



Power MOSFETS

DATASHEET

LM40095PAN3A

P-Channel
Enhancement Mode MOSFET

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Quality Management Systems

ISO 9001:2015 Certificate

LM40095PAN3A



P-Channel Enhancement Mode MOSFET

Pin Description

TO-251-3L (TOP view)	Symbol	Symbol	P-Channel	Unit
		V_{DSS}	-40	V
		$R_{DS(ON)-Max}$	10.6	mΩ
		I_D	-77	A

Ordering Information

Feature

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested

Applications

- SMPS Synchronous Rectification
- Load Switch

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM40095PAN3A	TO-251-3L	Tube	75 / Tube	40095 □□□□□□

Note : □□□□□□ = Lot Code

Absolute Maximum Ratings (T_J=25°C Unless Otherwise Noted)

Symbol	Parameter	P-Channel	Unit
V_{DSS}	Drain-Source Voltage	-40	V
V_{GSS}	Gate-Source Voltage	±20	V
T_J	Maximum Junction Temperature	150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
I_S	Diode Continuous Forward Current	$T_C=25^{\circ}C$ -57	A
$I_{DM}^{①}$	Pulse Drain Current Tested	$T_C=25^{\circ}C$ -192	A
I_D	Continuous Drain Current	$T_C=25^{\circ}C$ -77 $T_C=100^{\circ}C$ -49	A
P_D	Maximum Power Dissipation	$T_C=25^{\circ}C$ 62.5 $T_C=100^{\circ}C$ 25	W
I_D	Continuous Drain Current	$T_A=25^{\circ}C$ -13.7 $T_A=70^{\circ}C$ -11	A
P_D	Maximum Power Dissipation	$T_A=25^{\circ}C$ 2.0 $T_A=70^{\circ}C$ 1.3	W
$I_{AS}^{②}$	Avalanche Current, Single pulse	L=0.1mH -30 L=0.5mH -15	A
$E_{AS}^{③}$	Avalanche Energy, Single pulse	L=0.1mH 45 L=0.5mH 56	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State 2	°C/W
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State 62.5	°C/W

Note ① : Max. current is limited by junction temperature

Note ② : UIS tested and pulse width are limited by maximum junction temperature 150°C

Note ③ : Surface Mounted on 1in² FR-4 board with 1oz.

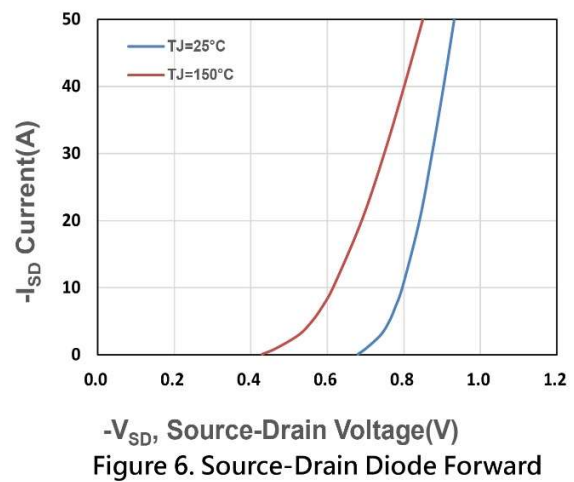
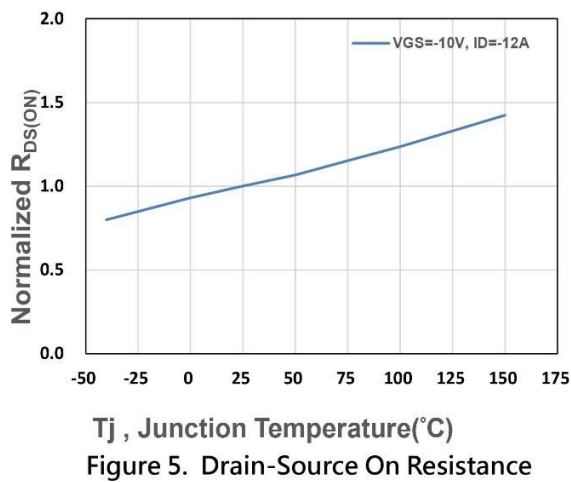
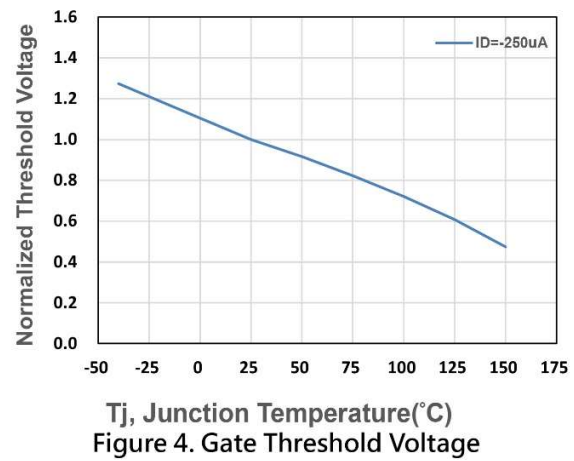
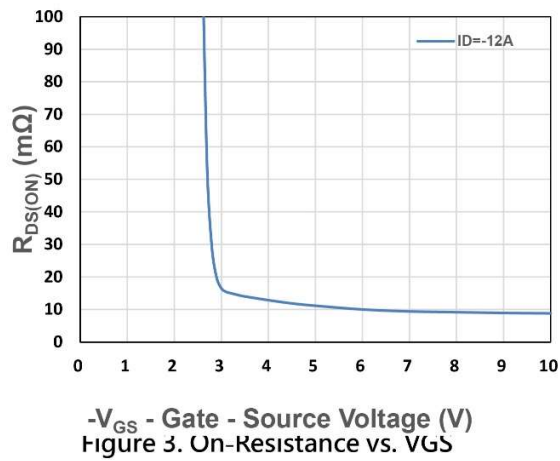
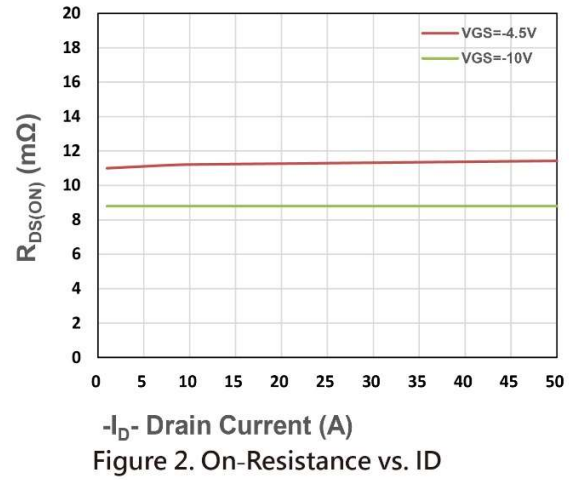
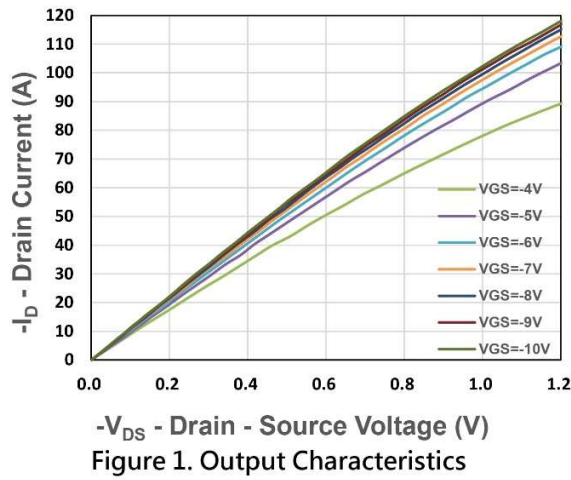
P-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

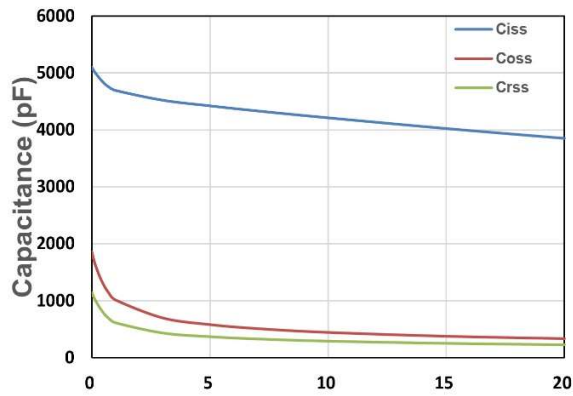
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250uA	-40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-32V, V _{GS} =0V	-	-	-1	uA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250uA	-1.1	-1.7	-2.3	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ④	Drain-Source On-state Resistance	V _{GS} =-10V, I _{DS} =-12A	-	8.8	10.6	mΩ
		V _{GS} =-4.5V, I _{DS} =-9A	-	10.4	14	
gfs	Forward Transconductance	V _{DS} =-5V, I _{DS} =-6A	-	22	-	S
Dynamic Characteristics ⑤						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	8	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-20V, Freq.=1MHz	-	3853	-	pF
C _{oss}	Output Capacitance		-	336	-	
C _{rss}	Reverse Transfer Capacitance		-	226	-	
td(ON)	Turn-on Delay Time	V _{GS} =-10V, V _{DS} =-25V, I _D =-1A, R _{GEN} =6Ω	-	6.4	-	nS
t _r	Turn-on Rise Time		-	18.1	-	
t _{d(OFF)}	Turn-off Delay Time		-	177	-	
t _f	Turn-off Fall Time		-	92	-	
Q _g	Total Gate Charge	V _{GS} =-4.5V, V _{DS} =-20V I _D =-12A	-	40.8	-	nC
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-20V, I _D =-12A	-	85.8	-	
Q _{gs}	Gate-Source Charge		-	16.8	-	
Q _{gd}	Gate-Drain Charge		-	12.7	-	
Source-Drain Characteristics						
V _{SD} ④	Diode Forward Voltage	I _{SD} =-6A, V _{GS} =0V	-	-0.75	-1.1	V
t _{rr}	Reverse Recovery Time	I _F =-6A, V _R =-20V	-	24.8	-	nS
Q _{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	17.4	-	nC

Note ④ : Pulse test (pulse width≤300us, duty cycle≤2%).

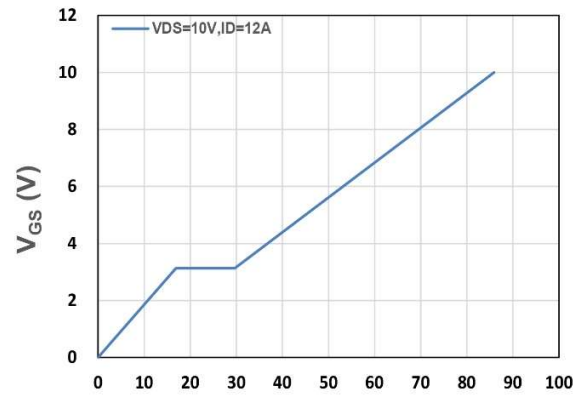
Note ⑤ : Guaranteed by design, not subject to production testing.

P-Channel Typical Characteristics

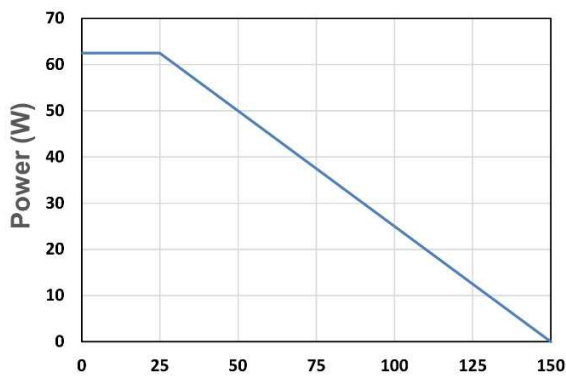




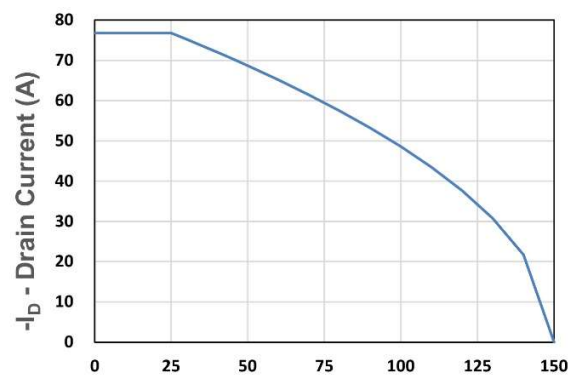
$-V_{DS}$ - Drain - Source Voltage (V)
Figure 7. Capacitance



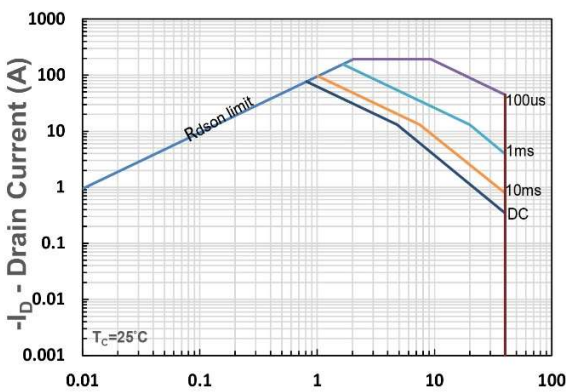
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



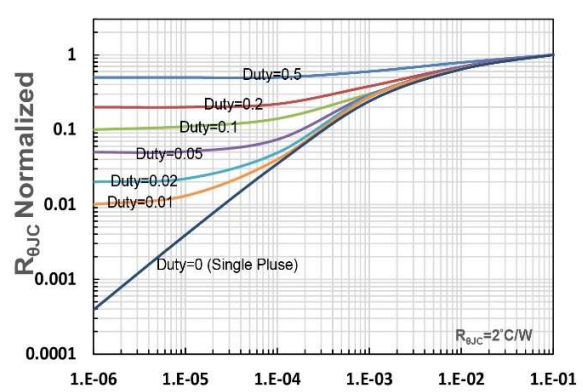
T_c - Case Temperature (°C)
Figure 9. Power Dissipation



T_c - Case Temperature (°C)
Figure 10. Drain Current



$-V_{DS}$ - Drain-Source Voltage (V)
Figure 11. Safe Operating Area



t_1 , Square Wave Pulse Duration(s)
Figure 12. $R_{\theta JC}$ Transient Thermal Impedance