30V N-channel enhancement mode MOSFET

General Description

The PAN3080L is a 30V N-channel enhancement mode MOSFET which uses advanced trench technology to provide excellent RDS(on), low gate charge. This device is suitable for use in UPS, power switching and general purpose applications. PAN3080L is packaged in TO-252-2L package.

Features

- V_{DS}(max) =30V
- I_D (max)=80A
- Extremely Low RDS(on):
  Typ.RDS(on) = 4.0 mΩ @V_{GS}=10 V, I_D=40 A
- Good stability and uniformity
- 100% avalanche tested
- Excellent package for good heat dissipation

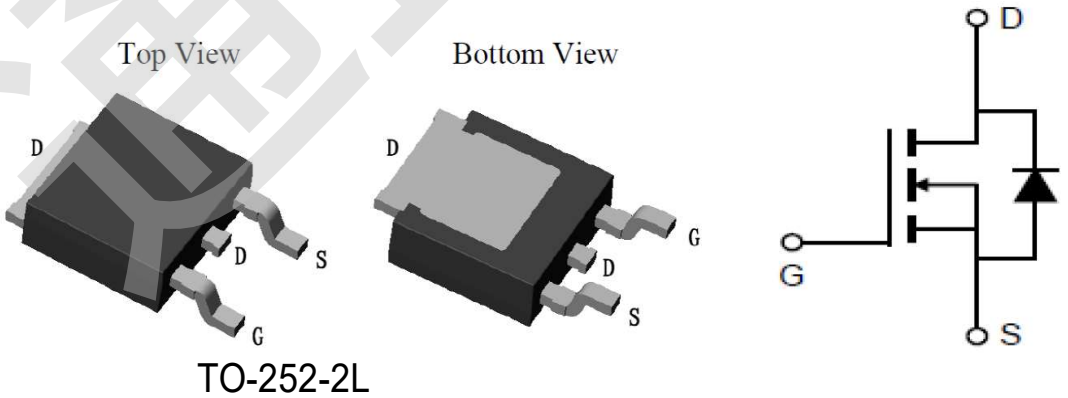
Applications

- Multi-cell Battery protection
- Battery Powered Systems
- UPS
- Portable Power Equipment

Ordering Information

Device	Package	Pin count	Marking
PAN3080L	TO-252-2L	3	PAN3080L

Pin Configurations



TO-252-2L

Main Parameters

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	30	V
I_D	Drain Current - Continuous (TC= 25°C)	80	A
	- Continuous (TC= 100°C)	52*	A
I_{DM}	Drain Current - Pulsed (Note 1)	320*	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	102	mJ
P_D	Power Dissipation (TC = 25°C)	80	W
	- Derate above 25°C	0.53	W/°C
T_j, T_{stg}	Operating and Storage Temperature Range	-55 to +175	°C

* Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.63	°C/W

Electrical Characteristics TC = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250μA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 30 V, V_{GS} = 0 V			1	μA
I_{GSSF}	Gate Leakage Current, Forward	V_{GS} = 20 V, V_{DS} = 0 V			100	nA
I_{GSSR}	Gate Leakage Current, Reverse	V_{GS} = -20 V, V_{DS} = 0 V			-100	nA
On Characteristics						
$V_{GS(TH)}$	Gate Threshold voltage	V_{DS} = V_{GS}, I_D = 250 uA	1	1.6	2.5	V
$R_{DS(On)}$	Drain-Source on-state resistance	V_{GS} = 10 V, I_D = 40 A		4.0	5.0	mΩ
		V_{GS} = 4.5 V, I_D = 24 A		6.9	8.6	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 5 V, I_D = 24 A (Note 3)	20			S
Dynamic Characteristics						

C_{iss}	Input capacitance	V_{DS}=15V, V_{GS}=0V, F=1.0Mhz		1560		pF
C_{oss}	Output capacitance			246		pF
C_{rss}	Reverse transfer capacitance			225		pF
Switching Characteristics						
$t_{d(on)}$	Turn On Delay Time	V_{DD}=15V, I_D=20A, V_{GS}=10V, Rg=3Ohm (Note 3, 4)		3.2		ns
t_r	Rising Time			19.6		ns
$t_{d(off)}$	Turn Off Delay Time			29.2		ns
t_f	Fall Time			18.5		ns
Q_g	Total Gate Charge	V_{DD}=15V, I_D=45A, V_{GS}=10V (Note 3, 4)		33.7		nC
Q_{gs}	Gate-Source Charge			4.5		nC
Q_{gd}	Gate-Drain Charge			7.4		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current				80	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current				320	A
V_{SD}	Diode Forward Voltage	V_{GS}= 0 V, I_S = 24 A			1.2	V
T_{rr}	Reverse recovery time	I_F=20A, di/dt=100A/μS		28		ns
Q_{rr}	Reverse recovery charge			13		nC

NOTE:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 0.5 mH, IAS = 35 A, VDD = 15V, Rg = 25 Ω, Starting Tj = 25°C
3. ISD ≤ 40A, di/dt = 100A/us, VDD ≤ BVDSS, Staring Tj =25°C
4. Pulse Test : Pulse width ≤ 300us, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

Typical Characteristics and Thermal Characteristics (Curves)

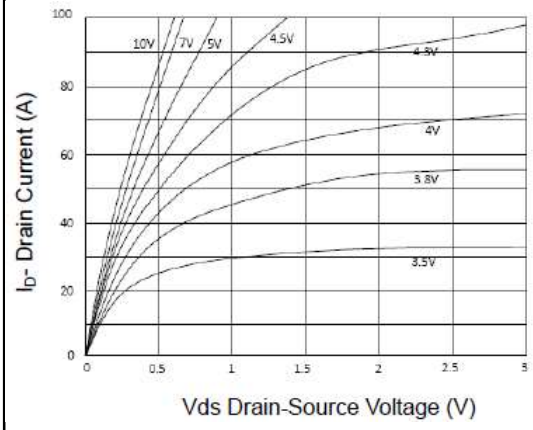


Figure 1 Output Characteristics

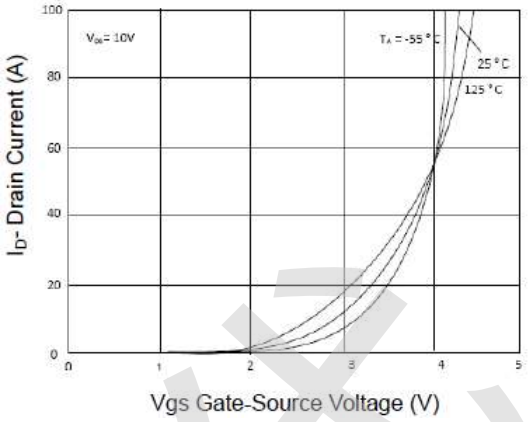


Figure 2 Transfer Characteristics

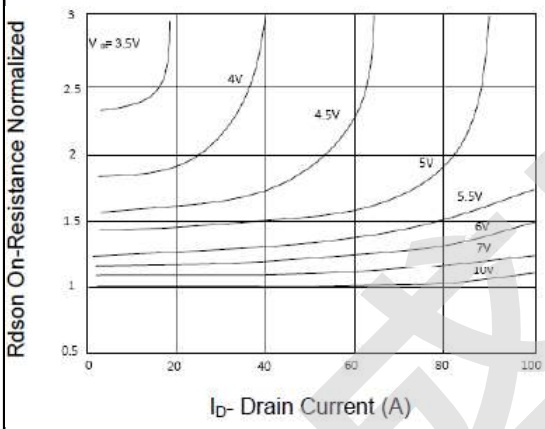


Figure 3 Rdson- Drain Current

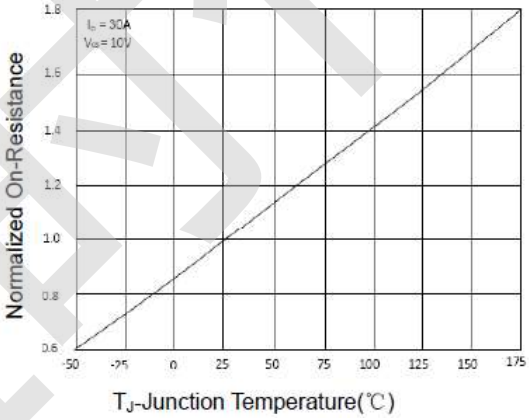


Figure 4 Rdson-Junction Temperature

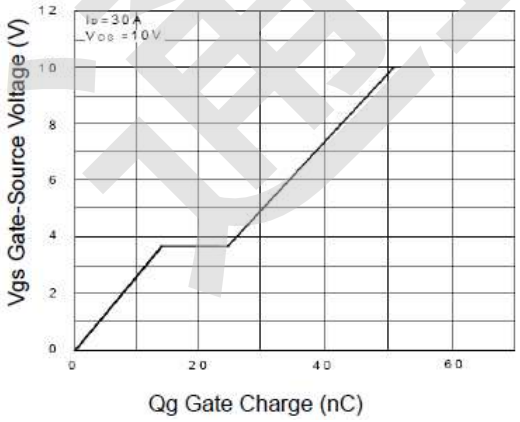


Figure 5 Gate Charge

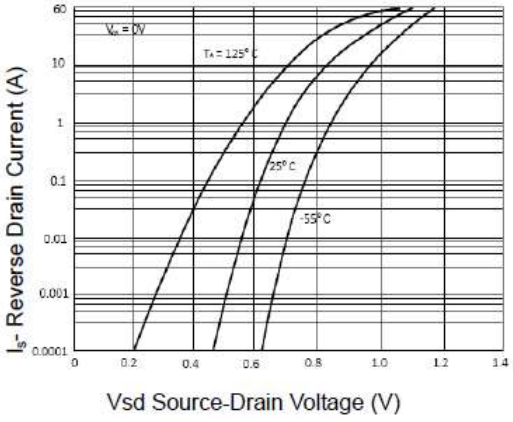


Figure 6 Source- Drain Diode Forward

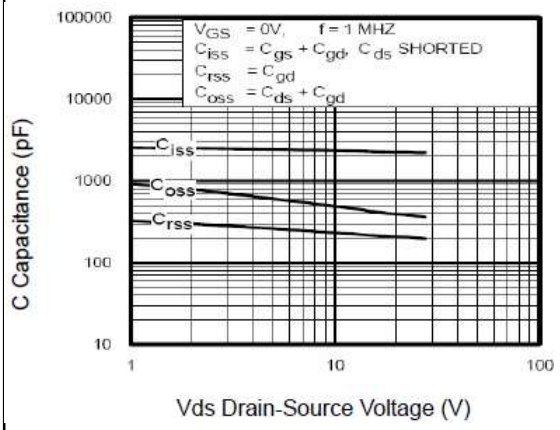


Figure 7 Capacitance vs Vds

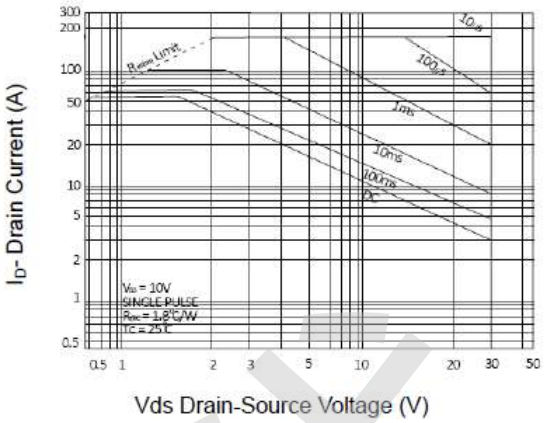


Figure 8 Safe Operation Area

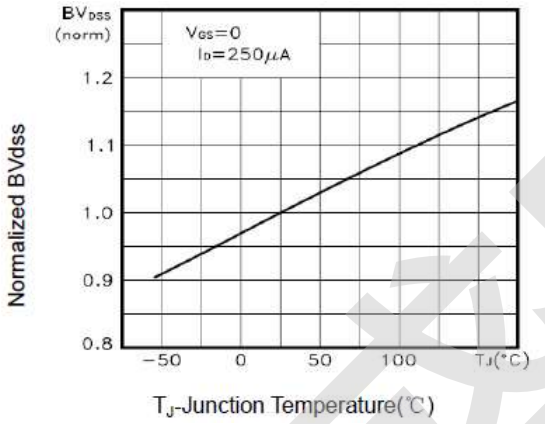


Figure 9 BVDSS vs Junction Temperature

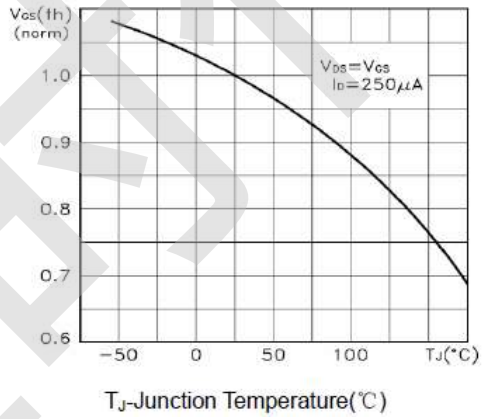


Figure 10 VGS(th) vs Junction Temperature

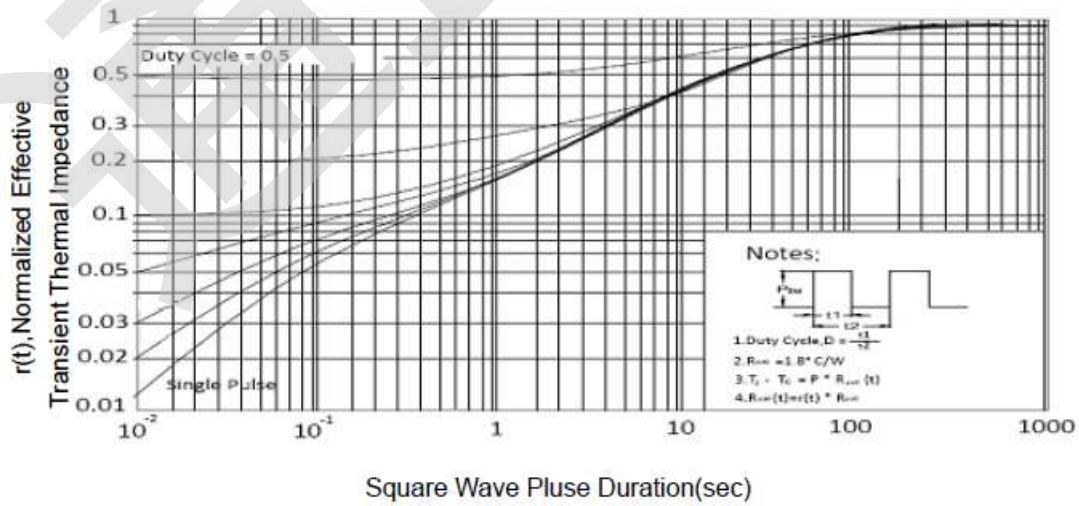
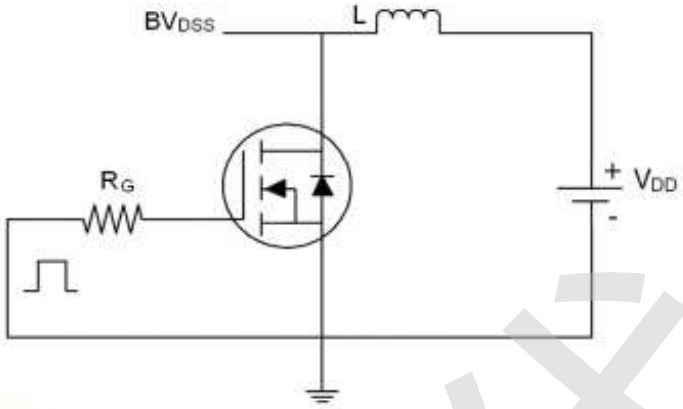


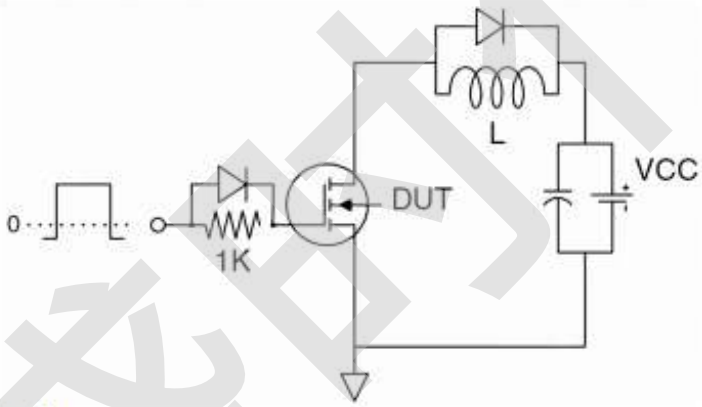
Figure 11 Normalized Maximum Transient Thermal Impedance

Test Circuit

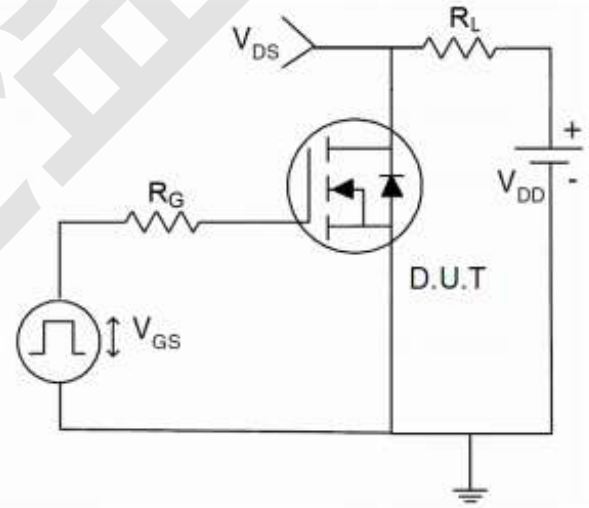
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit:



3) Switch Time Test Circuit:



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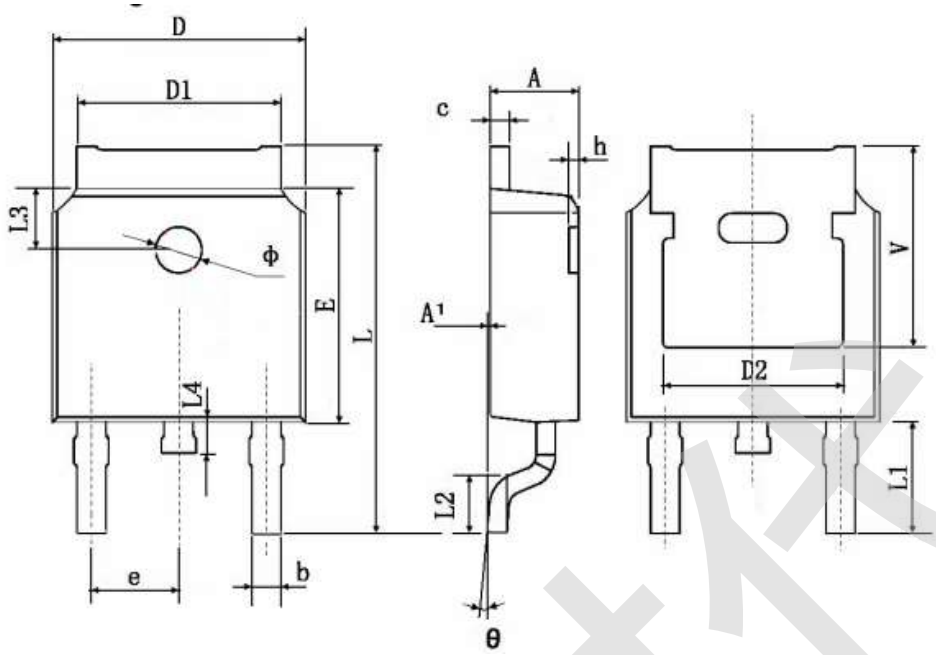
Package Dimensions



TO-252-2L

SYMBOL	DIMENSIONS IN MILLIMETERS		DIMENSIONS IN INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.250	2.350	0.089	0.093
A1	0.050	0.150	0.002	0.006
B	0.660	0.860	0.026	0.034
C	0.458	0.558	0.018	0.022
D	6.550	6.650	0.259	0.263
D1	5.234	5.434	0.207	0.215
D2	4.826 TYP.		0.191 TYP.	
E	6.050	6.150	0.239	0.243
E	2.236	2.336	0.088	0.092
L	9.820	10.220	0.388	0.404
L1	3.000 TYP.		0.119 TYP.	
L2	1.400	1.600	0.055	0.063
L3	1.800 TYP.		0.071 TYP.	
L4	0.700	0.900	0.028	0.036
Φ	1.150	1.250	0.045	0.049

Θ	0°	3°	0°	3°
H	0.000	0.300	0.000	0.012
V	5.399 TYP		0.213 TYP	