PE01P45Q P-Channel Enhancement Mode Power MOSFET

PE01P45Q Description

The PE01P45Q uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

PE01P45Q General Features

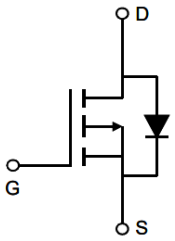
- V_{DS} = -100V, I_D = -45A

  $R_{DS(ON)}$ < 45mΩ @ V_{GS}=-10V
  $R_{DS(ON)}$ < 55mΩ @V_{GS}=-4.5V

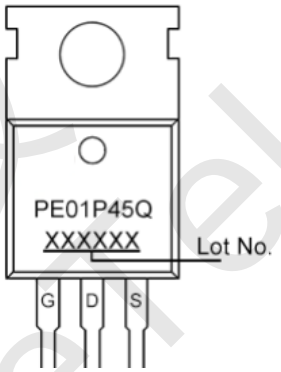
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

PE01P45Q Application

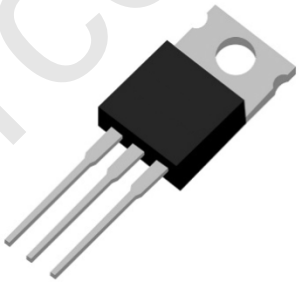
- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and pin assignment



TO-220

PE01P45Q Absolute Maximum Ratings (TC=25℃ unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-100	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	-45	A
Drain Current-Continuous (TC=100℃)	I_D	-32	A
Pulsed Drain Current (Note 1)	I_{DM}	-135	A
Maximum Power Dissipation	P_D	136	W
Avalanche Energy (L=0.5mH)	E_{AS}	400	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

PE01P45Q Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	1.1	℃/W
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	62.5	℃/W

PE01P45Q Electrical Characteristics (TC=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	-100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-90V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,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	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V,I_D=-20A	-	35	45	mΩ
		V_{GS}=-4.5V,I_D=-15A	-	40	55	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-10V,I_D=-20A	-	30	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	V_{DS}=-50V,V_{GS}=0V, F=1.0MHz	-	5612	-	pF
Output Capacitance	C_{oss}		-	180	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	80	-	pF
Gate Resistance	R_g	V_{DS}=0V,V_{GS}=0V,F=1.0MHz	-	4.3	-	Ω
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-50V,I_D=-22A, V_{GS}=-10V,R_G=3Ω	-	15	-	nS
Turn-on Rise Time	t_r		-	38	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	86	-	nS
Turn-Off Fall Time	t_f		-	68	-	nS
Total Gate Charge	Q_g	V_{DS}=-50V,I_D=-22A,V_{GS}=-10V	-	102	-	nC
Gate-Source Charge	Q_{gs}		-	25	-	nC
Gate-Drain Charge	Q_{gd}		-	19	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-1A	-	-	-1.2	V
Maximum Body-Diode Current	I_S				-30	A

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 product.

PE01P45Q Typical Electrical and Thermal Characteristics

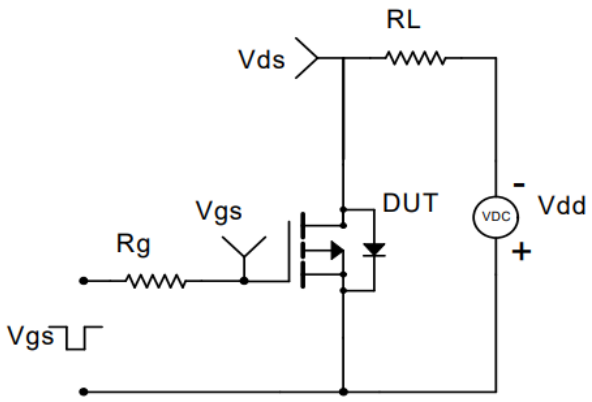


Figure 1 Switching Test Circuit

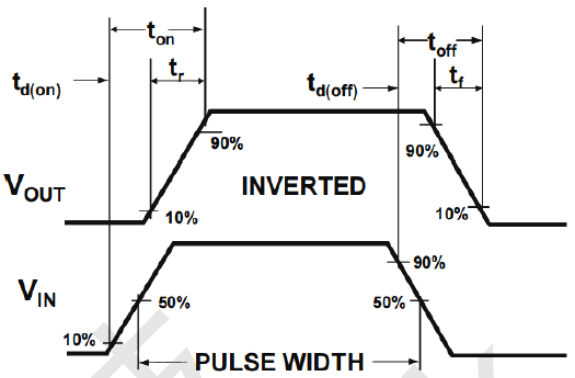


Figure 2 Switching Waveform

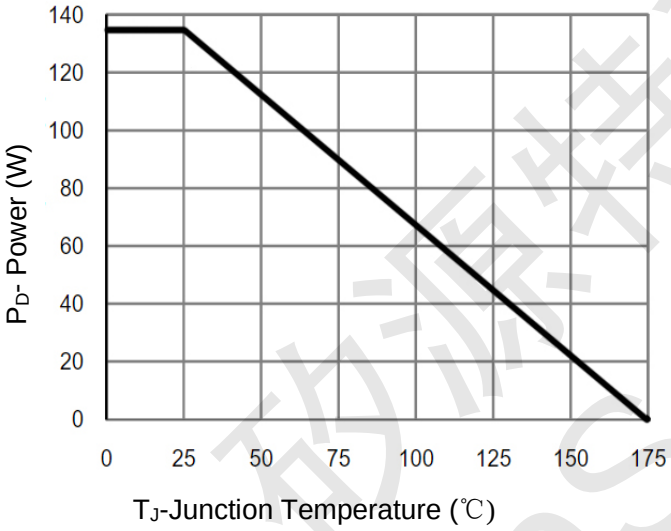


Figure 3 Power De-rating

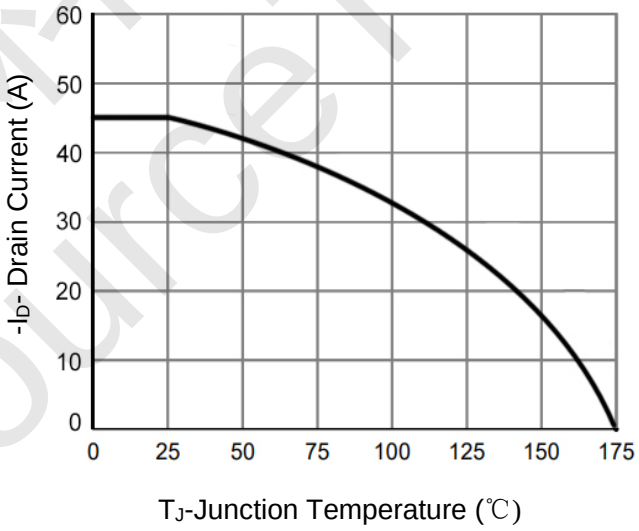


Figure 4 Drain Current

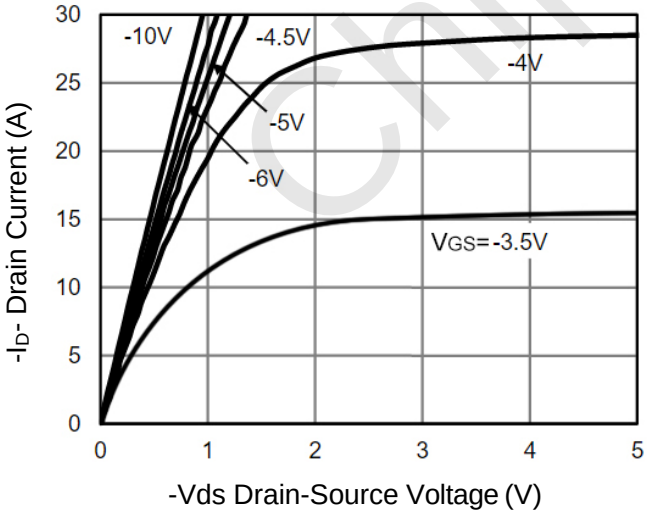


Figure 5 Output Characteristics

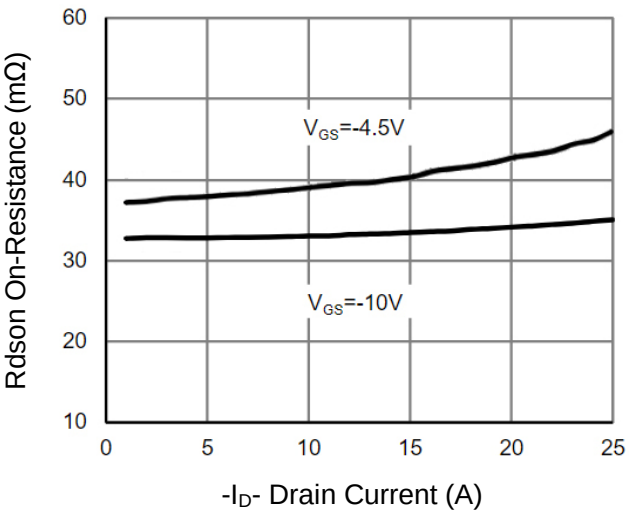


Figure 6 Rdson vs Drain Current

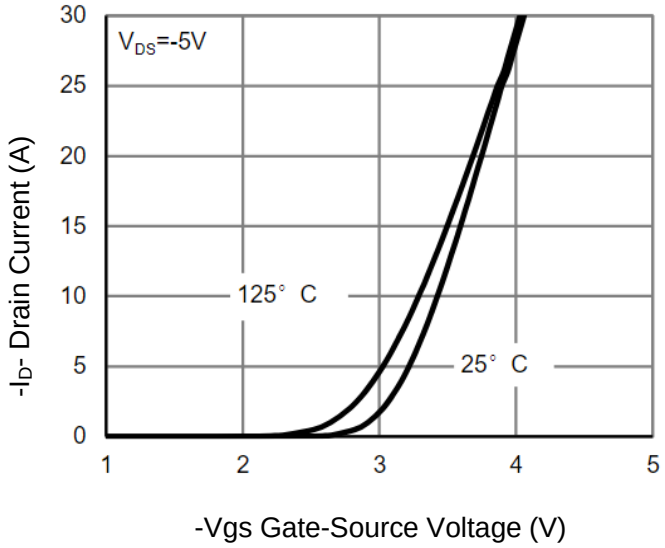


Figure 7 Transfer Characteristics

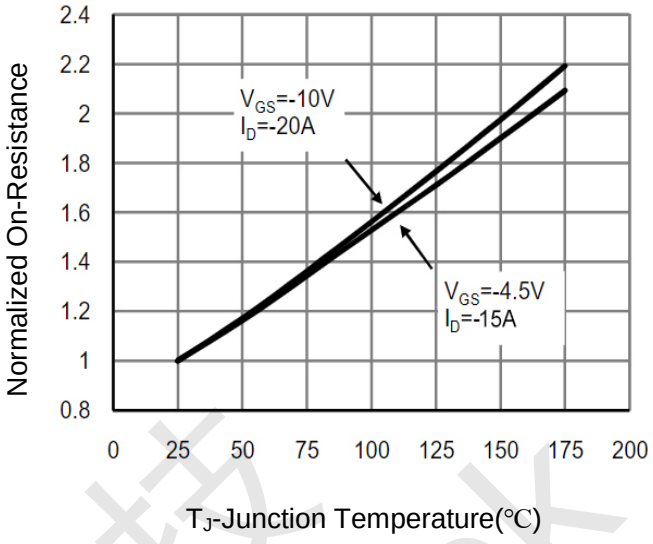


Figure 8 Rdson vs Junction Temperature

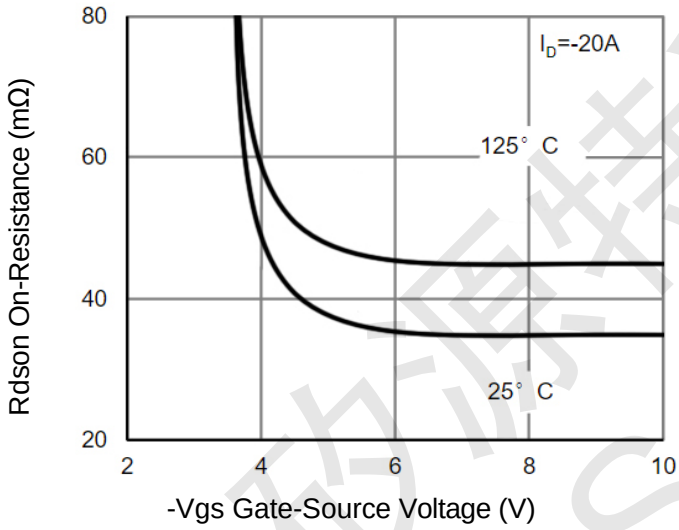


Figure 9 Rdson vs Vgs

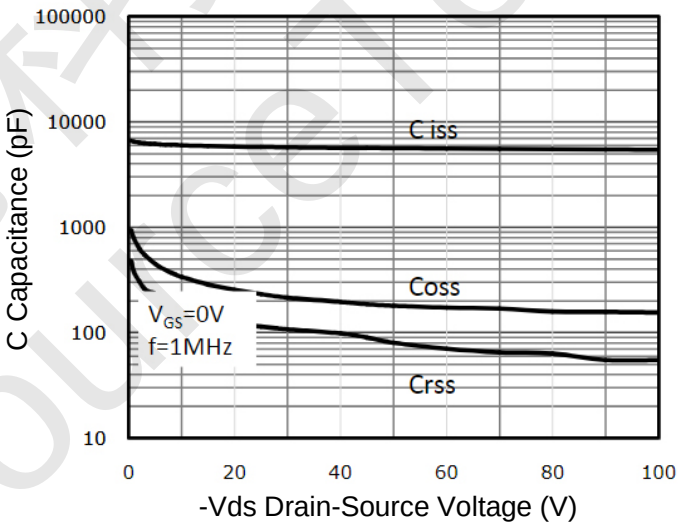


Figure 10 Capacitance vs Vds

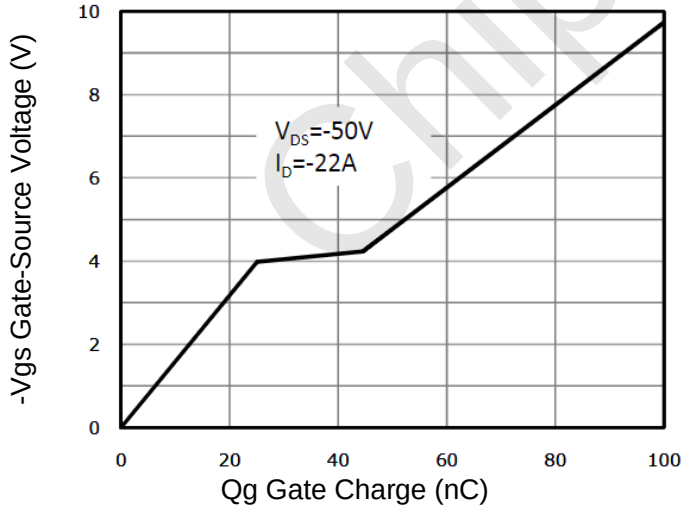


Figure 11 Gate Charge

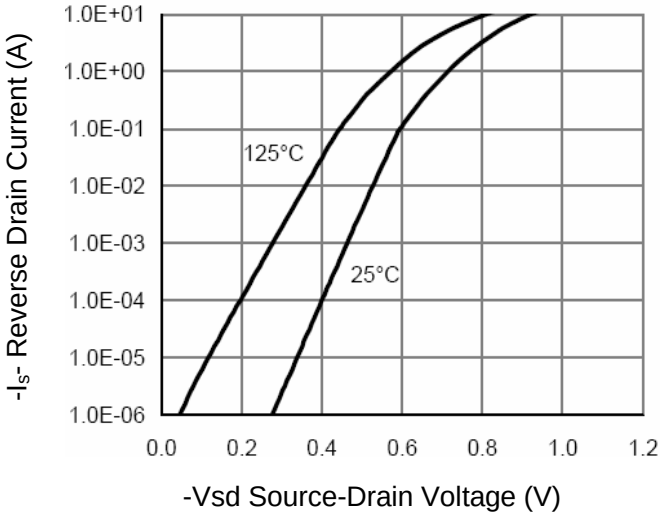


Figure 12 Source- Drain Diode Forward

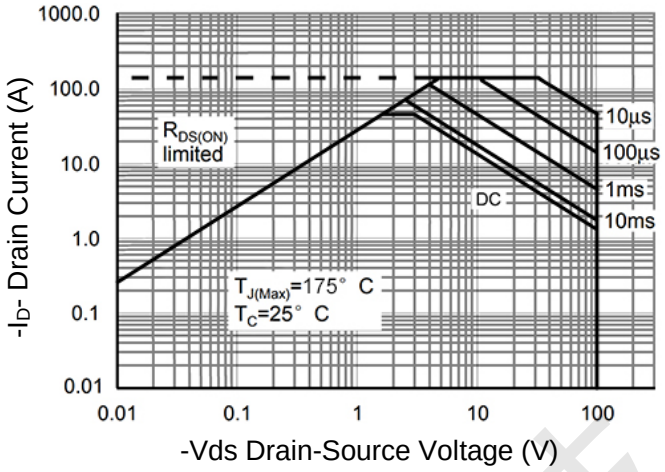


Figure 13 Safe Operation Area

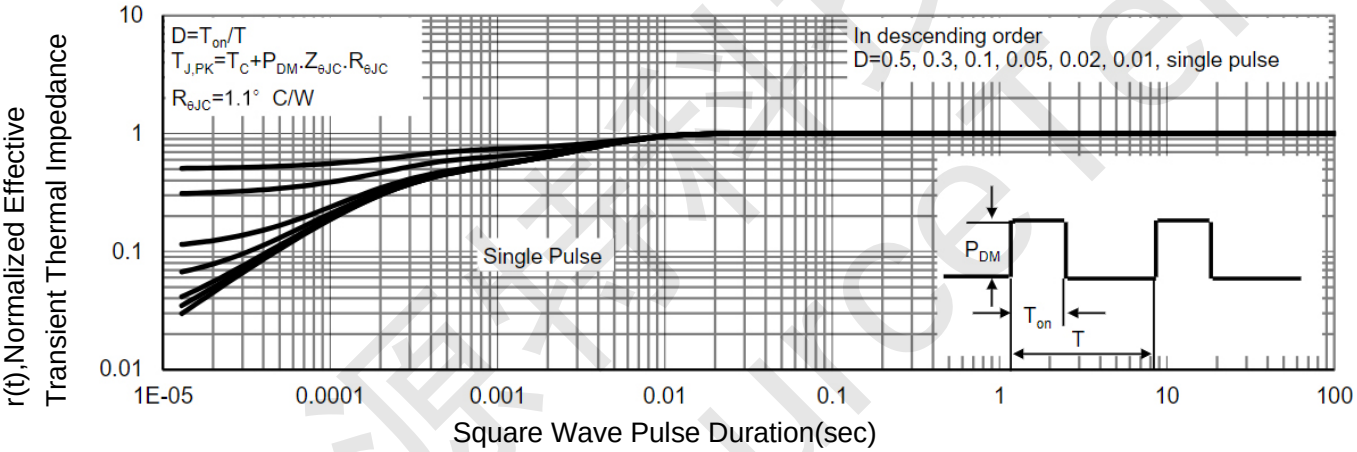
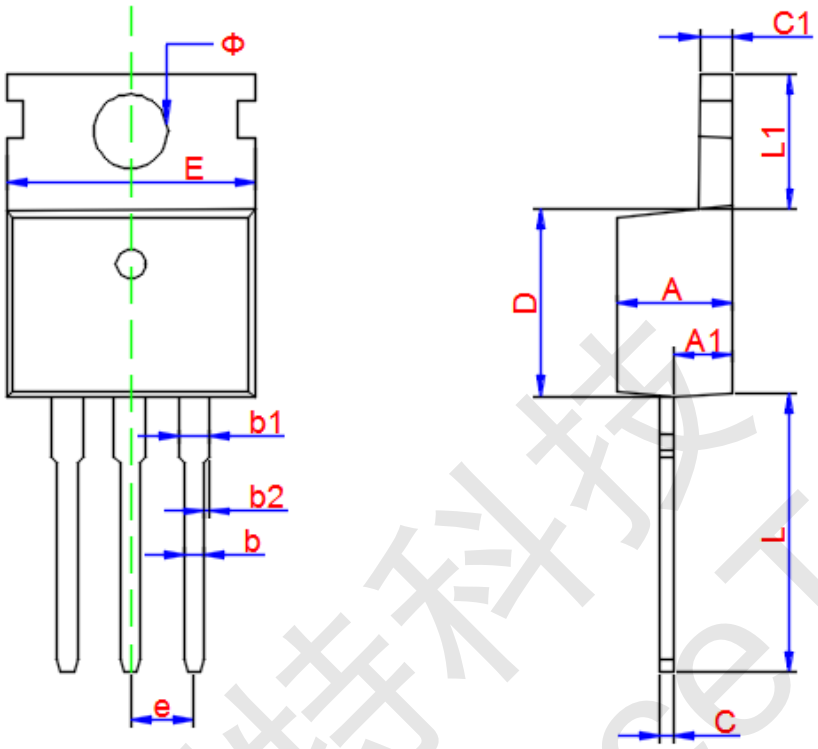


Figure 14 Normalized Maximum Transient Thermal Impedance

PE01P45Q TO-220 Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	4.520	4.570	4.620
A1	2.320	2.350	3.380
b	0.800 TYP.		
b1	1.270 TYP		
b2	0-0.076		
C	0.500 TYP.		
C1	1.300 TYP.		
D	9.050	9.100	9.150
E	9.880 TYP.		
e	2.540 TYP.		
L	13.160	13.260	13.360
L1	6.400	6.500	6.600
Φ	3.600 TYP.		