



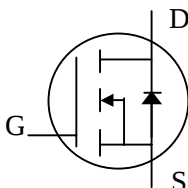
N-channel Enhancement-mode Power MOSFET

Simple Drive Requirement

SO-8 Compatible with Heatsink

Low On-resistance

RoHS-compliant, halogen-free

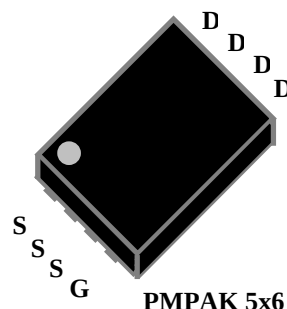


BV_{DSS}	40V
$R_{DS(ON)}$	3.6m Ω
I_D	120A

Description

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

The PMPAK 5x6 package is specially designed for DC-DC converter applications, with a foot print that is compatible with the popular SO-8 and offers a backside heat sink and lower package profile.



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D at $T_C=25^\circ\text{C}$	Continuous Drain Current (Chip)	120	A
I_D at $T_A=25^\circ\text{C}$	Continuous Drain Current ³	29	A
I_D at $T_A=70^\circ\text{C}$	Continuous Drain Current ³	23	A
I_{DM}	Pulsed Drain Current ¹	250	A
P_D at $T_C=25^\circ\text{C}$	Total Power Dissipation	83.3	W
P_D at $T_A=25^\circ\text{C}$	Total Power Dissipation	5	W
E_{AS}	Single Pulse Avalanche Energy ⁴	28.8	mJ
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	1.5	$^\circ\text{C/W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient ³	25	$^\circ\text{C/W}$

Ordering Information

AP3R604GMT-HF-3TR

RoHS-compliant halogen-free PMPAK5x6, shipped on tape
and reel (3000pcs/reel)



Electrical Specifications at $T_j=25^{\circ}\text{C}$ (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=30A$	-	-	3.6	m Ω
		$V_{GS}=4.5V, I_D=20A$	-	-	5	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1	-	3	V
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=20A$	-	80	-	S
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=40V, V_{GS}=0V$	-	-	10	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm 20V$	-	-	± 100	nA
Q_g	Total Gate Charge ²	$I_D=20A$	-	26	42	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=20V$	-	6		nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}=4.5V$	-	14		nC
$t_{d(on)}$	Turn-on Delay Time ²	$V_{DS}=20V$	-	10.5	-	ns
t_r	Rise Time	$I_D=1A$	-	8	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega, V_{GS}=10V$	-	27	-	ns
t_f	Fall Time	$R_D=20\Omega$	-	52	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	2800	4500	pF
C_{oss}	Output Capacitance	$V_{DS}=25V$	-	615	-	pF
C_{rss}	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	190	-	pF
R_g	Gate Resistance	$f=1.0\text{MHz}$	-	1.6	2.4	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage ²	$I_S=30A, V_{GS}=0V$	-	-	1.2	V
t_{rr}	Reverse Recovery Time ²	$I_S=10A, V_{GS}=0V,$	-	41	-	ns
Q_{rr}	Reverse Recovery Charge	$dI/dt=100A/\mu s$	-	49	-	nC

Notes:

1. Pulse width limited by maximum junction temperature
2. Pulse test
3. Surface mounted on 1 in² copper pad of FR4 board, $t \leq 10\text{sec}$, 60°C/W at steady state.
4. Starting $T_j=25^{\circ}\text{C}$, $V_{DD}=25V$, $L=0.1\text{mH}$, $R_G=25\Omega$, $I_{AS}=24A$.

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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Typical Electrical Characteristics

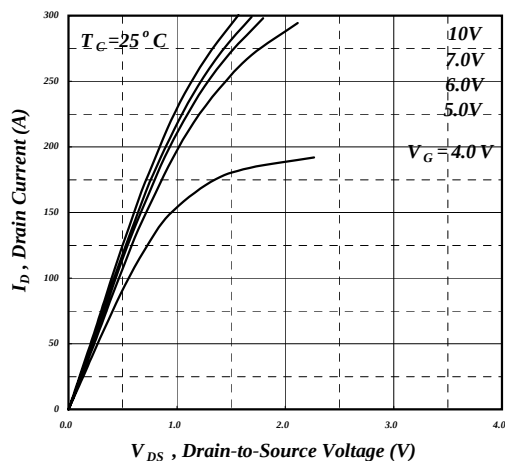


Fig 1. Typical Output Characteristics

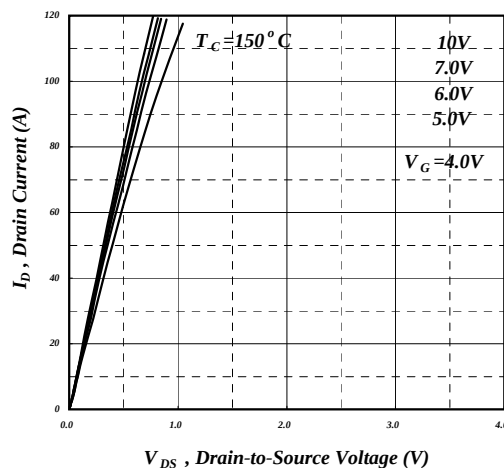


Fig 2. Typical Output Characteristics

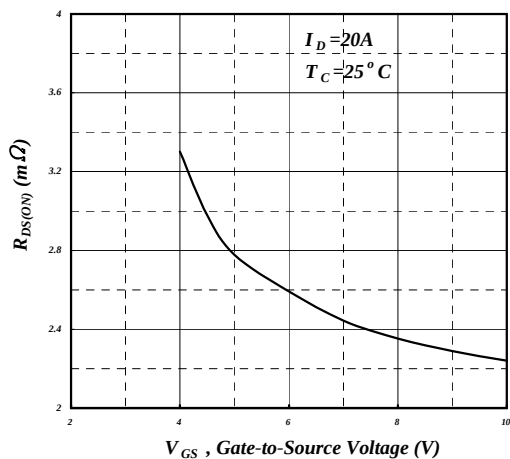


Fig 3. On-Resistance vs. Gate Voltage

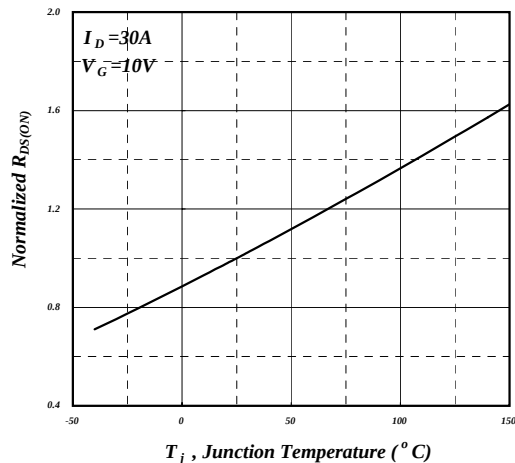


Fig 4. Normalized On-Resistance
vs. Junction Temperature

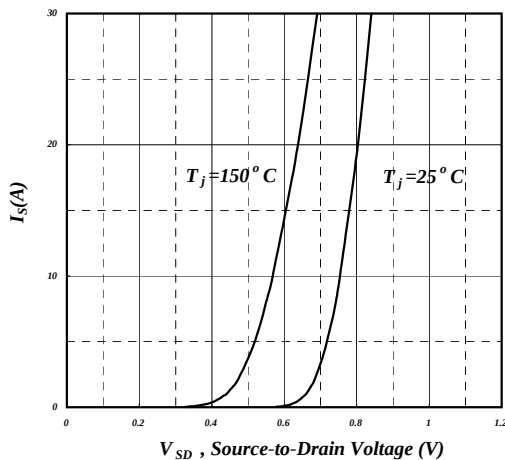


Fig 5. Forward Characteristic of
Reverse Diode

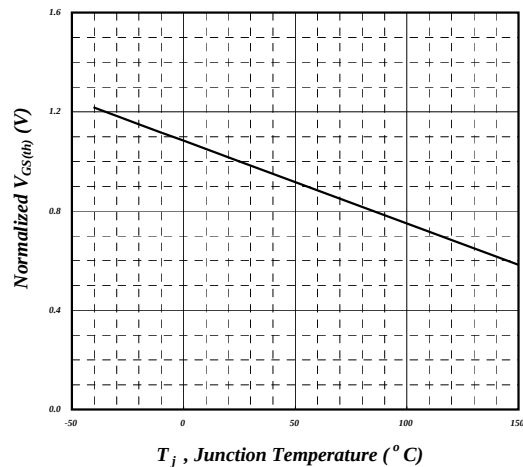
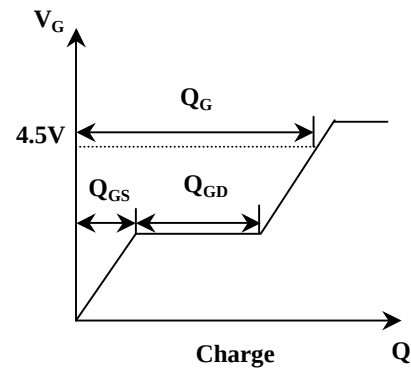
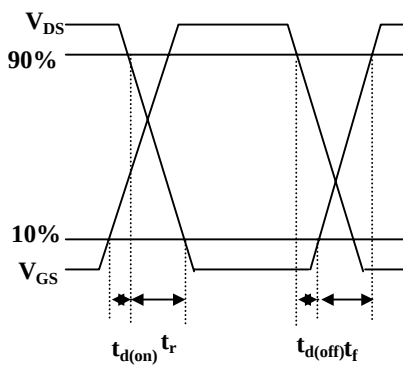
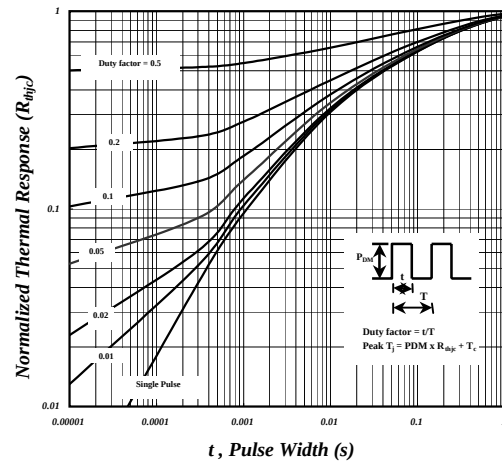
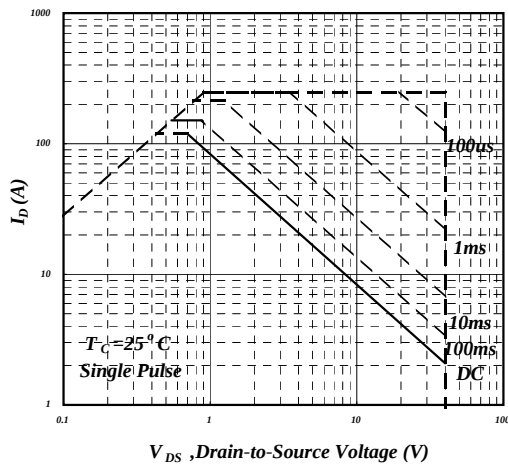
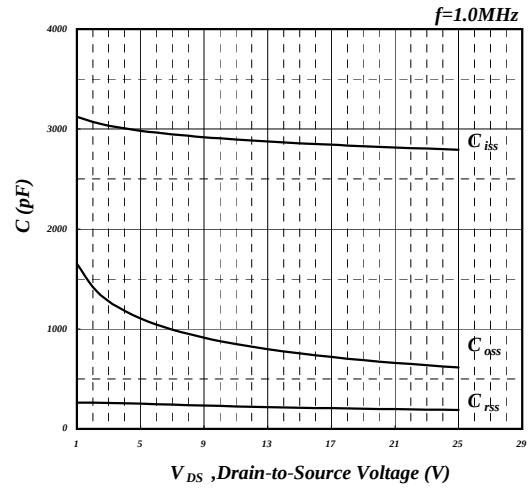
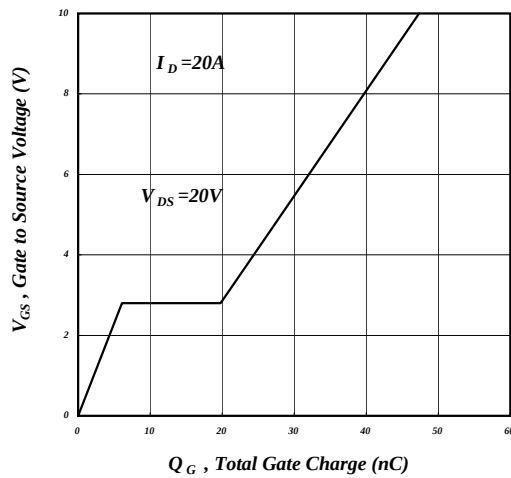


Fig 6. Gate Threshold Voltage vs.
Junction Temperature

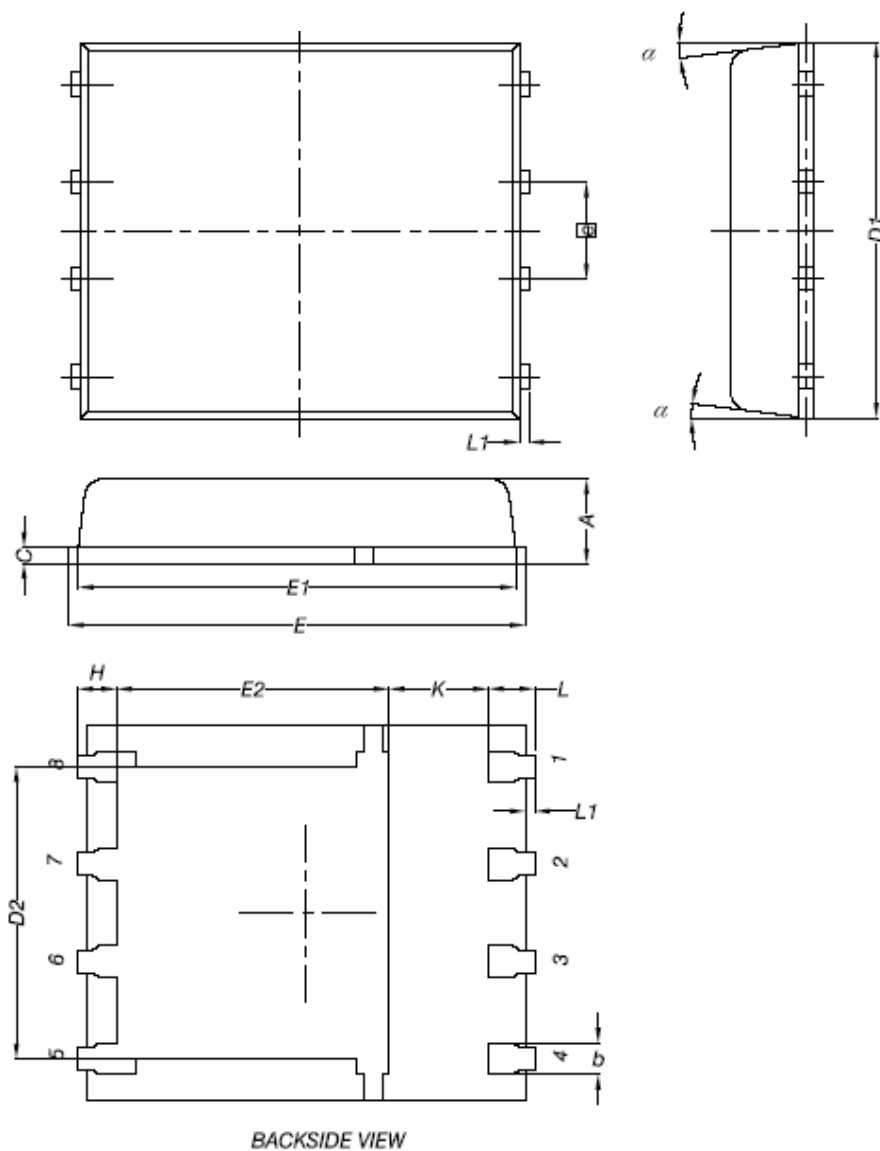


Typical Electrical Characteristics (cont.)





Package Dimensions: PMPAK5x6



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.33	0.41	0.51
C	0.20	-	-
D1	4.80	4.90	5.10
D2	-	-	4.20
E	5.90	6.00	6.10
E1 (Reference)	5.70	5.75	5.80
E2 (Reference)	3.38	3.58	3.78
e	1.27 BSC		
H	-	-	0.62
K (Reference)	0.70	-	-
L	0.51	0.61	0.71
L1	-	-	0.20
α (Reference)	0°	-	12°

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

Marking Information:

