

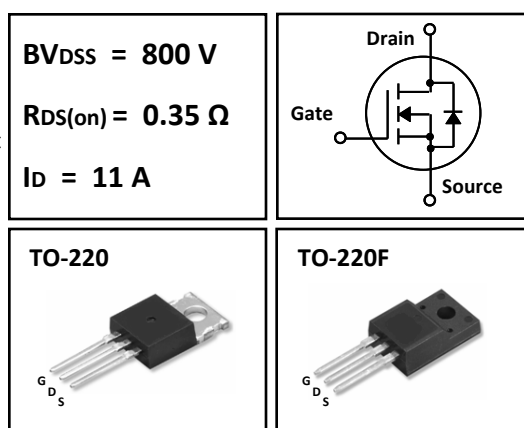
PFP80T420/PFF80T420 N-Channel Super Junction MOSFET

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

APPLICATION

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



Absolute Maximum Ratings

$T_c=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	PFP80T420	PFF80T420	Units
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	800		V
I_D	Drain Current – Continuous ($T_c = 25^{\circ}\text{C}$)	11	11*	A
	Drain Current – Continuous ($T_c = 100^{\circ}\text{C}$)	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, $V_{DS} \leq 480V$	50		V/ns
	Reverse Diode dv/dt , $V_{DS} \leq 480V$	15		V/ns
P_D	Maximum Power Dissipation ($T_c = 25^{\circ}\text{C}$)	188	33.8	W
	Derate above 25°C	1.5	0.27	W/ $^{\circ}\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to $+150$		$^{\circ}\text{C}$

* Limited by maximum junction temperature

Thermal Resistance Characteristics

Symbol	Parameter	PFP80T420	PFF80T420	Units
$R_{\theta JC}$	Junction-to-Case (Maximum)	0.66	3.69	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	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 $T_A=25\text{ }^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	3.0	3.5	4.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 5.5\text{ A}$	--	350	420	m.ohm

Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	800	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}$	--	--	10	μA
		$V_{DS} = 640\text{ V}, T_C=125\text{ }^{\circ}\text{C}$	--	--	100	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 30\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

Dynamic Characteristics

g_{FS}	Forward Transconductance	$V_{DS} = 20\text{ V}, I_D = 5.5\text{ A}$	--	7	--	S
C_{iss}	Input Capacitance	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	2600	--	pF
C_{oss}	Output Capacitance		--	95	--	pF
C_{rss}	Reverse Transfer Capacitance		--	7	--	pF
Q_g	Total Gate Charge	$V_{DS} = 640\text{ V}, I_D = 11\text{ A},$ $V_{GS} = 10\text{ V}$	--	48	--	nC
Q_{gs}	Gate-Source Charge		--	17	--	nC
Q_{gd}	Gate-Drain Charge		--	14	--	nC

Switching Characteristics

$t_{d(on)}$	Turn-On Time	$V_{DS} = 480\text{ V}, I_D = 5.5\text{ A},$ $R_G = 4\text{ }\Omega, V_{GS} = 10\text{ V}$	--	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

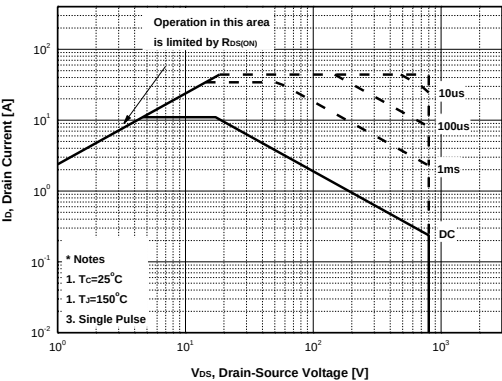
I _S	Continuous Source-Drain Diode Forward Current		--	--	11	A
I _{SM}	Pulsed Source-Drain Diode Forward Current		--	--	44	
V _{SD}	Source-Drain Diode Forward Voltage	I _S = 11 A, V _{GS} = 0 V	--	0.9	1.3	V
t _{rr}	Reverse Recovery Time	I _S = 11 A di/dt = 100 A/μs	--	290	--	ns
Q _{rr}	Reverse Recovery Charge		--	2.2	--	μC

Notes ;

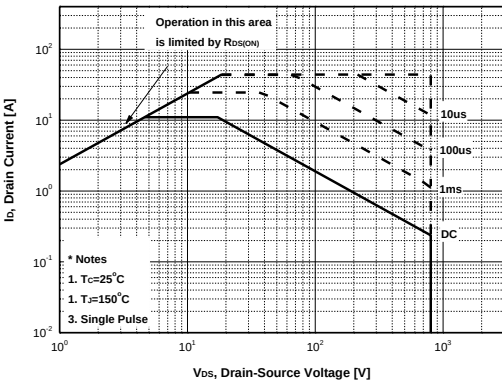
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $V_{DS}=50\text{ V}, V_G=10\text{ V}, R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$

Typical Characteristics

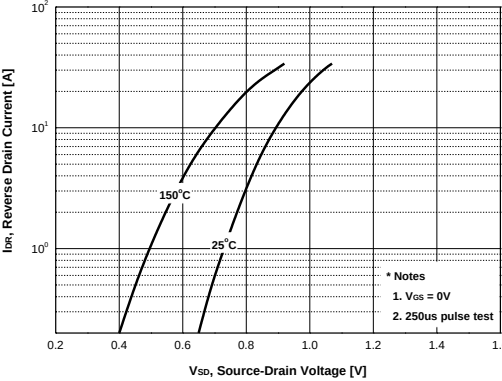
Safe Operation Area_TO-220



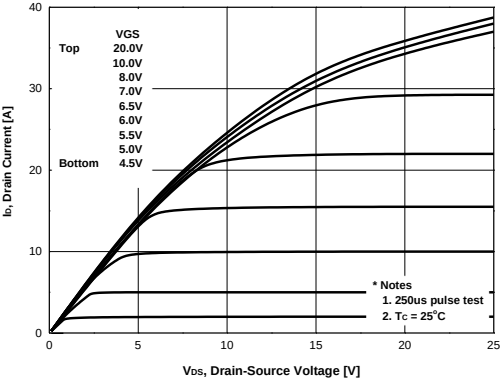
Safe Operation Area_TO-220F



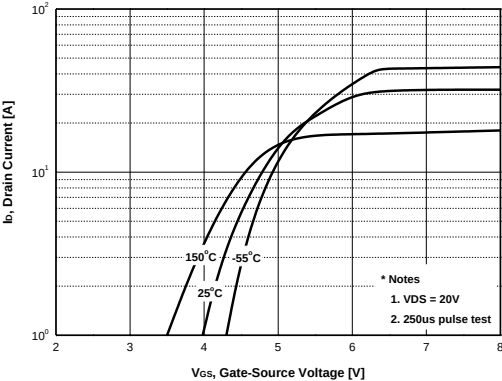
Source-Drain Diode Forward Voltage



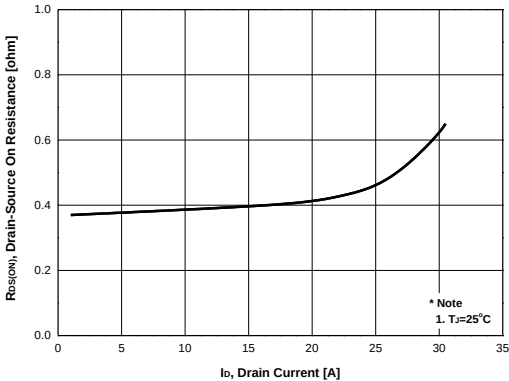
Output Characteristics



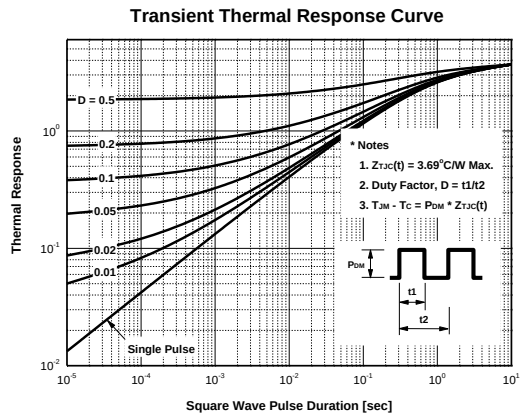
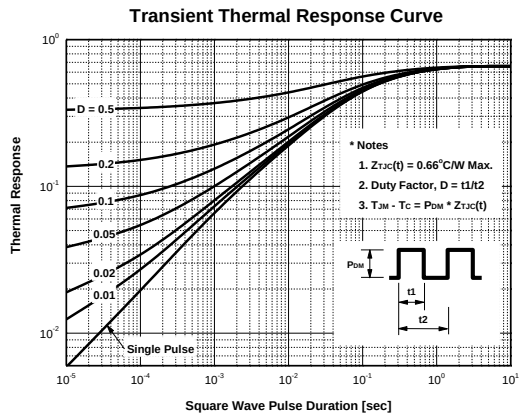
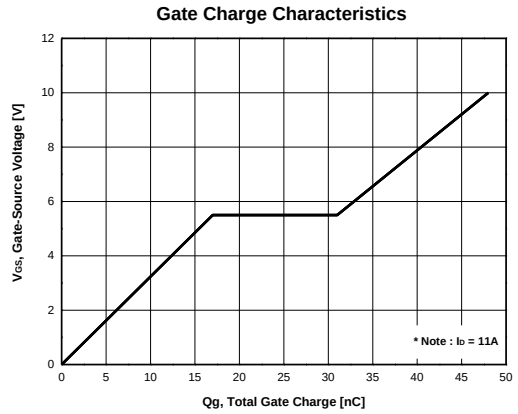
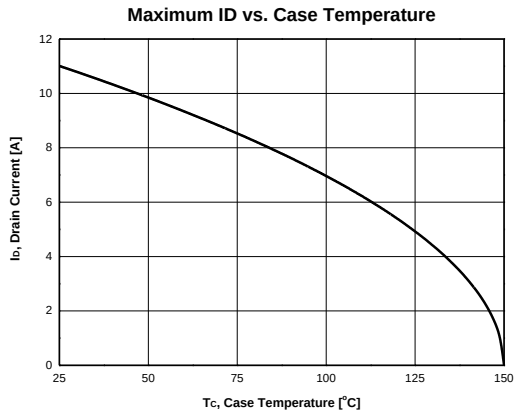
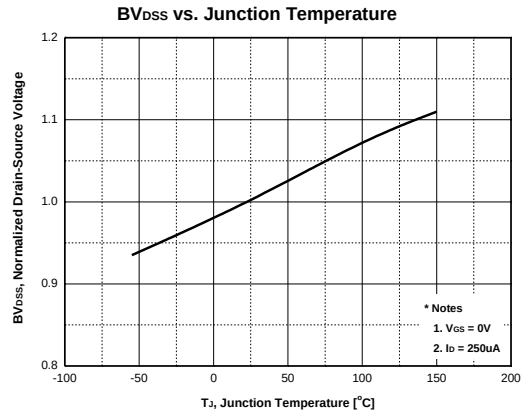
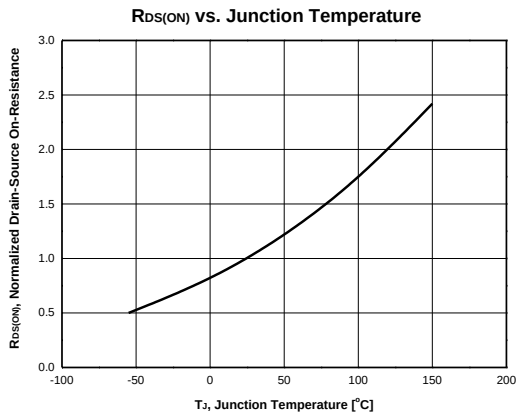
Transfer Characteristics



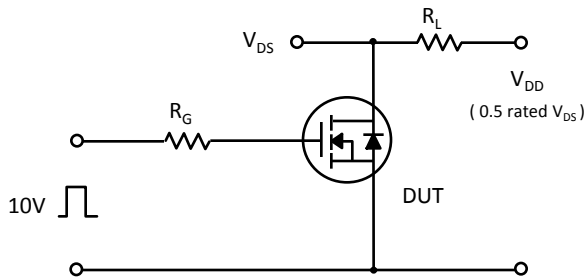
Static Drain-Source On Resistance



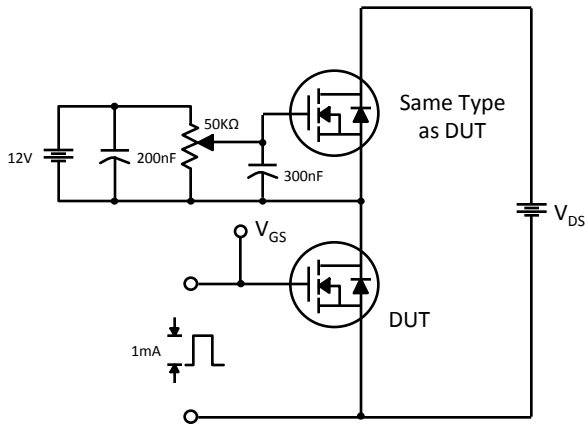
Typical Characteristics (continued)



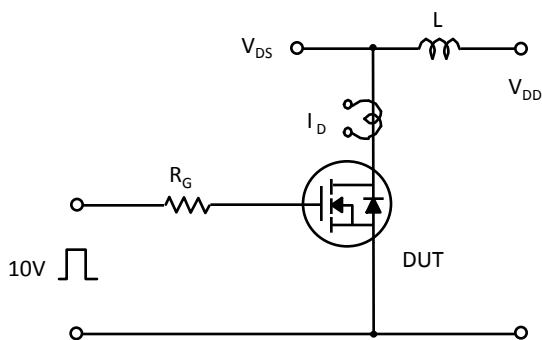
Characteristics Test Circuit & Waveform



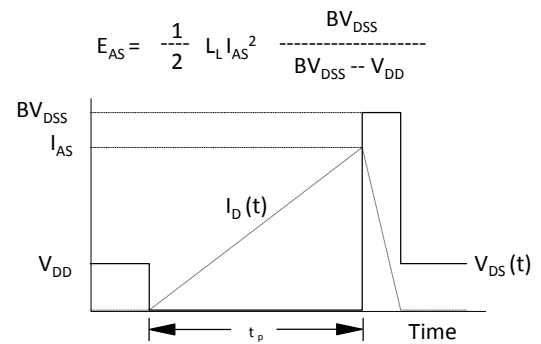
Switching Time Test Circuit & Waveforms



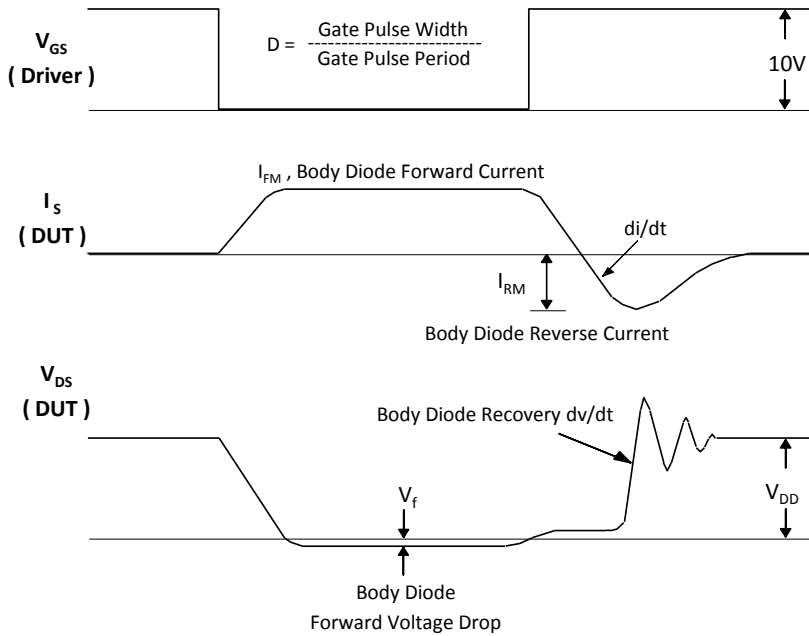
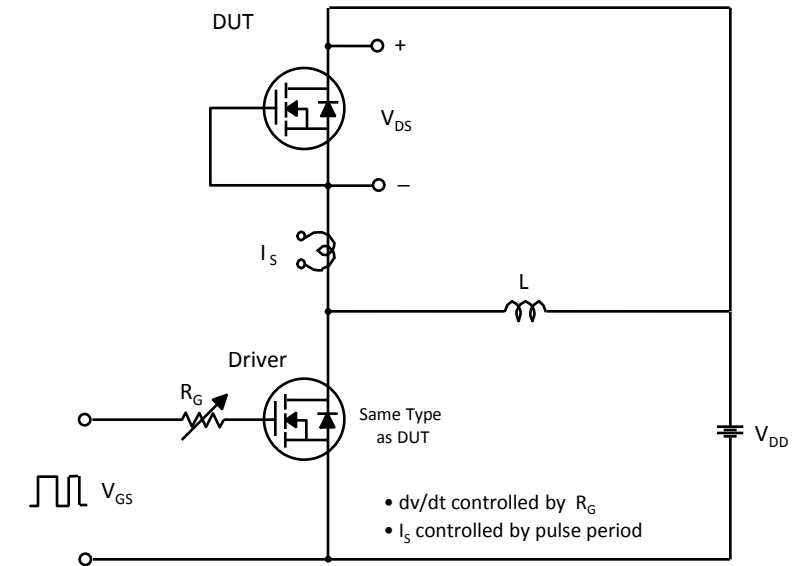
Gate Charge Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveforms



Characteristics Test Circuit & Waveform (continued)



Peak Diode Recovery dv/dt Test Circuit & Waveforms