P5MNP012A

150V N-Channel MOSFETs

BV_{DSS}	$R_{DS(ON)}$	I_D
150 V	11.5 mΩ	100 A

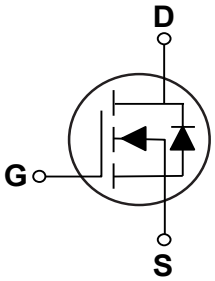
General Description

These N-Channel enhancement mode power field effect transistors are using SGT MOSFET 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.

Features

- $R_{DS(ON)} \leqq 11.5m\Omega @ V_{GS}=10V$
- Fast Switching
- Improved dv/dt Capability
- Green Device Available

PPAK5X6 Pin Configuration



Applications

- Power Management Switches
- DC/DC Converter
- Synchronous Rectification in SMPS

Absolute Maximum Ratings T_J=25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current - Continuous (T_C=25°C)	100	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	400	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	80	mJ
P_D	Power Dissipation (T_C=25°C)	215	W
T_J	Operating Junction Temperature Range	-55 to 150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
Marking Code		NP012A	

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	54	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	0.58	°C/W

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

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	150	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=150V , V_{GS}=0V	---	---	1	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=20A	---	---	11.5	mΩ
		V_{GS}=4.5V , I_D=10A	---	---	16	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	1	---	3	V

Dynamic and switching Characteristics (NOTE 4)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}=75V , V_{GS}=10V , I_D=20A	---	43	---	nC
Q_{gs}	Gate-Source Charge		---	14.5	---	
Q_{gd}	Gate-Drain Charge		---	18	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=75V , V_{GS}=10V , R_G=10Ω , I_D=20A	---	17.5	---	nS
T_r	Rise Time		---	7.9	---	
$T_{d(off)}$	Turn-Off Delay Time		---	28	---	
T_f	Fall Time		---	10.3	---	
C_{iss}	Input Capacitance	V_{DS}=75V , V_{GS}=0V , F=1MHz	---	3420	---	pF
C_{oss}	Output Capacitance		---	262	---	
C_{rss}	Reverse Transfer Capacitance		---	9.2	---	
R_g	Gate resistance	V_{GS}=0V , V_{DS}=0V , f=1MHz	---	2.2	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	100	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=20A	---	---	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	V_R=75V , I_F=20A , dI/dt=100A/us	---	81	---	nS
Q_{rr}	Body Diode Reverse Recovery Charge		---	162	---	nC

NOTES：

1. Repetitive Rating：Pulsed width limited by maximum junction temperature.
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 pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. This value is guaranteed by design hence it is not included in the production test.

Characteristics Curves

FIG. 1-Transfer Characteristics

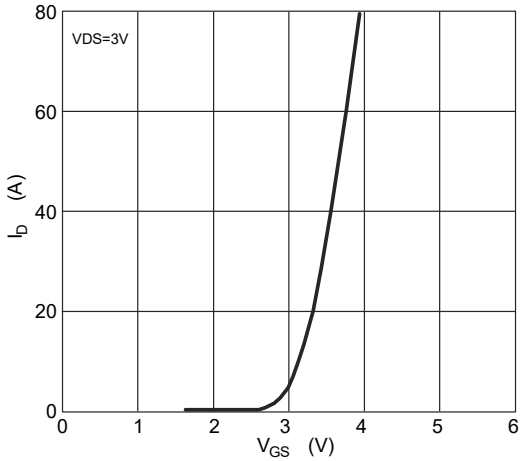


FIG. 2-I_S vs V_{SD}

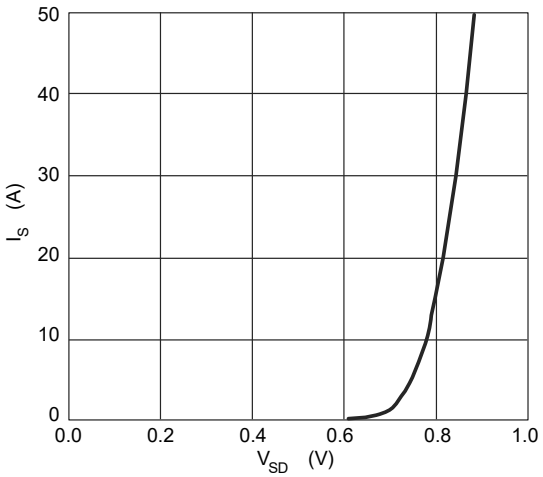


FIG. 3-Gate Charge Characteristics

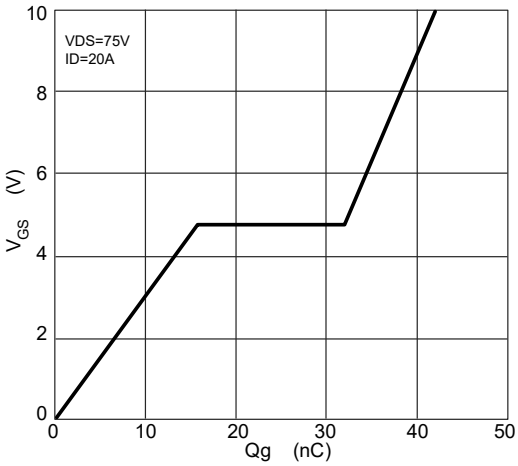


FIG. 4-$R_{DS(on)}$ vs V_{GS}

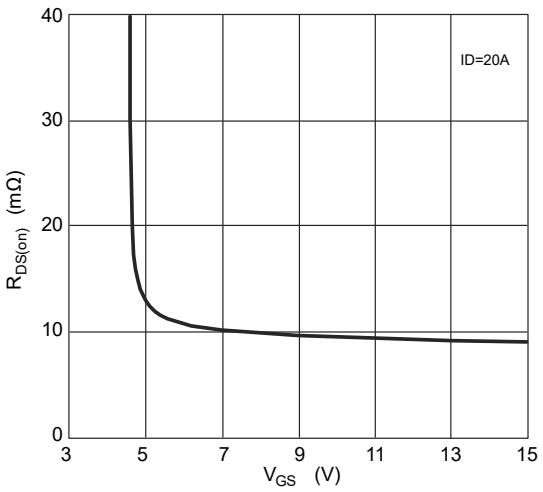


FIG. 5-$R_{DS(on)}$ vs I_D

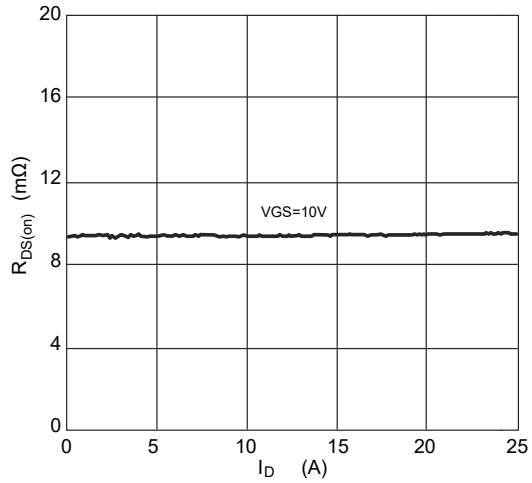
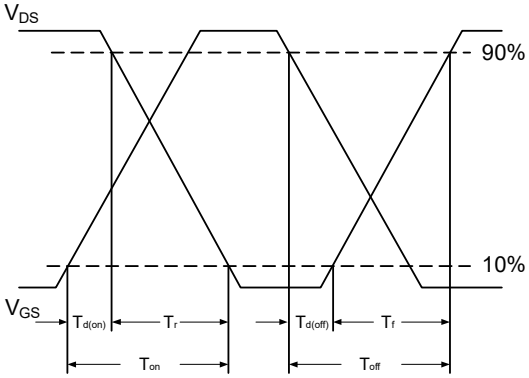
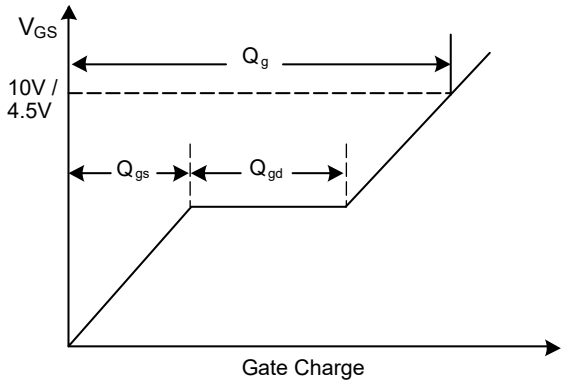


FIG. 6-Switching Time Waveform

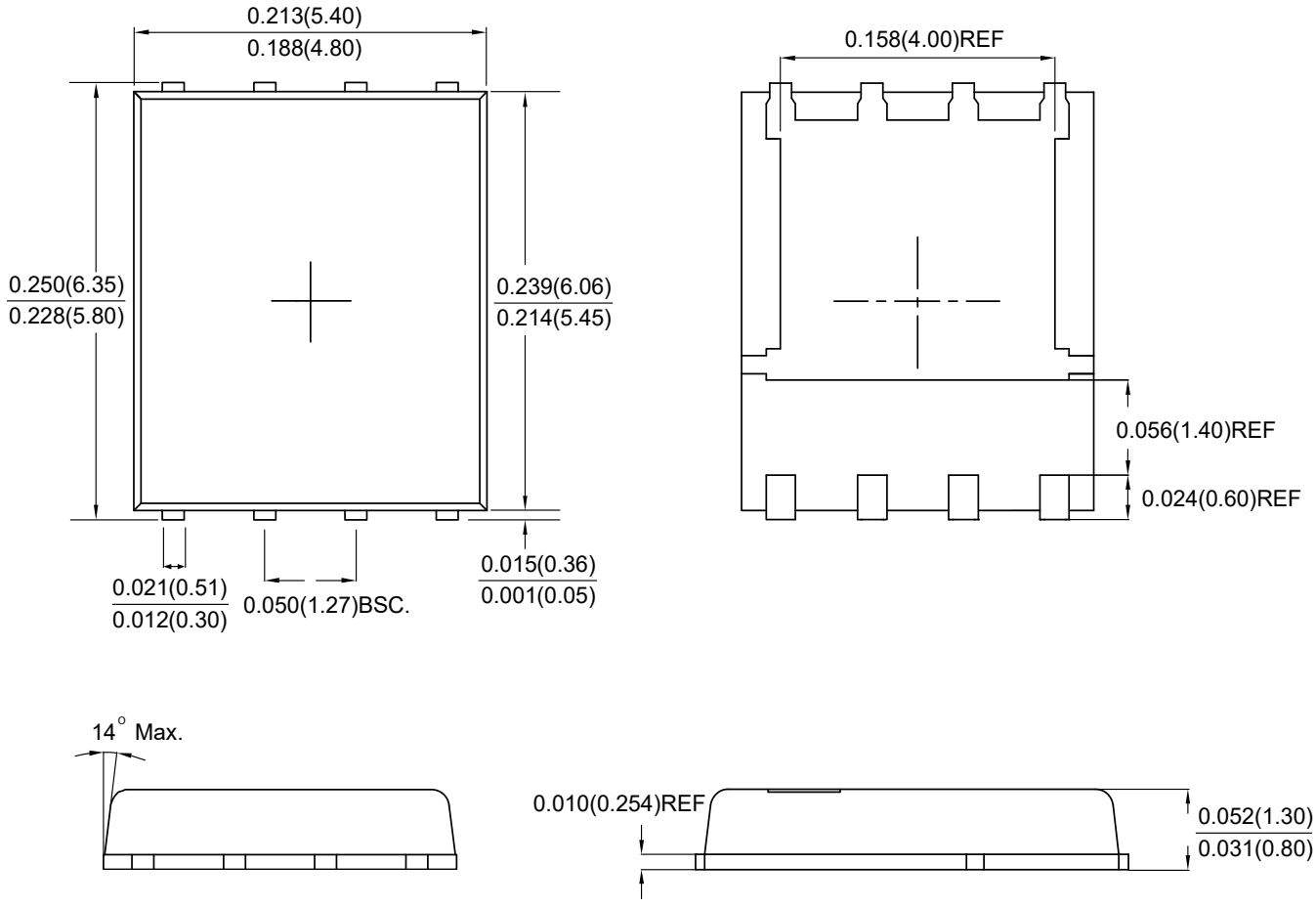


Characteristics Curves

FIG. 7-Gate Charge Waveform



Package Outline Dimensions



PPAK5X6

Dimensions in inches and (millimeters)

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