N-Channel Enhancement Mode MOSFET

Features

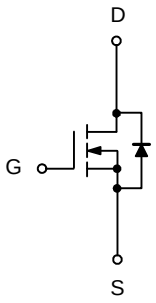
- 25V/60A ,
  $R_{DS(ON)}$=4.2mΩ (typ.) @ V_{GS}=10V
  $R_{DS(ON)}$=6.5mΩ (typ.) @ V_{GS}=4.5V
- Super High Dense Cell Design
- Avalanche Rated
- Reliable and Rugged
- Lead Free Available (RoHS Compliant)

Applications

- Power Management in Computer or Switching Power Supply Systems

Pin Description

Top View of TO-220



N-Channel MOSFET

Ordering and Marking Information

APM2506N □□-□□ □ Lead Free Code Handling Code Temp. Range Package Code	Package Code F : TO-220 Operating Junction Temp. Range C : -55 to 150°C Handling Code TU : Tube Lead Free Code L : Lead Free Device
APM2506N F : APM2506N XXXXX	XXXXX - Date Code

Note: ANPEC lead-free products contain molding compounds and 100% matte tin plate termination finish; which are fully compliant with RoHS and compatible with both SnPb and lead-free soldiering operations. ANPEC lead-free products meet or exceed the lead-free requirements of IPC/JEDEC J STD-020C for MSL classification at lead-free peak reflow temperature.

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_A=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		25	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_S	Diode Continuous Forward Current	T_C=25°C	30	A
Mounted on Large Heat Sink				
I_{DP}	300µs Pulse Drain Current Tested	T_C=25°C	240	A
		T_C=100°C	220	
I_D	Continuous Drain Current	T_C=25°C	60*	A
		T_C=100°C	55	
P_D	Maximum Power Dissipation	T_C=25°C	62.5	W
		T_C=100°C	25	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		2	°C/W
Mounted on PCB of Minimum Footprint				
I_{DP}	300µs Pulse Drain Current Tested	T_A=25°C	60	A
		T_A=100°C	35	
I_D	Continuous Drain Current	T_A=25°C	15	A
		T_A=100°C	9	
P_D	Maximum Power Dissipation	T_A=25°C	2	W
		T_A=100°C	0.8	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62.5	°C/W

Notes:

* Current limited by bond wire.

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

Symbol	Parameter	Test Condition	APM2506NF			Unit
			Min.	Typ.	Max.	
Drain-Source Avalanche Ratings						
E_{AS}	Avalanche Energy, Single Pulsed	I_D=15A, V_{DD}=20V			50	mJ
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250µA	25			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20V, V_{GS}=0V			1	µA
		T_J=85°C			30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250µA	1.3	1.8	2.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V			±100	nA
$R_{DS(ON)}$ [a]	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=40A		4.2	5.5	mΩ
		V_{GS}=4.5V, I_{DS}=20A		6.5	8.5	
Diode Characteristics						
V_{SD} [a]	Diode Forward Voltage	I_{SD}=10A, V_{GS}=0V		0.7	1.1	V
t_{rr}	Reverse Recovery Time	I_{DS}=10A, dI_{SD}/dt=100A/µs		30		ns
Q_{rr}	Reverse Recovery Charge			14		nC
Dynamic Characteristics [b]						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz		1.0	2.1	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz		3100		pF
C_{oss}	Output Capacitance			680		
C_{rss}	Reverse Transfer Capacitance			520		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V, R_L=15Ω, I_{DS}=1A, V_{GEN}=10V, R_G=6Ω		19		ns
T_r	Turn-on Rise Time			20		
$t_{d(OFF)}$	Turn-off Delay Time			62		
T_f	Turn-off Fall Time			43		
Gate Charge Characteristics [b]						
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}=4.5V, I_{DS}=40A		37.5	56	nC
Q_{gs}	Gate-Source Charge			9.4		
Q_{gd}	Gate-Drain Charge			21		

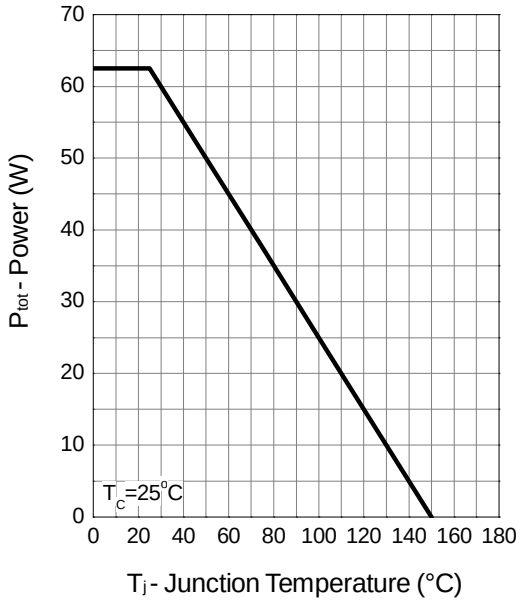
Notes:

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

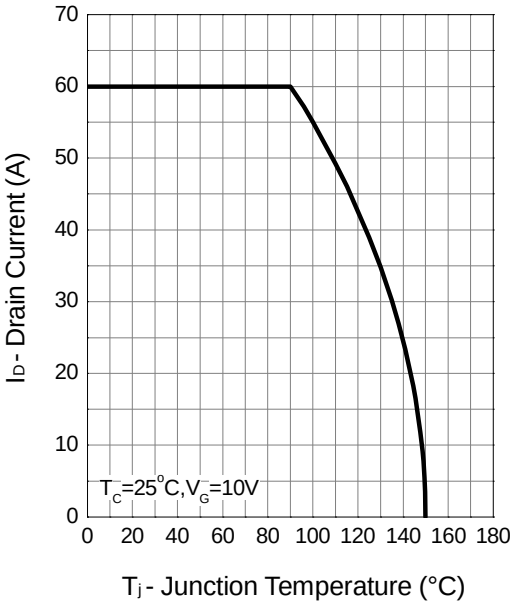
b : Guaranteed by design, not subject to production testing.

Typical Characteristics

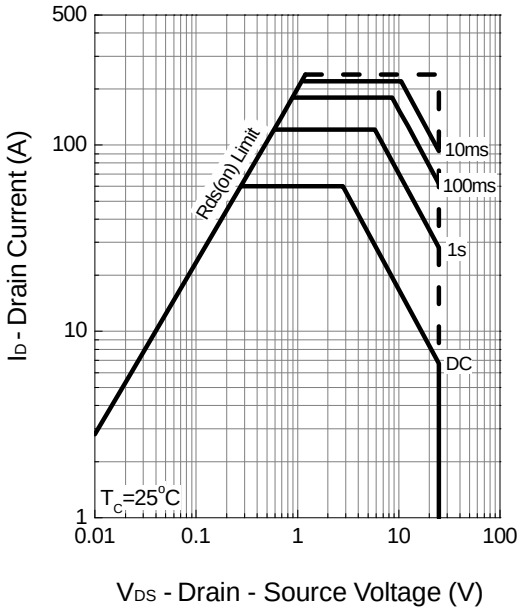
Power Dissipation



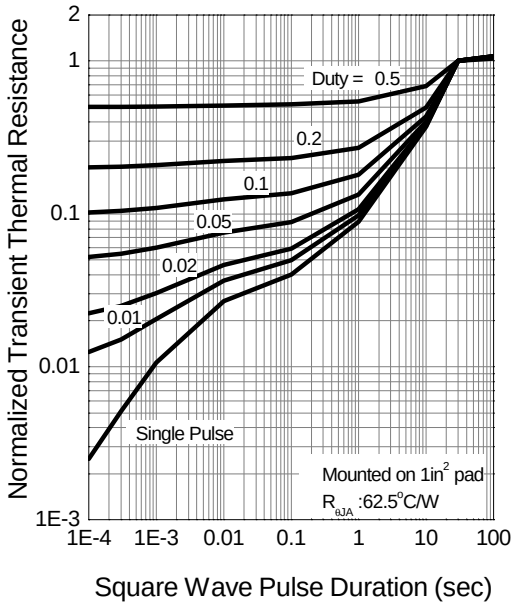
Drain Current



Safe Operation Area

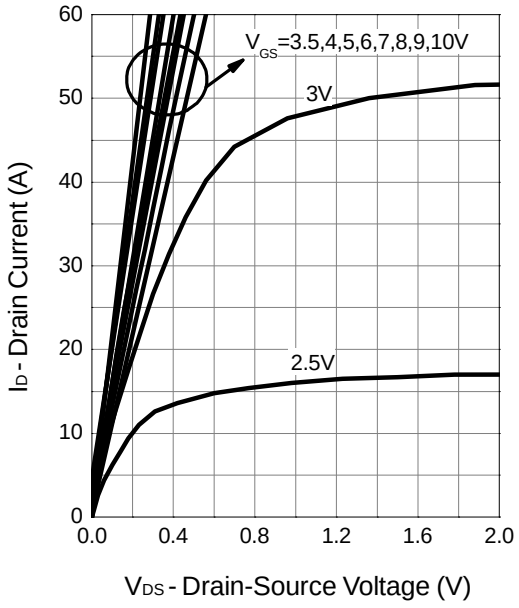


Thermal Transient Impedance

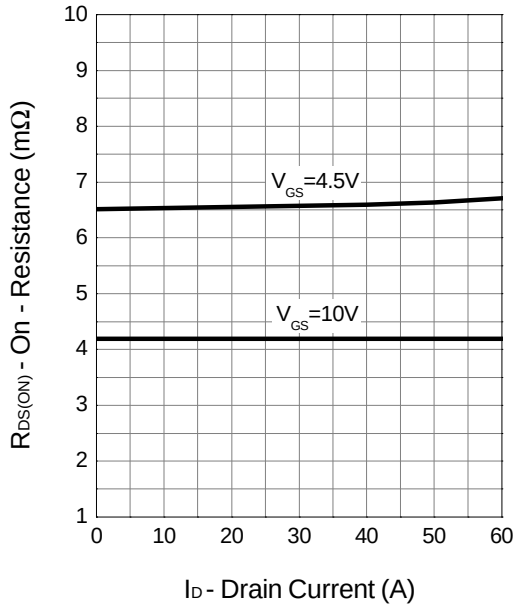


Typical Characteristics (Cont.)

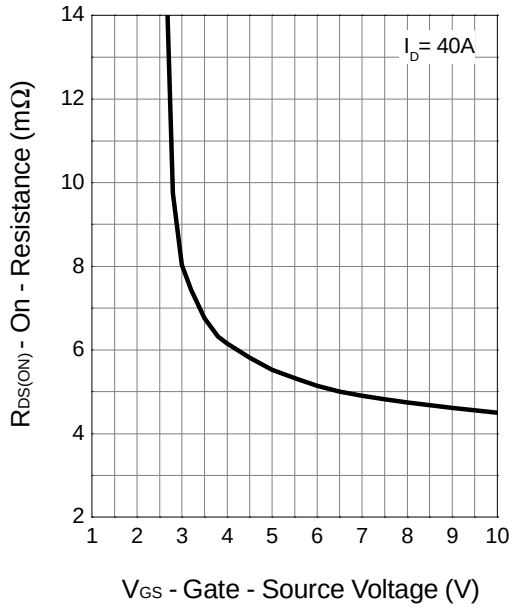
Output Characteristics



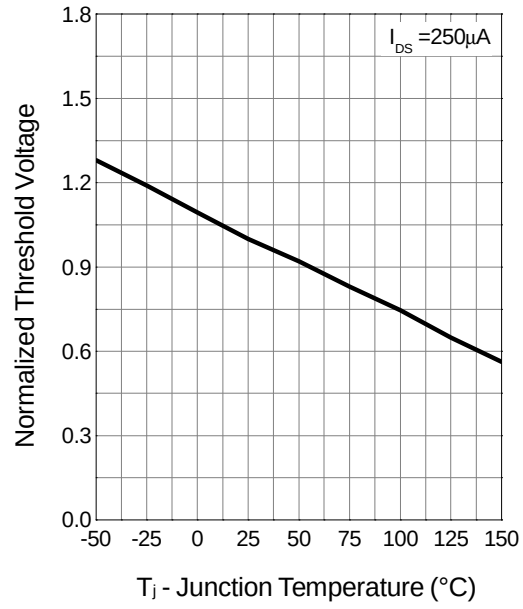
Drain-Source On Resistance



Gate-Source On Resistance

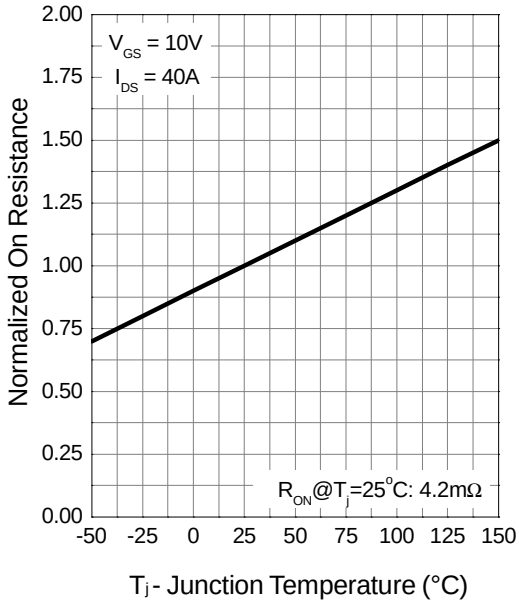


Gate Threshold Voltage

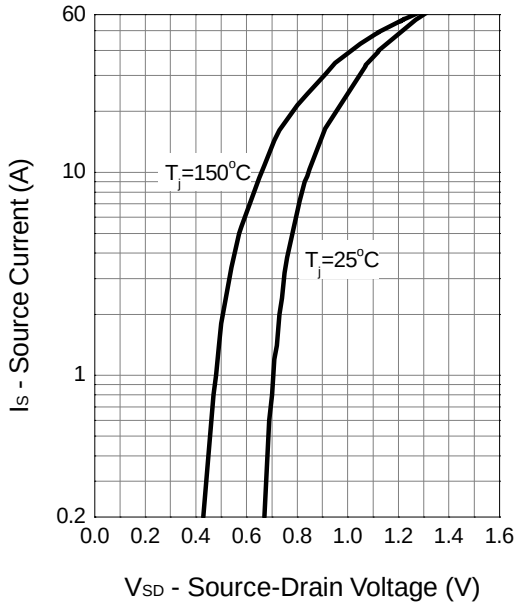


Typical Characteristics (Cont.)

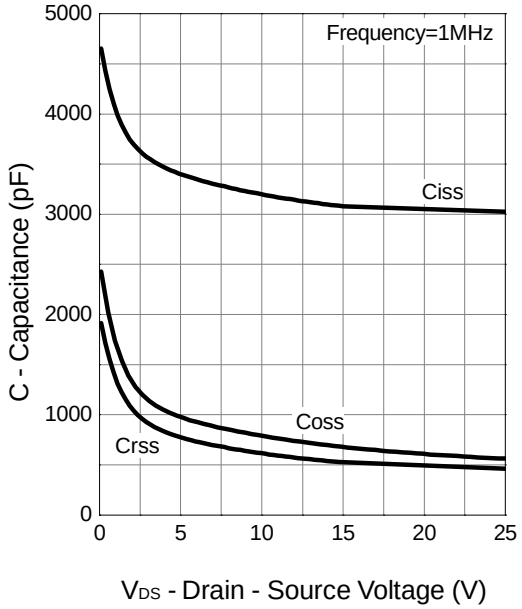
Drain-Source On Resistance



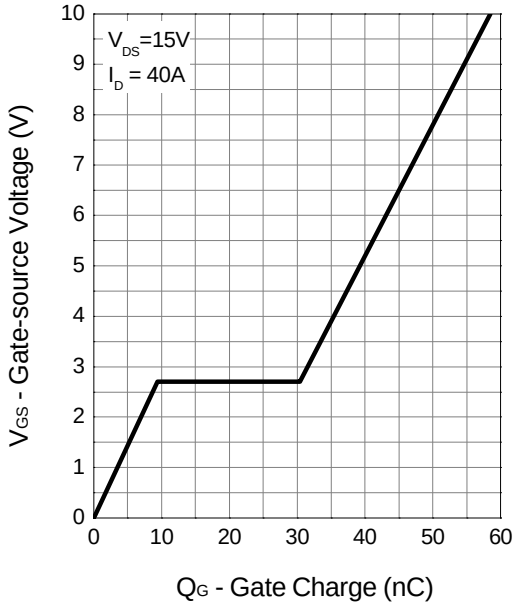
Source-Drain Diode Forward



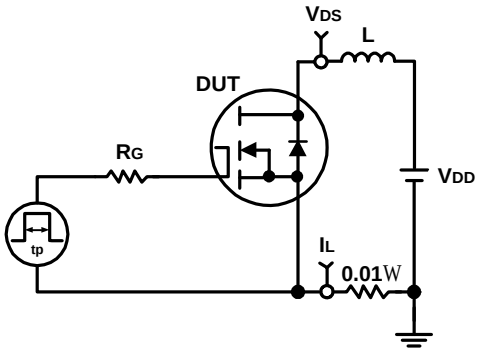
Capacitance

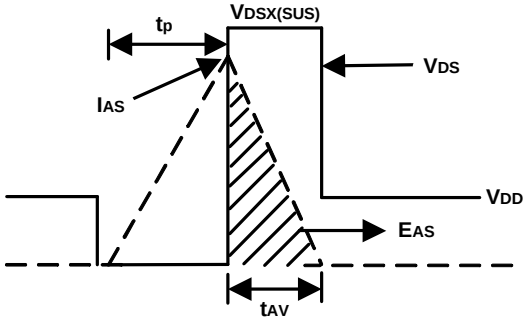


Gate Charge

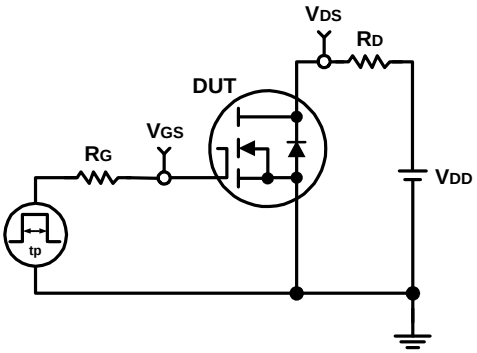


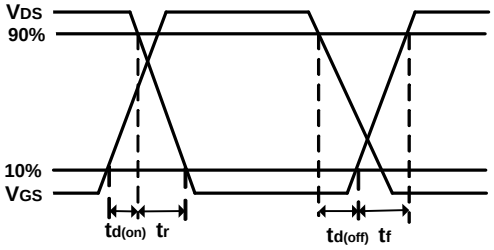
Avalanche Test Circuit and Waveforms





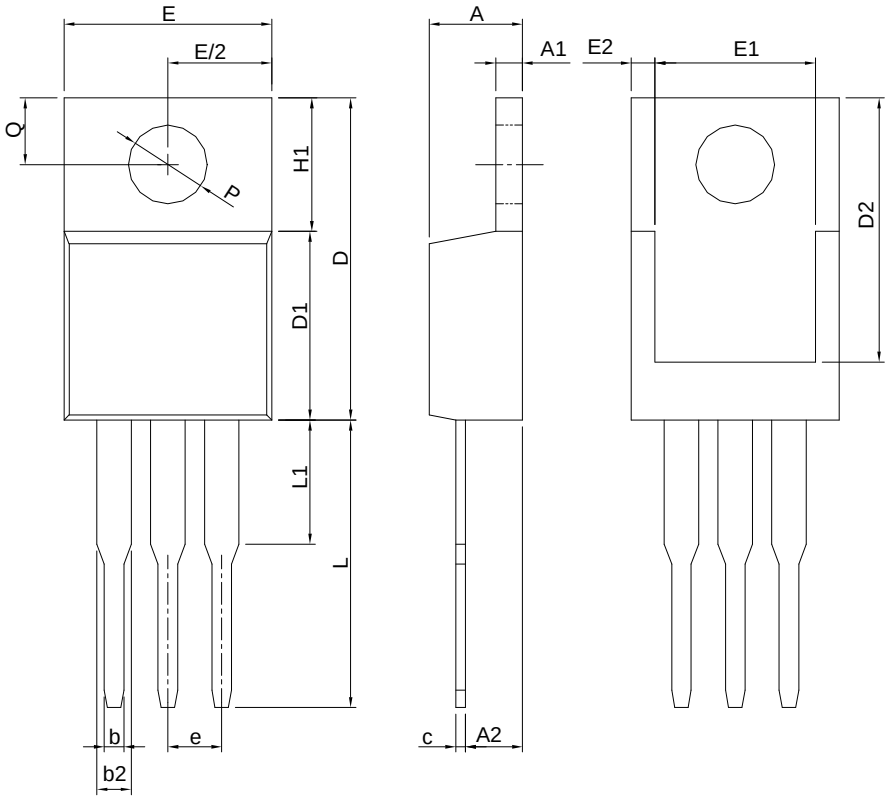
Switching Time Test Circuit and Waveforms





Package Information

TO-220



Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	3.56	4.83	0.140	0.190
A1	0.51	1.40	0.020	0.055
A2	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b2	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.22	16.51	0.560	0.650
D1	8.38	9.02	0.330	0.355
D2	12.19	12.88	0.480	0.507
E	9.65	10.67	0.380	0.420
E1	6.86	8.89	0.270	0.350
E2	-	0.76	-	0.030
e	2.54 BSC		0.100 BSC	
H1	5.84	6.86	0.230	0.270
L	12.70	14.73	0.500	0.580
L1	-	6.35	-	0.250
P	3.53	4.09	0.139	0.161
Q	2.54	3.43	0.100	0.135

Physical Specifications

Terminal Material	Solder-Plated Copper (Solder Material : Sn)
Lead Solderability	Meets EIA Specification RSI86-91, ANSI/J-STD-002 Category 3.

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

Customer Service

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