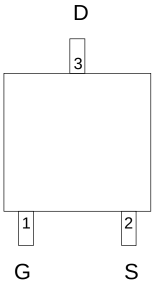
N-Channel Enhancement Mode MOSFET

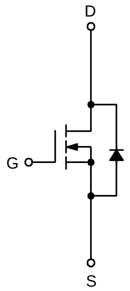
Features

- 30V/3A, $R_{DS(ON)}$=35mΩ(typ.) @ V_{GS}=10V
  $R_{DS(ON)}$=40mΩ(typ.) @ V_{GS}=4.5V
  $R_{DS(ON)}$=60mΩ(typ.) @ V_{GS}=2.5V
- Super High Dense Cell Design for Extremely
- SOT-23 Package

Pin Description



Top View of SOT-23



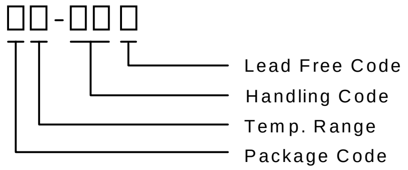
N-Channel MOSFET

Applications

- Power Management in Notebook Computer.
- Portable Equipment and Battery Powered Systems.

Ordering and Marking Information

APM2318



Package Code
A : SOT-23
Operating Junction Temp. Range
C : -55 to 125 °C
Handling Code
TR : Tape & Reel
Lead Free Code
L : Lead Free Device Blank : Original Device

APM2318 A : M18X

X - Date Code

Absolute Maximum Ratings (T$_A$ = 25°C unless otherwise noted)

Symbol	Parameter	Rating	Unit
V_{DSS}	Drain-Source Voltage	30	V
V_{GSS}	Gate-Source Voltage	±12	
I_D	Maximum Drain Current – Continuous	3	A
I_{DM}	Maximum Pulsed Drain Current (pulse width ≤ 300μs)	12	

Absolute Maximum Ratings (Cont.) (T_A = 25°C unless otherwise noted)

Symbol	Parameter		Rating	Unit
P_D	Maximum Power Dissipation	T_A=25°C	0.8	W
		T_A=100°C	0.3	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
$R_{\theta JA}$*	Thermal Resistance – Junction to Ambient		150	°C/W

*Surface Mounted on FR4 Board.

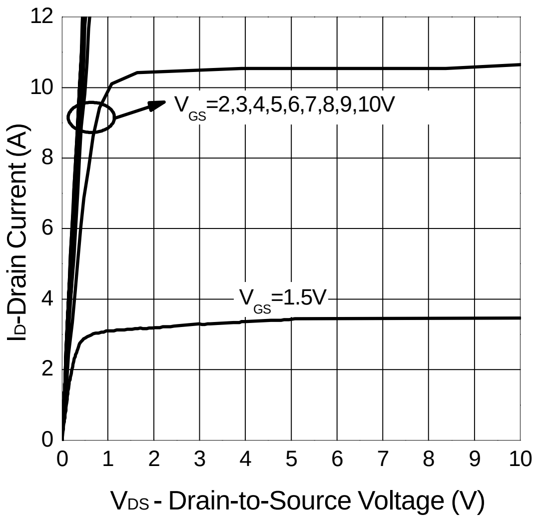
Electrical Characteristics (T_A = 25°C unless otherwise noted)

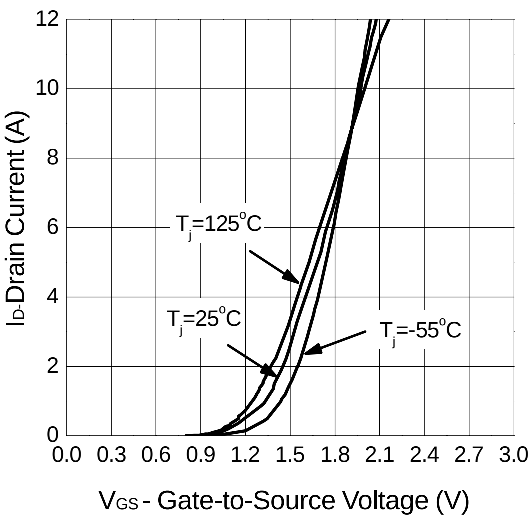
Symbol	Parameter	Test Condition	APM2318			Unit
			Min.	Typ.	Max.	
Static						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V, V_{GS}=0V			1	μA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	0.6	0.75	1.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±12V, V_{DS}=0V			±100	nA
$R_{DS(ON)}$[a]	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=3A		35	50	mΩ
		V_{GS}=4.5V, I_{DS}=1.5A		40	55	
		V_{GS}=2.5V, I_{DS}=0.5A		60	80	
V_{SD}[a]	Diode Forward Voltage	I_{SD}=0.5A, V_{GS}=0V		0.7	1.3	V
Dynamic[b]						
Q_g	Total Gate Charge	V_{DS}=10V, V_{GS}=4.5V, I_{DS}=3A		5.3	6.7	nC
Q_{gs}	Gate-Source Charge			0.8		
Q_{gd}	Gate-Drain Charge			0.8		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V,I_D=3A, V_{GS}=10V, R_G=6Ω		11	22	ns
t_r	Turn-on Rise Time			17	32	
$t_{d(OFF)}$	Turn-off Delay Time			37	68	
t_f	Turn-off Fall Time			20	38	
C_{iss}	Input Capacitance	V_{GS}=0V V_{DS}=25V Frequency=1.0MHz		318		pF
C_{oss}	Output Capacitance			24		
C_{rss}	Reverse Transfer			14		

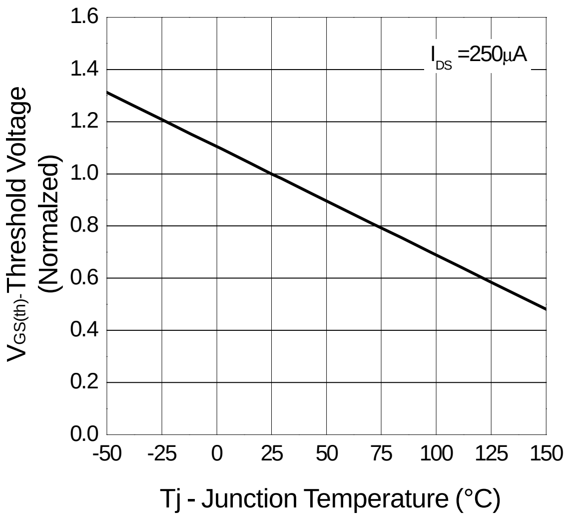
Notes: [a]: Pulse test; pulse width ≤ 300μs, duty cycle ≤ 2%.

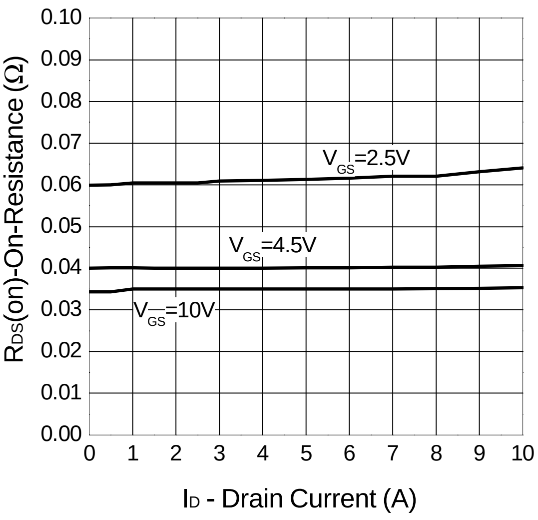
[b]: Guaranteed by design, not subject to production testing.

Typical Characteristics


Output Characteristics

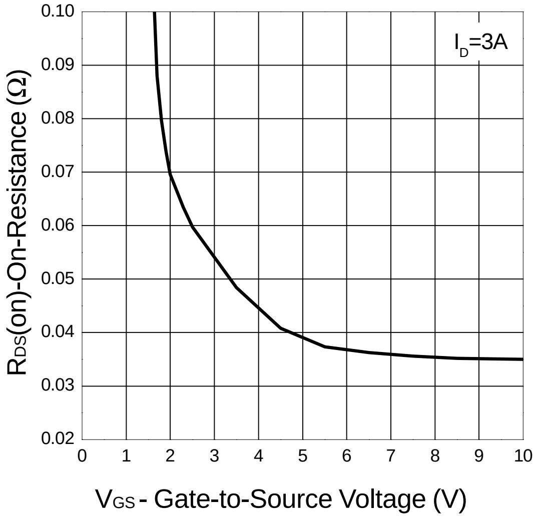

Transfer Characteristics


Threshold Voltage vs. Temperature

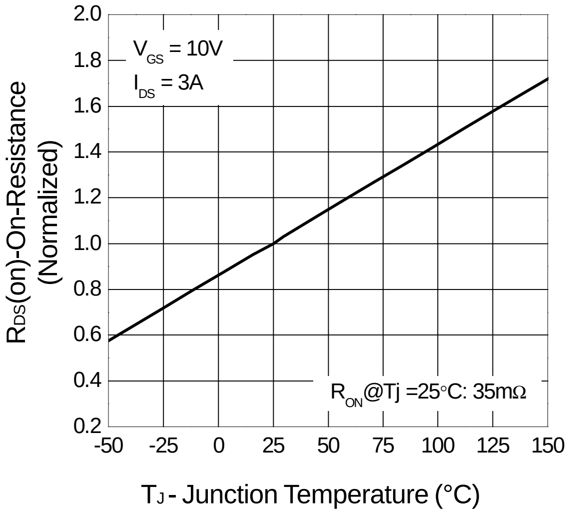

On-Resistance vs. Drain Current

Typical Characteristics

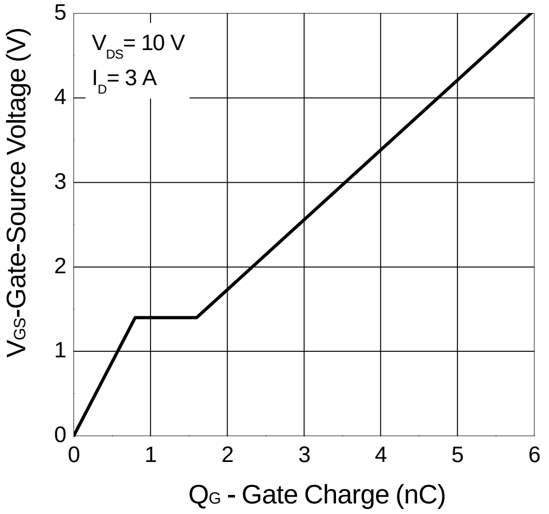
On-Resistance vs. Gate-to-Source Voltage



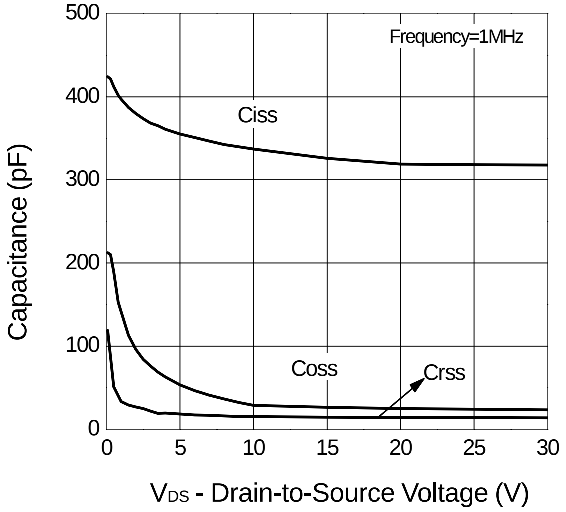
On-Resistance vs. Junction Temperature



Gate Charge

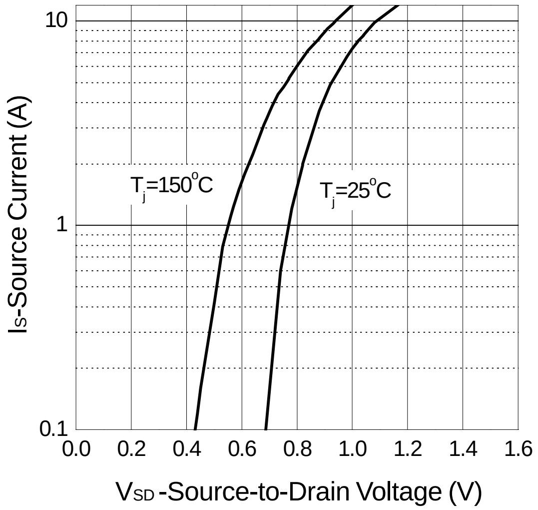


Capacitance

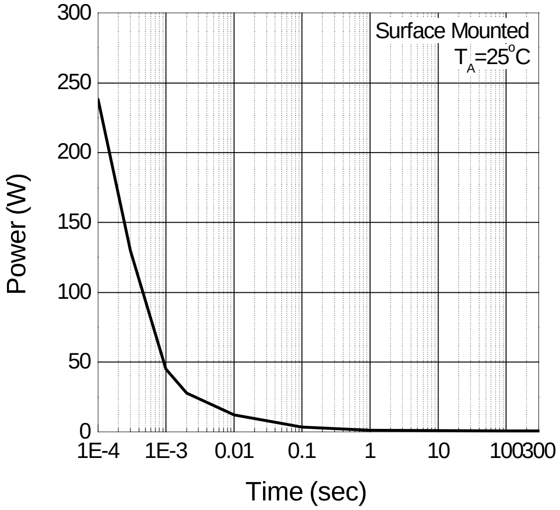


Typical Characteristics

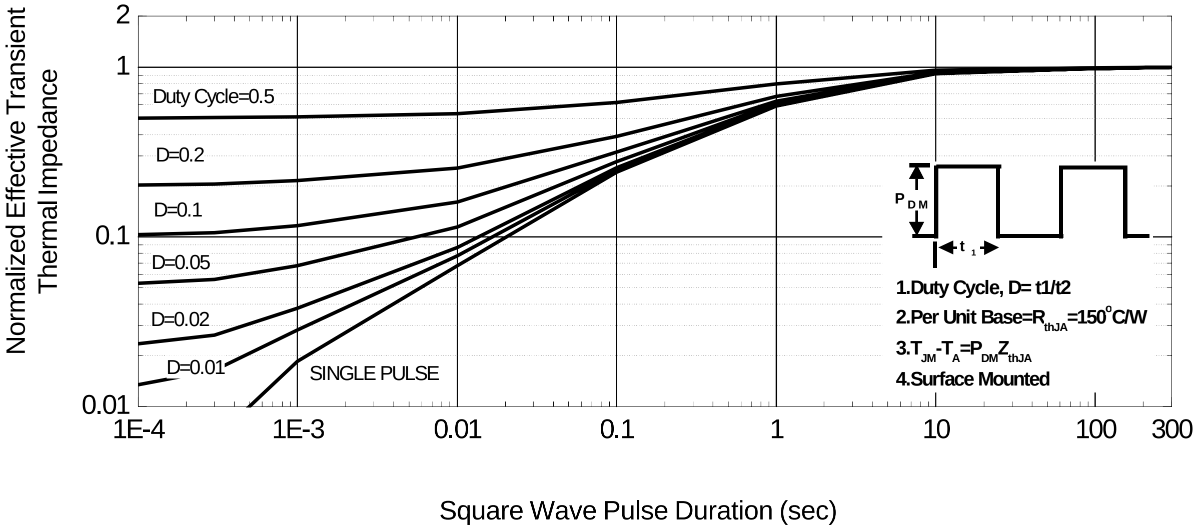
Source-Drain Diode Forward Voltage



Single Pulse Power

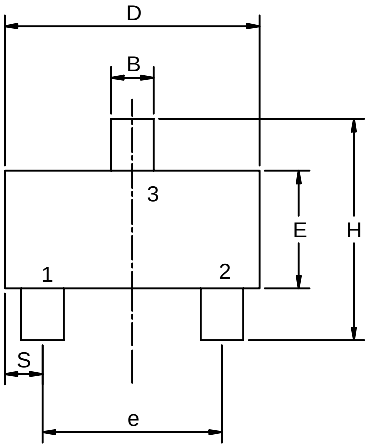


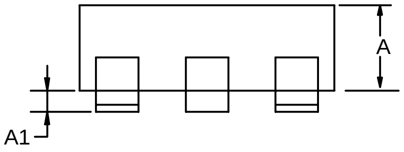
Normalized Thermal Transient Impedence, Junction to Ambient

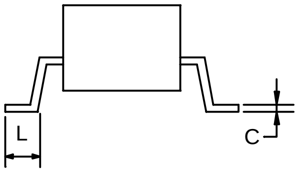


Package Information

SOT-23







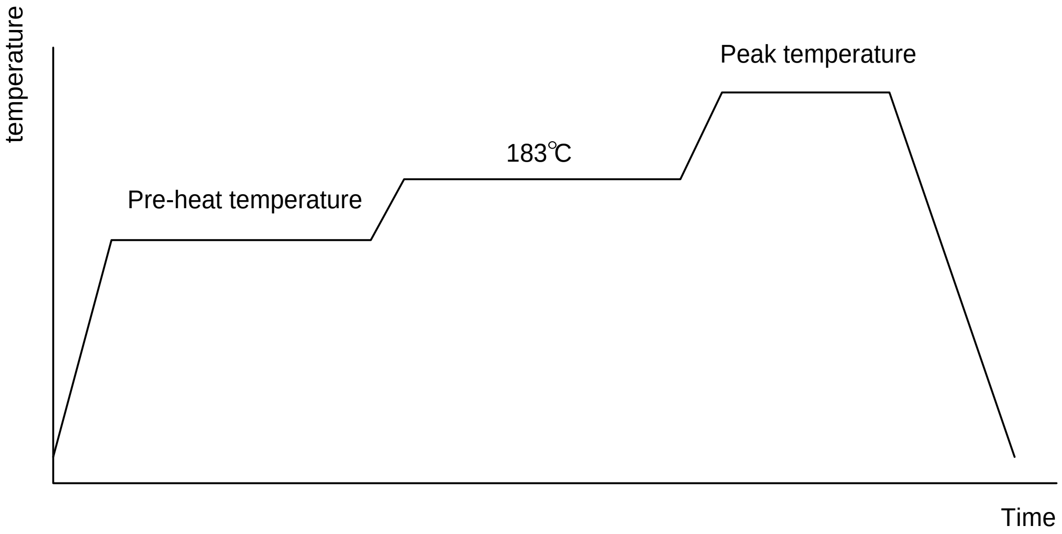
Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.00	1.30	0.039	0.051
A1	0.00	0.10	0.000	0.004
B	0.35	0.51	0.014	0.020
C	0.10	0.25	0.004	0.010
D	2.70	3.10	0.106	0.122
E	1.40	1.80	0.055	0.071
e	1.90 BSC		0.075 BSC	
H	2.40	3.00	0.094	0.118
L	0.37		0.0015	

Physical Specifications

Terminal Material	Solder-Plated Copper (Solder Material : 90/10 or 63/37 SnPb)
Lead Solderability	Meets EIA Specification RSI86-91, ANSI/J-STD-002 Category 3.

Reflow Condition (IR/Convection or VPR Reflow)

Reference JEDEC Standard J-STD-020A APRIL 1999



Classification Reflow Profiles

	Convection or IR/ Convection	VPR
Average ramp-up rate(183°C to Peak)	3°C/second max.	10 °C /second max.
Preheat temperature 125 ± 25°C)	120 seconds max	
Temperature maintained above 183°C	60 – 150 seconds	
Time within 5°C of actual peak temperature	10 –20 seconds	60 seconds
Peak temperature range	220 +5/-0°C or 235 +5/-0°C	215-219°C or 235 +5/-0°C
Ramp-down rate	6 °C /second max.	10 °C /second max.
Time 25°C to peak temperature	6 minutes max.	

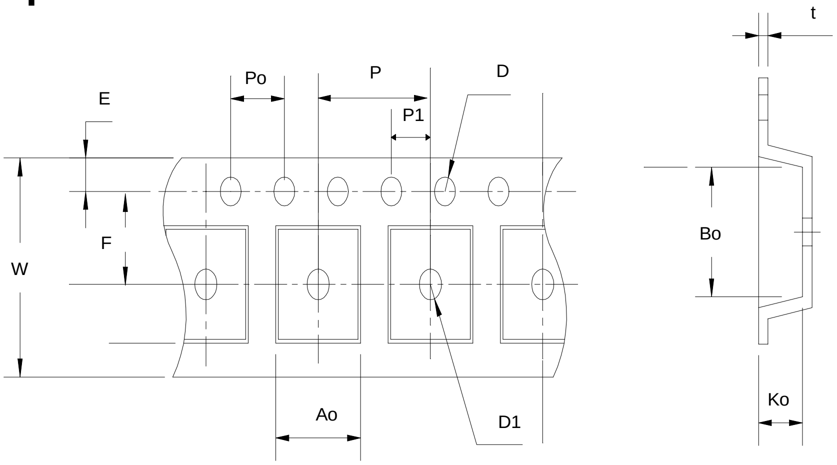
Package Reflow Conditions

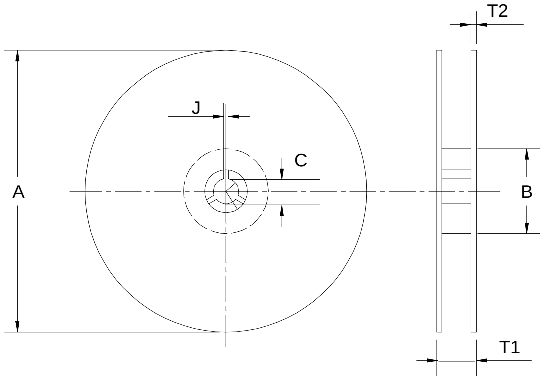
pkg. thickness ≥ 2.5mm and all bgas	**pkg. thickness < 2.5mm and pkg. volume ≥ 350 mm³**	**pkg. thickness < 2.5mm and pkg. volume < 350mm³**
Convection 220 +5/-0 °C		Convection 235 +5/-0 °C
VPR 215-219 °C		VPR 235 +5/-0 °C
IR/Convection 220 +5/-0 °C		IR/Convection 235 +5/-0 °C

Reliability test program

Test item	Method	Description
SOLDERABILITY	MIL-STD-883D-2003	245°C , 5 SEC
HOLT	MIL-STD-883D-1005.7	1000 Hrs Bias @ 125 °C
PCT	JESD-22-B, A102	168 Hrs, 100 % RH , 121°C
TST	MIL-STD-883D-1011.9	-65°C ~ 150°C, 200 Cycles
ESD	MIL-STD-883D-3015.7	VHBM > 2KV, VMM > 200V
Latch-Up	JESD 78	10ms , I_{tr} > 100mA

Carrier Tape





Application	A	B	C	J	T1	T2	W	P	E
SOT-23	178±1	60 ± 1.0	12.0	2.5 ± 0.15	9.0 ± 0.5	1.4	8.0+ 0.3 - 0.3	4.0	1.75
	F	D	D1	Po	P1	Ao	Bo	Ko	t
	3.5 ± 0.05	1.5 +0.1	φ 0.1MIN	4.0	2.0 ± 0.05	3.1	3.0	1.3	0.2±0.03

(mm)

Cover Tape Dimensions

Application	Carrier Width	Cover Tape Width	Devices Per Reel
SOT- 23	8	5.3	3000

Customer Service

Anpec Electronics Corp.
Head Office :
5F, No. 2 Li-Hsin Road, SBIP,
Hsin-Chu, Taiwan, R.O.C.
Tel : 886-3-5642000
Fax : 886-3-5642050
Taipei Branch :
7F, No. 137, Lane 235, Pac Chiao Rd.,
Hsin Tien City, Taipei Hsien, Taiwan, R. O. C.
Tel : 886-2-89191368
Fax : 886-2-89191369

Rev. A.1 - Oct., 2003