

**40V P-Channel Enhancement Mode Power MOSFET****Description**

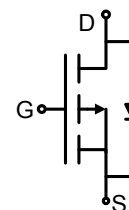
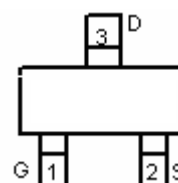
The PT40P05 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

- $V_{DS} = -40V, I_D = -5.3A$
 $R_{DS(ON)} < 85m\Omega @ V_{GS} = -10V$
 $R_{DS(ON)} < 145m\Omega @ V_{GS} = -4.5V$
- High density cell design for ultra low $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Application

- Power switching application
- Hard switched and high frequency circuits
- DC-DC converter

**Schematic diagram****SOT-23****Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	-5.3	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D (100^\circ C)$	-3.65	A
Pulsed Drain Current	I_{DM}	-20	A
Maximum Power Dissipation	P_D	2.0	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

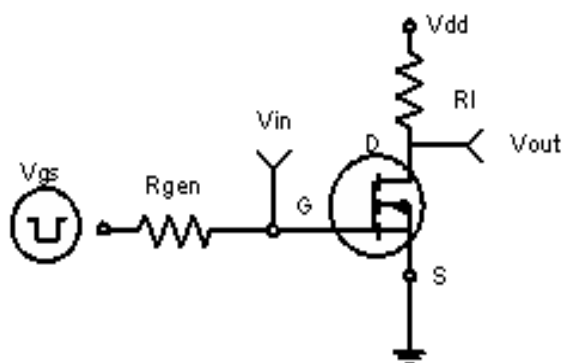
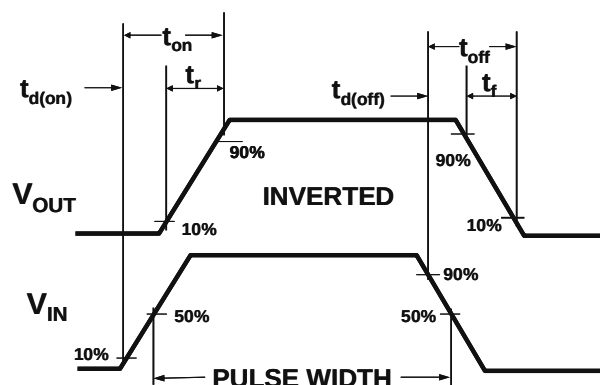
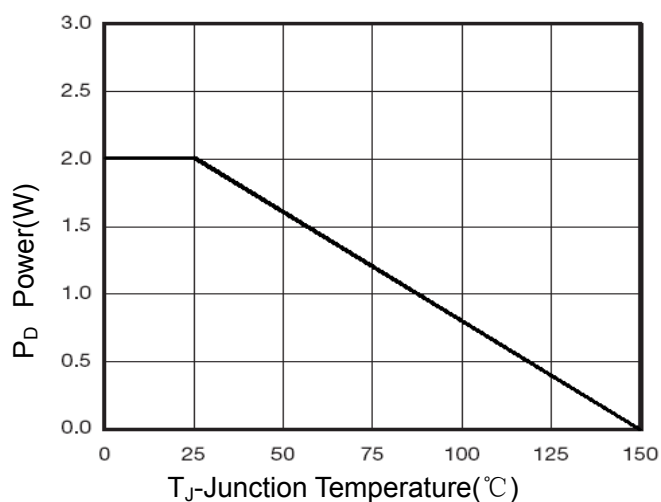
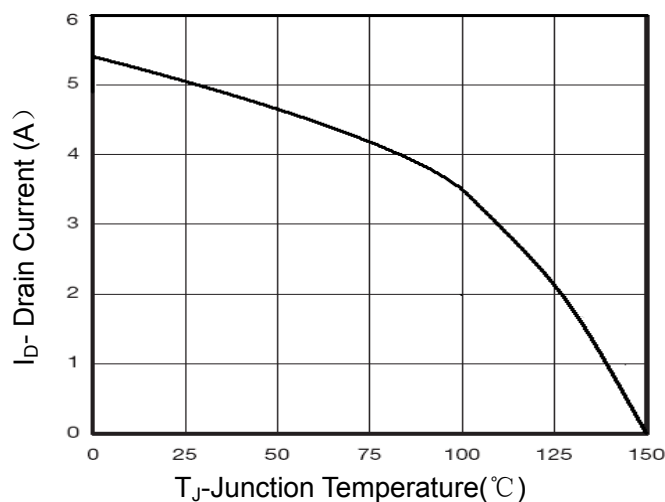
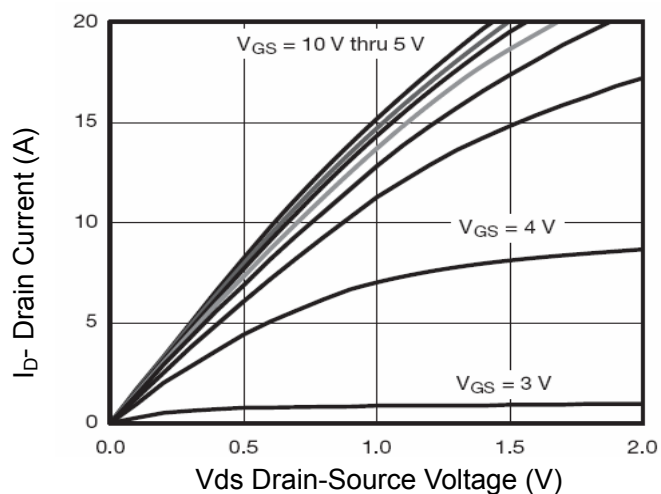
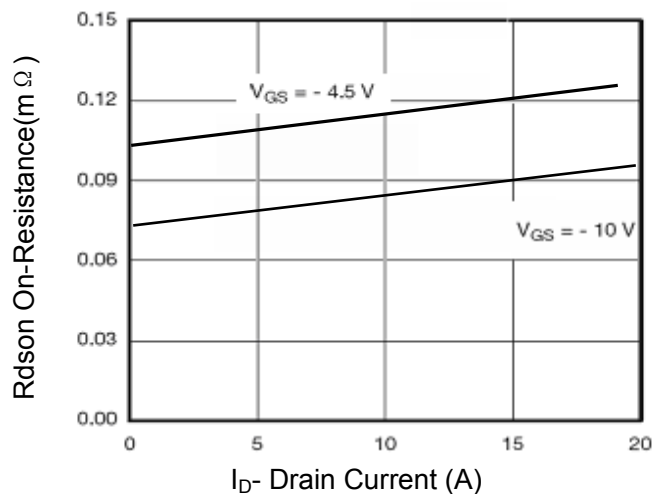
Thermal Resistance ,Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	62.5	$^\circ C/W$
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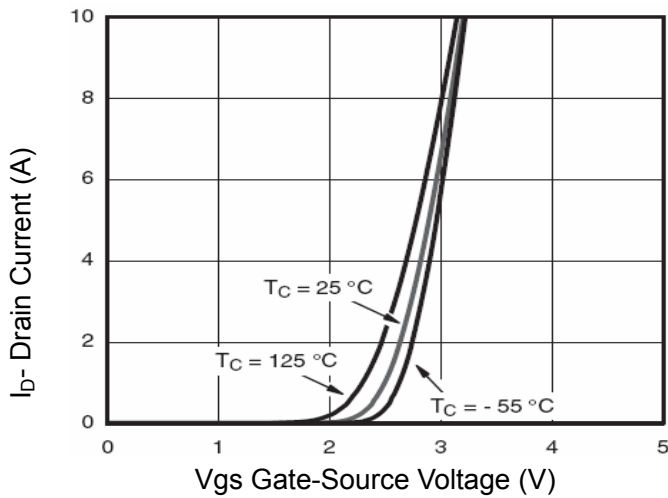
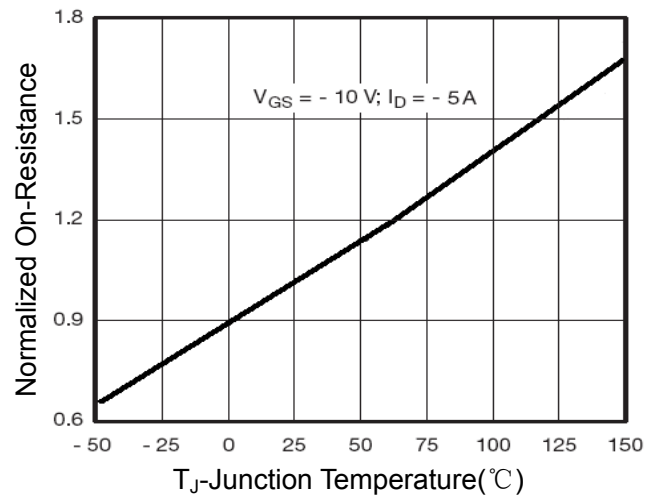
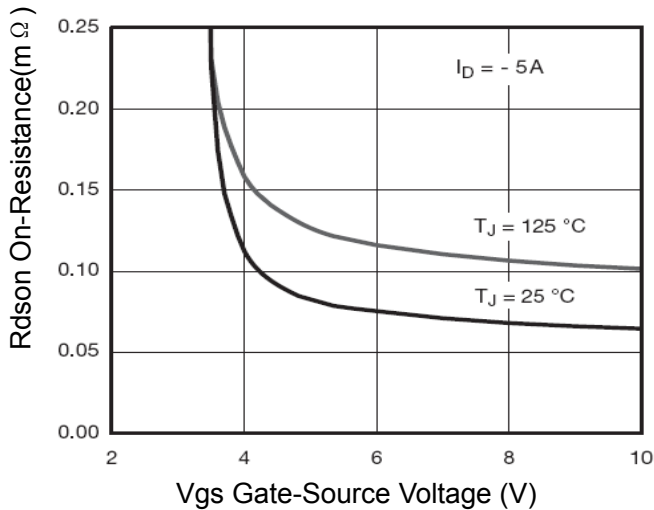
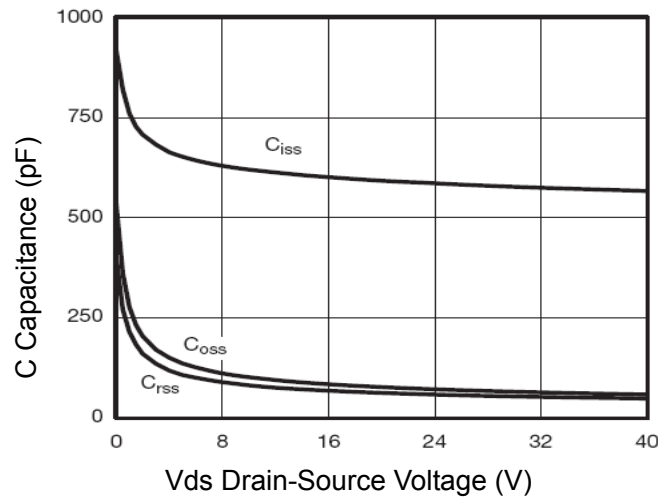
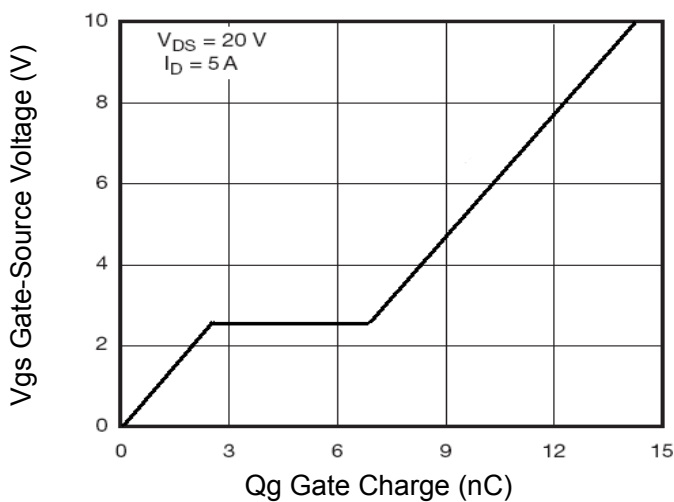
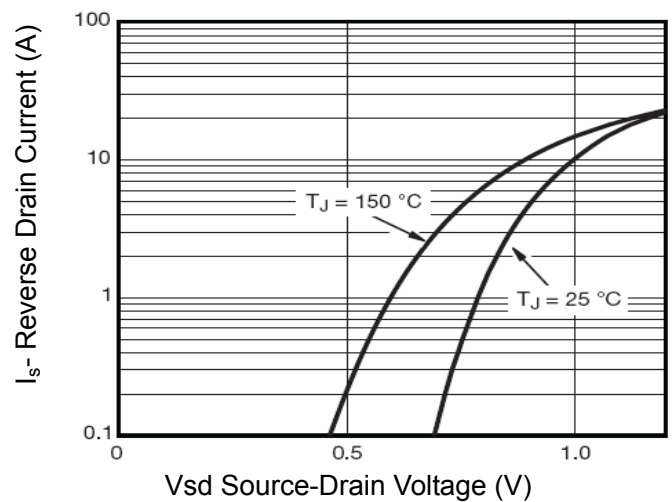
**40V P-Channel Enhancement Mode Power MOSFET****Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =-250μA	-40	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-40V,V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =-250μA	-1.0	-1.9	-3.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-5A	-	73	85	mΩ
		V _{GS} =-4.5V, I _D =-4A	-	107	145	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-15V,I _D =-3.1A	10	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =-20V,V _{GS} =0V, F=1.0MHz	-	600	-	PF
Output Capacitance	C _{oss}		-	90	-	PF
Reverse Transfer Capacitance	C _{rss}		-	70	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-20V, ,R _L =2Ω V _{GS} =-10V,R _{GEN} =3Ω	-	9	-	nS
Turn-on Rise Time	t _r		-	8	-	nS
Turn-Off Delay Time	t _{d(off)}		-	28	-	nS
Turn-Off Fall Time	t _f		-	10	-	nS
Total Gate Charge	Q _g	V _{DS} =-20V,I _D =-5A, V _{GS} =-10V	-	14	-	nC
Gate-Source Charge	Q _{gs}		-	2.9	-	nC
Gate-Drain Charge	Q _{gd}		-	3.8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V,I _S =-5A	-	-	1.2	V
Diode Forward Current (Note 2)	I _S		-	-	-5.3	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

**40V P-Channel Enhancement Mode Power MOSFET****Typical Electrical and Thermal Characteristics****Figure 1: Switching Test Circuit****Figure 2: Switching Waveforms****Figure 3 Power Dissipation****Figure 4 Drain Current****Figure 5 Output Characteristics****Figure 6 Drain-Source On-Resistance**

**40V P-Channel Enhancement Mode Power MOSFET****Figure 7 Transfer Characteristics****Figure 8 Drain-Source On-Resistance****Figure 9 Rdson vs Vgs****Figure 10 Capacitance vs Vds****Figure 11 Gate Charge****Figure 12 Source- Drain Diode Forward**

40V P-Channel Enhancement Mode Power MOSFET

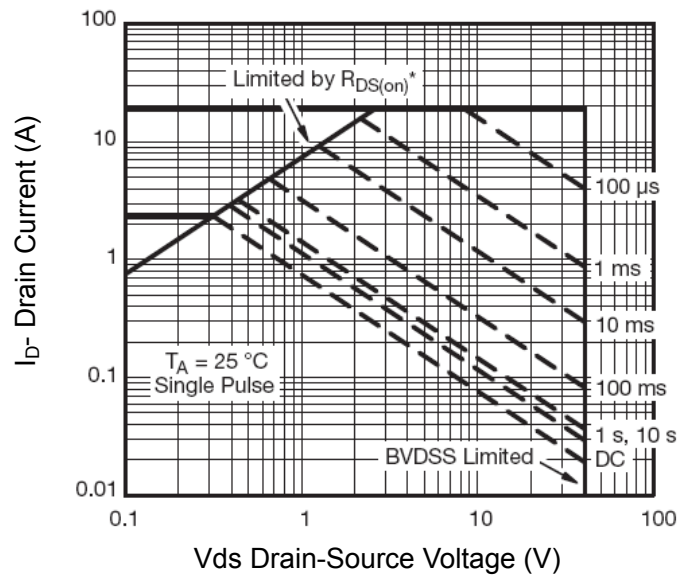


Figure 13 Safe Operation Area

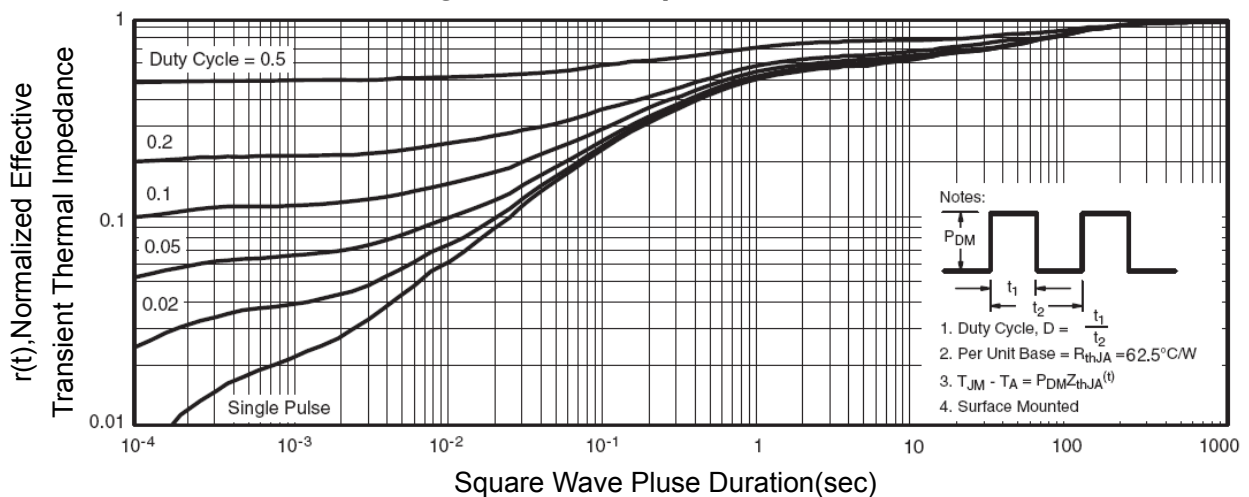
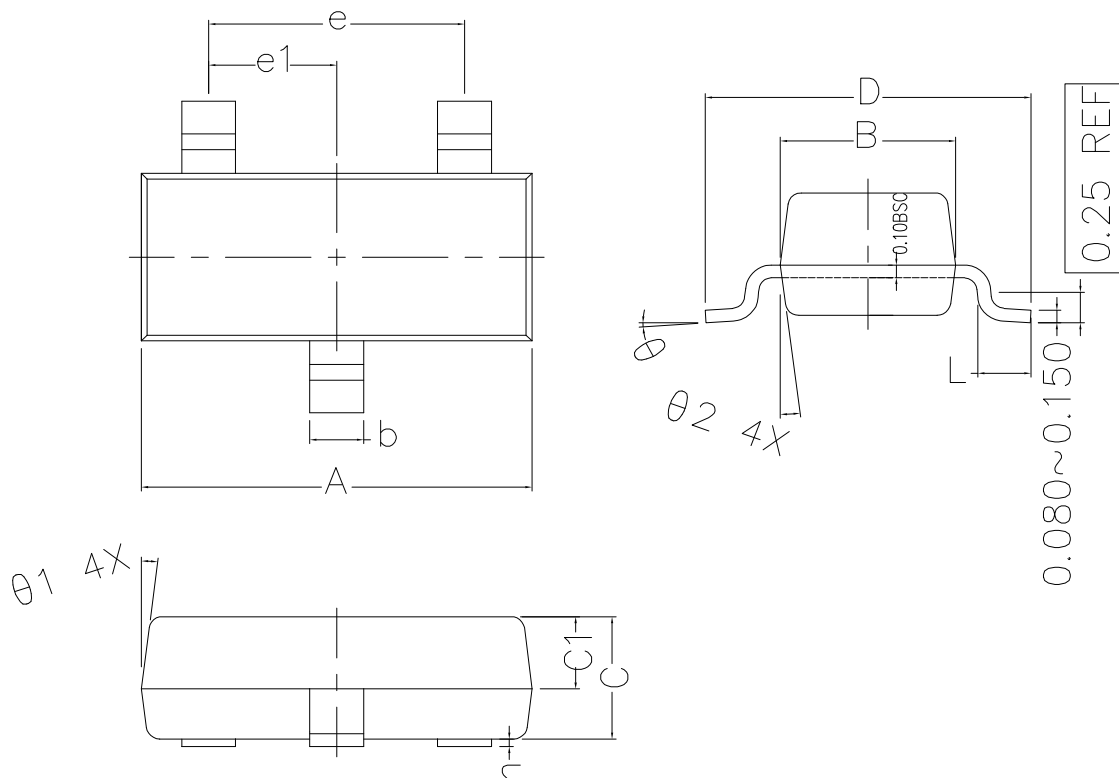


Figure 14 Normalized Maximum Transient Thermal Impedance

**40V P-Channel Enhancement Mode Power MOSFET**

SOT-23 Package Outline Dimensions (Units: mm)



COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A	2.800	2.900	3.000
B	1.200	1.300	1.400
C	0.900	1.000	1.100
C1	0.500	0.550	0.600
D	2.250	2.400	2.550
L	0.300	0.400	0.500
h	0.010	0.050	0.100
b	0.300	0.400	0.500
e	1.90 TYPE		
e1	0.95 TYPE		
theta1	7° TYPE		
theta2	7° TYPE		
theta	0° ~ 7°		