



PE60P50Q P-Channel Enhancement Mode Power MOSFET

PE60P50Q Description

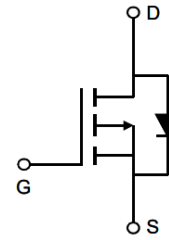
The PE60P50Q uses deep trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

PE60P50Q General Features

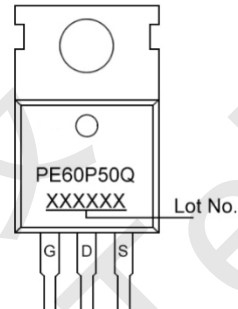
- $V_{DS} = -60V$, $I_D = -50A$
 $R_{DS(ON)} < 24m\Omega$ @ $V_{GS} = -10V$
 $R_{DS(ON)} < 30m\Omega$ @ $V_{GS} = -4.5V$
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

PE60P50Q Application

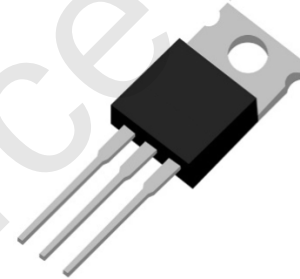
- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and pin assignment



TO-220

PE60P50Q Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	-50	A
Drain Current-Continuous (TC=100°C)	I_D	-35	A
Pulsed Drain Current (Note 1)	I_{DM}	-150	A
Maximum Power Dissipation	P_D	105	W
Single Pulsed Avalanche Energy (L=0.1mH)	E_{AS}	110	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	°C

PE60P50Q Thermal Characteristic

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.42	°C/W
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PE60P50Q Electrical Characteristics (TC=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off 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	-	-	-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	-1.5	-2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-20A	-	18	24	mΩ
		V _{GS} =-4.5V, I _D =-15A	-	24	30	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-10V, I _D =-20A	-	45	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C _{iss}	V _{DS} =-30V, V _{GS} =0V, F=1.0MHz	-	1520	-	pF
Output Capacitance	C _{oss}		-	280	-	pF
Reverse Transfer Capacitance	C _{rss}		-	8	-	pF
Gate Resistance	R _g	V _{GS} =V _{DS} =0V, F=1.0MHZ	-	7	-	Ω
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DS} =-30V, I _D =-20A, V _{GS} =-10V, R _G =3Ω	-	7	-	nS
Turn-on Rise Time	t _r		-	5	-	nS
Turn-Off Delay Time	t _{d(off)}		-	65	-	nS
Turn-Off Fall Time	t _f		-	20	-	nS
Total Gate Charge	Q _g	V _{DS} =-30V, I _D =-20A, V _{GS} =-10V	-	23	-	nC
Gate-Source Charge	Q _{gs}		-	4	-	nC
Gate-Drain Charge	Q _{gd}		-	3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =-1A	-	-	-1.2	V
Diode Forward Current (Note 2)	I _S		-	-	-50	A
Diode Reverse Recovery Time	t _{rr}	I _F =-10A, dI/dt=100A/μs	-	60	-	nS
Diode Reverse Recovery Charge	Q _{rr}		-	105	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to product.



PE60P50Q Typical Electrical and Thermal Characteristics

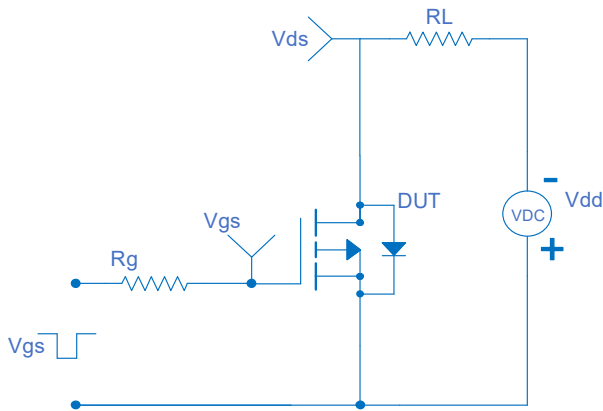


Figure 1 Switching Test Circuit

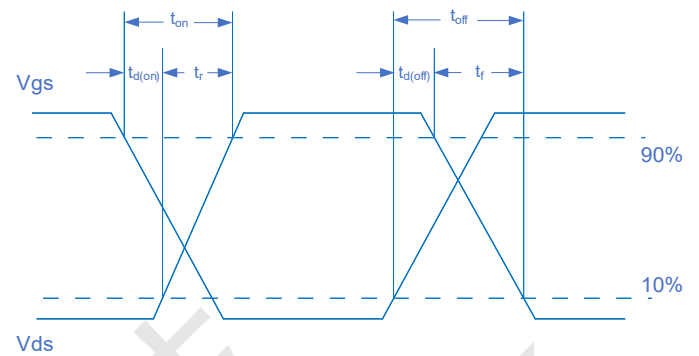


Figure 2 Switching Waveform

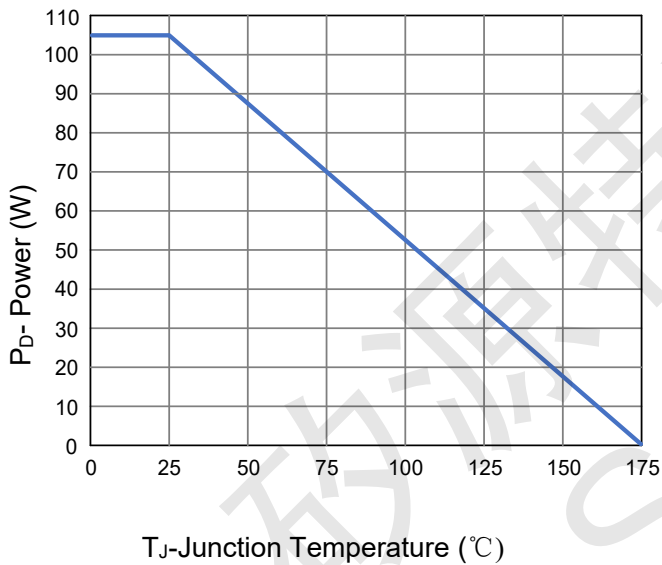


Figure 3 Power De-rating

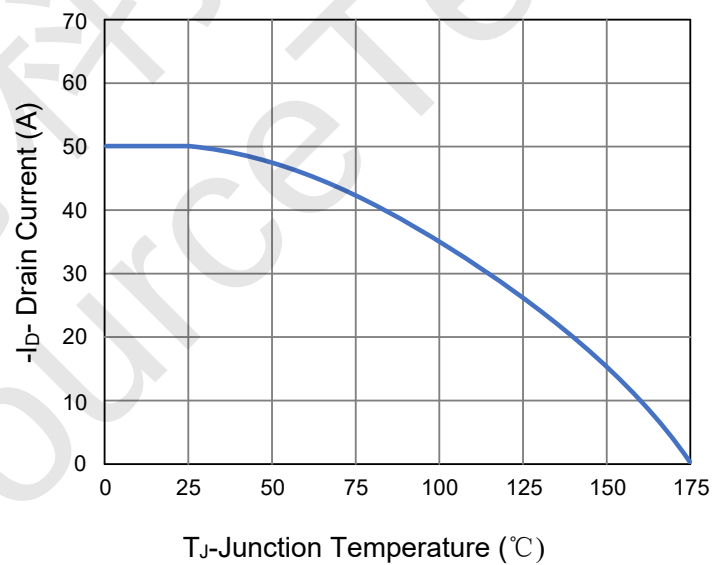


Figure 4 Drain Current

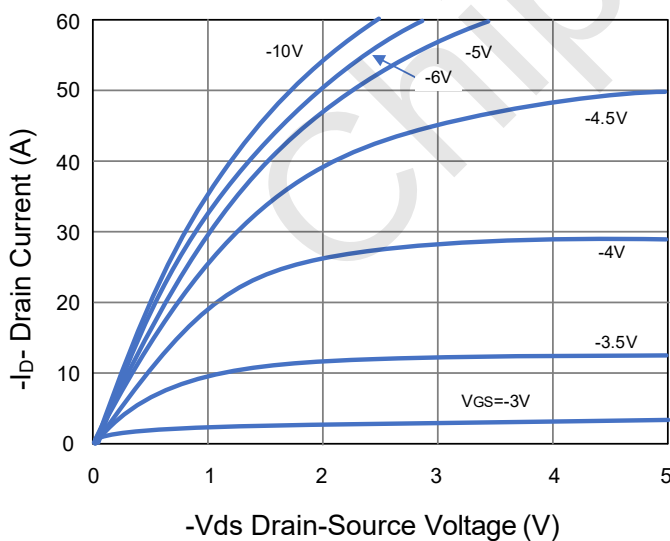


Figure 5 Output Characteristics

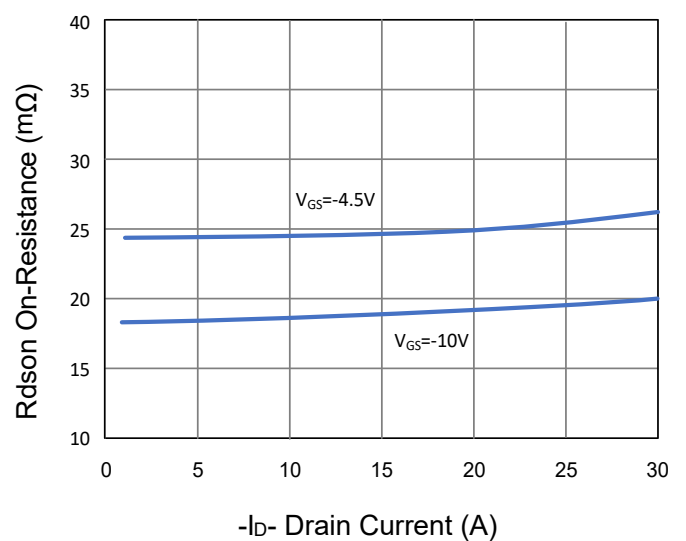


Figure 6 Rdson vs Drain Current

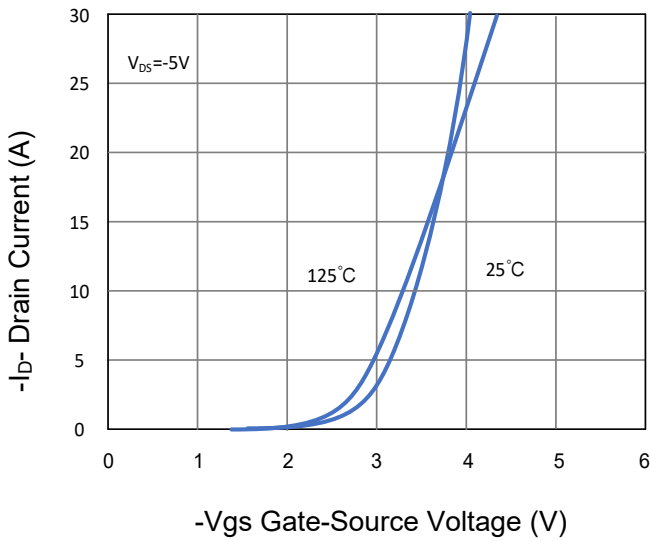


Figure 7 Transfer Characteristics

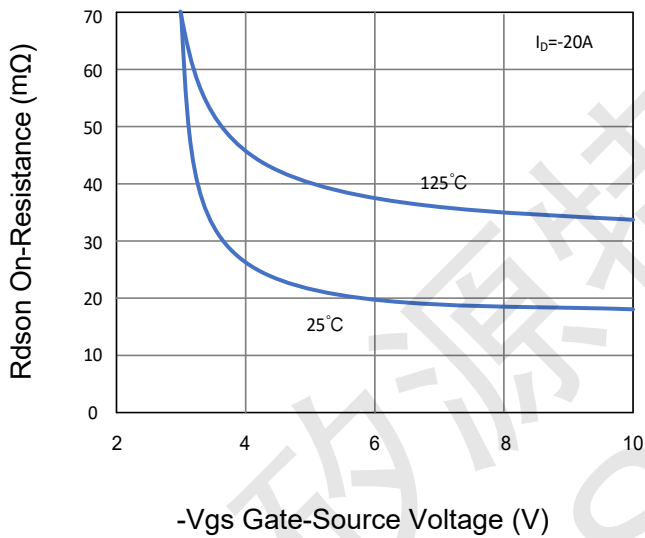


Figure 9 Rdson vs Vgs

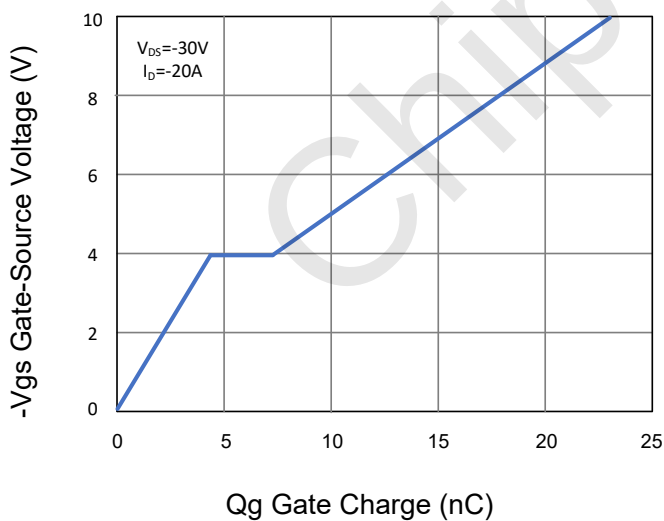


Figure 11 Gate Charge

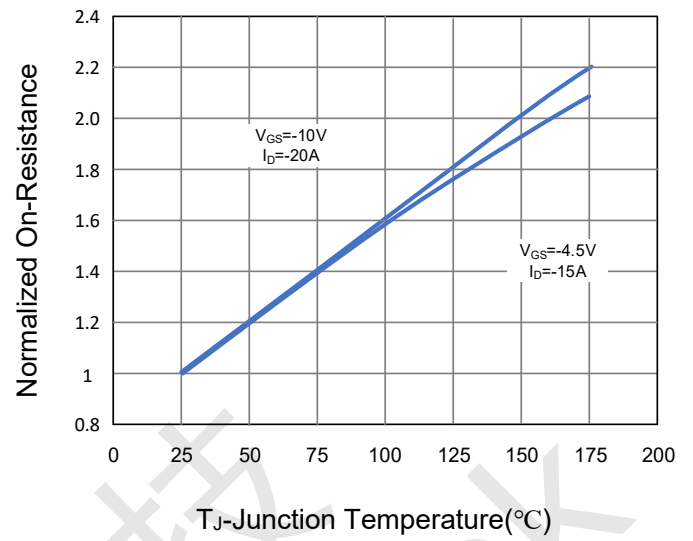


Figure 8 Rdson vs Junction Temperature

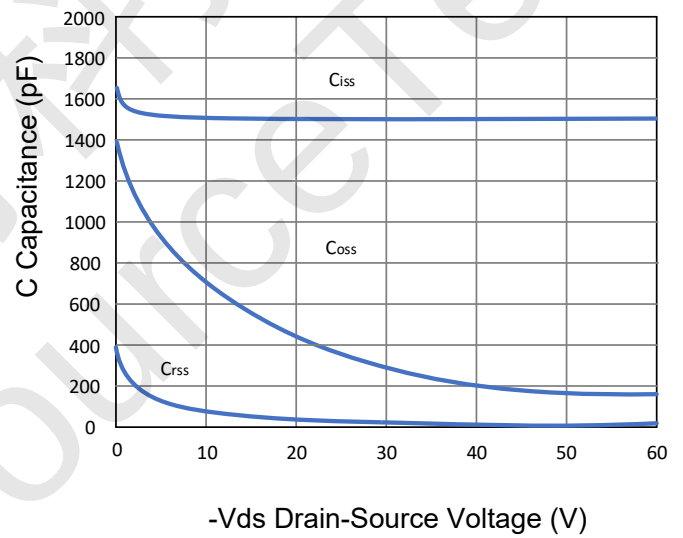


Figure 10 Capacitance vs Vds

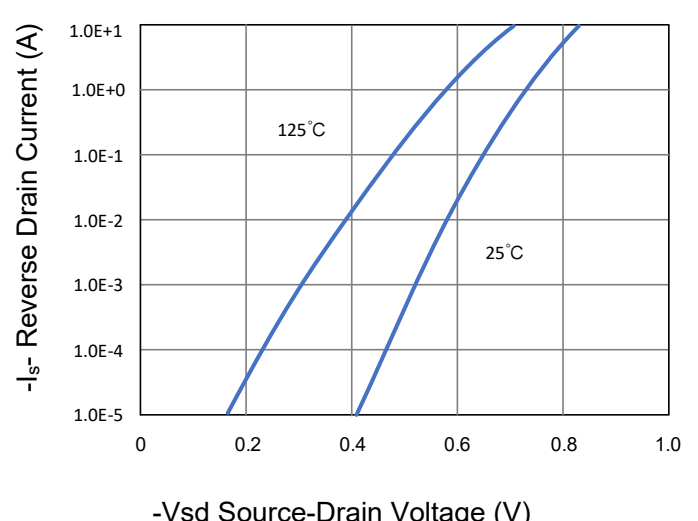


Figure 12 Source- Drain Diode Forward

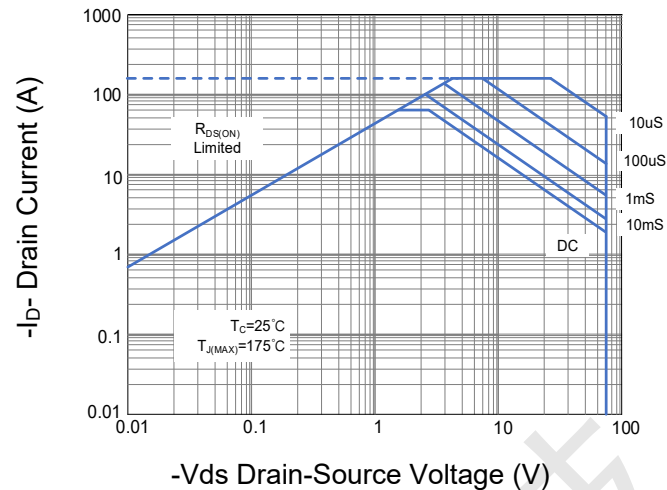


Figure 13 Safe Operation Area

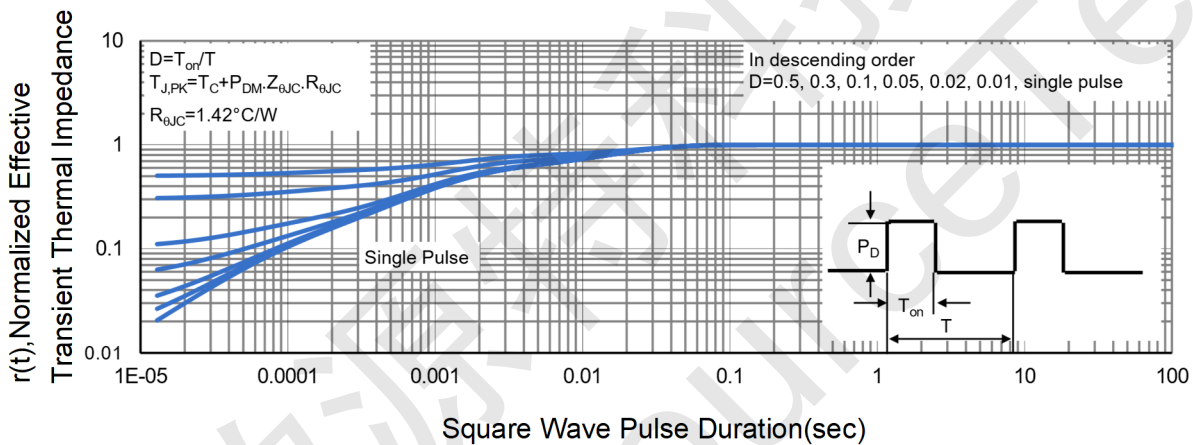
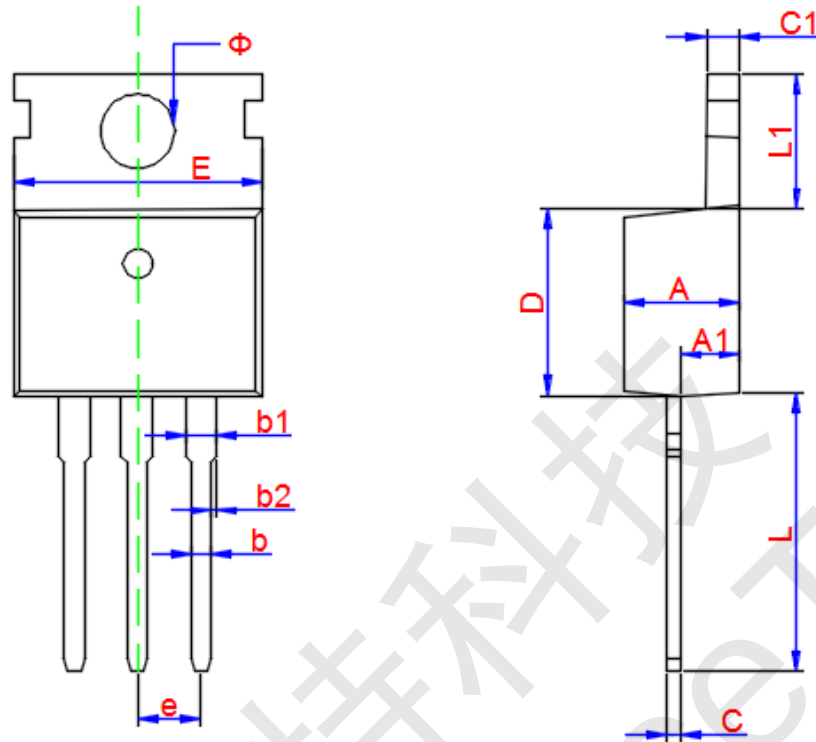


Figure 14 Normalized Maximum Transient Thermal Impedance



PE60P50Q 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.		