

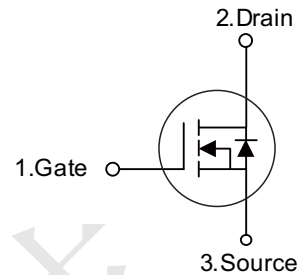


MOT120N03D/C N-CHANNEL MOSFET

■ MOT120N03D/C PRODUCT CHARACTERISTICS

VDSS	30V
$R_{DS(on)Typ}(@V_{GS} = 10 V)$	3mΩ
ID	120A

Symbol



■ MOT120N03D/C APPLICATIONS

- * Power switching application
- * Hard switched and high frequency circuits
- * Uninterruptible power supply

■ MOT120N03D/C FEATURES

- * High density cell design for ultra low $R_{DS(on)}$
- * Excellent package for good heat DISSIPATION



■ MOT120N03D/C ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT120N03D	TO-252	2500 pieces /Reel
N/A	MOT120N03C	TO-251	70 pieces/Tube

■ MOT120N03D/C ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	120	A
Drain Current-Continuous($T_C=100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	84	A
Pulsed Drain Current	I_{DM}	420	A
Maximum Power Dissipation	P_D	120	W
Single pulse avalanche energy ^(Note 5)	E_{AS}	350	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ\text{C}$

■ MOT120N03D/C THERMAL DATA

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	1.25	$^\circ\text{C/W}$



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■ MOT120N03D/C ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	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} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	1.6	3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A		3	3.5	mΩ
Gate resistance	R _G	F=1.0MHz	-	1.2	-	Ω
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =20A	50	-	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, F=1.0MHz		4120		PF
Output Capacitance	C _{oss}			498		PF
Reverse Transfer Capacitance	C _{rss}			456		PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{GS} =10V, V _{DS} =20V R _L =0.75Ω, R _{GEN} =3Ω	-	11	-	nS
Turn-on Rise Time	t _r		-	10	-	nS
Turn-Off Delay Time	t _{d(off)}		-	38	-	nS
Turn-Off Fall Time	t _f		-	11	-	nS
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =15V, I _D =20A		79		nC
Gate-Source Charge	Q _{gs}			9		nC
Gate-Drain Charge	Q _{gd}			18		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =20A	-	-	1.2	V
Diode Forward Current	I _S	-		-	120	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F =20A	-	58	-	nS
Reverse Recovery Charge	Q _{rr}	di/dt = 100A/μs (Note3)	-	115	-	nC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition: T_j=25°C, V_{DD}=15V, V_G=10V, L=0.5mH, R_g=25Ω



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■ MOT120N03D/C TYPICAL CHARACTERISTICS

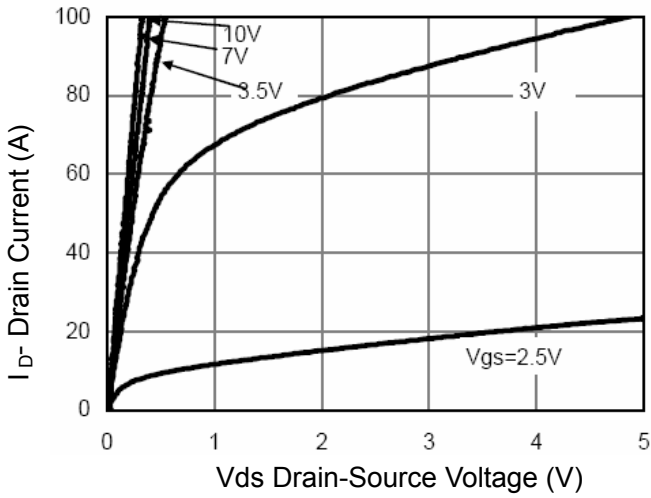


Figure 1 Output Characteristics

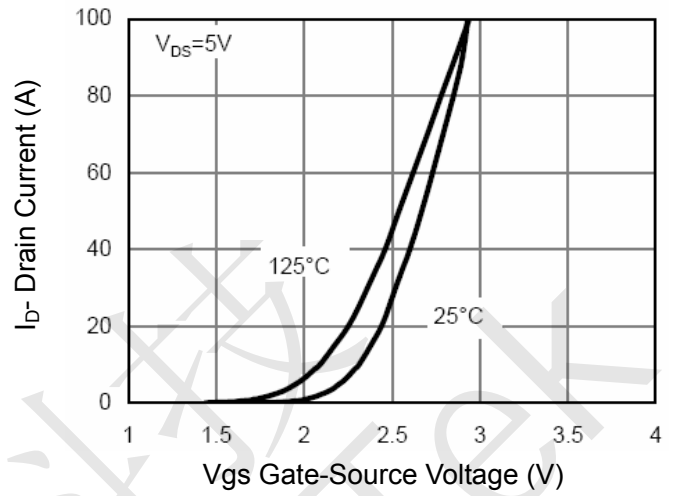


Figure 2 Transfer Characteristics

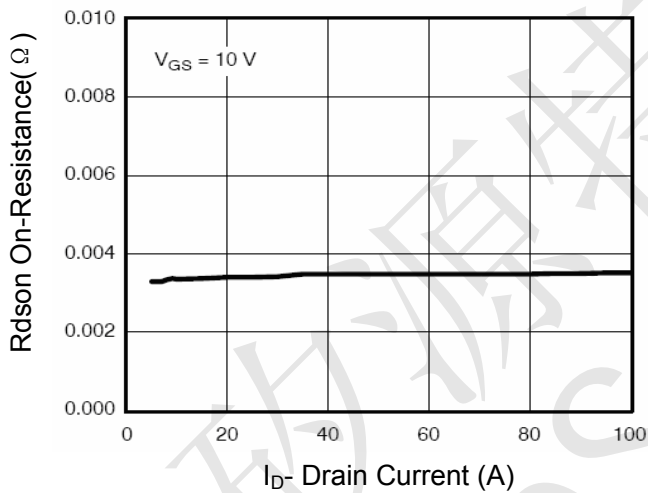


Figure 3 $R_{DS(on)}$ - Drain Current

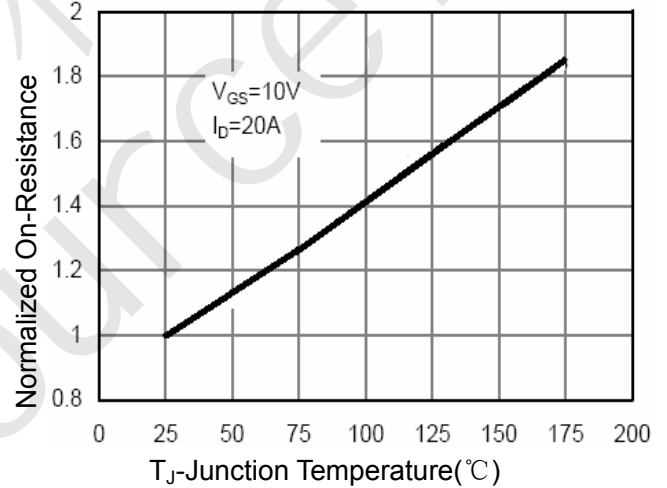


Figure 4 $R_{DS(on)}$ -Junction Temperature

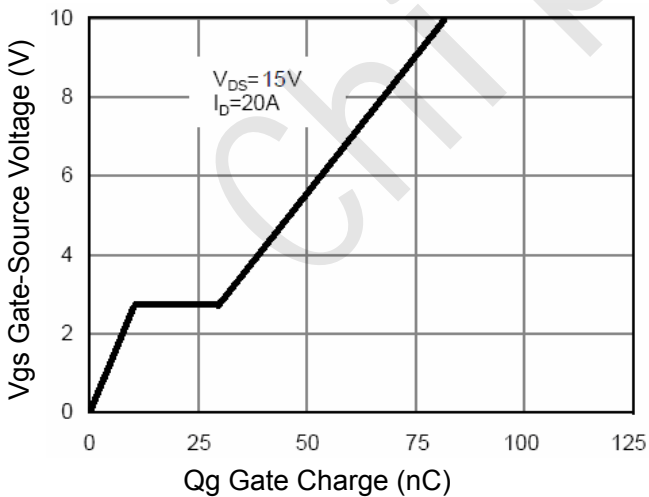


Figure 5 Gate Charge

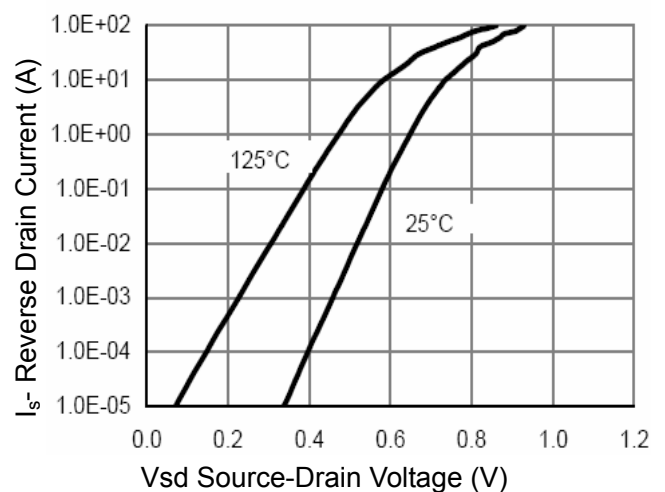


Figure 6 Source- Drain Diode Forward



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■ MOT120N03D/C TYPICAL CHARACTERISTICS(Cont.)

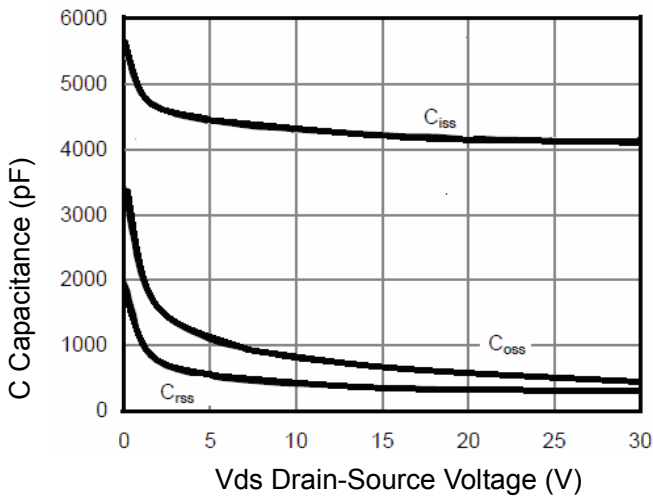


Figure 7 Capacitance vs Vds

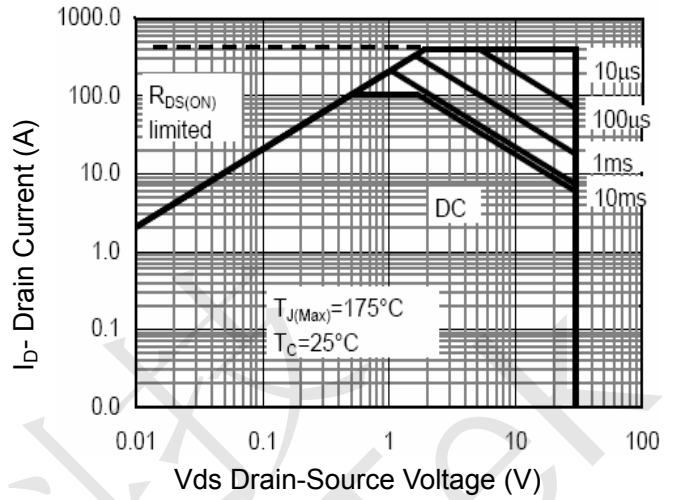


Figure 8 Safe Operation Area

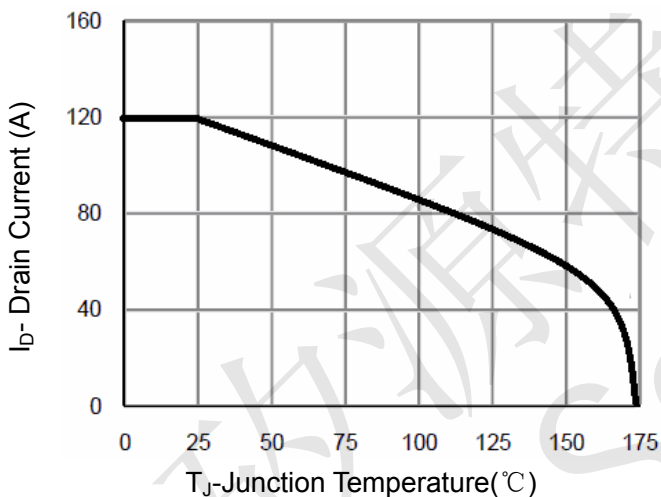


Figure 9 Current De-rating

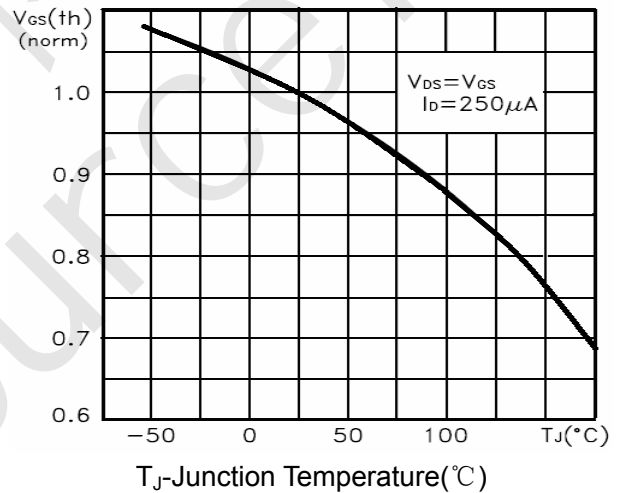


Figure 10 $V_{GS(th)}$ vs Junction Temperature

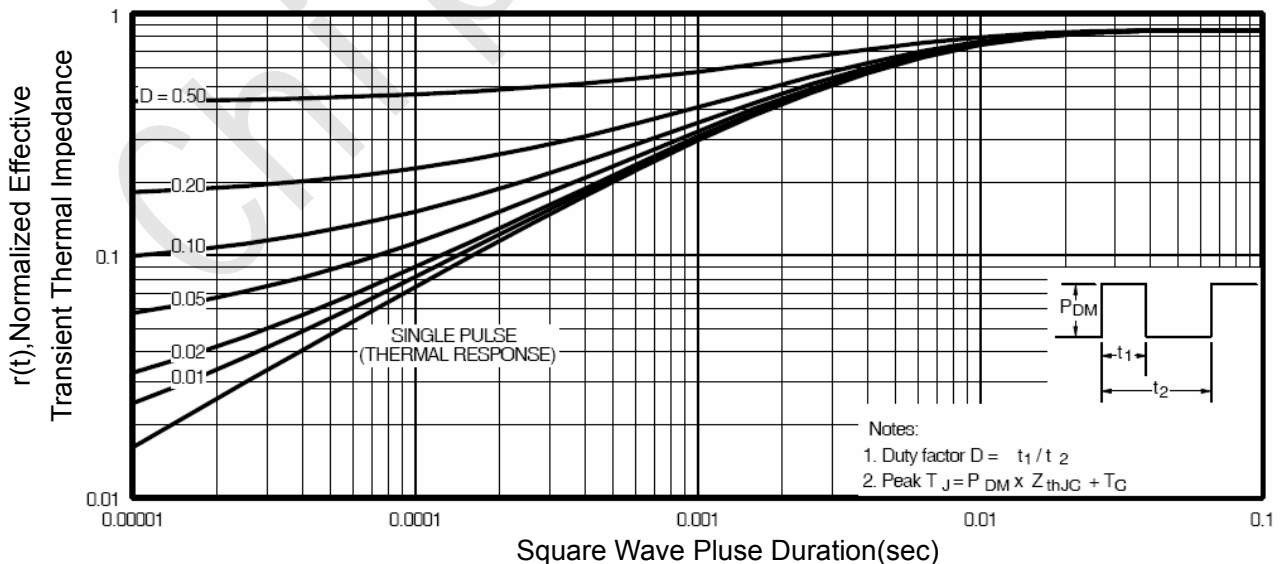


Figure 11 Normalized Maximum Transient Thermal Impedance



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■ MOT120N03D/C TO-251-3L PACKAGE OUTLINE DIMENSIONS

