PE4080K N-Channel Enhancement Mode Power MOSFET

PE4080K Description

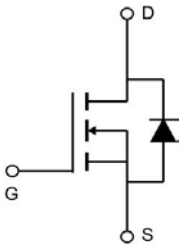
The PE4080K uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

PE4080K General Features

- V_{DS} =40V, I_D=150A
  $R_{DS(ON)}$ < 3mΩ @ V_{GS}=10V
  $R_{DS(ON)}$ < 4.5mΩ @ V_{GS}=4.5V
- High density cell design for ultra-low $R_D$son
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

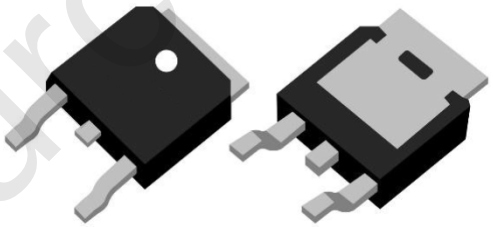
PE4080K Application

- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply



Schematic diagram

Marking and pin assignment



TO-252-2L

PE4080K Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±25	V
Drain Current-Continuous	I_D	150	A
Drain Current-Continuous (T_C=100℃)	I_D (100℃)	102	A
Pulsed Drain Current	I_{DM}	450	A
Maximum Power Dissipation	P_D	96	W
Avalanche Energy (L =0.5mH)	E_{AS}	756	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	℃

PE4080K Thermal Characteristic

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.6	℃/W

PE4080K Electrical Characteristics (T_C=25℃unless otherwise noted)

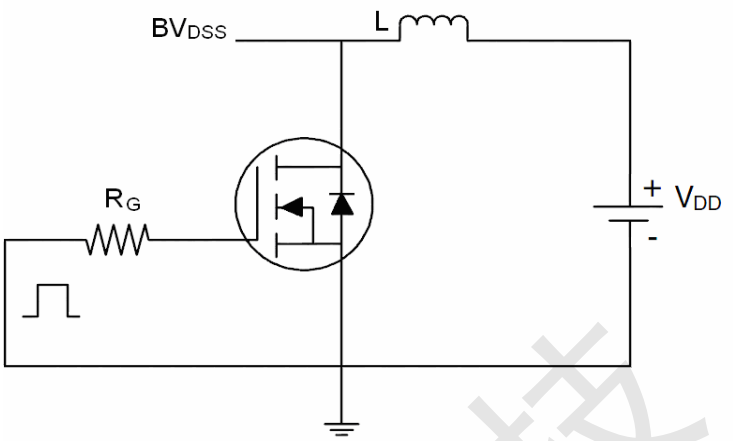
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=40V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±25V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.2	2	2.7	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	2.5	3	mΩ
		V_{GS}=4.5V, I_D=20A	-	3.2	4.5	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=20A	-	45	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=20V,V_{GS}=0V, F=1.0MHz	-	5740	-	PF
Output Capacitance	C_{oss}		-	612	-	PF
Reverse Transfer Capacitance	C_{rss}		-	350	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=20V,I_D=2A,R_L=1Ω V_{GS}=10V,R_G=3Ω	-	6.4	-	nS
Turn-on Rise Time	t_r		-	17.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	29.6	-	nS
Turn-Off Fall Time	t_f		-	16.8	-	nS
Total Gate Charge	Q_g	V_{DS}=20V,I_D=20A, V_{GS}=10V	-	110		nC
Gate-Source Charge	Q_{gs}		-	14		nC
Gate-Drain Charge	Q_{gd}		-	30		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=10A	-		1.2	V
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF = 20A di/dt = 100A/μs(Note3)	-	29	-	nS
Reverse Recovery Charge	Qrr		-	26	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

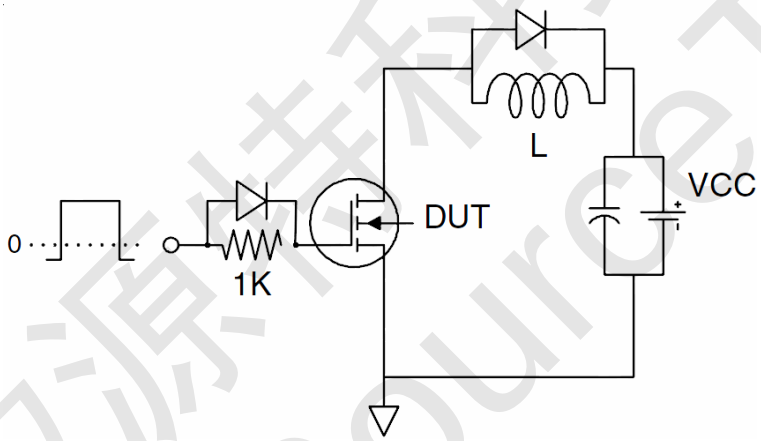
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

PE4080K Test circuit

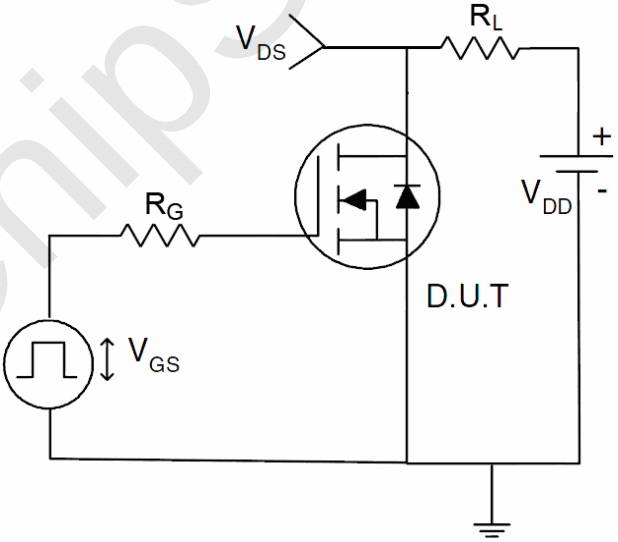
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



PE4080K Typical Electrical and Thermal Characteristics (Curves)

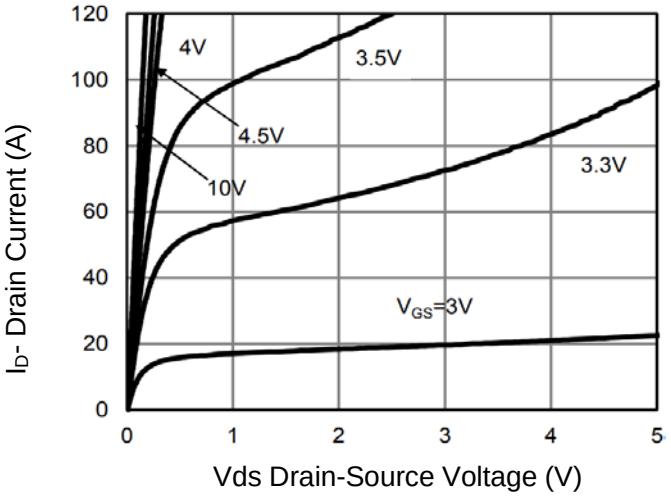


Figure 1 Output Characteristics

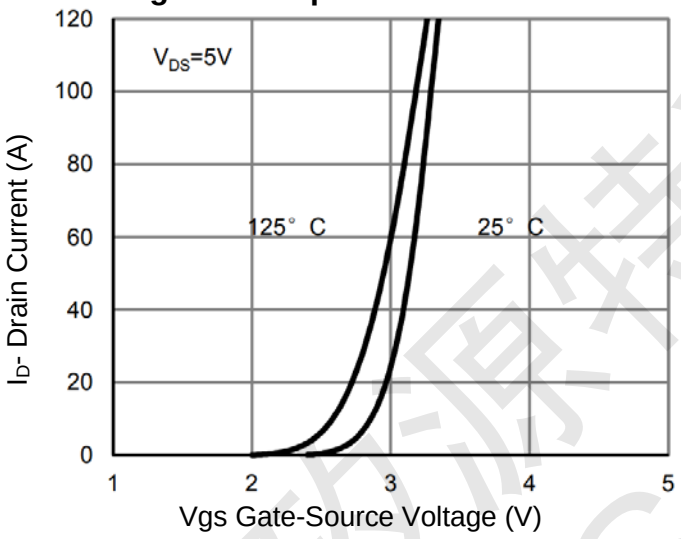


Figure 2 Transfer Characteristics

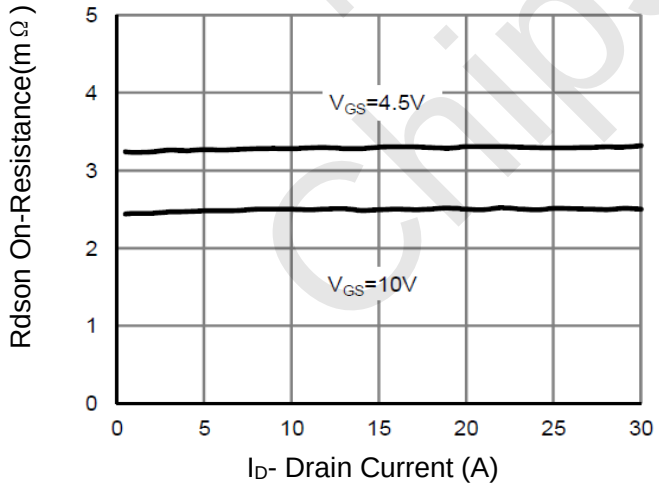


Figure 3 Rdson- Drain Current

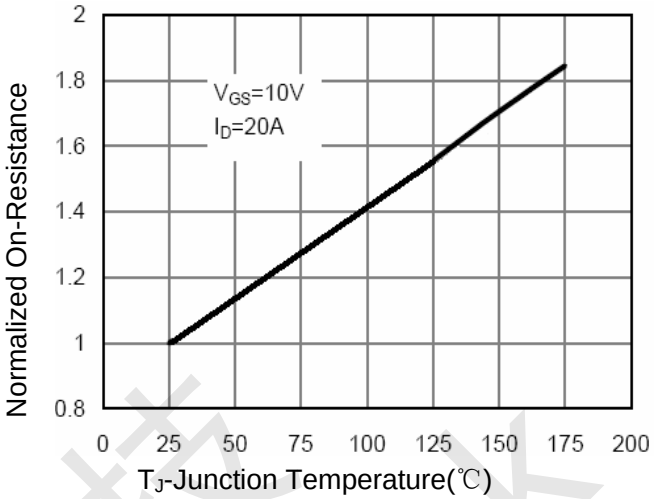


Figure 4 Rdson-JunctionTemperature

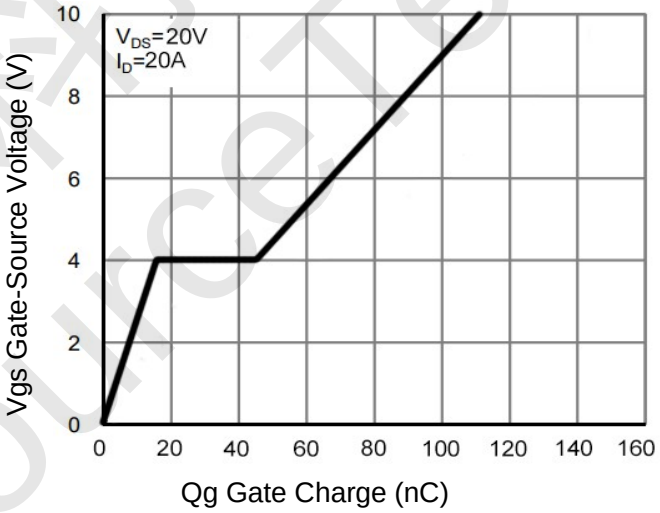


Figure 5 Gate Charge

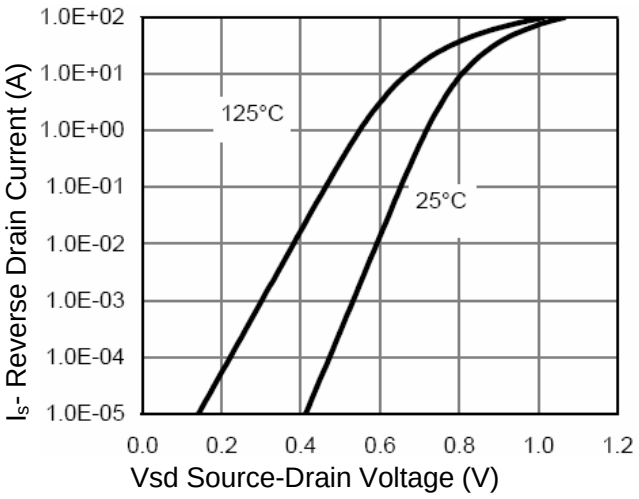


Figure 6 Source- Drain Diode Forward

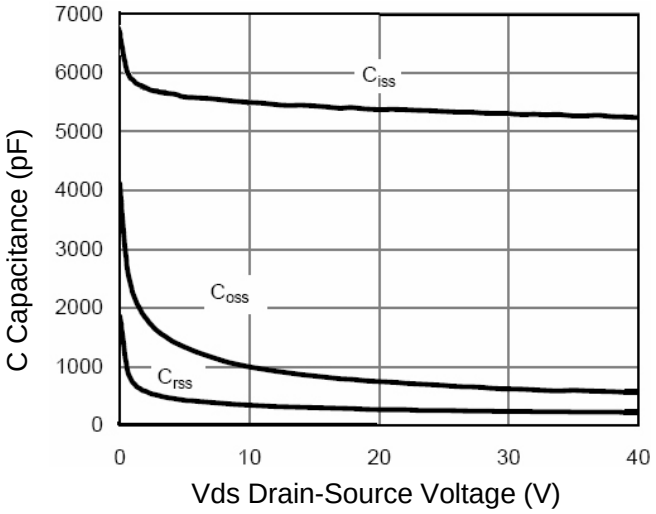


Figure 7 Capacitance vs Vds

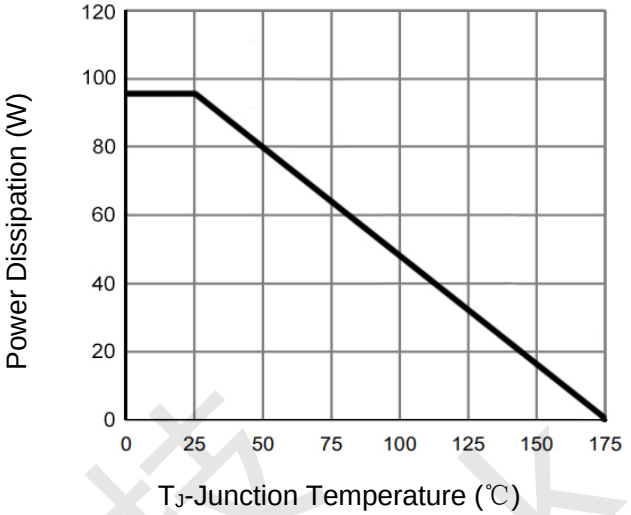


Figure 9 Power De-rating

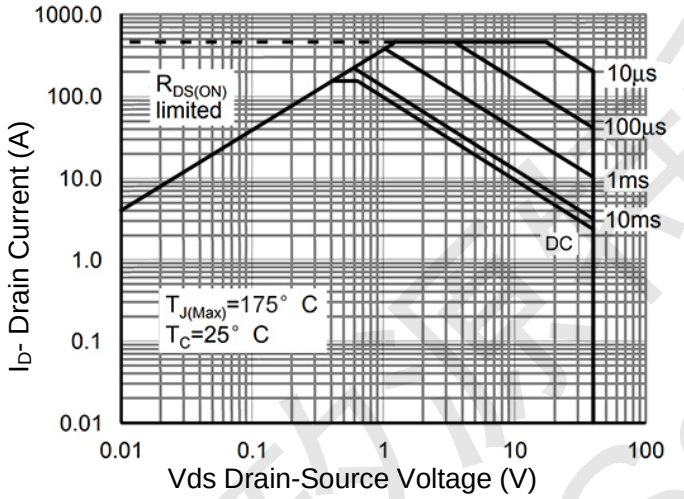


Figure 8 Safe Operation Area

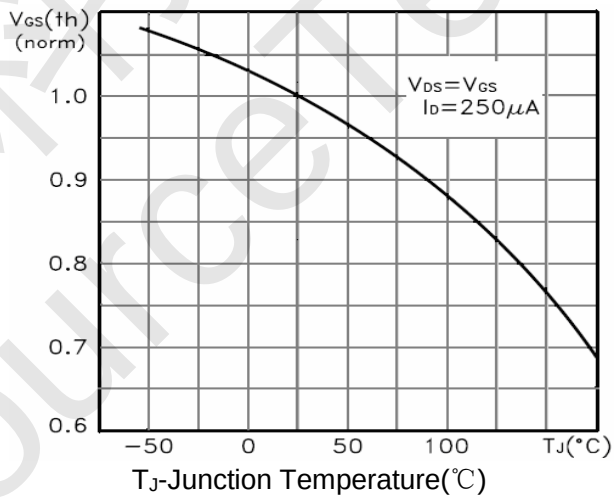


Figure 10 $V_{GS(th)}$ vs Junction Temperature

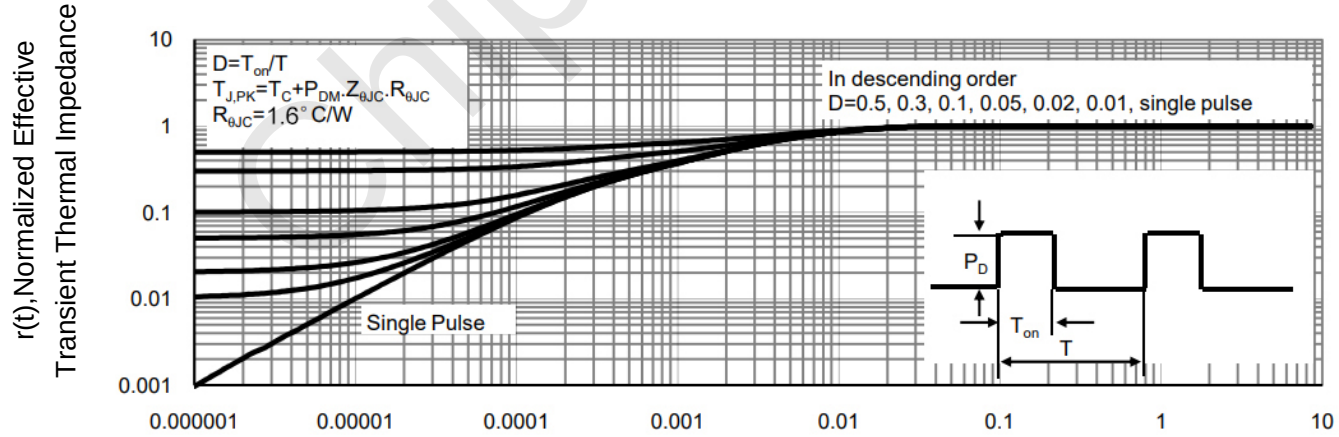
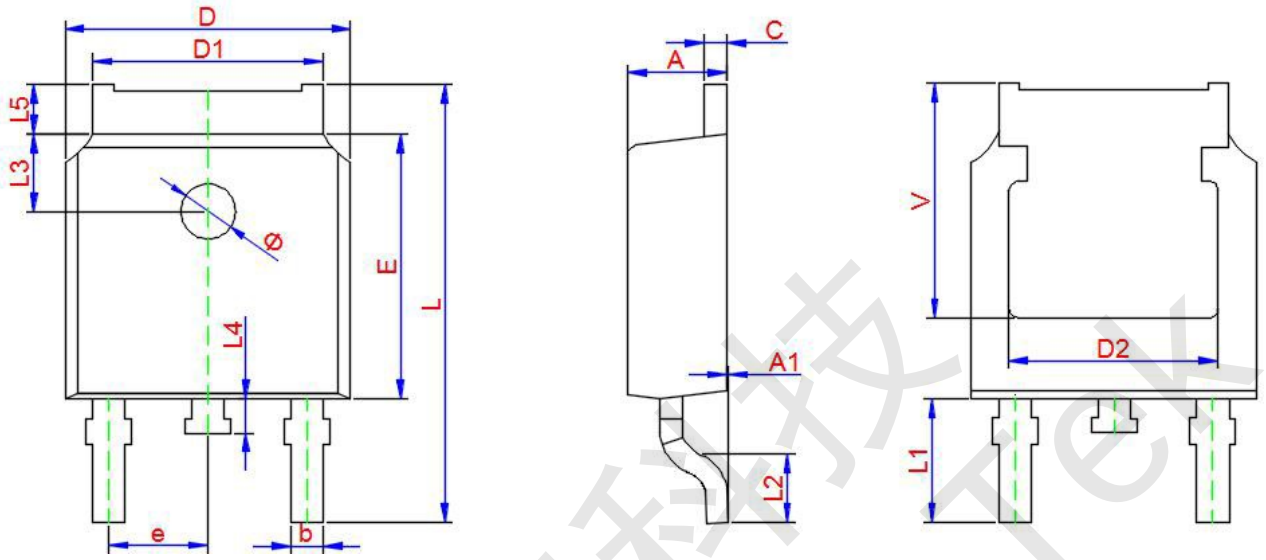


Figure 11 Normalized Maximum Transient Thermal Impedance

PE4080K TO-252-2L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	2.200	2.300	2.400
A1	0.000	- -	0.127
D	6.500	6.600	6.700
D1	5.100	5.330	5.460
C	0.450	0.500	0.600
D2	4.830 TYP.		
E	6.000	6.100	6.200
e	2.186	2.286	2.386
L	9.800	10.100	10.400
L1	2.900 TYP.		
L2	1.400	1.500	1.600
L3	1.800 TYP.		
L4	0.600	0.800	1.000
L5	0.900	- -	1.250
Φ	1.100.	- -	1.300
θ	0°	- -	8°
V	5.350		