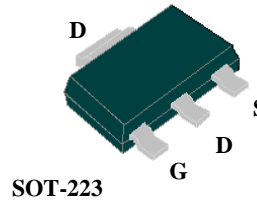


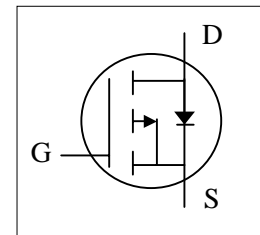


- ▼ Lower Gate Charge
- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free



SOT-223

BV_{DSS}	-40V
$R_{DS(ON)}$	40m Ω
I_D	-6.5A



Description

AP4P040 series are from the innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The SOT-223 package is designed for surface mount application, larger heatsink than SO-8 and SOT package.

Absolute Maximum Ratings @ $T_J=25^{\circ}\text{C}$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A=25^{\circ}\text{C}$	Drain Current, $V_{GS} @ 10\text{V}^3$	-6.5	A
$I_D @ T_A=70^{\circ}\text{C}$	Drain Current, $V_{GS} @ 10\text{V}^3$	-5.2	A
I_{DM}	Pulsed Drain Current ¹	-30	A
$P_D @ T_A=25^{\circ}\text{C}$	Total Power Dissipation	2.77	W
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	Unit
R_{thj-a}	Maximum Thermal Resistance, Junction-ambient ³	45	$^{\circ}\text{C}/\text{W}$



AP4P040K

Electrical Characteristics @ $T_j = 25^\circ\text{C}$ (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	$V_{GS}=-10V, I_D=-6A$	-	-	40	m Ω
		$V_{GS}=-4.5V, I_D=-4A$	-	-	60	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-	-3	V
g_{fs}	Forward Transconductance	$V_{DS}=-10V, I_D=-6A$	-	14	-	S
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-32V, V_{GS}=0V$	-	-	-10	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 0.1	μA
Q_g	Total Gate Charge	$I_D=-6A$	-	12	19.2	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=-32V$	-	4.5	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}=-4.5V$	-	4.5	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=-20V$	-	10	-	ns
t_r	Rise Time	$I_D=-1A$	-	4	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega$	-	41	-	ns
t_f	Fall Time	$V_{GS}=-10V$	-	17	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	1350	2160	pF
C_{oss}	Output Capacitance	$V_{DS}=-25V$	-	105	-	pF
C_{rss}	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	80	-	pF
R_g	Gate Resistance	$f=1.0\text{MHz}$	-	8	16	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage ²	$I_S=-2.2A, V_{GS}=0V$	-	-	-1.3	V
t_{rr}	Reverse Recovery Time	$I_S=-6A, V_{GS}=0V,$	-	13	-	ns
Q_{rr}	Reverse Recovery Charge	$dI/dt=100A/\mu s$	-	6	-	nC

Notes:

1. Pulse width limited by Max. junction temperature.
2. Pulse test
3. Surface mounted on 1 in² copper pad of FR4 board, $t \leq 10\text{sec}$; 150°C/W when mounted on Min. copper pad.

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

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

APEC DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

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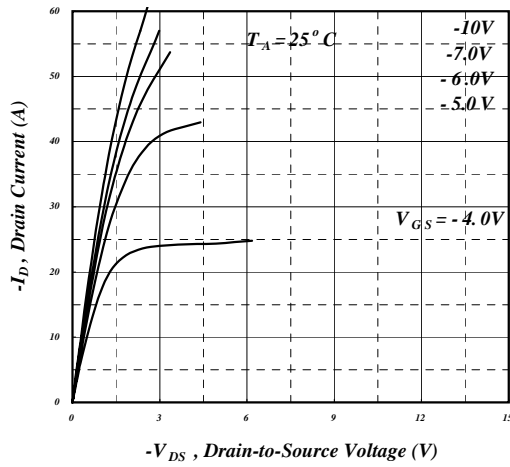


Fig 1. Typical Output Characteristics

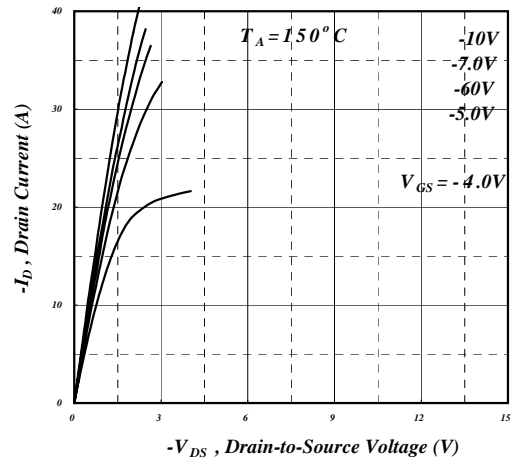


Fig 2. Typical Output Characteristics

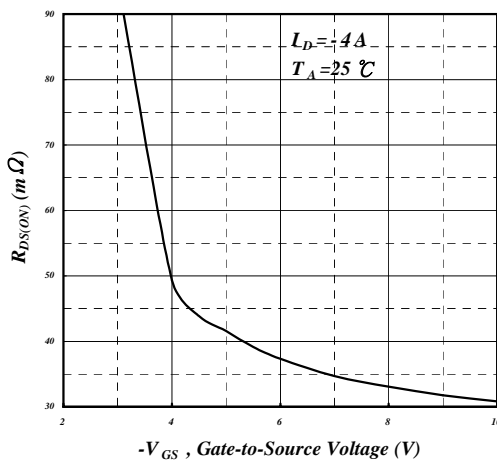


Fig 3. On-Resistance v.s. Gate Voltage

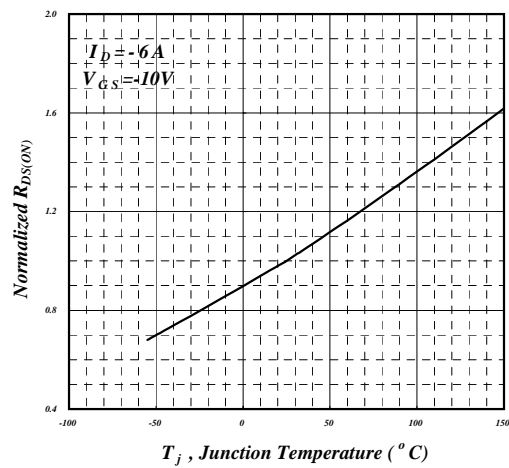


Fig 4. Normalized On-Resistance v.s. Junction Temperature

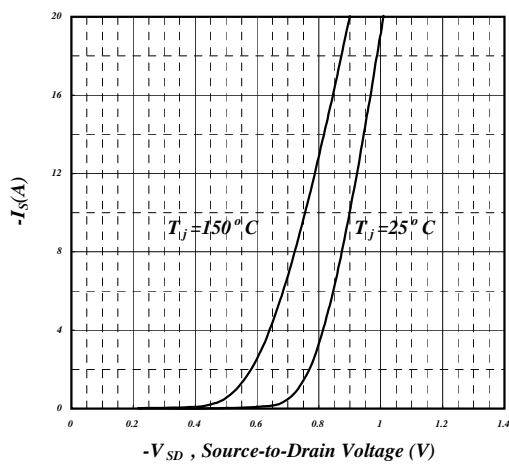


Fig 5. Forward Characteristic of Reverse Diode

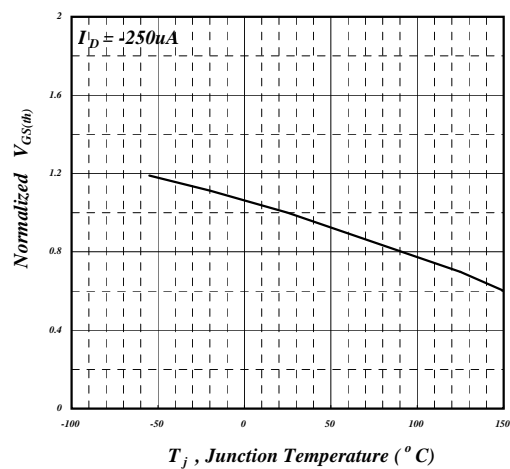


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

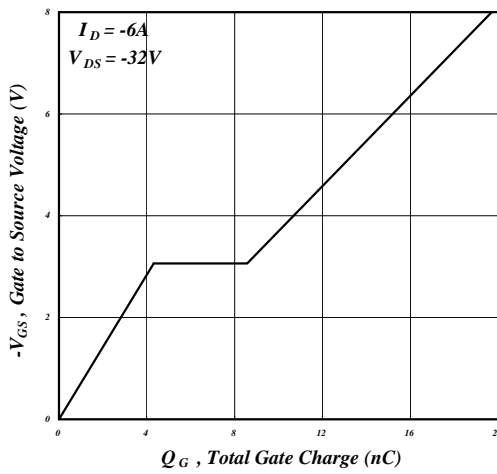


Fig 7. Gate Charge Characteristics

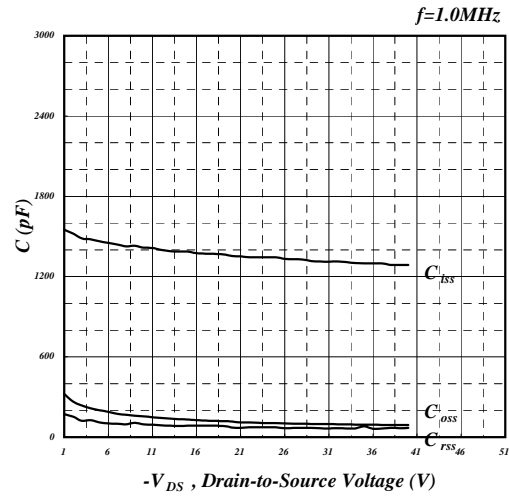


Fig 8. Typical Capacitance Characteristics

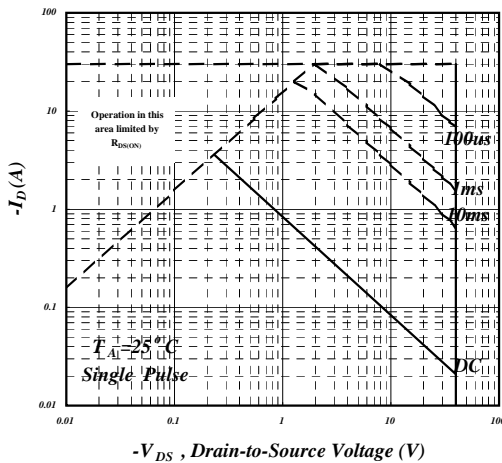


Fig 9. Maximum Safe Operating Area

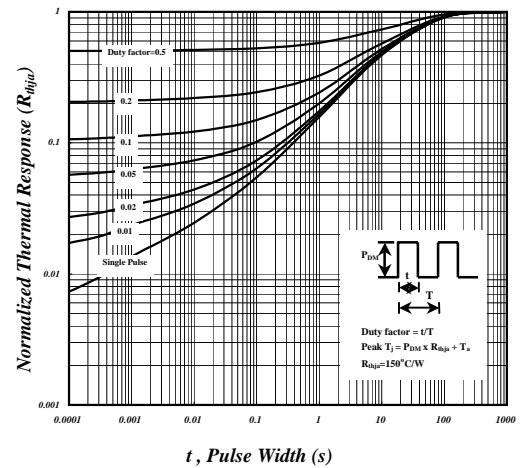


Fig 10. Effective Transient Thermal Impedance

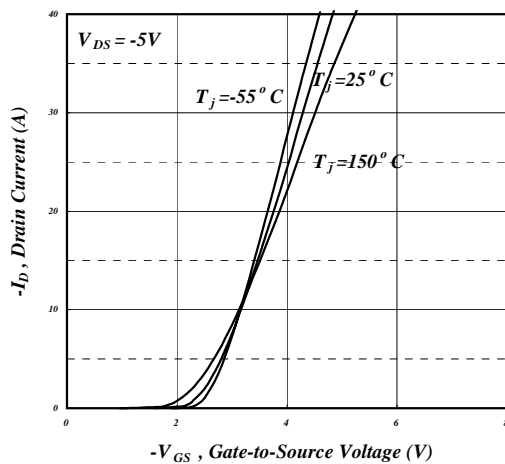


Fig 11. Transfer Characteristics

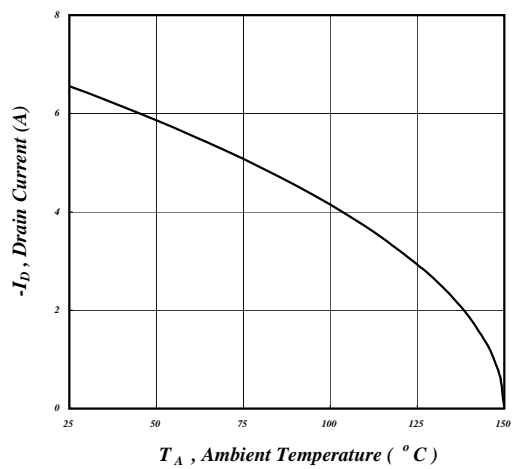


Fig 12. Drain Current v.s. Ambient Temperature



MARKING INFORMATION

