AP012SN650MTC

N-Channel Enhancement Mode MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
650V	720mΩ@10V	12A

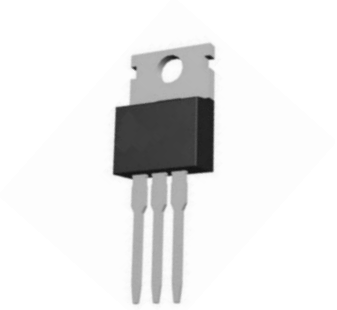
Feature

- Self-aligned planar technology
- Low conduction loss

Application

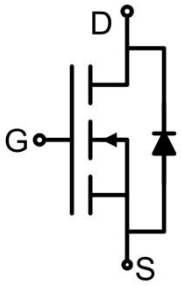
- Uninterruptible power supply (UPS)
- Power factor correction (PFC)

Package



TO-220AB

Circuit diagram



Marking

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage (V_{GS}=0V)	V_{DS}	650	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}	304	mJ
Power Dissipation[4)]	P_D	32.1	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	3.89	℃/W
Operating Junction Temperature	T_J	-55 ~ +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	650			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =650V, 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	3.5	4	V
Drain-source on-resistance[3)]	$R_{DS(on)}$	V_{GS} =10V, I_D =5.5A		600	720	mΩ
Dynamic characteristics[5)]						
Input Capacitance	C_{iss}	V_{DS} =25V, V_{GS} =0V, f =1MHz		1528		pF
Output Capacitance	C_{oss}			147		
Reverse Transfer Capacitance	C_{rss}			16		
Total Gate Charge	Q_g	V_{DS} =520V, V_{GS} =10V, I_D =11A		46		nC
Gate-Source Charge	Q_{gs}			7		
Gate-Drain Charge	Q_{gd}			23		
Turn-on delay time	$t_{d(on)}$	V_{DS} =325V, I_D =11A, R_G =25Ω		43		nS
Turn-on rise time	t_r			29		
Turn-off delay time	$t_{d(off)}$			196		
Turn-off fall time	t_f			51		
Source-Drain Diode characteristics						
Diode Continuous Current	I_S	T_C=25℃			12	A
Diode Forward voltage	V_{SD}	V_{GS} =0V, I_S =5.5A			1.4	V
Reverse recover time	T_{rr}	V_{GS} =0V, I_S =11A di/dt =100A/us		482		nS
Reverse recovery charge	Q_{rr}			2.85		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 . I_{AS}=11A, V_{DD}=50V, R_G=25Ω, Starting T_J = 25 °C.

3) The test condition is Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%.

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

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

Typical Characteristics

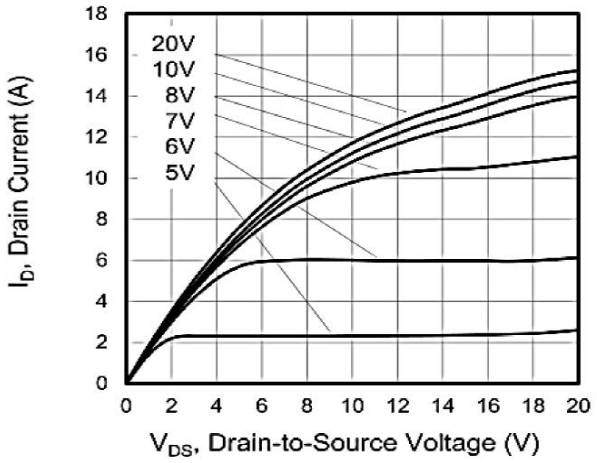


Figure 1. Output Characteristics (T J = 25ºC)

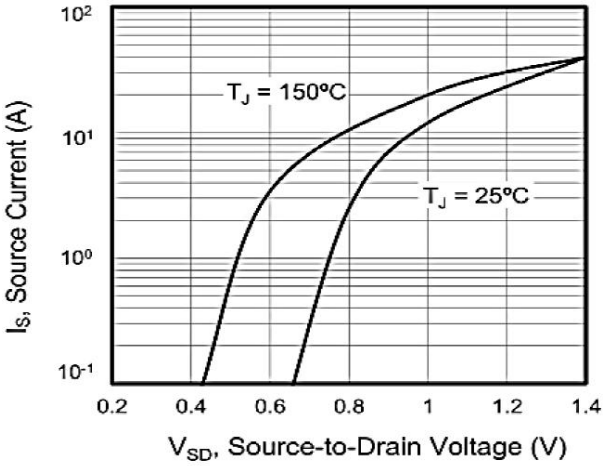


Figure 2. Body Diode Forward Voltage

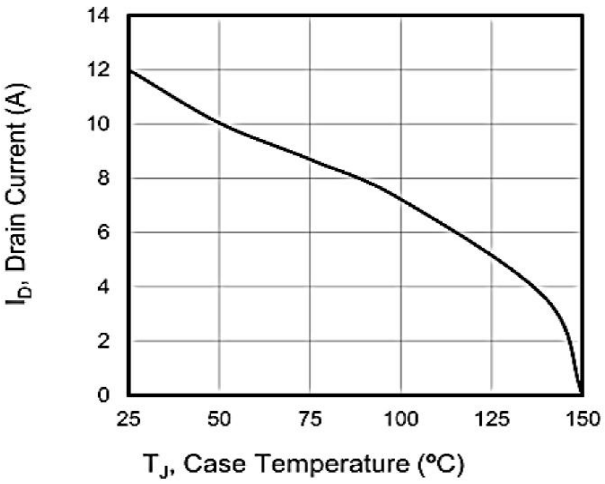


Figure 3. Drain Current vs. Temperature

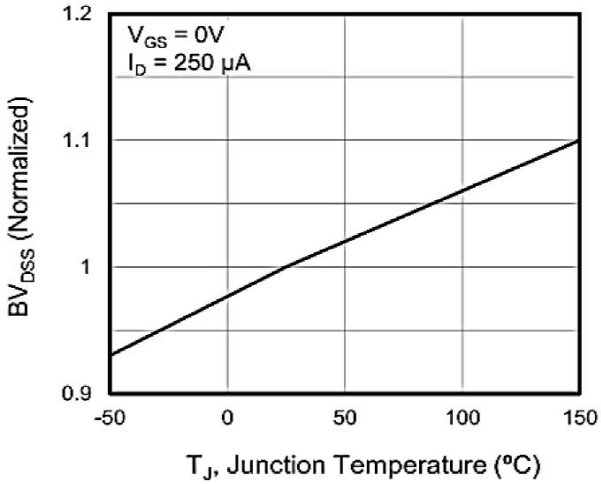


Figure 4. BV DSS Variation vs. Temperature

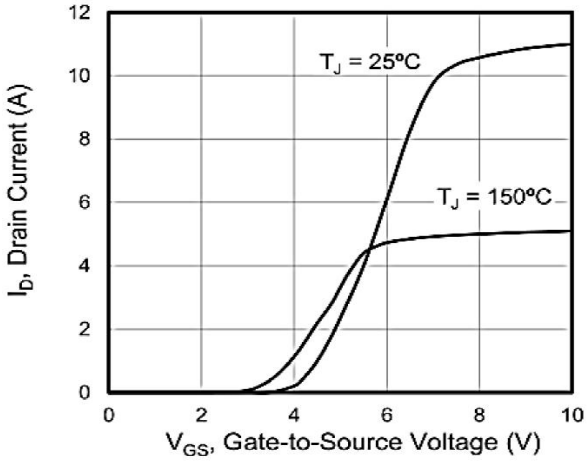


Figure 5. Transfer Characteristics

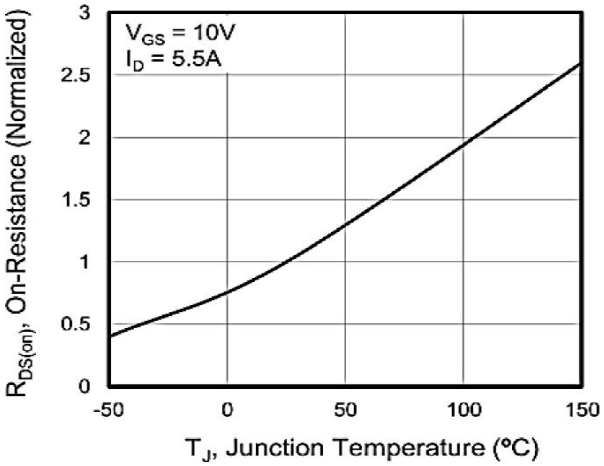


Figure 6. On-Resistance vs. Temperature

Typical Characteristics

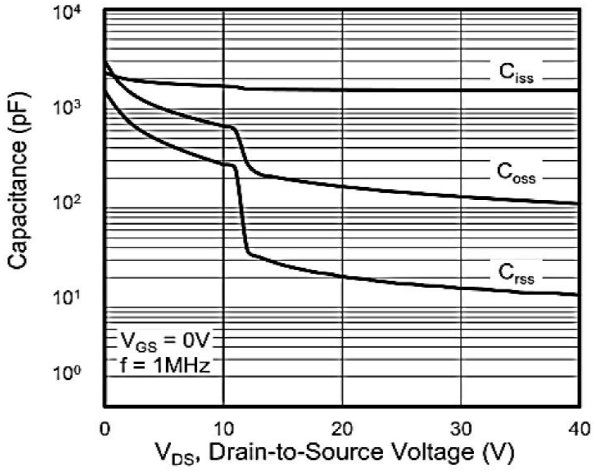


Figure 7. Capacitance Figure

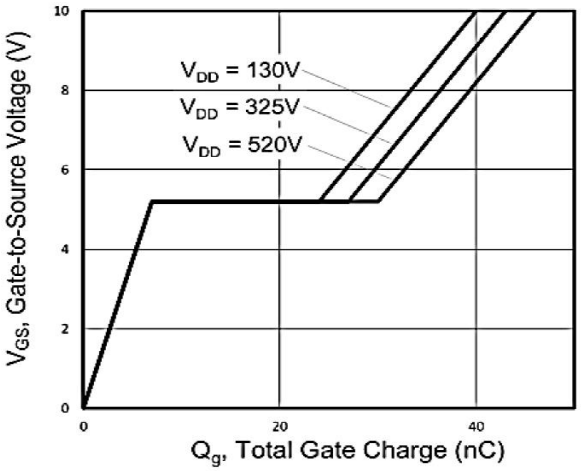


Figure 8. Gate Charge

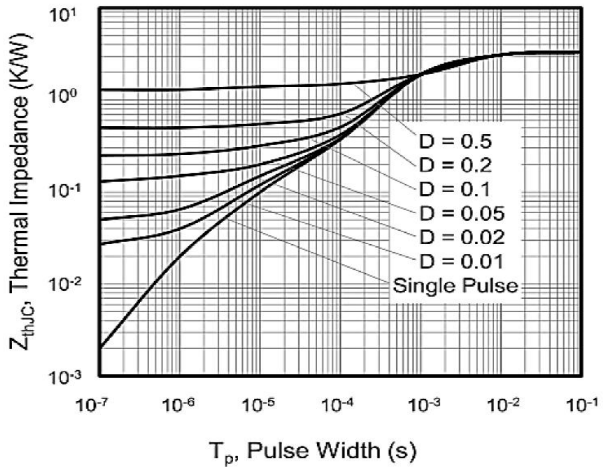
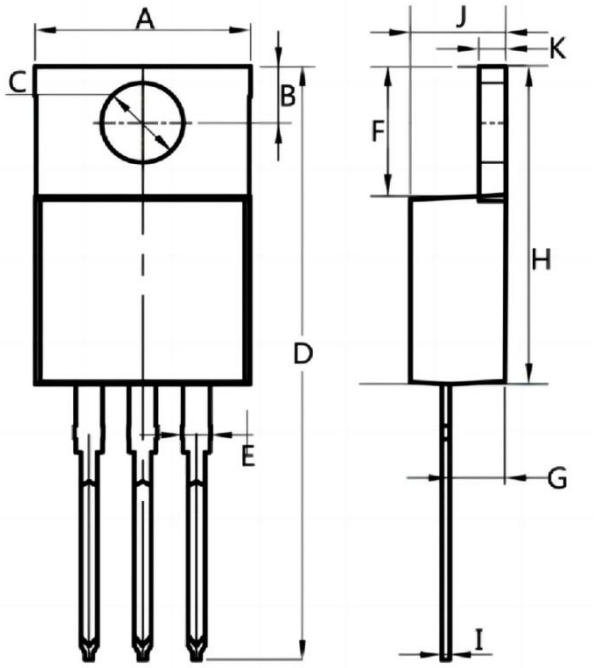


Figure 9. Transient Thermal Impedance

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