

Description

The 40P04 is the high cell density trench P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The 40P04 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

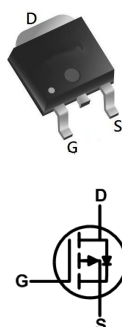
100% EAS Guaranteed

Green Device Available

Super Low Gate Charge

Excellent CdV/dt effect decline

Advanced high cell density Trench technology

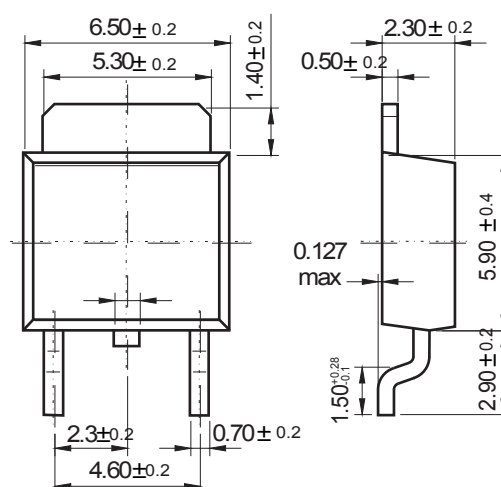


Product Summary

BVDSS	RDSON	ID
-40V	10mΩ	-40A

TO-252

Unit: mm



Dimensions in inches and (millimeters)

Absolute Maximum Ratings (TA = 25°C, unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V _{DS}	-40	V
Gate-Source Voltage		V _{GS}	±20	V
Continuous Drain Current	T _C =25°C	I _D	-40	A
	T _C =100°C		-31	
Pulsed Drain Current ¹		I _{DM}	-200	A
Single Pulse Avalanche Energy ²		EAS	80	mJ
Total Power Dissipation	T _C =25°C	P _D	55	W
Operating Junction and Storage Temperature Range		T _J , T _{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ³	R _{θJA}	61	°C/W
Thermal Resistance from Junction-to-Case	R _{θJC}	2.27	°C/W

40P04

Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-40	-	-	V
Gate-body Leakage current		I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T _J =25°C	I _{DSS}	V _{DS} = -40V, V _{GS} = 0V	-	-	1	μA
	T _J =100°C			-	-	5	
Gate-Threshold Voltage		V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-1.0	-1.6	-2.5	V
Drain-Source On-Resistance ⁴		R _{DS(on)}	V _{GS} = -10V, I _D = -16A	-	10.5	13	mΩ
			V _{GS} = -4.5V, I _D = -12A	-	14.2	20	
Forward Transconductance ⁴		g _{fs}	V _{DS} = -10V, I _D = -16A	-	44	-	S
Dynamic Characteristics ⁵							
Input Capacitance		C _{iss}	V _{DS} = -20V, V _{GS} =0V, f =1MHz	-	3050	-	pF
Output Capacitance		C _{oss}		-	282	-	
Reverse Transfer Capacitance		C _{rss}		-	230	-	
Gate Resistance		R _g	f =1MHz	-	9	-	Ω
Switching Characteristics ⁵							
Total Gate Charge		Q _g	V _{GS} = -10V,V _{DS} = -20V, I _D = -16A	-	28	-	nC
Gate-Source Charge		Q _{gs}		-	8	-	
Gate-Drain Charge		Q _{gd}		-	8.5	-	
Turn-on Delay Time		t _{d(on)}	V _{GS} =-10V, V _{DD} = -15V, R _G = 3Ω, I _D = -16A	-	38	-	ns
Rise Time		t _r		-	31	-	
Turn-off Delay Time		t _{d(off)}		-	90	-	
Fall Time		t _f		-	9.2	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴		V _{SD}	I _S = -1A, V _{GS} = 0V	-	-	-1.2	V
Continuous Source Current	T _C =25°C	I _S	-	-	-	-50	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C.
2. The EAS data shows Max. rating . The test condition is V_{DD}= -25V, V_{GS}= -10V, L=0.1mH, I_{AS}= -40A.
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test..

RATING AND CHARACTERISTIC CURVES (40P04)

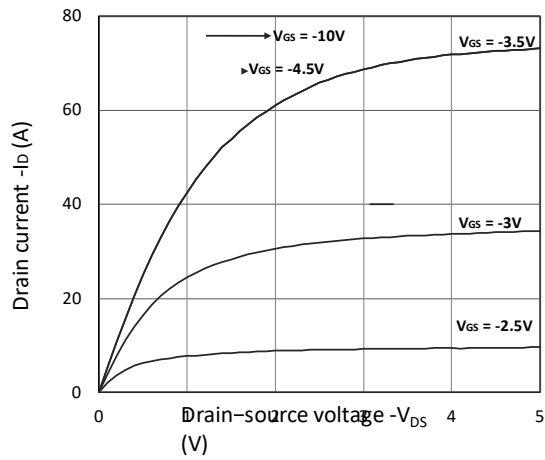


Figure 1. Output Characteristics

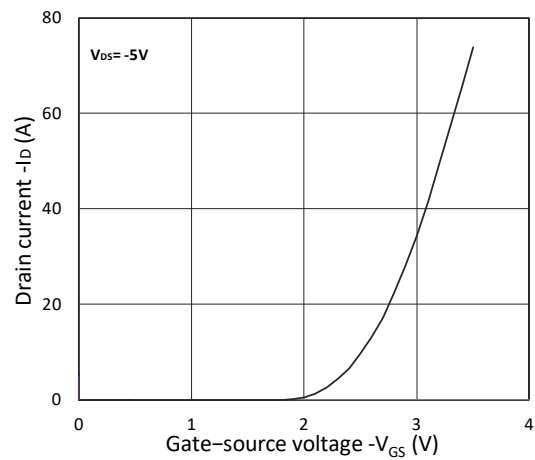


Figure 2. Transfer Characteristics

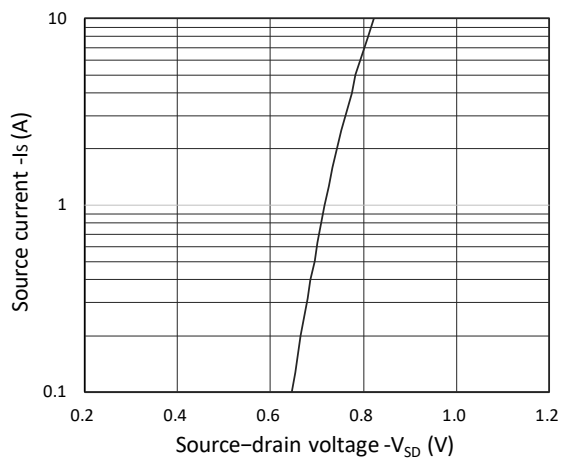


Figure 3. Forward Characteristics of Reverse

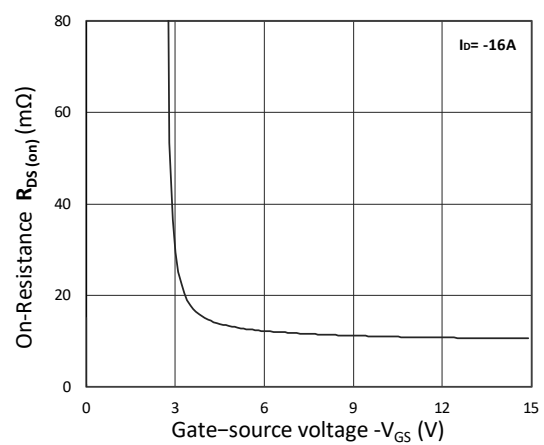


Figure 4. $R_{DS(on)}$ vs. V_{GS}

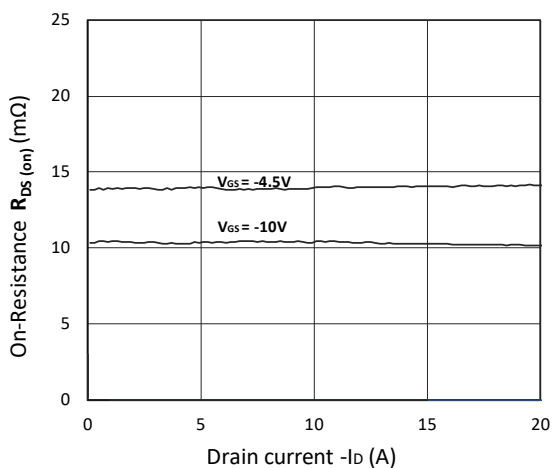


Figure 5. $R_{DS(on)}$ vs. I_D

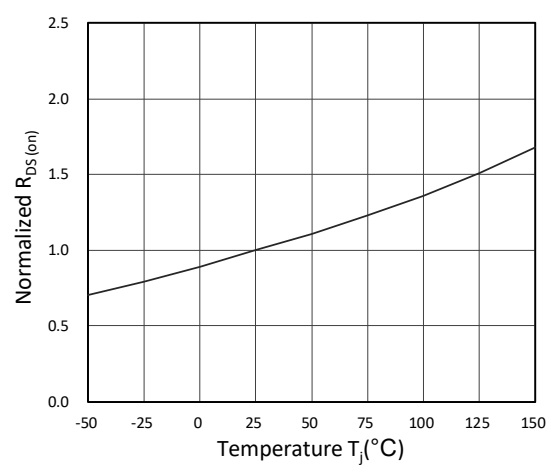


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

RATING AND CHARACTERISTIC CURVES (40P04)

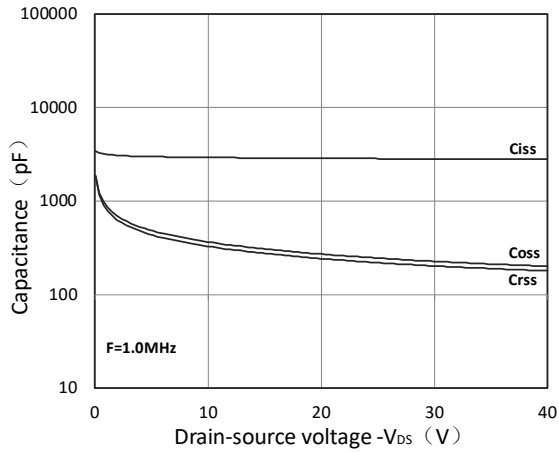


Figure 7. Capacitance Characteristics

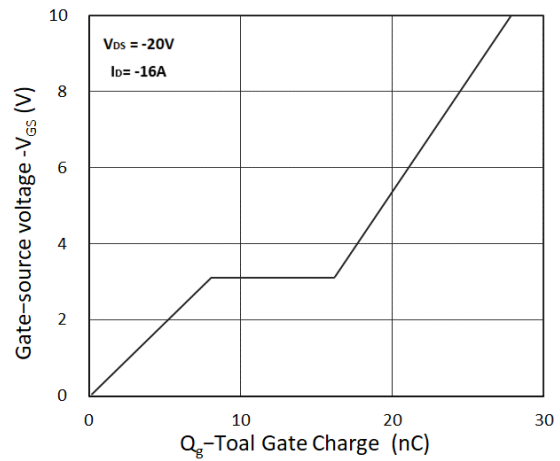


Figure 8. Gate Charge Characteristics

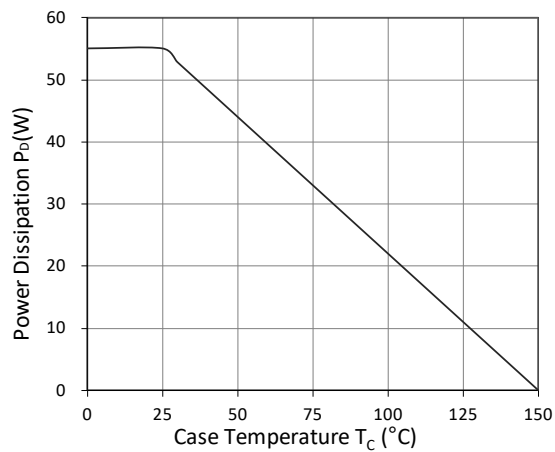


Figure 9. Power Dissipation

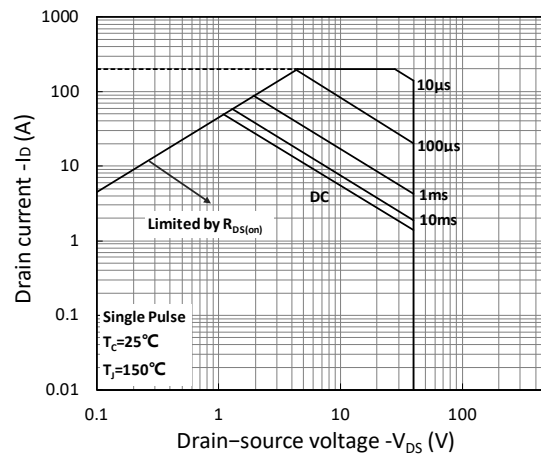


Figure 10. Safe Operating Area

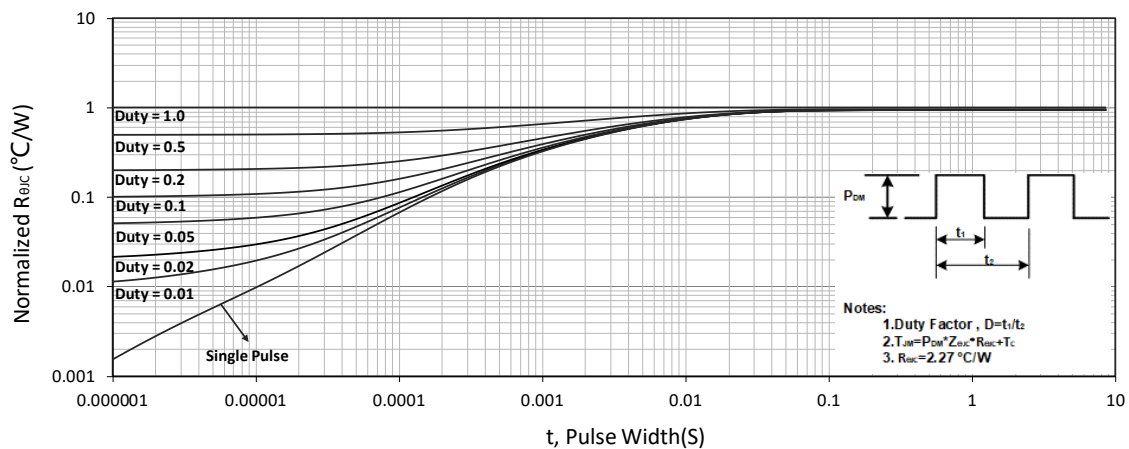


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

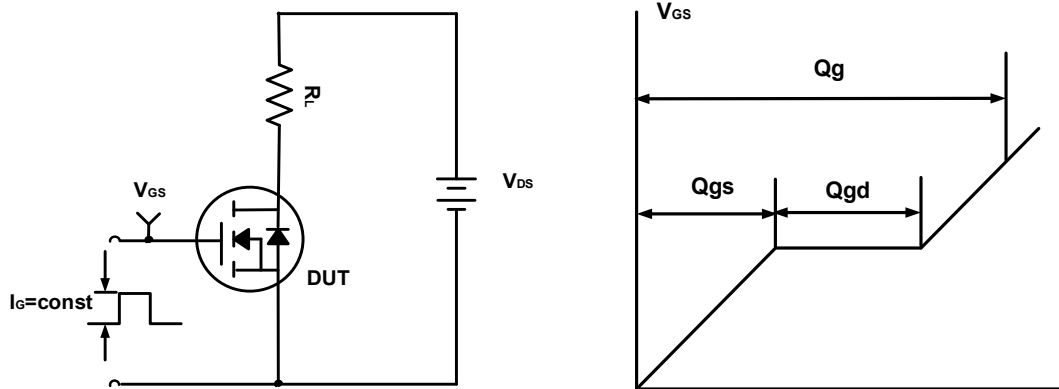


Figure A. Gate Charge Test Circuit & Waveforms

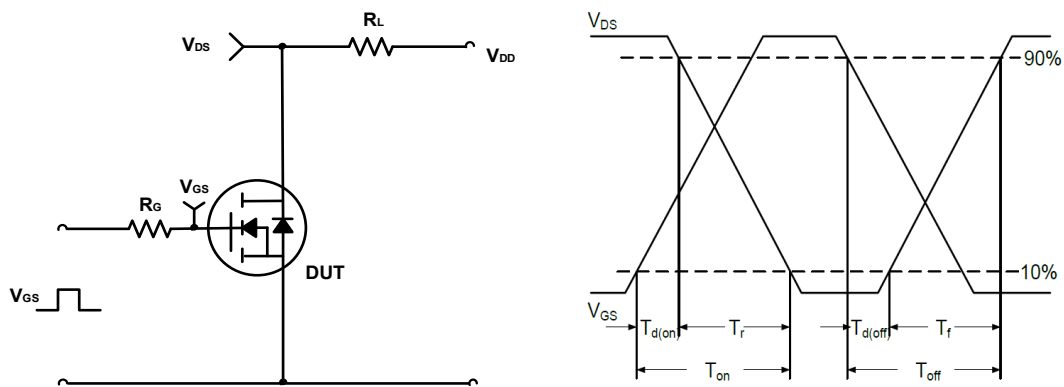


Figure B. Switching Test Circuit & Waveforms

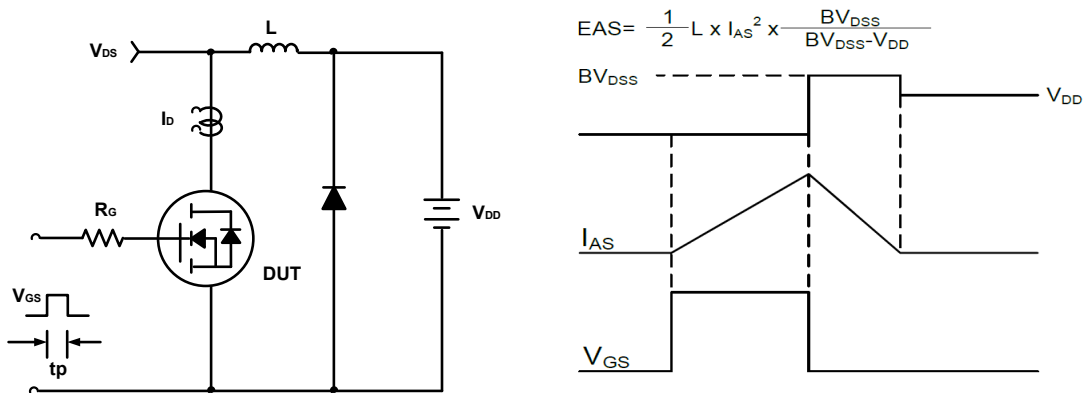


Figure C. Unclamped Inductive Switching Circuit & Waveforms