





Power MOSFETS

DATASHEET

LM30500PAI3A

P-Channel
Enhancement Mode MOSFET

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Quality Management Systems

ISO 9001:2015 Certificate

P-Channel Enhancement Mode MOSFET

Pin Description

SOT-23 (TOP view) 	Symbol 	Symbol	P-Channel	Unit
		V_{DSS}	-30	V
		$R_{DS(ON)-Max}$	50	mΩ
		I_D	-3.8	A

Ordering Information

Feature

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free

Applications

- Portable Equipment
- Battery Powered System

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM30500PAI3A	SOT-23	Tape & Reel	3000 / Tape & Reel	02□□□

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

Symbol	Parameter	P-Channel	Unit	
V_{DSS}	Drain-Source Voltage	-30	V	
V_{GSS}	Gate-Source Voltage	±20		
T_J	Maximum Junction Temperature	150	°C	
T_{STG}	Storage Temperature Range	-55 to 150	°C	
$I_{DM}^{①}$	Pulse Drain Current Tested	$T_A=25^{\circ}C$	-9.5	A
I_D	Continuous Drain Current	$T_A=25^{\circ}C$	-3.8	A
		$T_A=70^{\circ}C$	-3	
P_D	Maximum Power Dissipation	$T_A=25^{\circ}C$	1.1	W
		$T_A=70^{\circ}C$	0.7	
$I_{AS}^{②}$	Avalanche Current, Single pulse	L=0.1mH	-12.5	A
$E_{AS}^{②}$	Avalanche Energy, Single pulse	L=0.1mH	7.8	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit	
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State	110	°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	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-24V, V _{GS} =0V	-	-	-1	uA
V_{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250uA	-1	-1.5	-2	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} =-4.5A	-	40	50	mΩ
		V _{GS} =-4.5V, I _{DS} =-3.5A	-	60	70	
g_{fs}	Forward Transconductance	V _{DS} =-10V, I _{DS} =-4.5A	-	1.7	-	S
Dynamic Characteristics[®]						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	18.5	-	Ω
C_{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, Freq.=1MHz	-	577	-	pF
C_{oss}	Output Capacitance					
C_{rss}	Reverse Transfer Capacitance					
t_{d(ON)}	Turn-on Delay Time	V _{GS} =-10V, V _{DS} =-15V, I _D =-1A, R _{GEN} =6Ω	-	8	-	nS
t_r	Turn-on Rise Time					
t_{d(OFF)}	Turn-off Delay Time					
t_f	Turn-off Fall Time					
Q_g	Total Gate Charge	V _{GS} =-4.5V, V _{DS} =-15V, I _D =-4A	-	4.6	-	nC
Q_g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-4A	-	9.5	-	
Q_{gs}	Gate-Source Charge		-	1.7	-	
Q_{gd}	Gate-Drain Charge		-	2	-	
Source-Drain Characteristics						
V_{SD}^④	Diode Forward Voltage	I _{SD} =-1A, V _{GS} =0V	-	-0.75	-1.1	V
t_{rr}	Reverse Recovery Time	I _F =-4A, V _R =-15V	-	16	-	nS
Q_{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	10	-	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

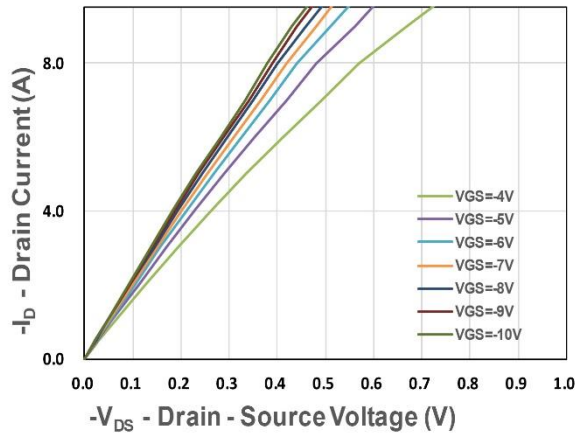


Figure 1. Output Characteristics

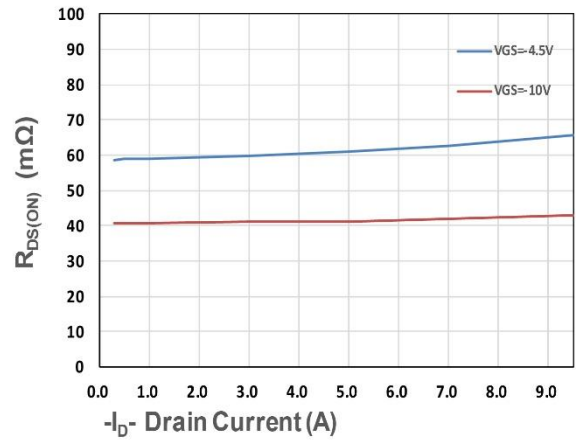


Figure 2. On-Resistance vs. ID

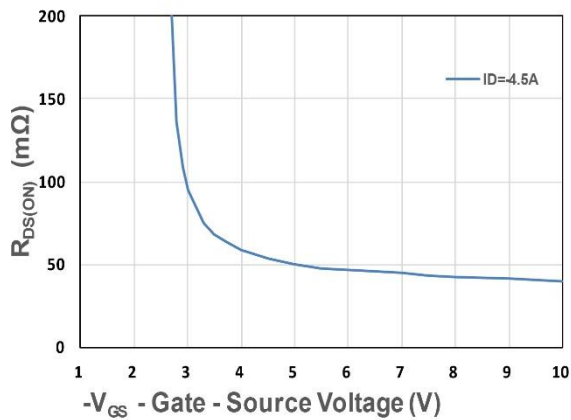


Figure 3. On-Resistance vs. VGS

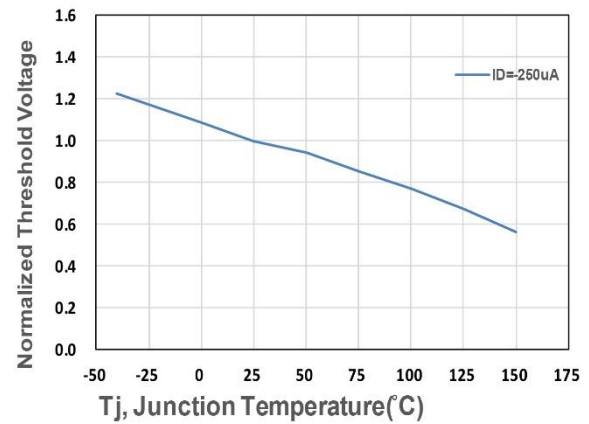


Figure 4. Gate Threshold Voltage

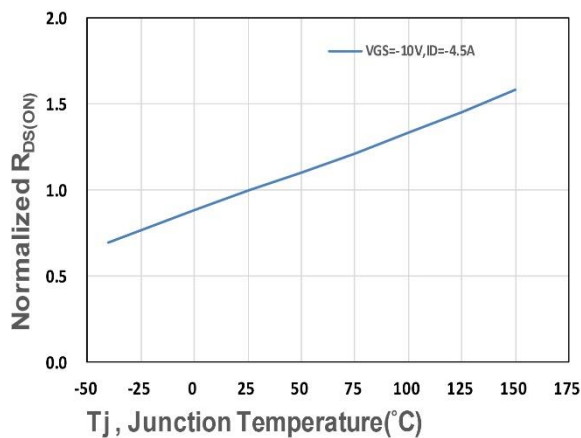


Figure 5. Drain-Source On Resistance

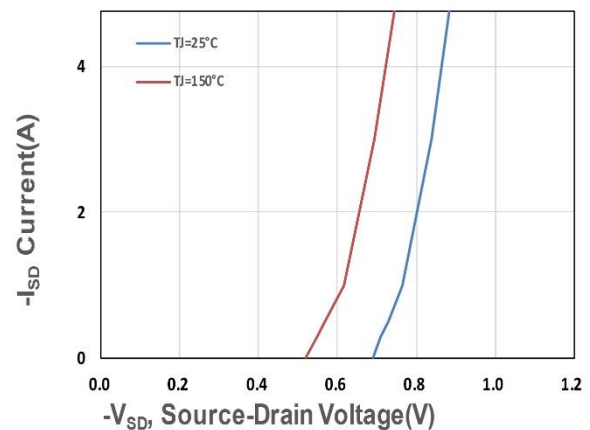
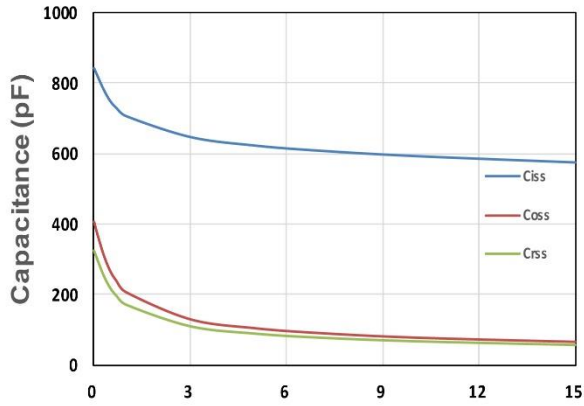
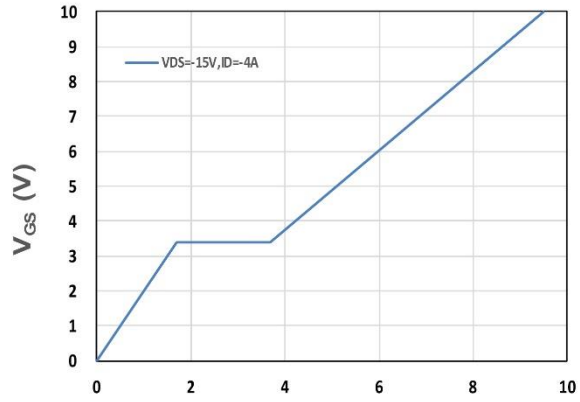


Figure 6. Source-Drain Diode Forward



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



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

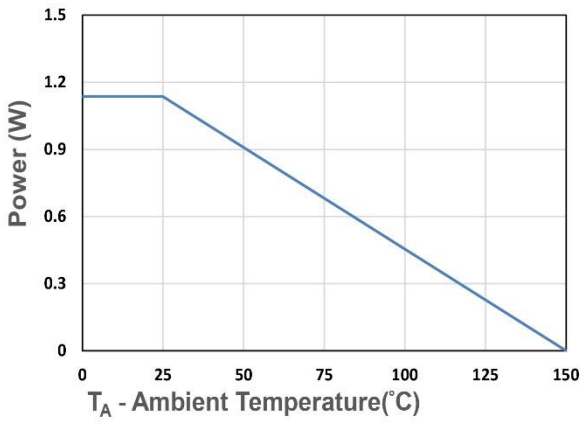


Figure 9. Power Dissipation

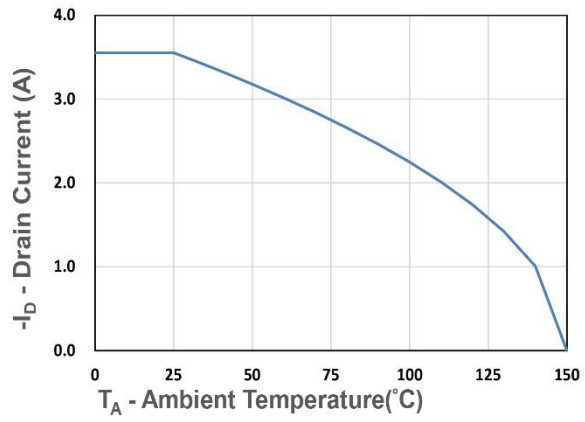


Figure 10. Drain Current

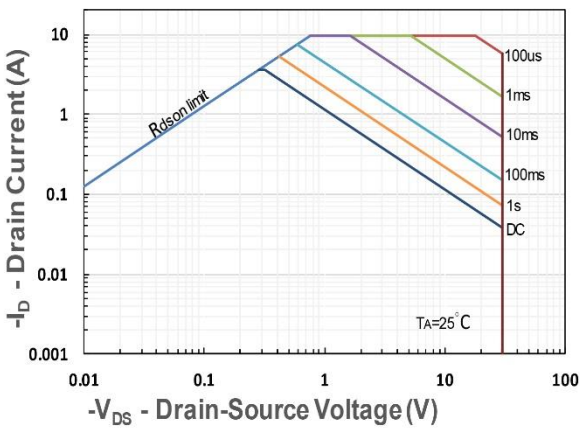


Figure 11. Safe Operating Area

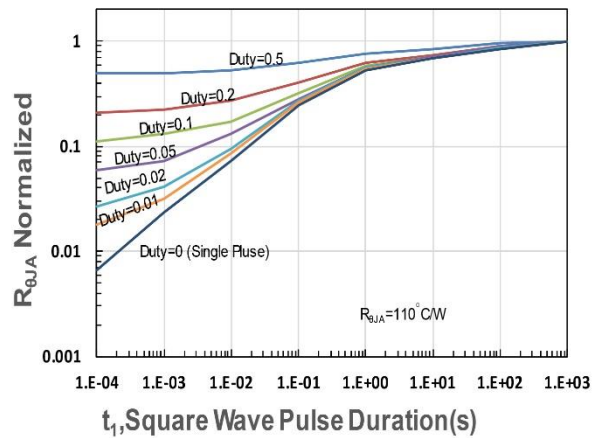


Figure 12. $R_{\theta JA}$ Transient Thermal Impedance