

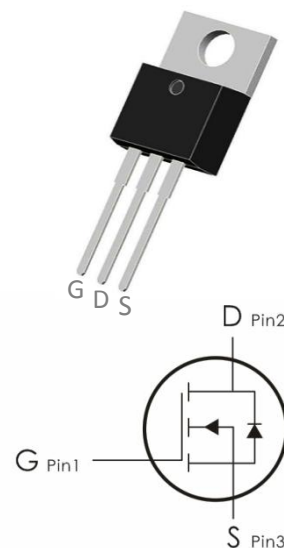
Description:

This N-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.

Features:

- 1) $V_{DS}=30V, I_D=120A, R_{DS(on)} < 3.5m\Omega @ V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra $R_{DS(on)}$.
- 5) Excellent package for good heat dissipation.



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
DOP120N03	120N03	TO- 220	50 pcs/Tube

Absolute Maximum Ratings: ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current- $T_C=25^\circ\text{C}$	120	A
	Continuous Drain Current- $T_C=100^\circ\text{C}$	89	
	Pulsed Drain Current ¹	560	
E_{AS}	Single Pulse Avalanche Energy	125	mJ
P_D	Power Dissipation, $T_C=25^\circ\text{C}$	125	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +175	$^\circ\text{C}$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62	

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	30	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =30V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V, V _{DS} =0A	---	---	± 100	nA
On Characteristics						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	1.2	1.5	2.5	V
R _{DS(ON)}	Drain-Source On Resistance ³	V _{GS} =10V, I _D =30A	---	2.9	3.5	m Ω
		V _{GS} =4.5V, I _D =15A	---	4.6	6	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	3075	---	pF
C _{oss}	Output Capacitance		---	400	---	
C _{rss}	Reverse Transfer Capacitance		---	315	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time ³	V _{DD} =15V, I _D =30A, V _{GS} =10V, R _{GEN} =3.3Ω	---	9	---	ns
t _r	Rise Time ^{2,3}		---	19	---	ns
t _{d(off)}	Turn-Off Delay Time		---	58	---	ns
t _f	Fall Time ^{2,3}		---	15.2	---	ns
Q _g	Total Gate Charge ³	V _{GS} =10 V, V _{DS} =15V, I _D =30A	---	31.6	---	nC
Q _{gs}	Gate-Source Charge		---	8.6	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	11.7	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Source-Drain Diode Forward Voltage ³	V _{GS} =0V, I _S =1A	---	---	1	V
I _S	Continuous Source Current	V _D =V _G =0V	---	---	120	A
I _{SM}	Pulsed Source Current		---	---	560	A
Trr	Reverse Recovery Time	IF=30A , dI/dt=100A/μs ,	---	18	---	Ns
Qrr	Reverse Recovery Charge		---	8	---	nc

Notes:

- 1.The data tested by surface mounted on a 1 inch FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=53.8A$
- 4.The power dissipation is limited by $175^{\circ}C$ junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics: ($T_c=25^{\circ}C$ unless otherwise noted)

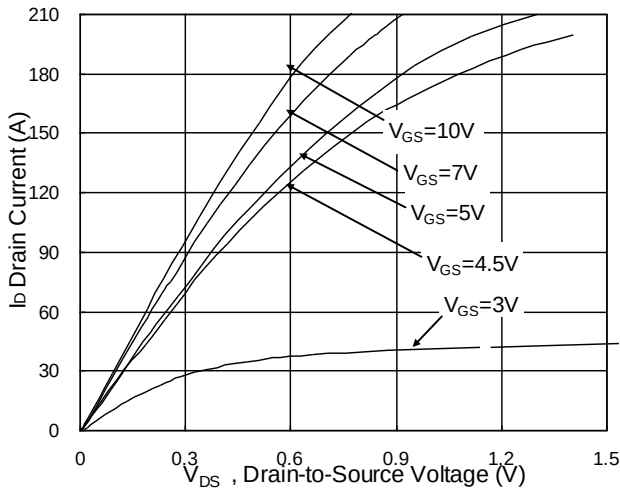


Fig.1 Typical Output Characteristics

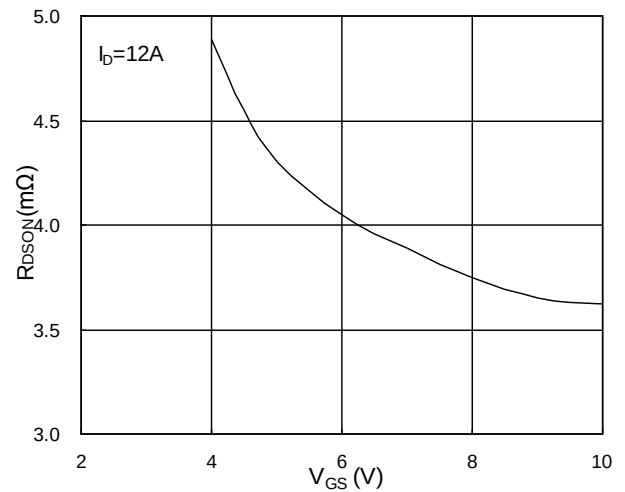


Fig.2 On-Resistance vs. G-S Voltage

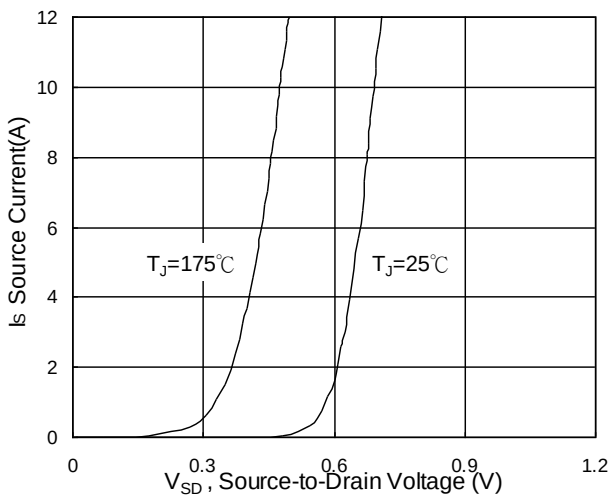


Fig.3 Forward Characteristics of Reverse

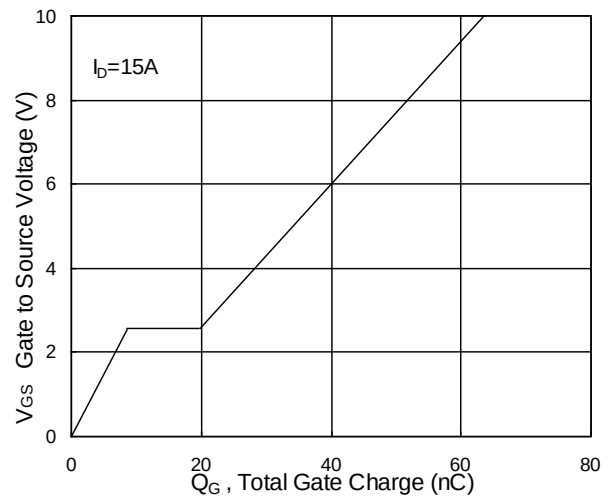


Fig.4 Gate-Charge Characteristics

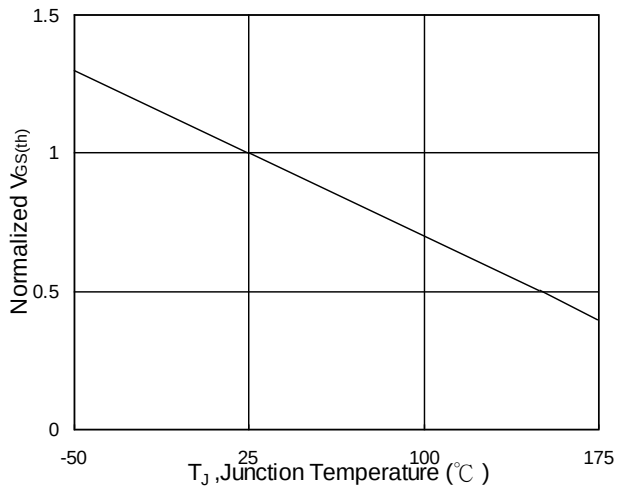


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

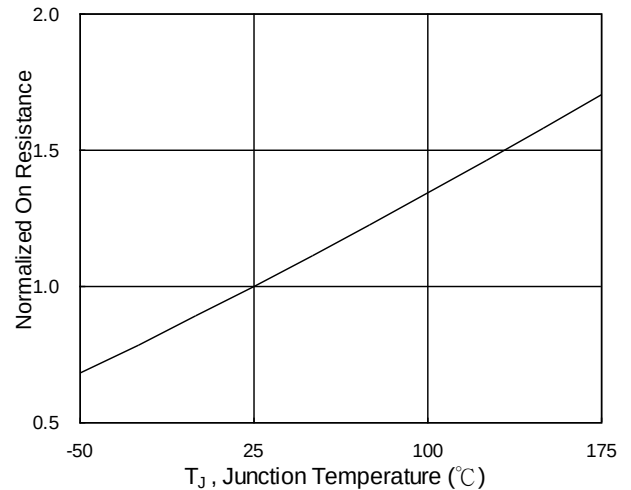


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

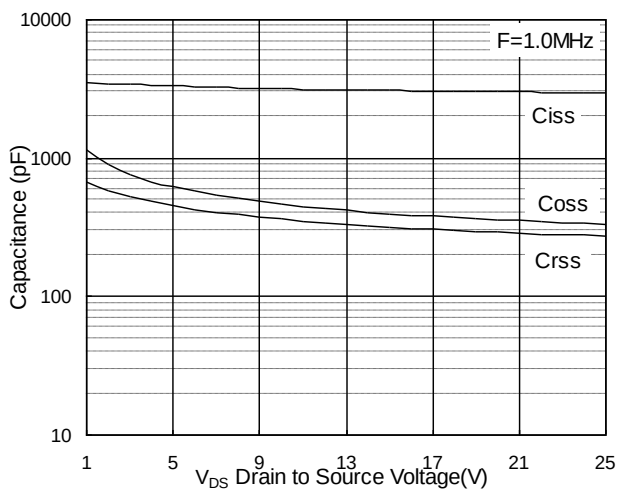


Fig.7 Capacitance

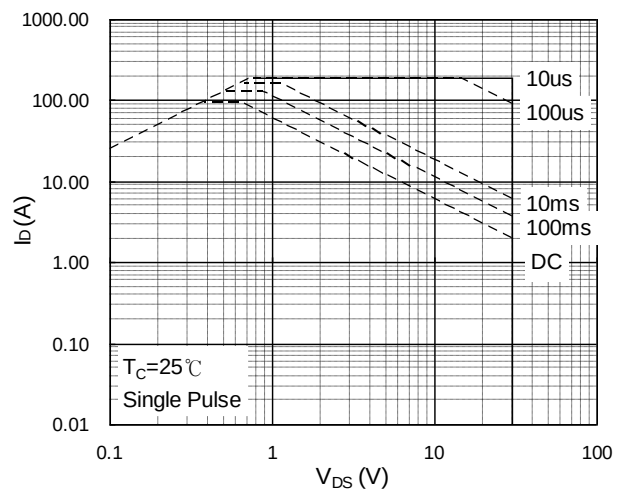


Fig.8 Safe Operating Area

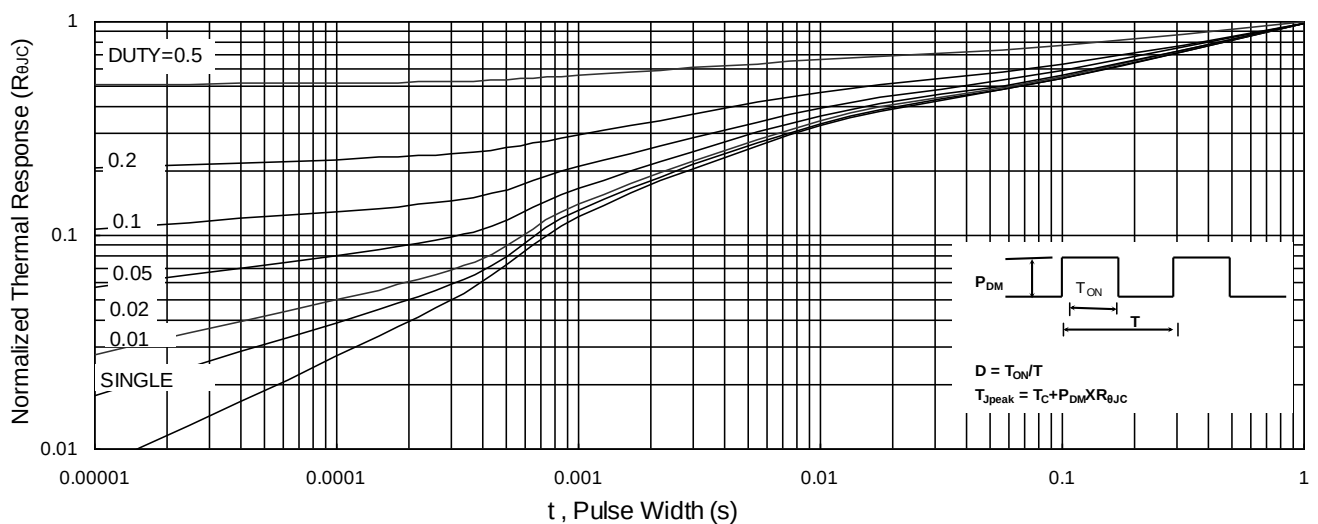


Fig.9 Normalized Maximum Transient Thermal Impedance

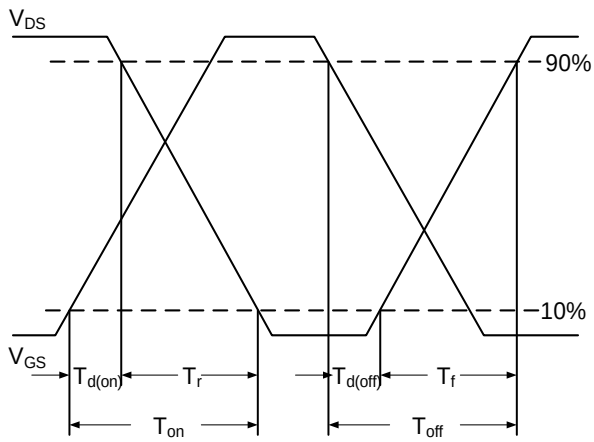


Fig.10 Switching Time Waveform

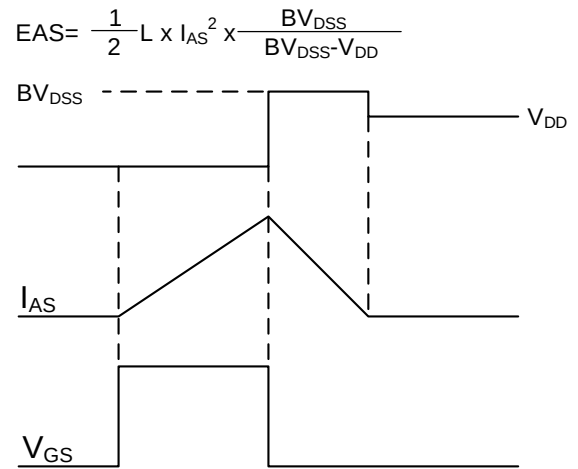
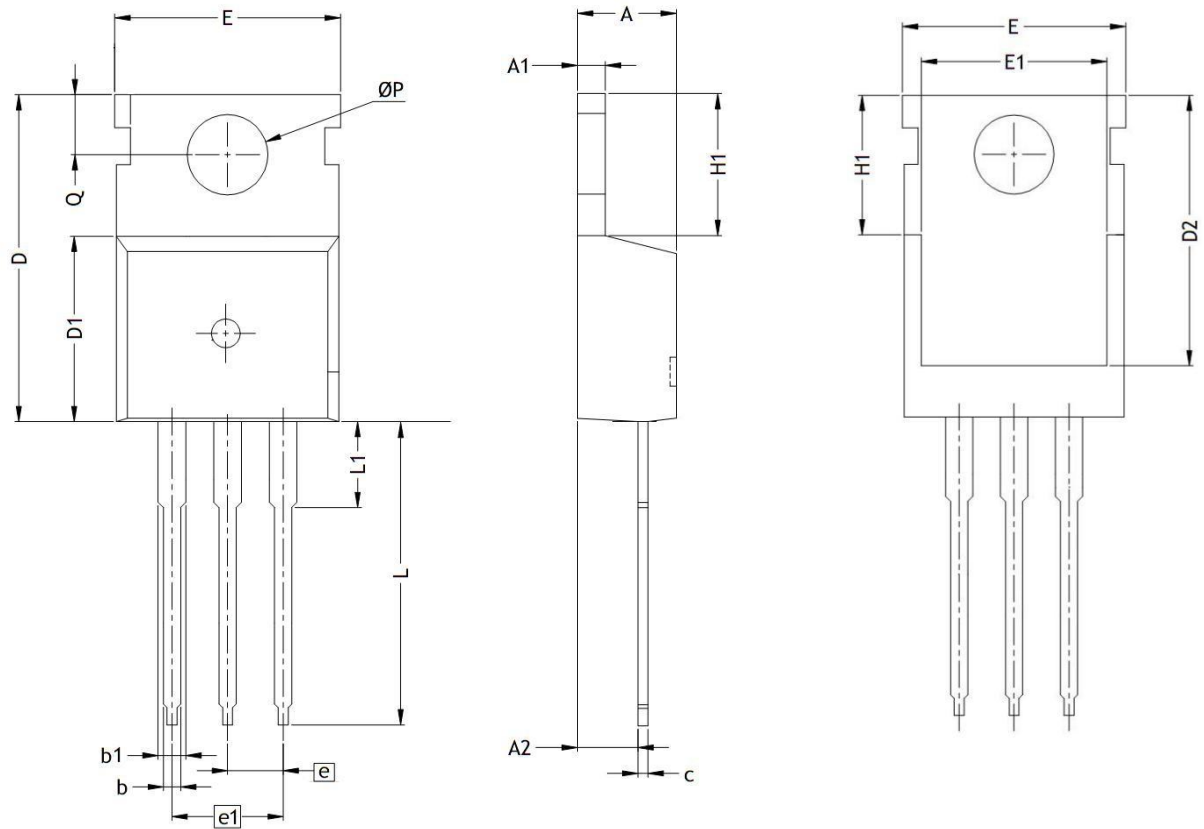


Fig.11 Unclamped Inductive Switching Waveform

TO-220 Package Information:



UNIT: mm

SYMBOLS	A	A1	A2	b	b1	c	D	D1	D2	E	E1	e
MIN	4.25	1.25	2.35	0.7	1.15	0.45	14.35	8.80	13.05	9.90	7.85	2.540
MAX	4.65	1.35	2.55	0.9	1.75	0.60	15.95	9.50	13.65	10.35	8.85	
SYMBOLS	e1	H1	L	L1	Q	φP						
MIN	5.080	6.30	12.85	2.85	2.70	3.50						
MAX	BSC	6.65	13.50	3.25	2.90	3.70						

Marking Information:

①. Doingter LOGO

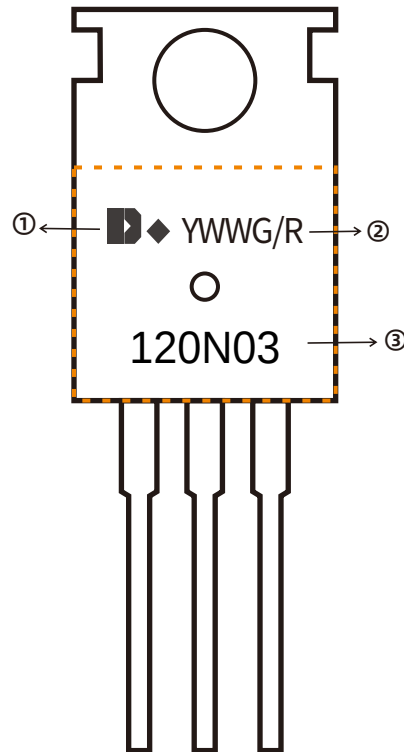
②. Date Code(YWWG / R)

Y : Year Code , last digit of the year

WW : Week Code(01-53)

G/R : G(Green) /R(Lead Free)

③. Part NO.



Previous Version

Version	Date	Subjects (major changes since last revision)
2.0	2024-08-16	Release of final version

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