



30V N-Channel MOSFETs

General Description

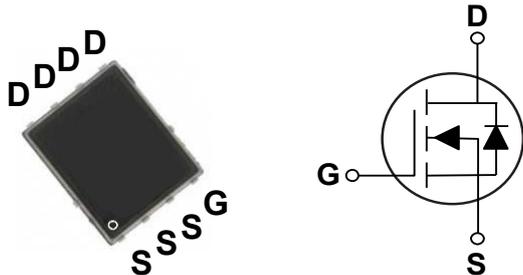
These N-Channel enhancement mode power field effect transistors are using SGT MOSFET technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
30 V	0.7 m Ω	250 A

Features

- $R_{DS(ON)} \leq 0.7m\Omega @ V_{GS}=10V$
- Fast Switching
- Green Device Available

PPAK5X6 Pin Configuration



Applications

- Boost Driver
- Brushless Motor
- BLDC

Absolute Maximum Ratings $T_C=25^\circ C$ unless otherwise noted

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_C=25^\circ C$)	250	A
I_{DM}	Drain Current – Pulsed (NOTE 1)	1000	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	1332	mJ
P_D	Power Dissipation ($T_C=25^\circ C$)	165	W
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
Marking Code		NC0P7	

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	50	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	0.75	$^\circ C/W$



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Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu\text{A}$	30	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=20A$	---	---	0.7	m Ω
		$V_{GS}=4.5V, I_D=10A$	---	---	1	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu\text{A}$	1.2	---	2.5	V

Dynamic and switching Characteristics (NOTE 4)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	$V_{DS}=15V, V_{GS}=10V, I_D=20A$	---	147.4	---	nC
Q_{gs}	Gate-Source Charge		---	25.2	---	
Q_{gd}	Gate-Drain Charge		---	18	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V, V_{GS}=10V, R_G=3\Omega, I_D=20A$	---	14.8	---	nS
T_r	Rise Time		---	15.6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	106	---	
T_f	Fall Time		---	49	---	
C_{ISS}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, F=1\text{MHz}$	---	9130	---	pF
C_{OSS}	Output Capacitance		---	3360	---	
C_{RSS}	Reverse Transfer Capacitance		---	300	---	
R_g	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	1.4	---	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	---	---	250	A
V_{SD}	Diode Forward Voltage (NOTE 3)	$V_{GS}=0V, I_S=20A$	---	---	1.2	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The EAS data shows Max. rating. The test condition is $V_{DD}=24V, L=0.5\text{mH}, V_{GS}=10V, I_{AS}=73A$.
3. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
4. This value is guaranteed by design hence it is not included in the production test.



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Characteristics Curves

FIG. 1-Transfer Characteristics

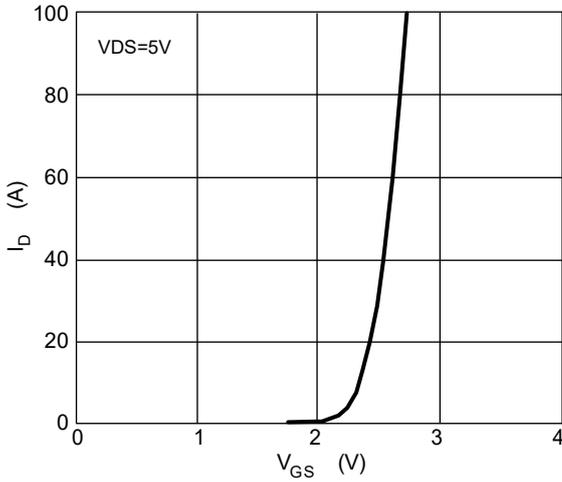


FIG. 2- I_S vs V_{SD}

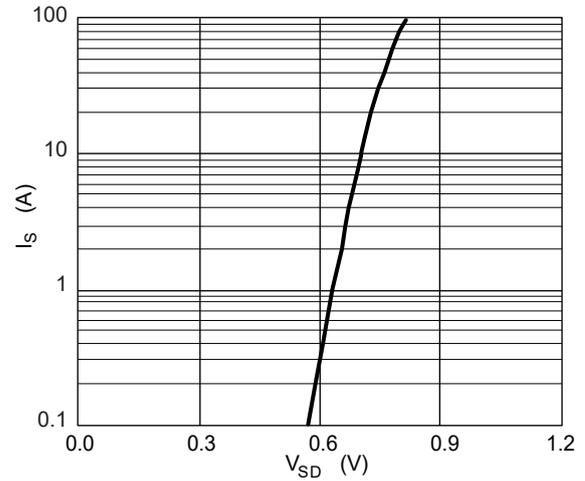


FIG. 3- $R_{DS(on)}$ vs I_D

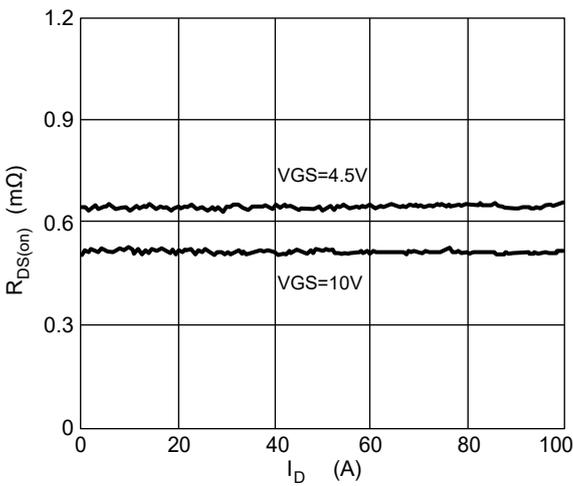


FIG. 4-Normalized $R_{DS(on)}$ vs T_J

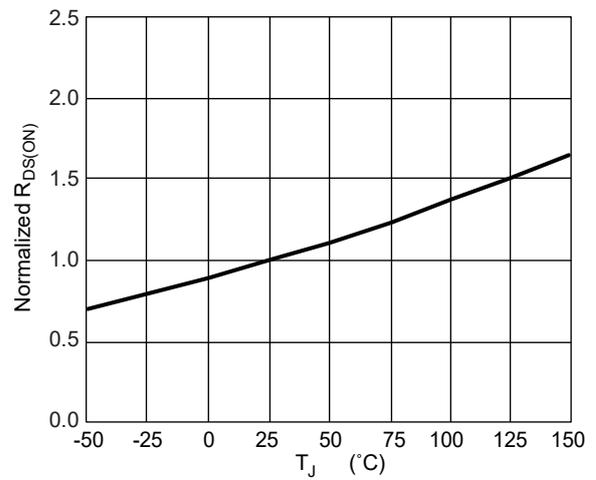


FIG. 5-Gate Charge Characteristics

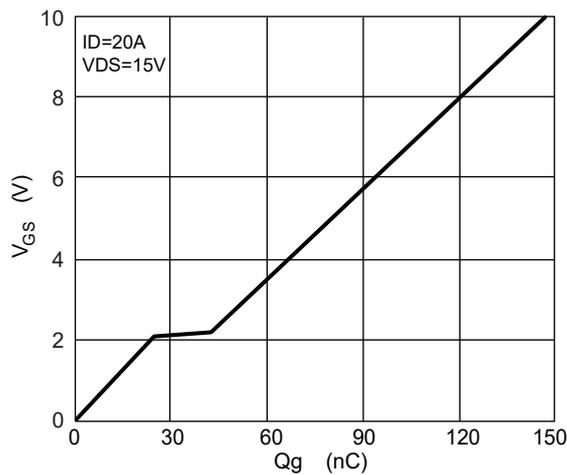
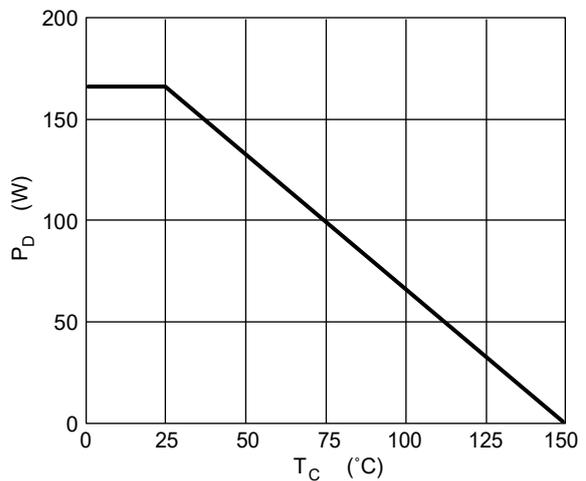


FIG. 6-Power Dissipation





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Characteristics Curves

FIG. 7-Switching Time Waveform

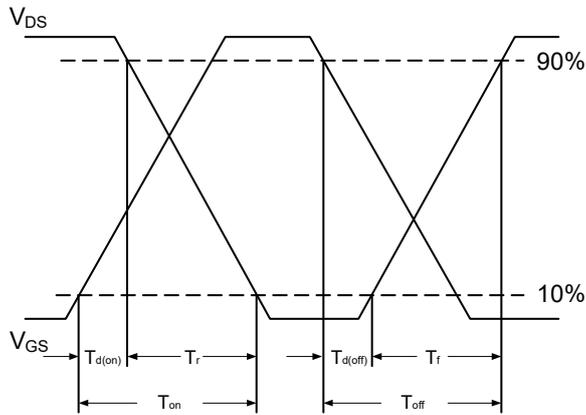
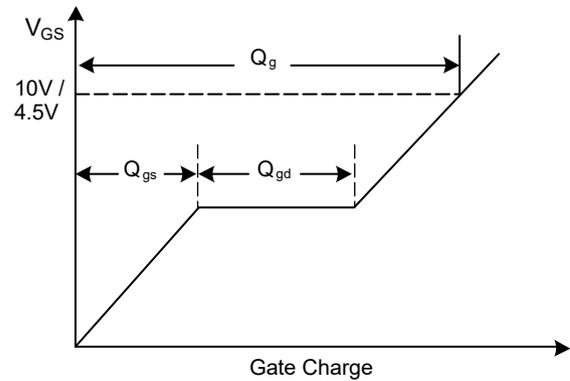
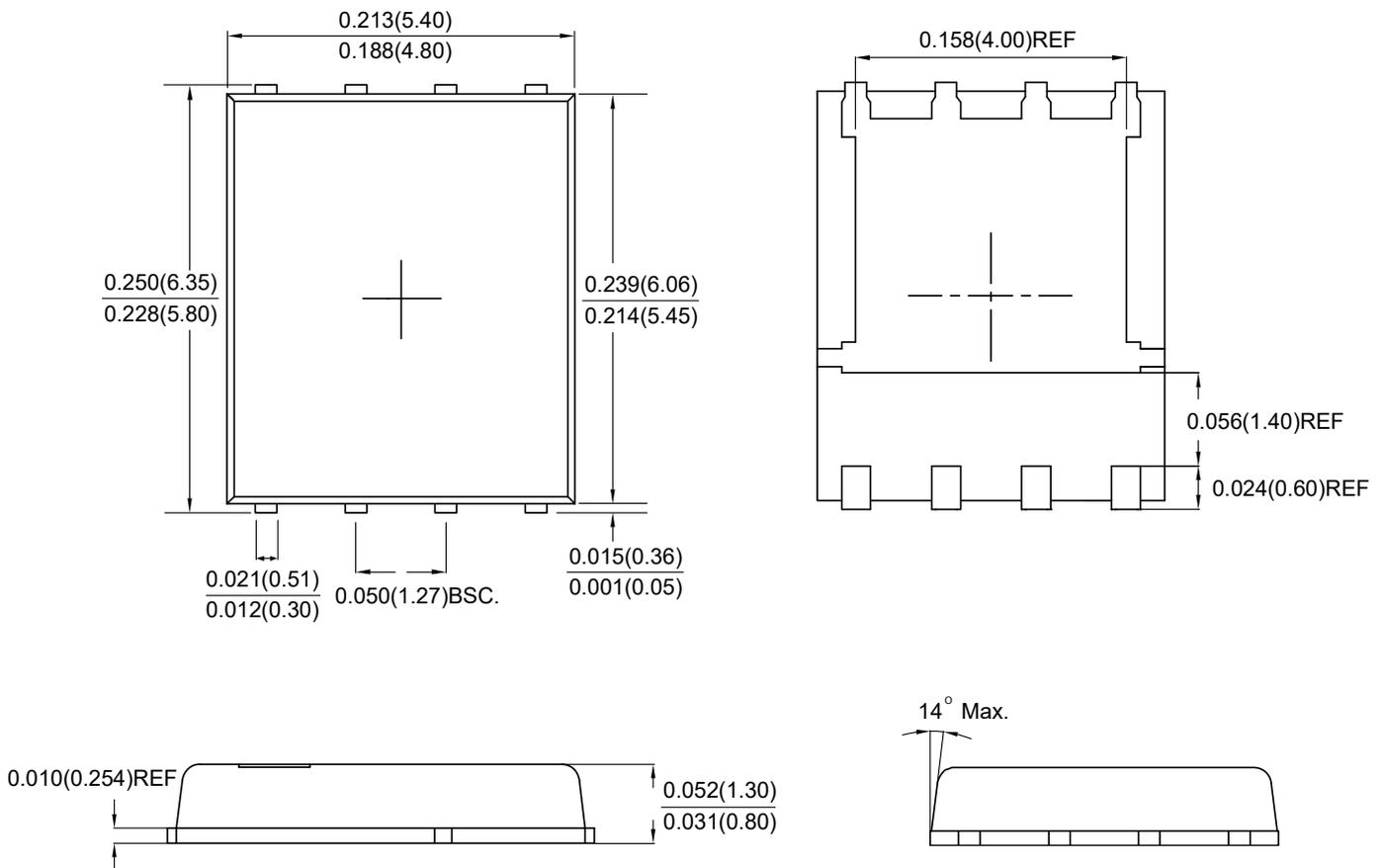


FIG. 8-Gate Charge Waveform



Package Outline Dimensions



PPAK5X6

Dimensions in inches and (millimeters)



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