AP012SN400MTC

N-Channel Enhancement Mode MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
400V	500mΩ@10V	12A

Feature

- Self-aligned planar technology
- Low conduction loss

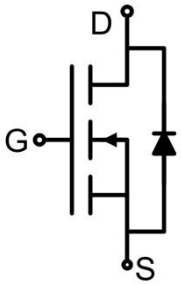
Application

- Uninterruptible power supply (UPS)
- Power factor correction (PFC)

Package

TO-220AB

Circuit diagram



Marking

AP012SN400MTC

N-Channel Enhancement Mode MOSFET

Absolute maximum ratings(T_C=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage (V_{GS}=0V)	V_{DS}	400	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current	I_D	12	A
Pulsed Drain Current[1)]	I_{DM}	44	A
Single Pulse Avalanche Energy[2)]	E_{AS}	368	mJ
Power Dissipation[3)]	P_D	33.2	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	3.8	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55 ~ +150	℃

Electrical characteristics (T_J=25℃, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} =0V, I_D =250μA	400			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =400V, V_{GS} =0V			1	μA
Gate-body leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±30V			±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	2		4	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =5.5A		430	500	mΩ
Dynamic characteristics[4)]						
Input Capacitance	C_{iss}	V_{DS} =25V, V_{GS} =0V, f =1MHz		755		pF
Output Capacitance	C_{oss}			132		
Reverse Transfer Capacitance	C_{rss}			9		
Total Gate Charge	Q_g	V_{DS} =320V, V_{GS} =10V I_D =11A		9.6		nC
Gate-Source Charge	Q_{gs}			3		
Gate-Drain Charge	Q_{gd}			2.5		
Turn-on delay time	$t_{d(on)}$	V_{DS} =200V, I_D =11A R_G =25Ω		11		nS
Turn-on rise time	t_r			25		
Turn-off delay time	$t_{d(off)}$			28		
Turn-off fall time	t_f			26		
Source-Drain Diode characteristics						
Diode Continuous Current	I_S				12	A
Diode Forward voltage	V_{SD}	V_{GS} =0V, I_S =11A			1.2	V
Reverse recover time	T_{rr}	V_{GS} =0V, I_S =11A di/dt =100A/us		356		nS
Reverse recovery charge	Q_{rr}			2.4		μC

Notes:

1) The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

2) The EAS data shows Max. rating . L=4.1mH, I_{AS}=11A, V_{DD}=50V, R_G=25Ω, Starting T_J = 25 °C.

3) The power dissipation is limited by 150℃ junction temperature.

4) Guaranteed by design, not subject to production testing.

Typical Characteristics

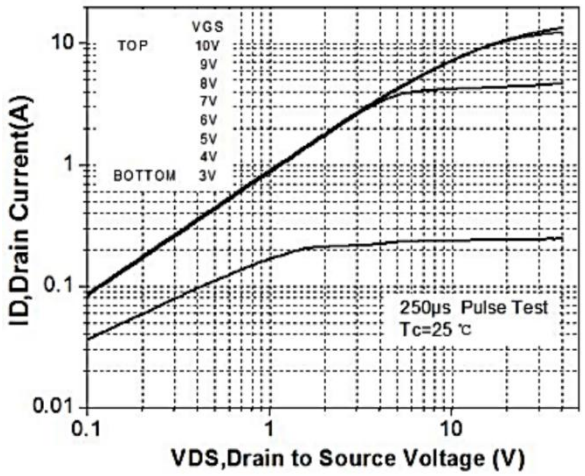


Figure 1. On-Region Characteristics

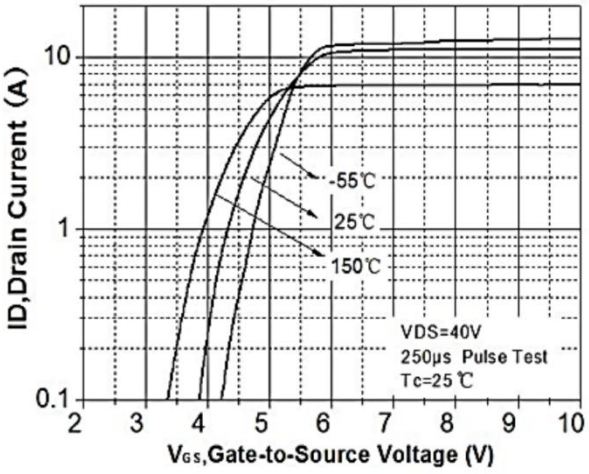


Figure 2. Transfer Characteristics

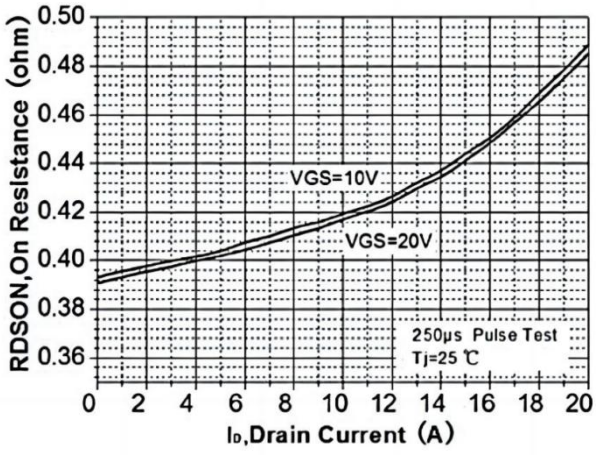


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

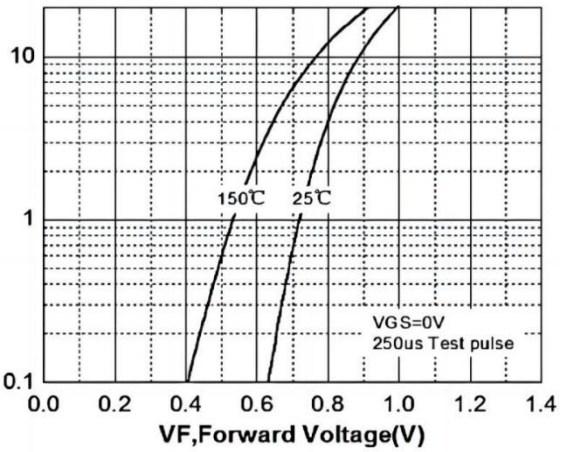


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

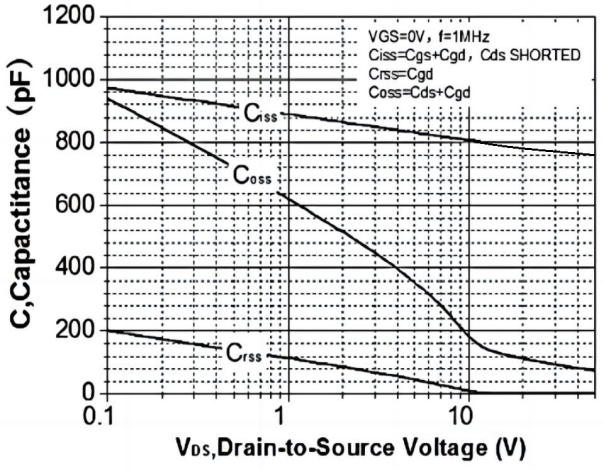


Figure 5. Capacitance Characteristics

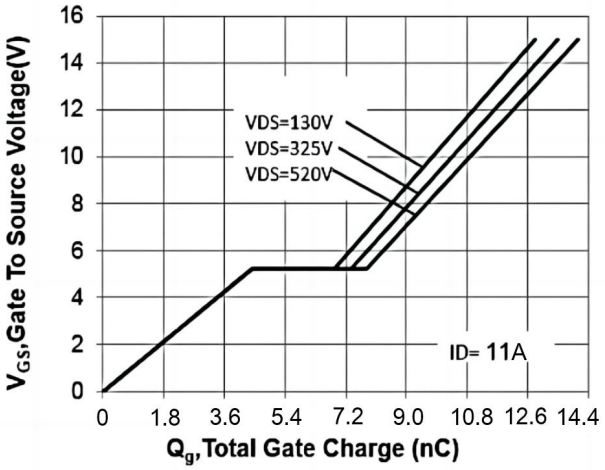


Figure 6. Gate Charge Characteristics

Typical Characteristics

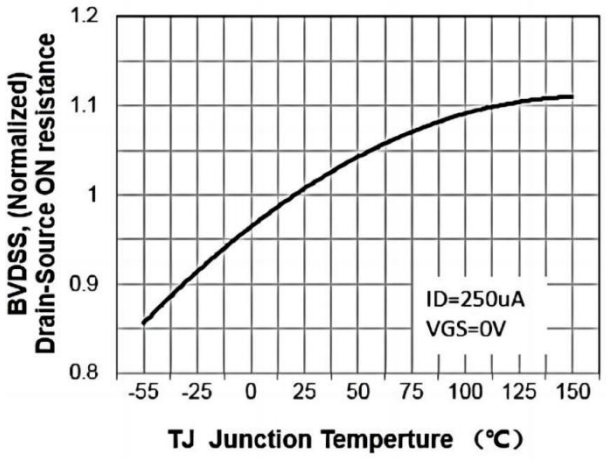


Figure 7. Breakdown Voltage Variation vs Temperature

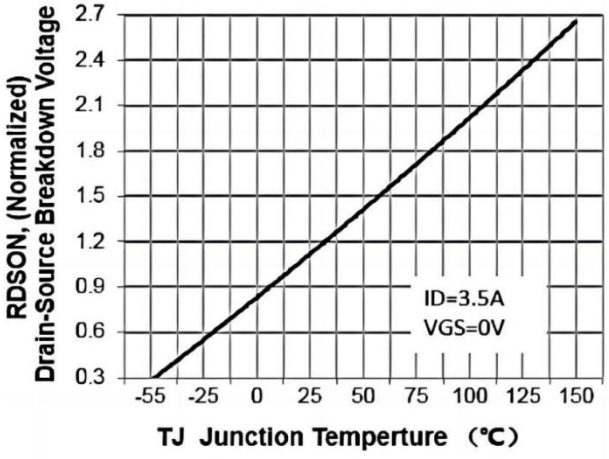


Figure 8. On-Resistance Variation vs Temperature

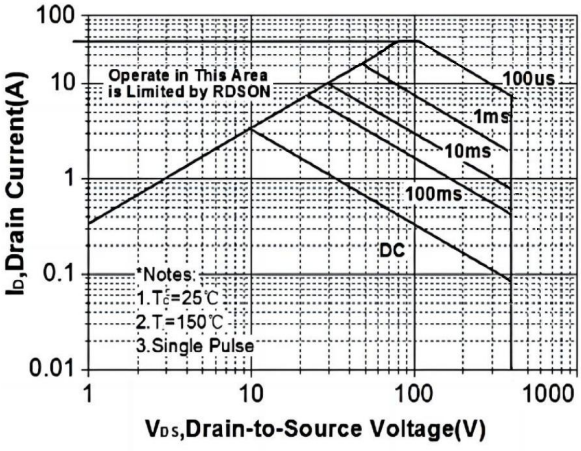


Figure 9. Maximum Safe Operating Area

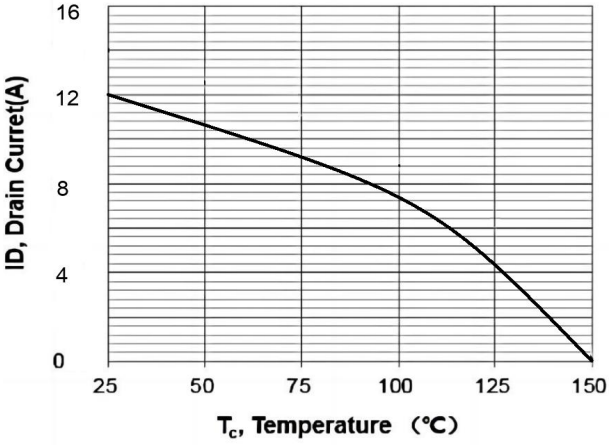


Figure 10. Maximum Drain Current vs Case Temperature

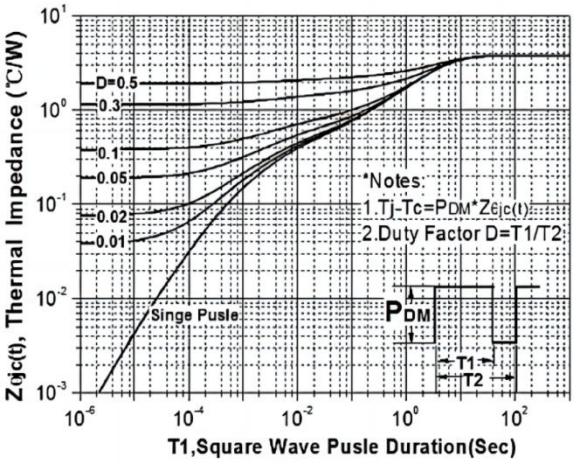
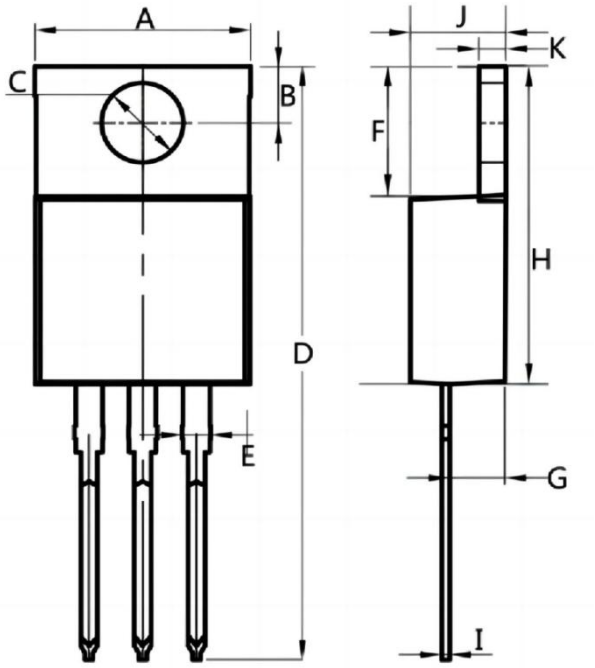


Figure 11. Transient Thermal Response Curve

TO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	10.000	10.400	0.394	0.409
B	2.500	3.000	0.098	0.118
C	3.500	4.000	0.138	0.157
D	28.000	30.000	1.102	1.181
E	1.100	1.500	0.043	0.059
F	6.200	6.600	0.244	0.260
G	2.900	3.300	0.114	0.130
H	15.000	16.000	0.591	0.630
I	0.350	0.450	0.014	0.018
J	4.300	4.700	0.169	0.185
K	1.200	1.400	0.047	0.055