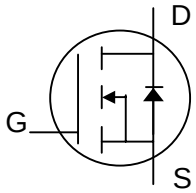
N-channel Enhancement-mode Power MOSFET

Operates with Gate Drive down to 2.5V

Low Gate Charge

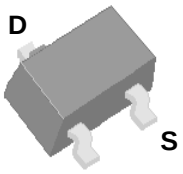
Surface Mount Device

RoHS-compliant, halogen-free



BV_{DSS}	20V
$R_{DS(ON)}$	25mΩ
I_D	6A

Description



SOT-23

Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, low on-resistance and cost-effectiveness.

The AP2324GN-HF-3 is in the popular SOT-23 small surface-mount package which is widely used in commercial and industrial applications where a small board footprint is required.
This device is well suited for use in medium current applications such as voltage conversion or switch applications.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D at T_A=25°C	Continuous Drain Current [3]	6	A
I_D at T_A= 70°C	Continuous Drain Current[3]	4.8	A
I_{DM}	Pulsed Drain Current[1]	24	A
P_D at T_A=25°C	Total Power Dissipation	1.38	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Value	Unit
Rthj-a	Maximum Thermal Resistance, Junction-ambient	90	°C/W

Ordering Information

AP2324GN-HF-3TR : in RoHS-compliant halogen-free SOT-23, shipped on tape and reel, 3000pcs/ reel

Electrical Specifications at T_j=25°C (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	20	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V, I_D=5A	-	-	25	mΩ
		V_{GS}=2.5V, I_D=2.5A	-	-	39	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	0.3	-	1.2	V
g_{fs}	Forward Transconductance	V_{DS}=5V, I_D=5A	-	15	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=20V, V_{GS}=0V	-	-	1	uA
I_{GSS}	Gate-Source Leakage	V_{GS}= ±12V, V_{DS}=0V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=5A	-	9	14.4	nC
Q_{gs}	Gate-Source Charge	V_{DS}=10V	-	1.2	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	3.5	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=10V	-	8	-	ns
t_r	Rise Time	I_D=1A	-	11	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω	-	20	-	ns
t_f	Fall Time	V_{GS}=10V	-	6	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	600	960	pF
C_{oss}	Output Capacitance	V_{DS}=20V	-	125	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	115	-	pF
R_g	Gate Resistance	f=1.0MHz	-	1.7	-	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=1.2A, V_{GS}=0V	-	-	1.2	V
trr	Reverse Recovery Time[2]	I_S=5A, V_{GS}=0V,	-	22	-	ns
Qrr	Reverse Recovery Charge	dI/dt=100A/μs	-	10	-	nC

Notes:

1. Pulse width limited by maximum junction temperature.
2. Pulse test - pulse width ≤ 300μs , duty cycle ≤ 2%
3. Surface mounted on 1in^2 copper pad of FR4 board, t ≤10sec; 270°C/W when mounted on minimum copper pad.

Typical Electrical Characteristics

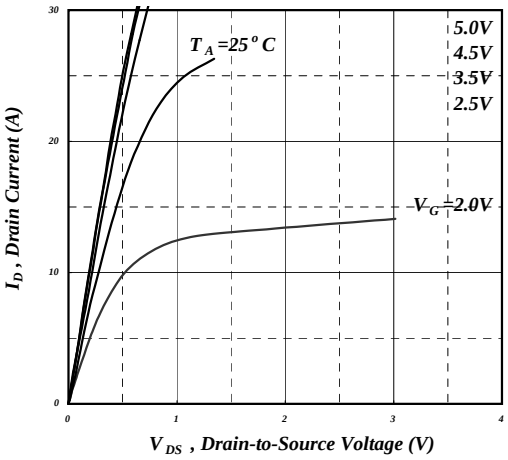


Fig 1. Typical Output Characteristics

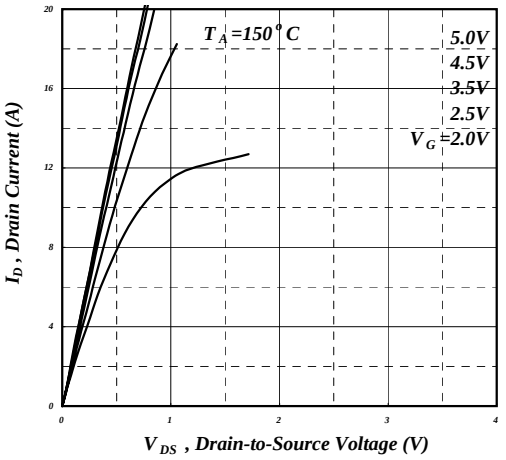


Fig 2. Typical Output Characteristics

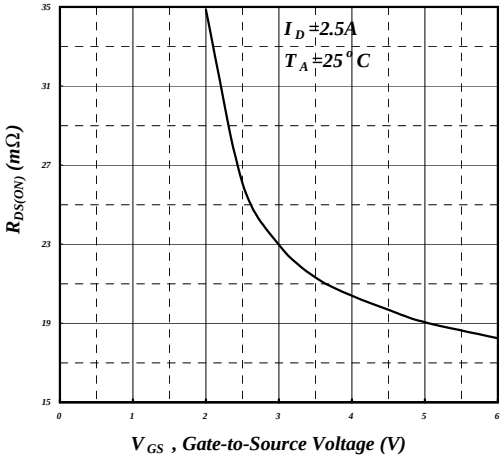


Fig 3. On-Resistance vs. Gate Voltage

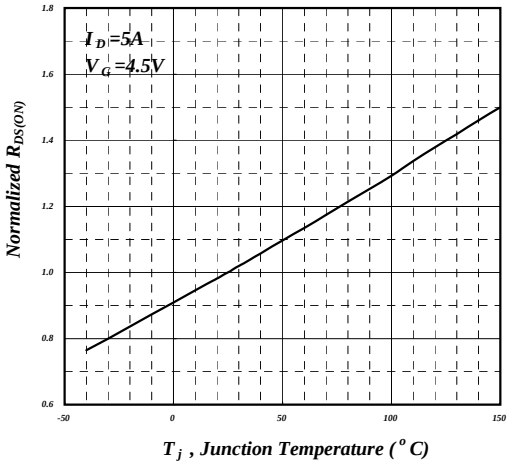


Fig 4. Normalized On-Resistance vs. Junction Temperature

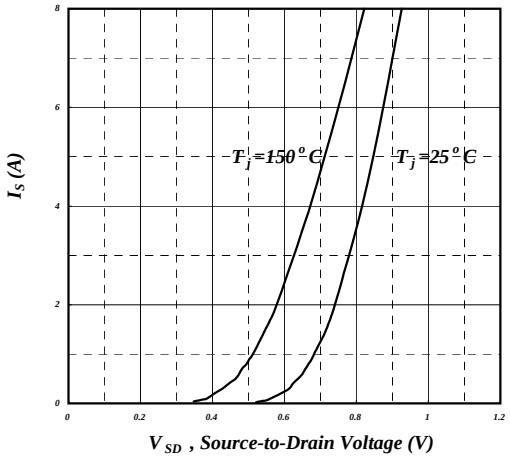


Fig 5. Forward Characteristic of Reverse Diode

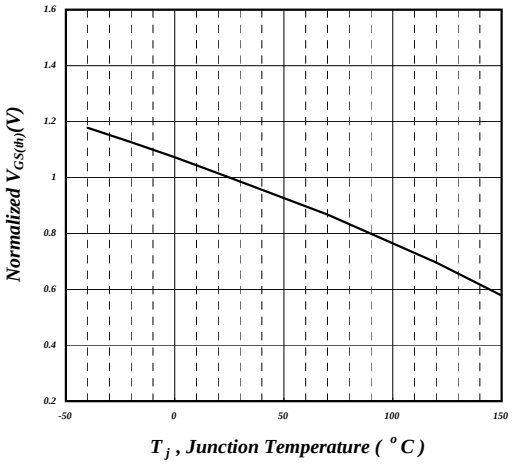


Fig 6. Gate Threshold Voltage vs. Junction Temperature

Typical Electrical Characteristics (cont.)

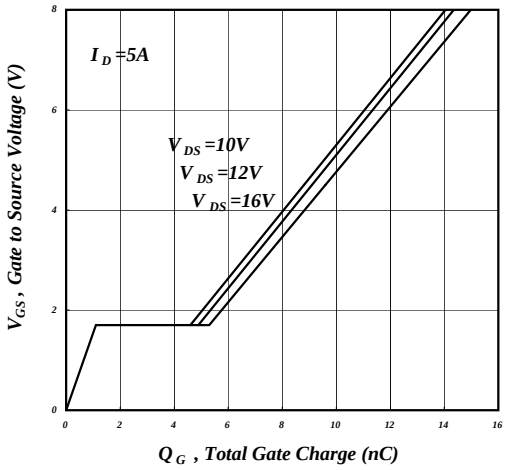


Fig 7. Gate Charge Characteristics

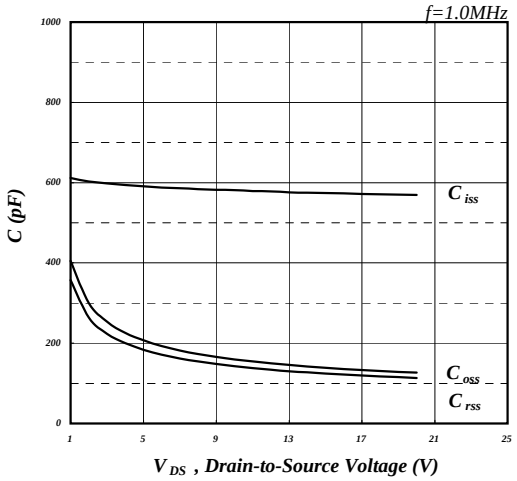


Fig 8. Typical Capacitance Characteristics

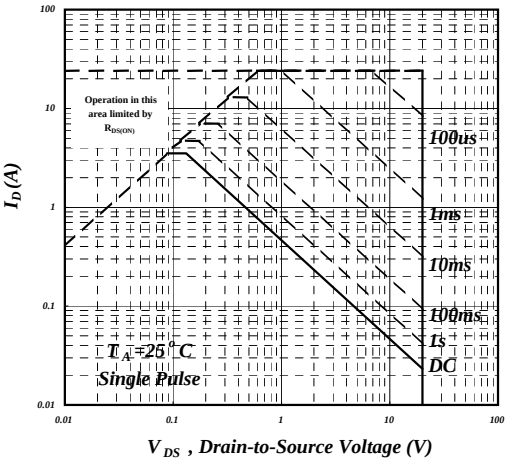


Fig 9. Maximum Safe Operating Area

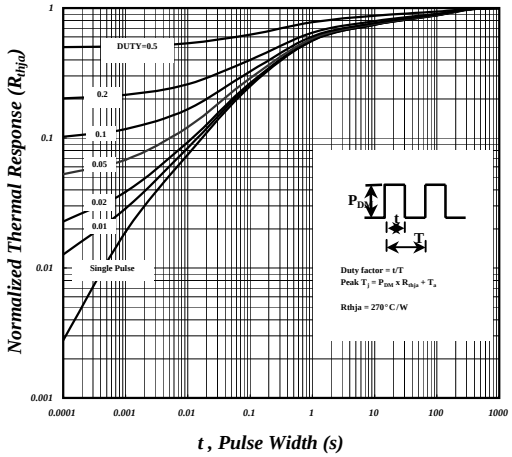


Fig 10. Effective Transient Thermal Impedance

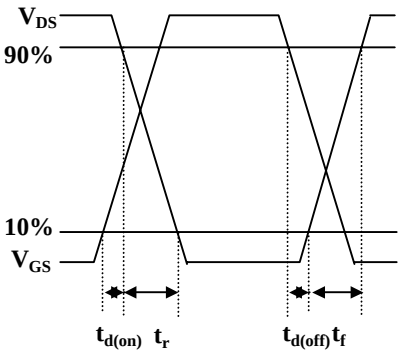


Fig 11. Switching Time Waveform

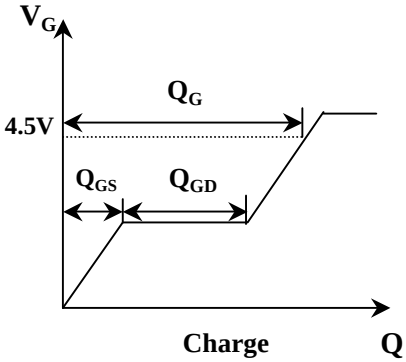
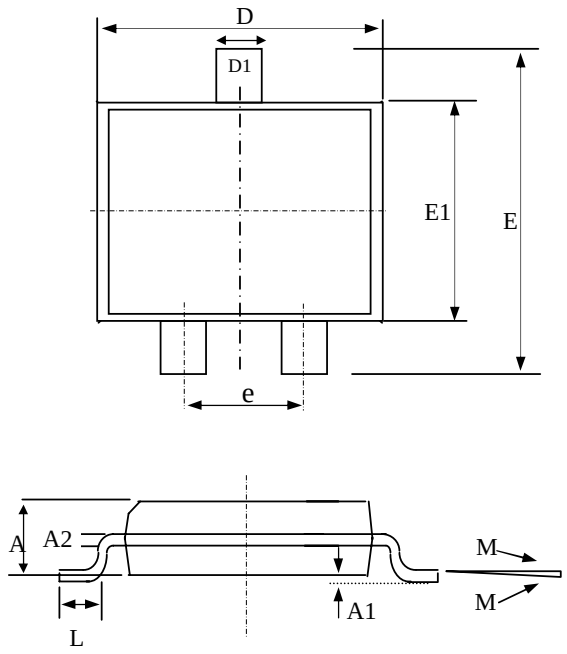


Fig 12. Gate Charge Waveform

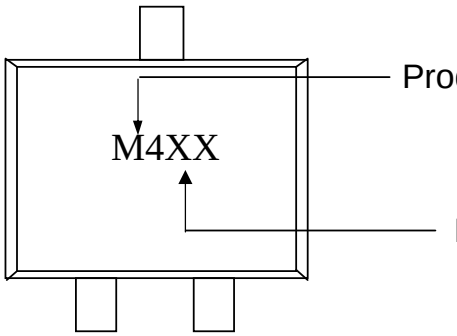
Package Dimensions: SOT-23



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	0.88	--	1.30
A1	0.00	--	0.10
A2	0.08	--	0.25
D1	0.30	0.40	0.50
e	1.70	2.00	2.30
D	2.70	2.90	3.10
E	2.20	2.60	3.00
E1	1.20	1.50	1.80
M	0°	--	10°
L	0.30	--	0.60

1. All dimensions are in millimeters.
2. Dimensions do not include mold protrusions.

Marking Information:



Product: M4 = AP2324GN-HF-3

Date/lot code

For details of how to convert this to standard YYWW date code format, please contact us directly.