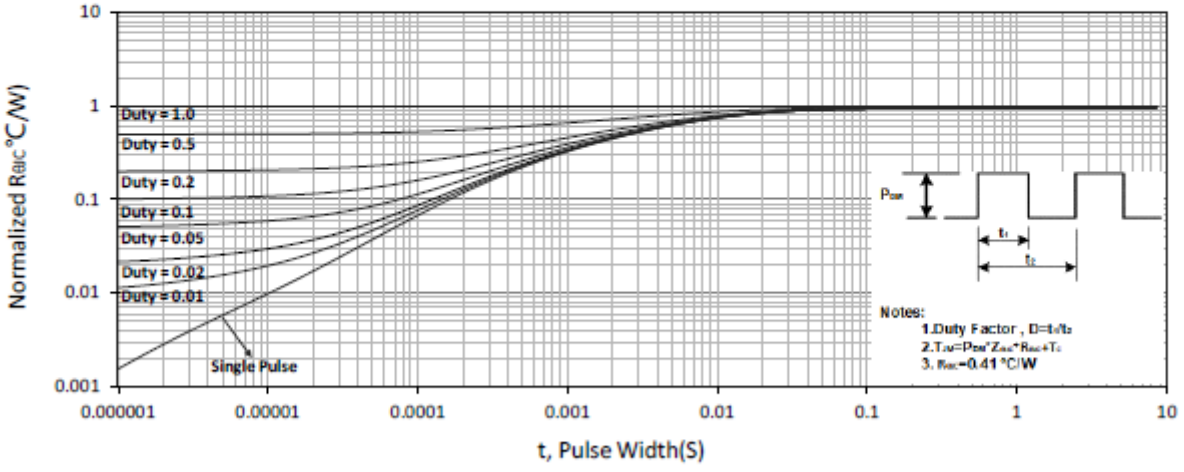


Figure 11. Normalized Maximum Transient Thermal Impedance

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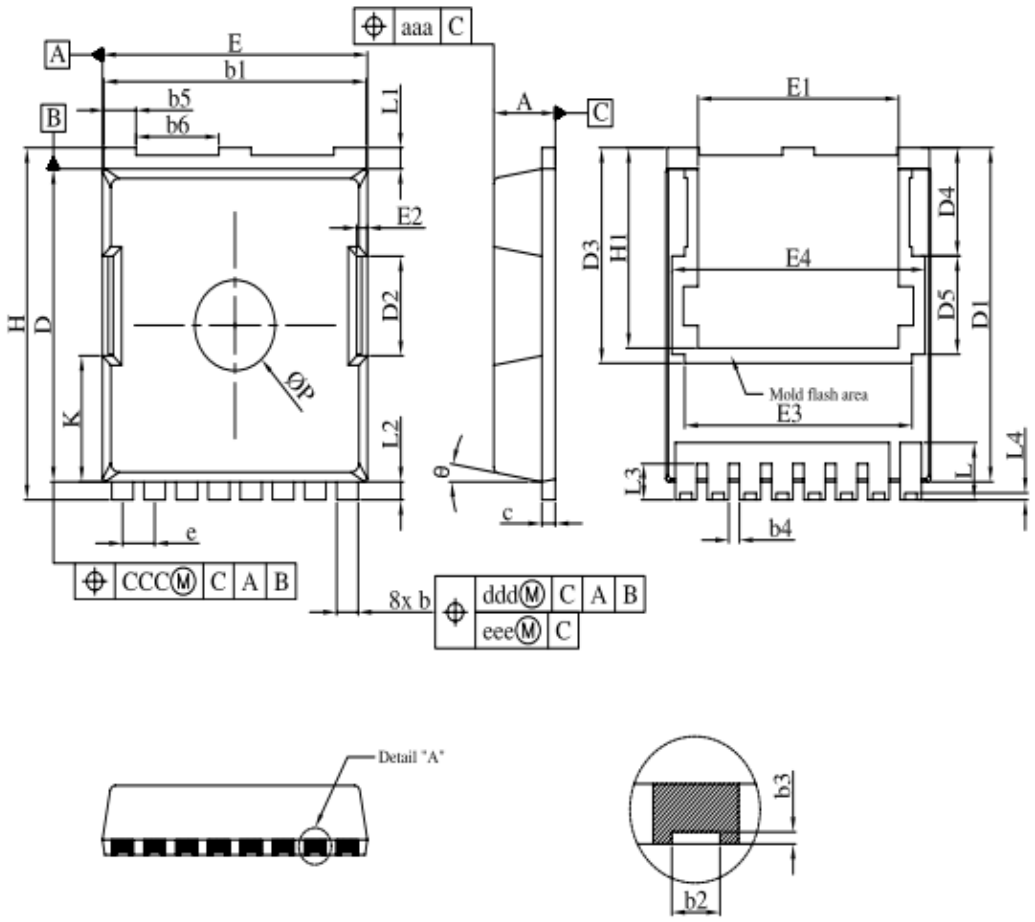

SYMBOL	COMMON MILLIMETER		
	MIN.	NOMINAL	MAX.
A	2.20	2.30	2.40
b	0.70	0.80	0.90
b1	9.70	9.80	9.90
b2	0.36	0.45	0.55
b3	0.05	0.100	/
b4	0.30	0.40	0.50
b5	1.10	1.20	1.30
b6	3.00	3.10	3.20
c	0.40	0.50	0.60
D	10.28	10.38	10.55
D1	10.98	11.08	11.18
D2	3.20	3.30	3.40
D3		7.15	
D4		3.59	
D5		3.26	
e	1.10	1.20	1.30
E	9.80	9.90	10.00
E1	7.40	7.50	7.60
E2	0.30	0.40	0.50
E3		8.50	
E4		9.46	
H	11.50	11.68	11.85
H1	6.55	6.65	6.75
K	4.08	4.18	4.28
L	1.60	1.90	2.10
L1	0.50	0.70	0.90
L2	0.50	0.60	0.70
L3	1.00	1.20	1.30
L4	0.13	0.23	0.33
P	2.85	3.00	3.15
θ		10° REF	
aaa		0.20	
ccc		0.20	
ddd		0.25	
eee		0.20	