

60V N-Channel Enhancement Mode MOSFET

Description

The PECN90N06T uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

General Features

- ◆ $V_{DS} = 60V$ $I_D = 90A$
 $R_{DS(ON)}(Typ.) = 6.2m\Omega$ @ $V_{GS} = 10V$
- ◆ High density cell design for ultra low $R_{DS(on)}$
- ◆ Fully characterized avalanche voltage and current
- ◆ Good stability and uniformity with high E_{AS}
- ◆ Excellent package for good heat dissipation
- ◆ Special process technology for high ESD capability

Application

- ◆ Power switching application
- ◆ Hard switched and high frequency circuits
- ◆ Uninterruptible power supply

Package

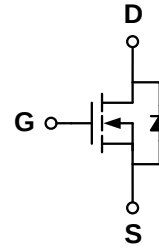
- ◆ TO-220-3L

100% UIS TESTED!

100% ΔV_{ds} TESTED!



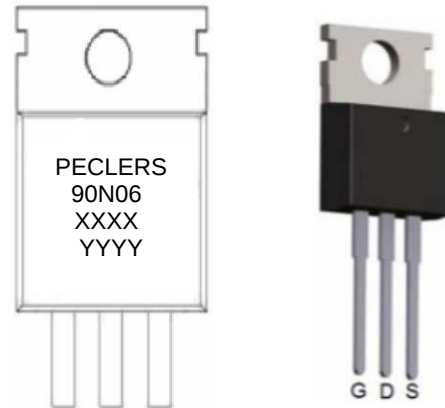
Schematic diagram



Marking and pin assignment

TO-220-3L

(Top View)



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN90N06T	-55°C to +150°C	TO-220-3L	—

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

parameter		symbol	limit	unit
Drain-source voltage		V_{DS}	60	V
Gate-source voltage		V_{GS}	±20	V
Continuous Drain Current	TC=25°C	I_D	90	A
	TC=100°C		62	
Pulsed Drain Current		I_{DP}	310	A
Avalanche energy(L=0.5mH)		E_{AS}	450	mJ
Maximum power dissipation	TC=25°C	P_D	160	W
Operating junction Temperature range		T_j	-55—150	°C

Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition		Min	Typ	Max	Unit
Static Characteristics							
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA		60	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	T _J =25°C	-	-	1	μA
			T _J =85°C	-	-	30	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V		-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA		1.0	1.4	2.5	V
Drain-source on-state resistance ¹	R _{DS(ON)}	V _{GS} =10V, I _D =45A		-	6.2	9	mΩ
		V _{GS} =4.5V, I _D =45A			7.8	10	
On Status Drain Current	I _{D(ON)}	V _{DS} =60V, V _{GS} =10V		90	-	-	A
Diode Characteristics							
Diode Continuous Forward Current	I _S			-	-	90	A
Reverse Recovery Time	t _{rr}	I _F =90A,		-	33	-	ns
Reverse Recovery Charge	Q _{rr}	dI/dt=100A/us		-	54	-	nC
Dynamic Characteristics ²							
Input capacitance	C _{ISS}	V _{GS} =0V ,V _{DS} =25V f=1.0MHz		-	3400	-	pF
Output capacitance	C _{OSS}			-	300	-	
Reverse transfer capacitance	C _{RSS}			-	215	-	
Turn-on delay time	t _{D(ON)}	V _{GS} =10V, V _{DD} =30V, I _D =30A		-	15	-	ns
Turn-on Rise time	t _r			-	11	-	
Turn-off delay time	t _{D(OFF)}			-	52	-	
Turn-off Fall time	t _f			-	13	-	
Total gate charge	Q _g	V _{GS} =4.5V,I _D =15A V _{DS} =15V		-	94		nC
Gate-source charge	Q _{gs}				16		
Gate-drain charge	Q _{gd}			-	24	-	
Drain-Source Diode Characteristics							
Diode forward voltage	V _{SD}	I _{SD} =90A,V _{GS} =0V		-	0.8	1.1	V

Note: 1: Pulse test; pulse width $\leq 300ns$, duty cycle $\leq 2\%$.

2: Guaranteed by design, not subject to production testing.

Typical Performance Characteristics

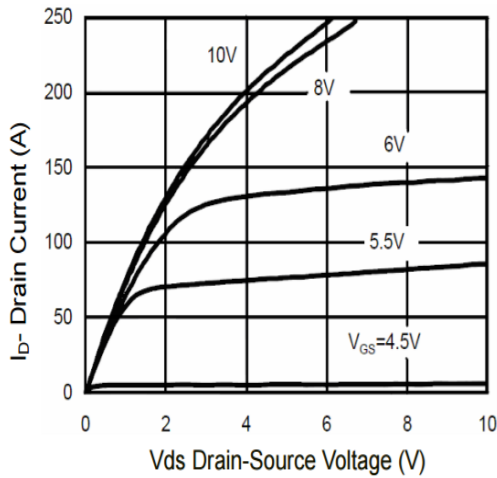


Figure 1 Output Characteristics

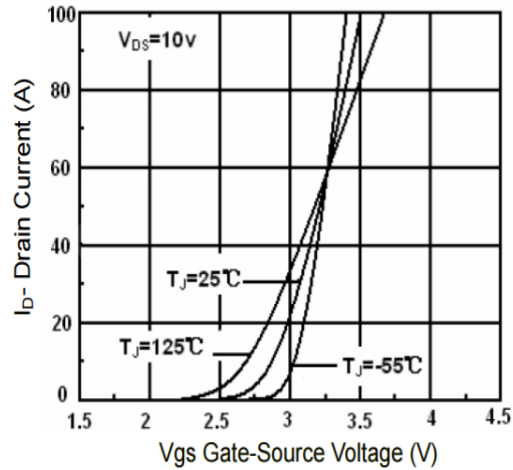


Figure 2 Transfer Characteristics

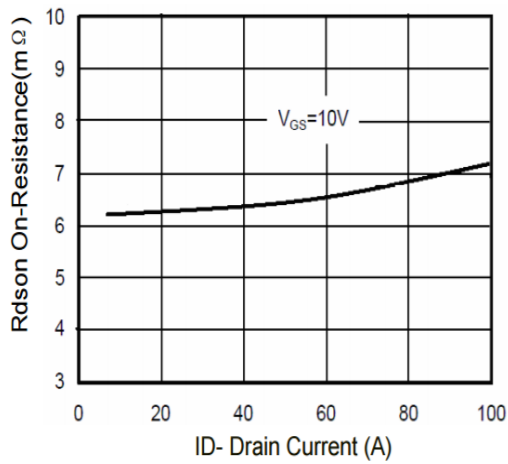


Figure 3 Rdson- Drain Current

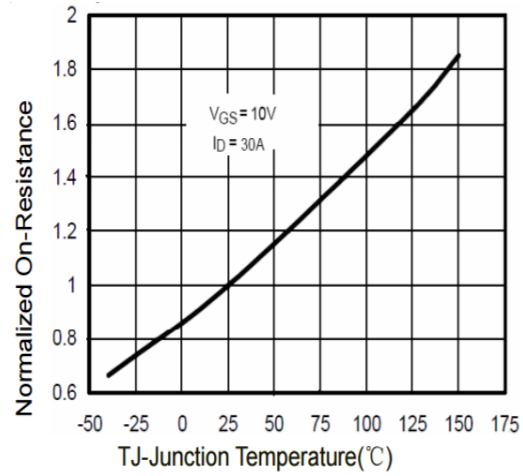


Figure 4 Rdson-Junction Temperature

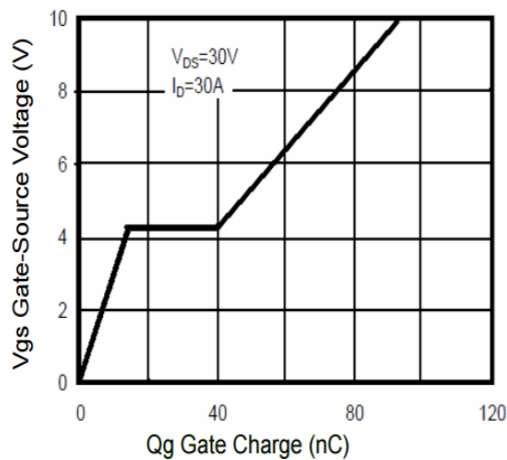


Figure 5 Gate Charge

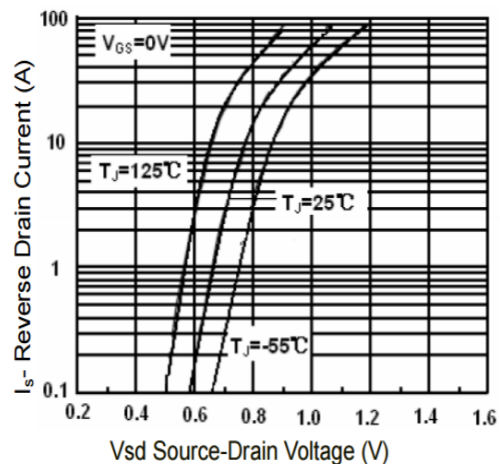


Figure 6 Source- Drain Diode Forward

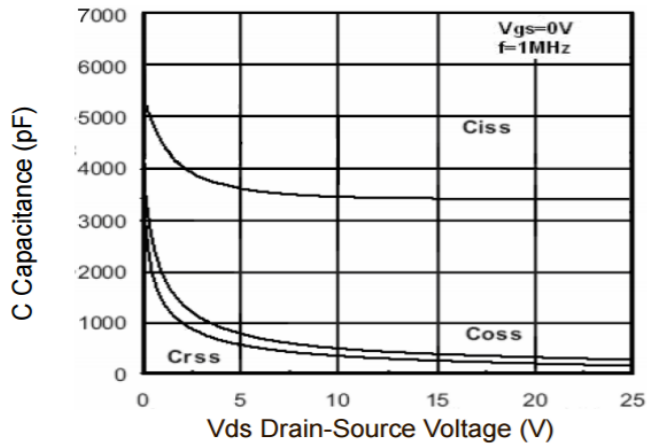


Figure 7 Capacitance vs Vds

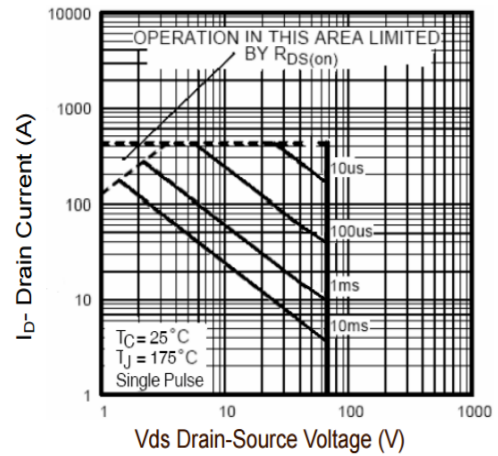


Figure 8 Safe Operation Area

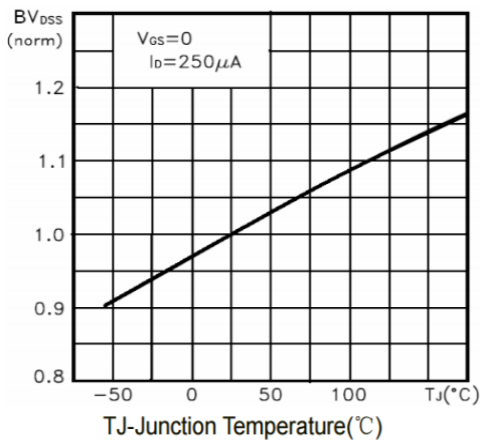


Figure 9 BV_{DSS} vs Junction Temperature

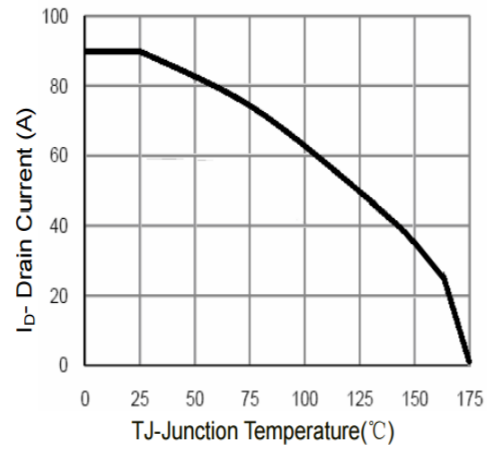


Figure 10 Current vs Junction Temperature

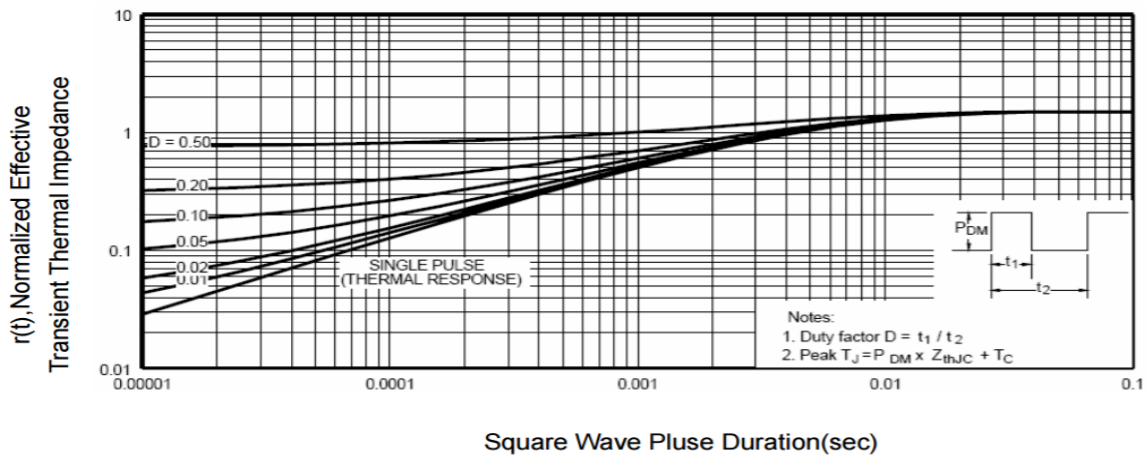
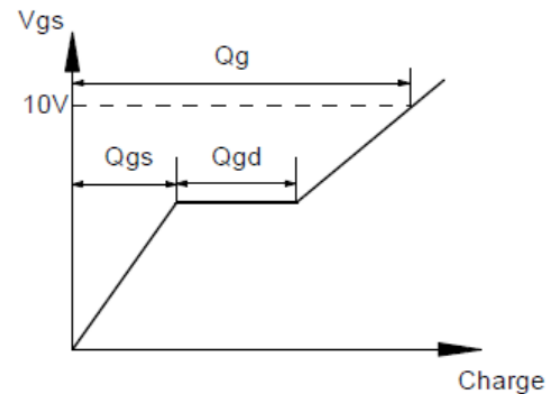
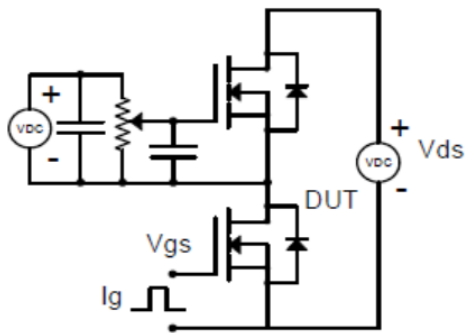
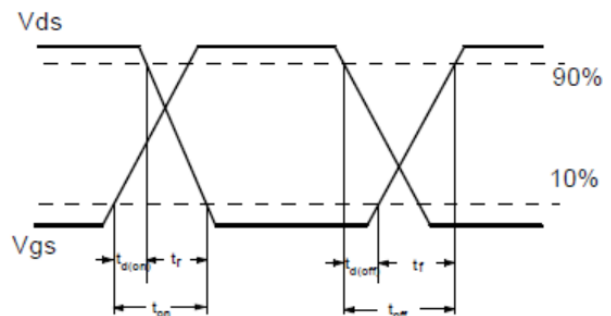
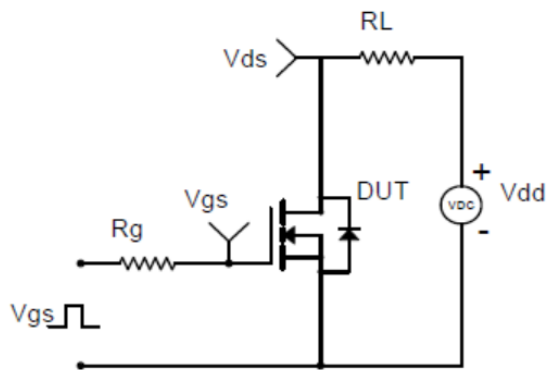


Figure 11 Normalized Maximum Transient Thermal Impedance

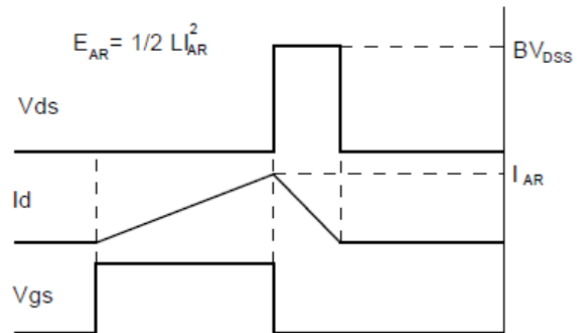
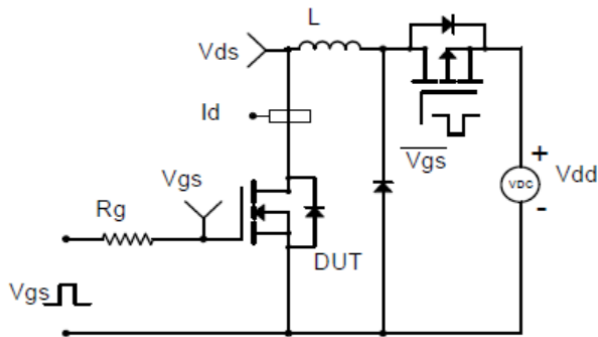
Gate Charge Test Circuit & Waveform



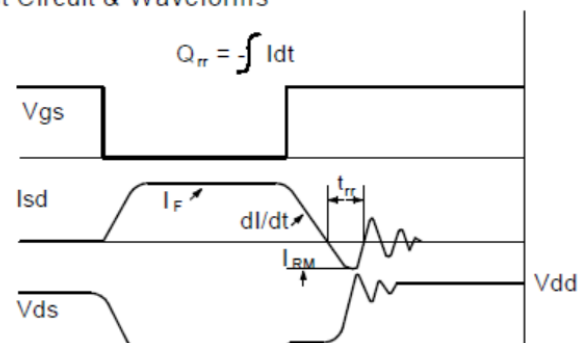
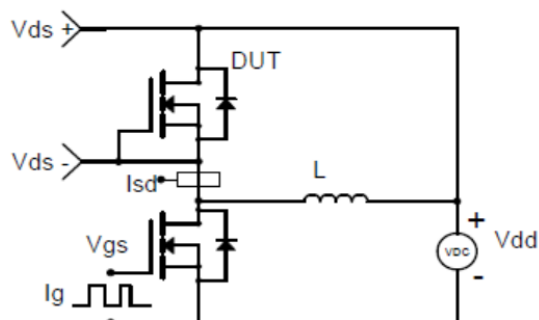
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

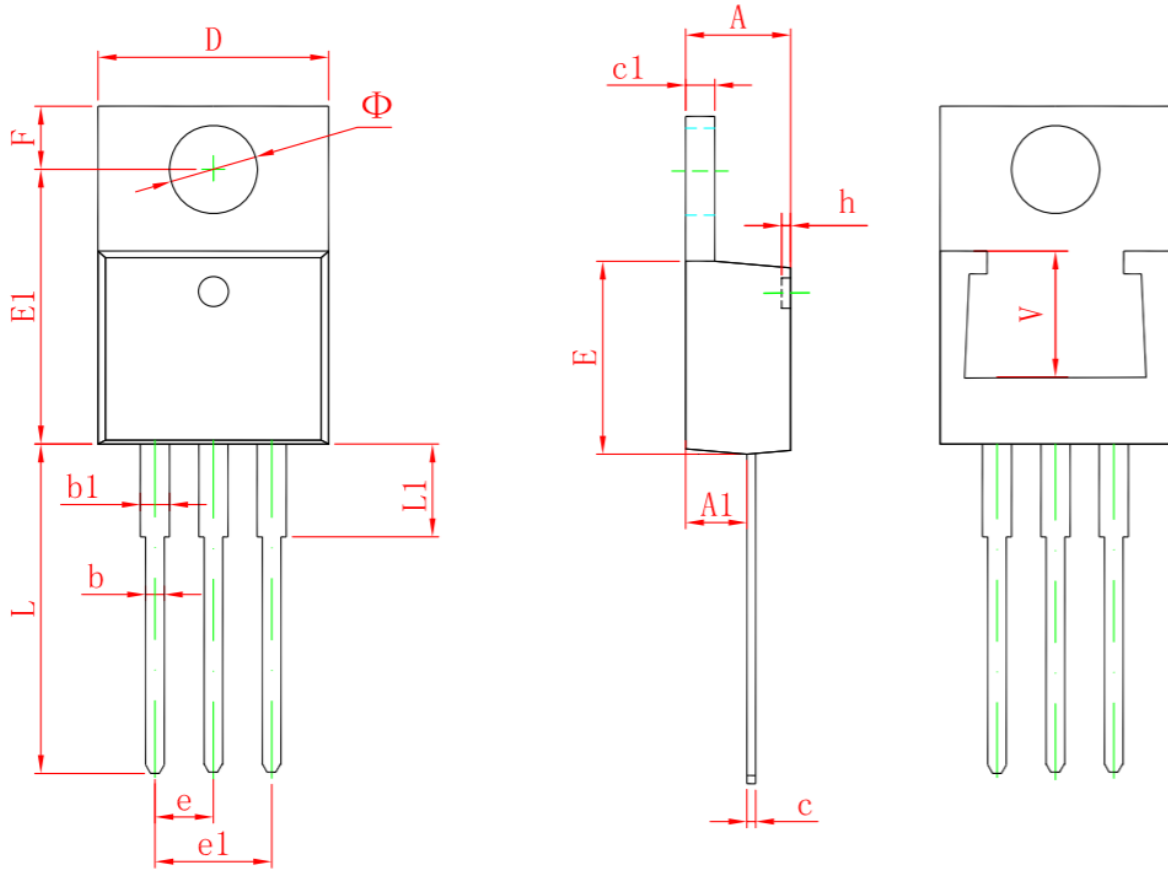


Diode Recovery Test Circuit & Waveforms



Package Information

- TO-220-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155
V	5.600 REF.		0.220 REF.	