SUMSEMI

S40N05PPB

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	90A

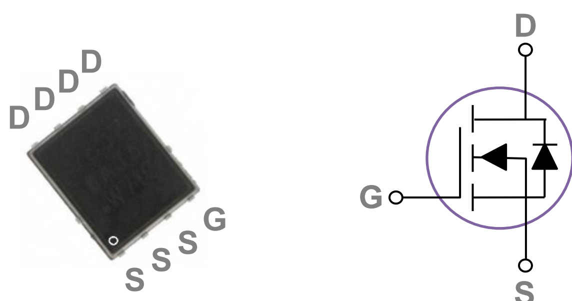
Features

- *40V, 90A, $R_{DS(ON)}$Max.=5.5mΩ@V_{GS} = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *Green Device Available*

Applications

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

PPAK5×6 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℃)	90	A
	Drain Current – Continuous (T_C=100℃)	57	A
I_{DM}	Drain Current – Pulsed[1]	360	A
E_{AS}	Single Pulse Avalanche Energy[2]	80	mJ
I_{AS}	Single Pulse Avalanche Current[2]	40	A
P_D	Power Dissipation (T_C=25℃)	142	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
△$V_{GS(th)}$	$V_{GS(th)}$ 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		20		nC
Q_{gs}	Gate-Source Charge[3,4]			5.5		
Q_{gd}	Gate-Drain Charge[3,4]			3		
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=15V, V_{GS}=10V , R_G=3.3Ω I_D=1A		7.5		ns
T_r	Rise Time[3,4]			2		
$T_{d(off)}$	Turn-Off Delay Time[3,4]			23		
T_f	Fall Time[3,4]			3		
C_{iss}	Input Capacitance	V_{DS}=20V , V_{GS}=0V , F=1MHz		1480		pF
C_{oss}	Output Capacitance			245		
C_{rss}	Reverse Transfer Capacitance			13		
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			90	A
I_{SM}	Pulsed Source Current				180	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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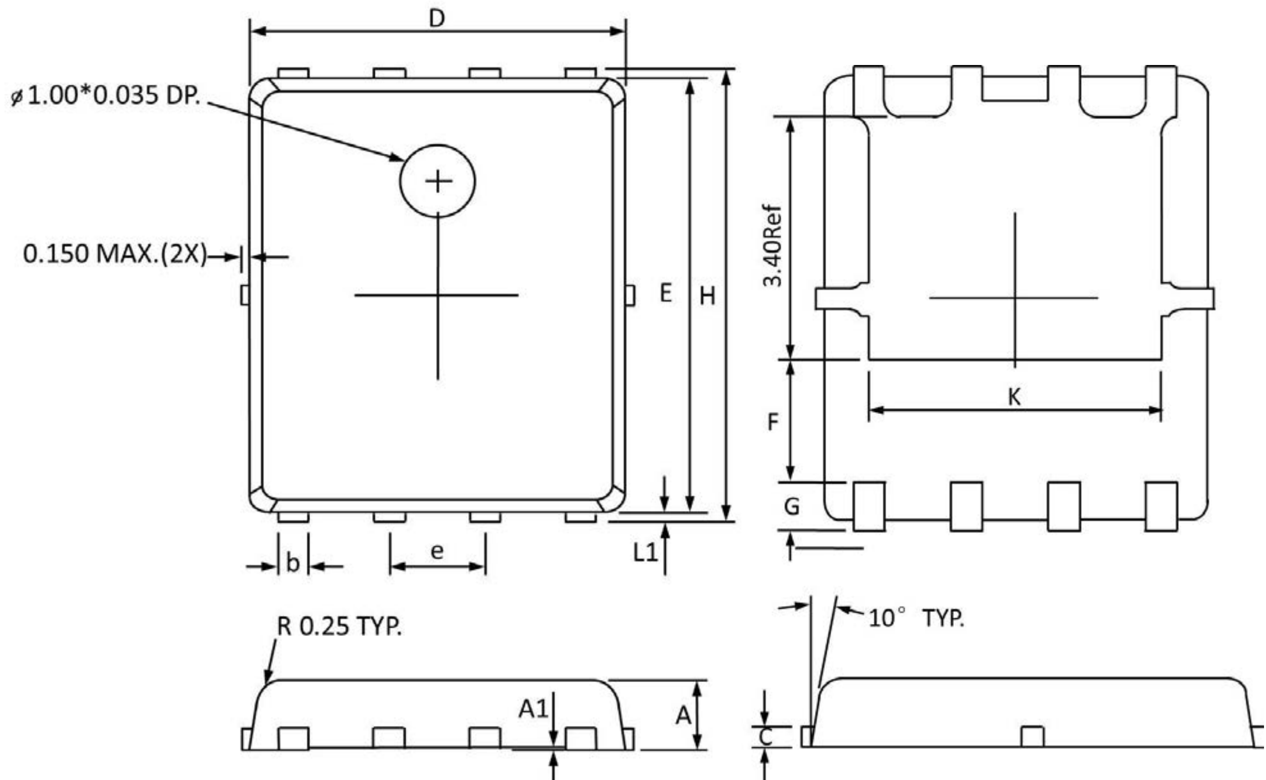
PPAK5X6 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.000	0.032	0.039
A1	0.000	0.005	0.000	0.000
b	0.350	0.490	0.014	0.019
C	0.254 Ref		0.254 Ref	
D	4.900	5.100	0.193	0.200
E	5.700	5.900	0.225	0.232
e	1.27 BSC		1.27 BSC	
F	1.400 Ref		1.400 Ref	
G	0.600 Ref		0.600 Ref	
H	5.950	6.200	0.235	0.244
L1	0.100	0.180	0.004	0.007
K	4.000 Ref		4.000 Ref	

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