SUMSEMI

S40N05PPA

40V N-Channel MOSFETs

General Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

BV_{DSS}	$R_{DS(ON)}$Max.	I_D
40V	5.5mΩ	50A

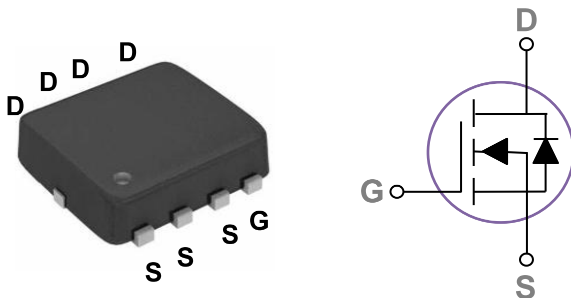
Features

- *40V, 50A, $R_{DS(ON)}$Max.=5.5mΩ@V_{GS} = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *Green Device Available*

Applications

- *Notebook*
- *Load Switch*
- *LED applications*
- *Hand-Held Device*

PPAK3×3 Pin Configuration



Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	50	A
	Drain Current – Continuous (T_C=100℃)	31	A
I_{DM}	Drain Current – Pulsed[1]	240	A
E_{AS}	Single Pulse Avalanche Energy[2]	76	mJ
I_{AS}	Single Pulse Avalanche Current[2]	39	A
P_D	Power Dissipation (T_C=25℃)	66	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Note 1: Exceed these limits to damage to the device.
Note 2: Exposure to absolute maximum rating conditions may affect device reliability.

CAUTION: These devices are sensitive to electrostatic discharge; follow proper IC Handling Procedures.
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Electrical Characteristics (T_J=25 ℃, unless otherwise noted) Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	40			V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=40V , V_{GS}=0V , T_J=25℃			1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=85℃			10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V			±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=24A		4.8	5.5	mΩ
		V_{GS}=4.5V , I_D=12A		6.2	7.2	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.6	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			-4		mV/℃
gfs	Forward Transconductance	V_{DS}=5V , I_D=20A		70		S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge[3,4]	V_{DS}=20V , V_{GS}=10V , I_D=15A		27.8		nC
Q_{gs}	Gate-Source Charge[3,4]			3.9		
Q_{gd}	Gate-Drain Charge[3,4]			6		
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=15V, V_{GS}=10V , R_G=3.3Ω I_D=1A		7.2		ns
T_r	Rise Time[3,4]			3		
$T_{d(off)}$	Turn-Off Delay Time[3,4]			23		
T_f	Fall Time[3,4]			3.5		
C_{iss}	Input Capacitance	V_{DS}=20V , V_{GS}=0V , F=1MHz		1830		pF
C_{oss}	Output Capacitance			521		
C_{rss}	Reverse Transfer Capacitance			43		
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		0.8		Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current			50	A
I_{SM}	Pulsed Source Current				100	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25℃			1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=39A.,R_G=25Ω,Starting T_J=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

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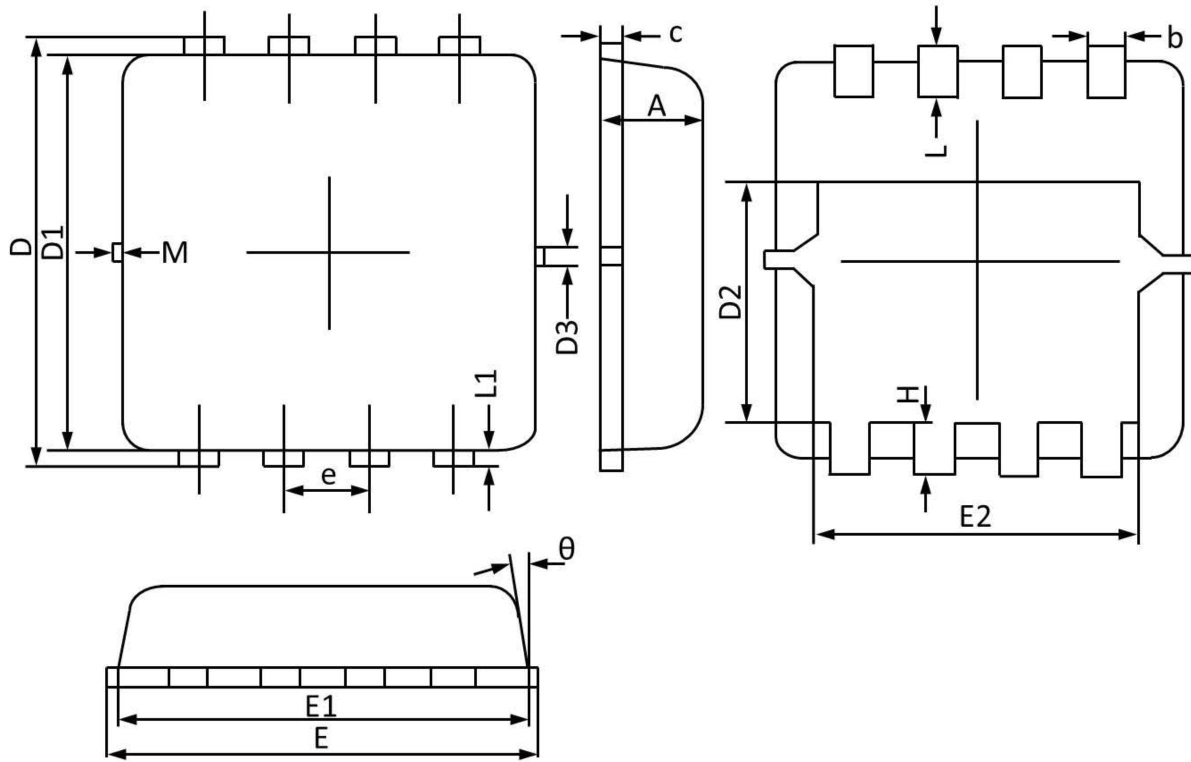
PPAK3x3 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
b	0.250	0.350	0.010	0.013
c	0.100	0.250	0.004	0.009
D	3.250	3.450	0.128	0.135
D1	3.000	3.200	0.119	0.125
D2	1.780	1.980	0.070	0.077
D3	0.130 REF		0.005 REF	
E	3.200	3.400	0.126	0.133
E1	3.000	3.200	0.119	0.125
E2	2.390	2.590	0.094	0.102
e	0.650 BSC		0.026 BSC	
H	0.300	0.500	0.011	0.019
L	0.300	0.500	0.011	0.019
L1	0.130 REF		0.005 REF	
θ	0°	12°	0°	12°
M	0.150 REF		0.006 REF	

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