PFP80T420/PFF80T420

N-Channel Super Junction MOSFET

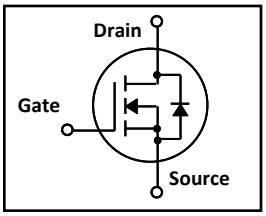
FEATURES

- New technology for high voltage device
- Low $R_{DS(on)}$ low conduction losses
- Small package
- Ultra low gate charge cause lower driving requirement
- 100% avalanche tested
- RoHS compliant

BV_{DSS} = 800 V

$R_{DS(on)}$ = 0.35 Ω

I_D = 11 A



TO-220

TO-220F

APPLICATION

- Power Factor Correction(PFC)
- Switched mode power supply (SMPS)
- Uninterruptible Power Supply (UPS)

Absolute Maximum Ratings

T_C=25°C unless otherwise specified

Symbol	Parameter	PFP80T420	PFF80T420	Units
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	800		V
I_D	Drain Current – Continuous (T_C = 25°C)	11	11*	A
	Drain Current – Continuous (T_C = 100°C)	8.5	8.5*	A
$I_{DM(pulse)}$	Drain Current – Pulsed * Note 1	44	44*	A
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±30		V
E_{AS}	Single Pulsed Avalanche Energy * Note 2	144		mJ
I_{AR}	Avalanche Current * Note 1	6		A
E_{AR}	Repetitive Avalanche Energy * Note 1	0.7		mJ
dv/dt	Drain Source Voltage Slope, V_{DS} ≤ 480V	50		V/ns
	Reverse Diode dv/dt, V_{DS} ≤ 480V	15		V/ns
P_D	Maximum Power Dissipation (T_C = 25°C)	188	33.8	W
	Derate above 25°C	1.5	0.27	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150		°C

* Limited by maximum junction temperature

Thermal Resistance Characteristics

Symbol	Parameter	PFP80T420	PFF80T420	Units
$R_{\theta JC}$	Junction-to-Case (Maximum)	0.66	3.69	°C/W
$R_{\theta JA}$	Junction-to-Ambient (Maximum)	62.5	80	

Package Marking and Ordering Information

Marking	Device	Package	Remark
NCE80T420	PFP80T420	TO-220	RoHS
NCE80T420F	PFF80T420	TO-220F	RoHS

Electrical Characteristics T_A=25 °C unless otherwise specified

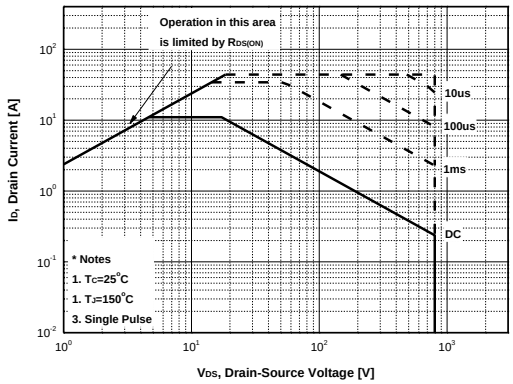
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 uA	3.0	3.5	4.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 5.5 A	--	350	420	m.ohm
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	800	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 800 V, V_{GS} = 0 V	--	--	10	uA
		V_{DS} = 640 V, T_C=125 °C	--	--	100	uA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V, V_{DS} = 0 V	--	--	-100	nA
Dynamic Characteristics						
g_{FS}	Forward Transconductance	V_{DS} = 20V, I_D = 5.5A	--	7	--	S
C_{iss}	Input Capacitance	V_{DS} = 50 V, V_{GS} = 0 V, f = 1.0 MHz	--	2600	--	pF
C_{oss}	Output Capacitance		--	95	--	pF
C_{rss}	Reverse Transfer Capacitance		--	7	--	pF
Q_g	Total Gate Charge	V_{DS} = 640 V, I_D = 11 A, V_{GS} = 10 V	--	48	--	nC
Q_{gs}	Gate-Source Charge		--	17	--	nC
Q_{gd}	Gate-Drain Charge		--	14	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On Time	V_{DS} = 480 V, I_D = 5.5 A, R_G = 4 Ω, V_{GS} = 10V	--	12	--	ns
t_r	Turn-On Rise Time		--	7	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	62	--	ns
t_f	Turn-Off Fall Time		--	5	--	ns
Source-Drain Diode Maximum Ratings and Characteristics						
I_S	Continuous Source-Drain Diode Forward Current		--	--	11	A
I_{SM}	Pulsed Source-Drain Diode Forward Current		--	--	44	A
V_{SD}	Source-Drain Diode Forward Voltage	I_S = 11 A, V_{GS} = 0 V	--	0.9	1.3	V
trr	Reverse Recovery Time	I_S = 11 A di/dt = 100 A/µs	--	290	--	ns
Qrr	Reverse Recovery Charge		--	2.2	--	µC

Notes ;

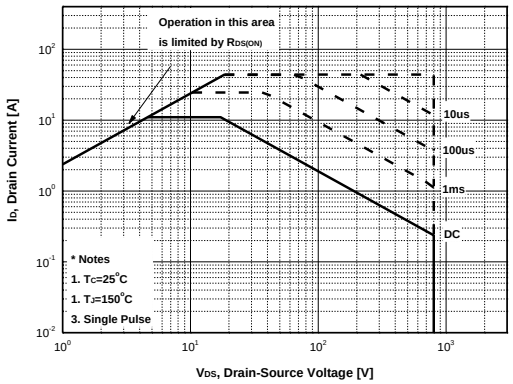
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. V_{DD}=50V, V_G=10V, R_G=25Ω, Starting T_J=25°C

Typical Characteristics

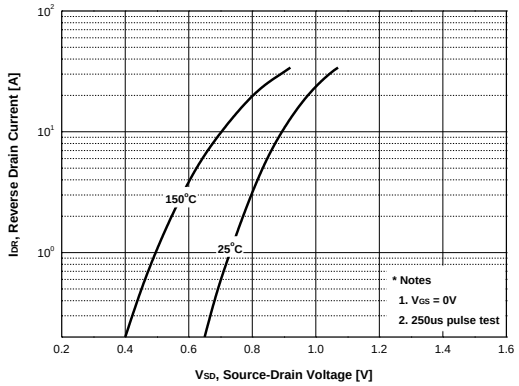
Safe Operation Area_TO-220



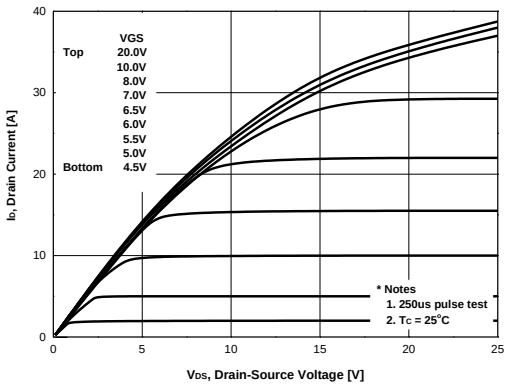
Safe Operation Area_TO-220F



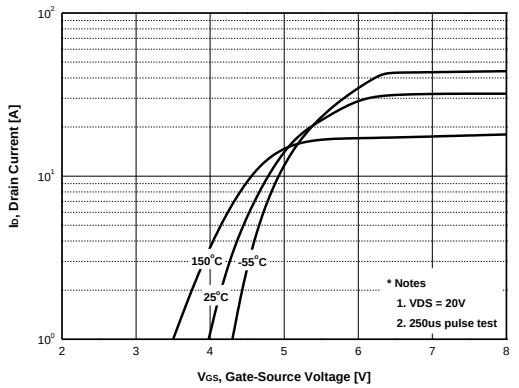
Source-Drain Diode Forward Voltage



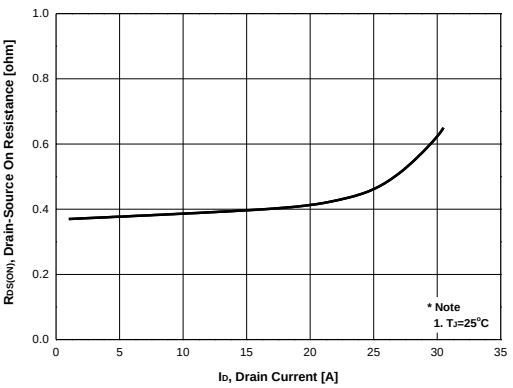
Output Characteristics



Transfer Characteristics

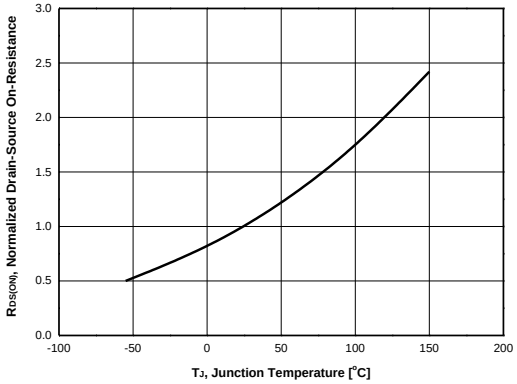


Static Drain-Source On Resistance

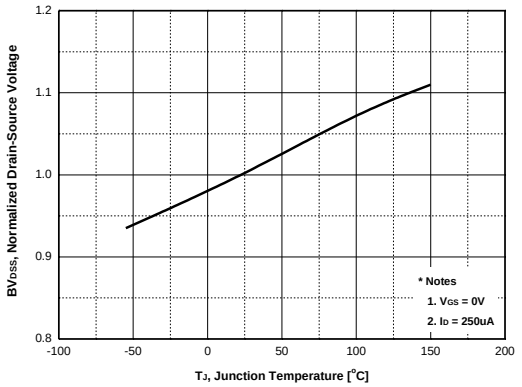


Typical Characteristics (continued)

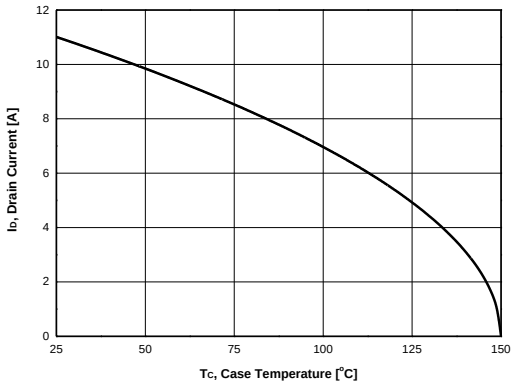
$R_{DS(ON)}$ vs. Junction Temperature



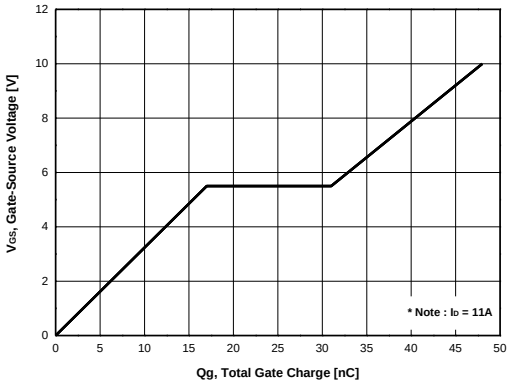
BV_{DSS} vs. Junction Temperature



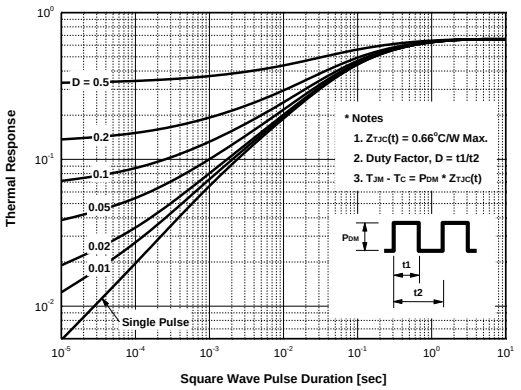
Maximum ID vs. Case Temperature



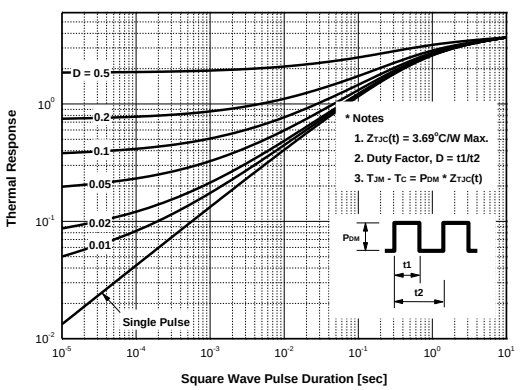
Gate Charge Characteristics



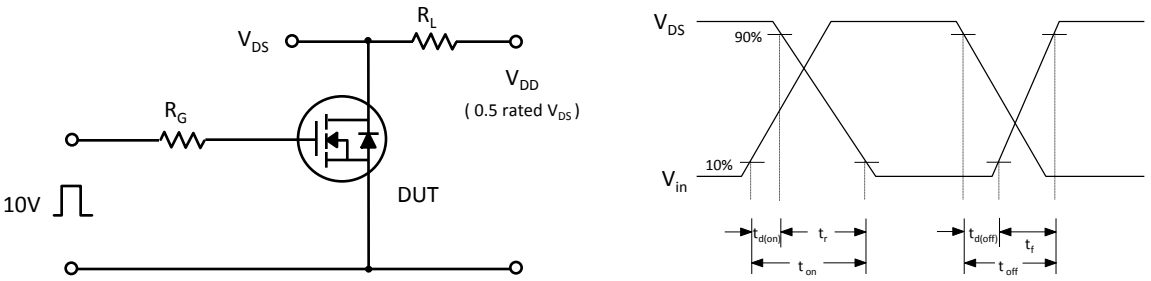
Transient Thermal Response Curve



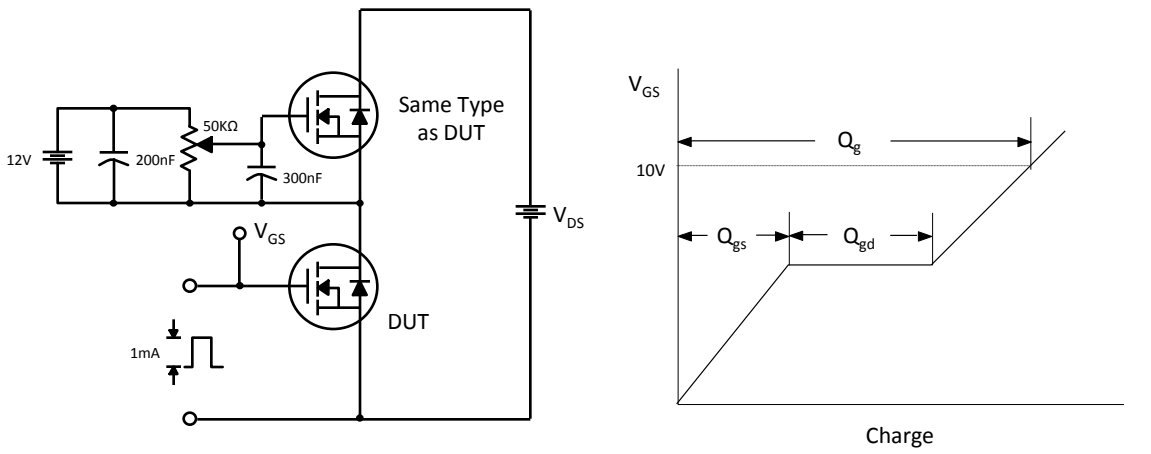
Transient Thermal Response Curve



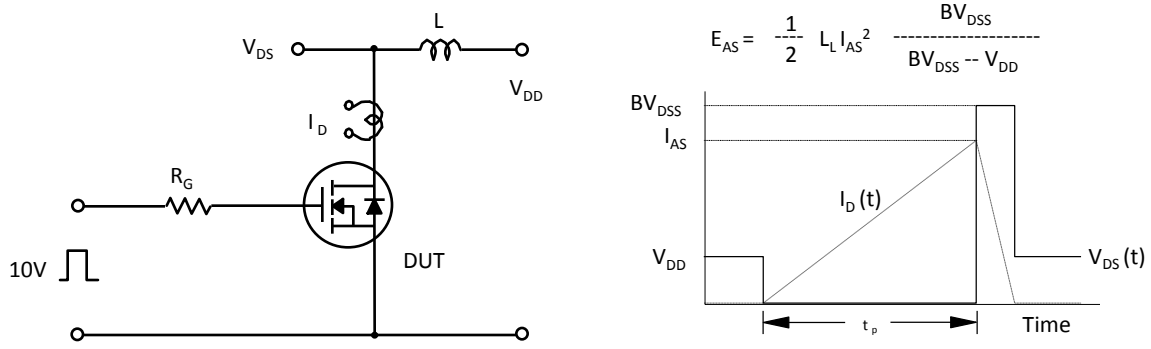
Characteristics Test Circuit & Waveform



Switching Time Test Circuit & Waveforms

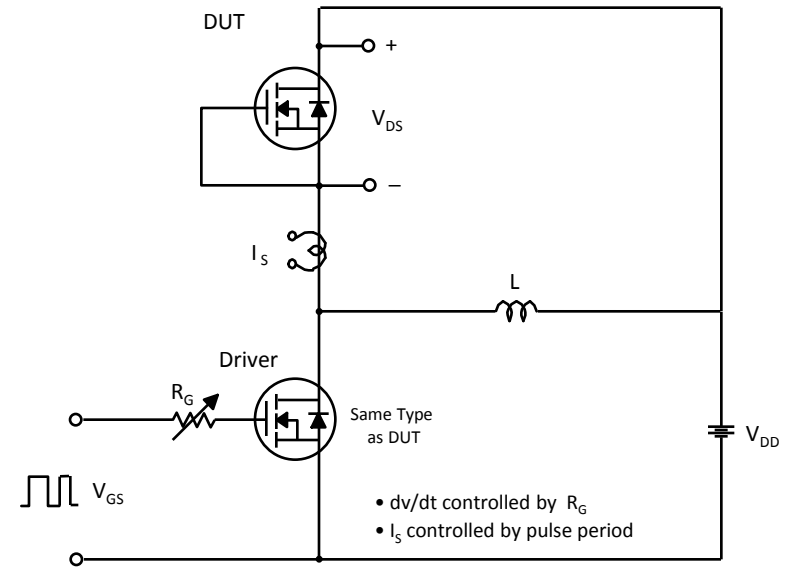


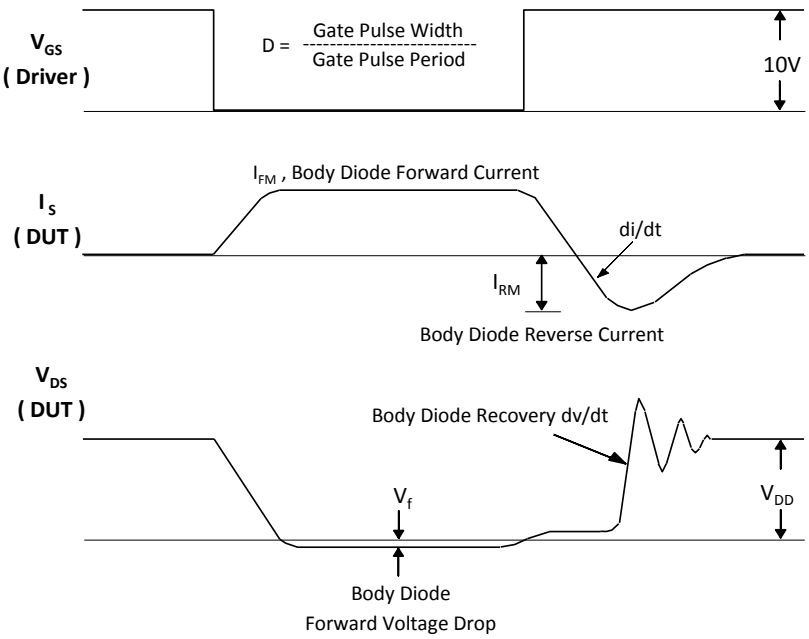
Gate Charge Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveforms

Characteristics Test Circuit & Waveform (continued)





Peak Diode Recovery dv/dt Test Circuit & Waveforms