PE8688W N-Channel Enhancement Mode Power MOSFET

PE8688W Description

The PE8688W uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

PE8688W General Features

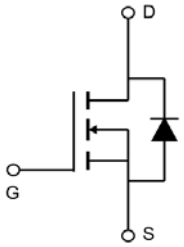
- V_{DS} =60V, I_D =90A

  $R_{DS(ON)}$ < 9.5mΩ @ V_{GS}=10V

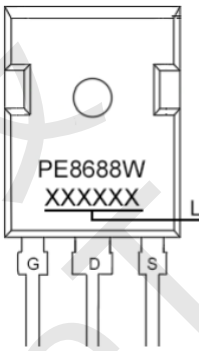
- High Power and current handing capability
- Lead free product is acquired

PE8688W Application

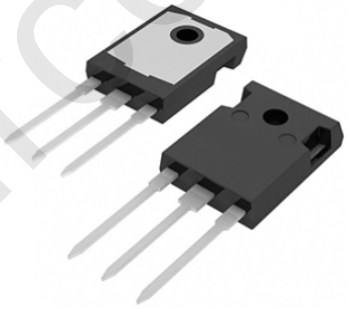
- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and pin assignment



TO-247

PE8688W Absolute Maximum Ratings (TC=25℃ 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	90	A
Drain Current-Continuous (TC=100℃)	I_D	90	A
Pulsed Drain Current (Note 1)	I_{DM}	360	A
Maximum Power Dissipation	P_D	200	W
Avalanche Energy (L=0.5mH)	E_{AS}	306	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	℃

PE8688W Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	0.75	℃/W
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	40	℃/W

PE8688W 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	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	2.5	3	3.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=40A	-	8	9.5	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=20A	-	50	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	V_{DS}=30V,V_{GS}=0V, F=1.0MHz	-	3300	-	pF
Output Capacitance	C_{oss}		-	212	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	150	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=30V,R_L=1Ω, V_{GS}=10V,R_G=3Ω	-	18	-	nS
Turn-on Rise Time	t_r		-	20	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	32	-	nS
Turn-Off Fall Time	t_f		-	4	-	nS
Total Gate Charge	Q_g	V_{DS}=30V,I_D=20A, V_{GS}=10V	-	53	-	nC
Gate-Source Charge	Q_{gs}		-	13	-	nC
Gate-Drain Charge	Q_{gd}		-	15	-	nC
Body Diode Reverse Recovery Time	t_{rr}	I_F=20A, dI/dt=100A/μs	-	110	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	450	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=1A	-	-	1.2	V

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.

PE8688W Typical Electrical and Thermal Characteristics

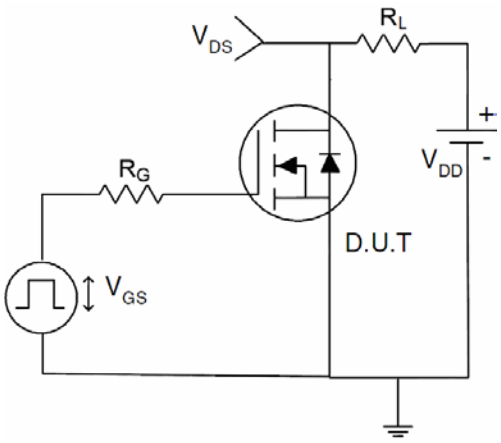


Figure 1 Switching Test Circuit

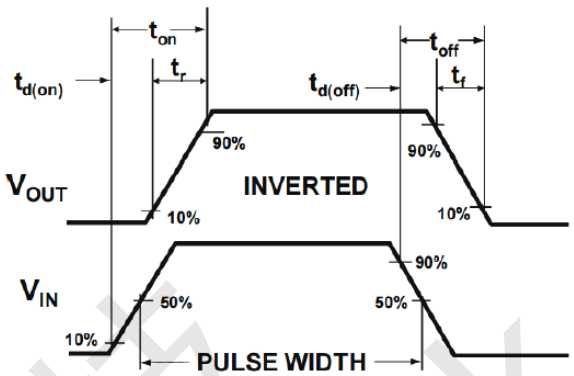


Figure 2 Switching Waveform

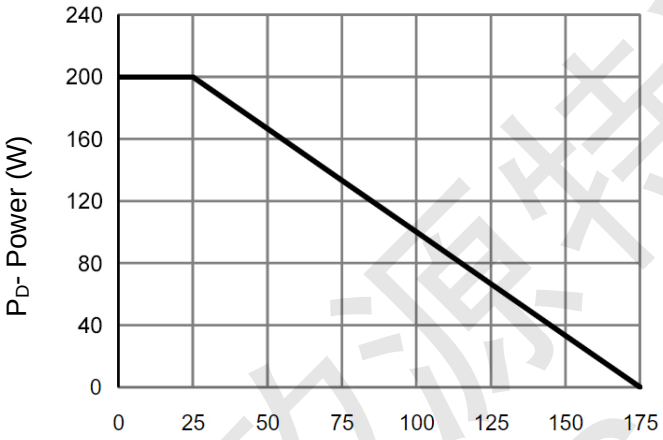


Figure 3 Power De-rating

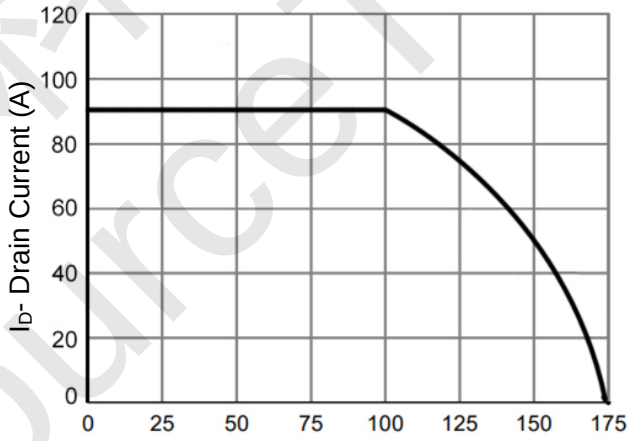


Figure 4 Drain Current

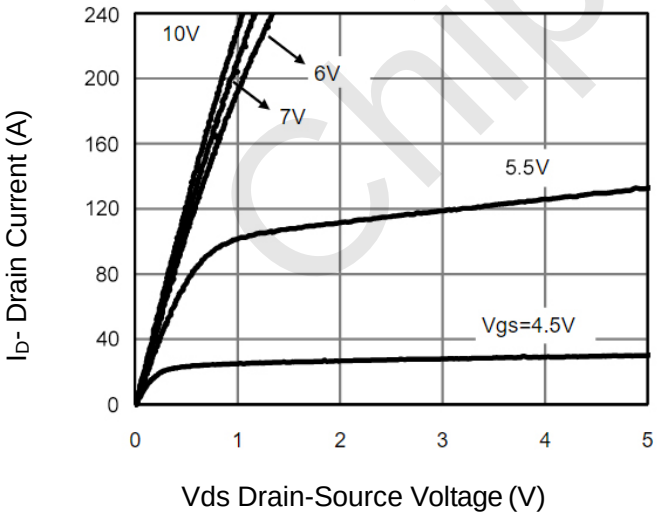


Figure 5 Output Characteristics

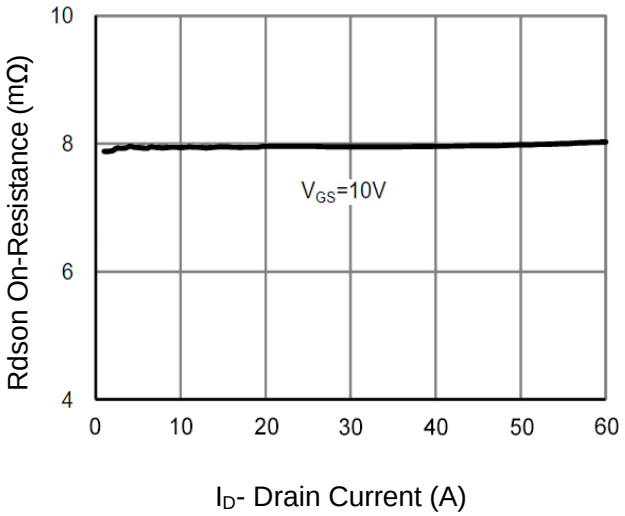


Figure 6 Rdson vs Drain Current

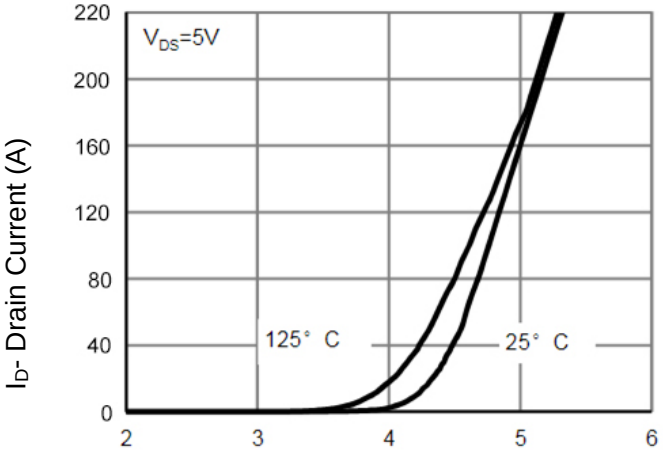


Figure 7 Transfer Characteristics

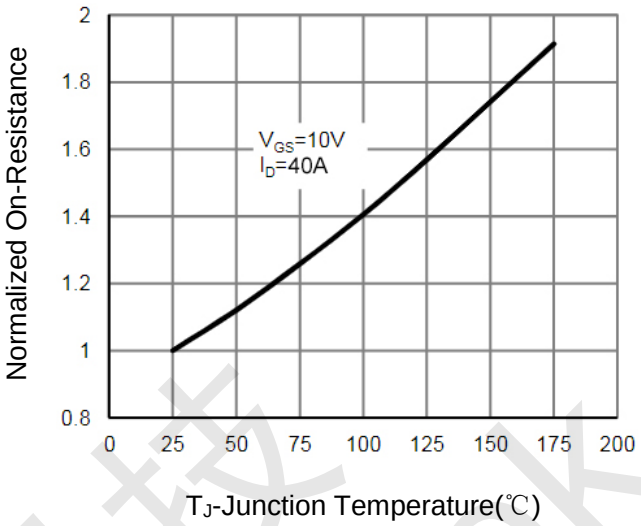


Figure 8 Rdson vs Junction Temperature

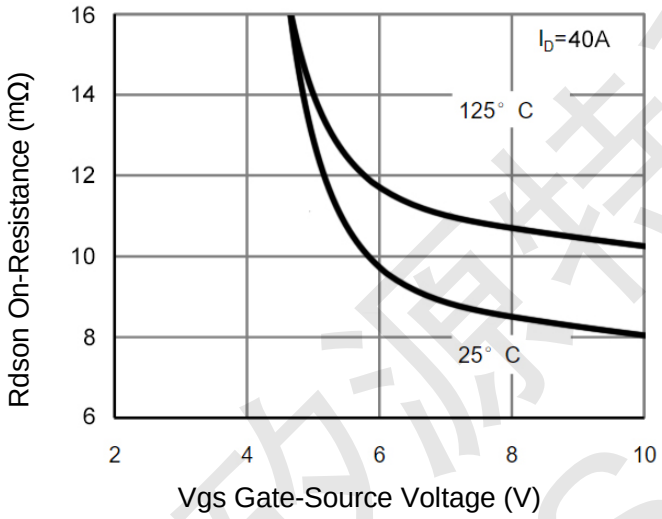


Figure 9 Rdson vs Vgs

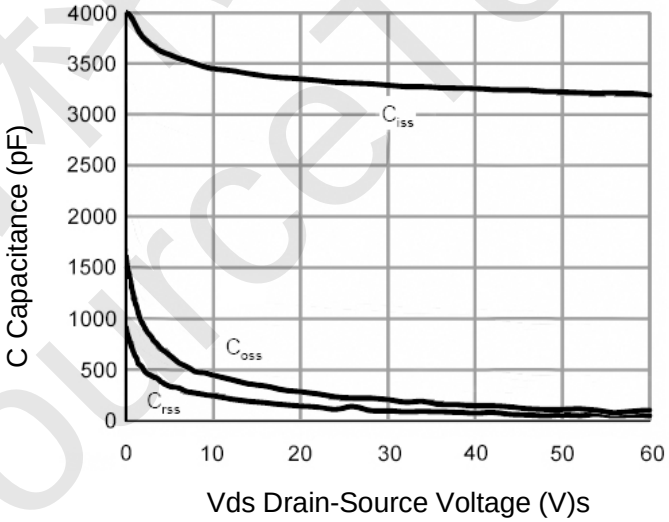


Figure 10 Capacitance vs Vds

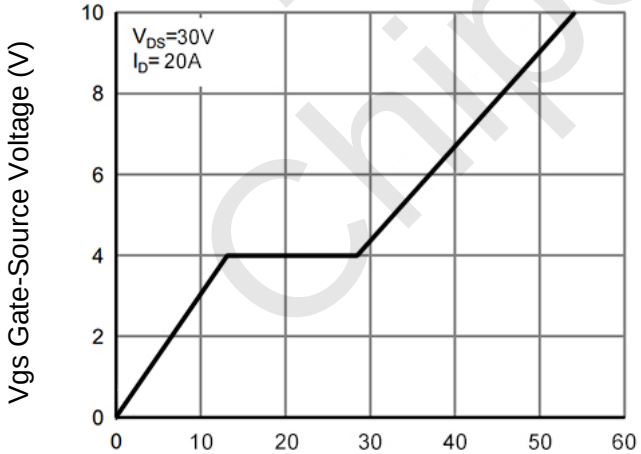


Figure 11 Gate Charge

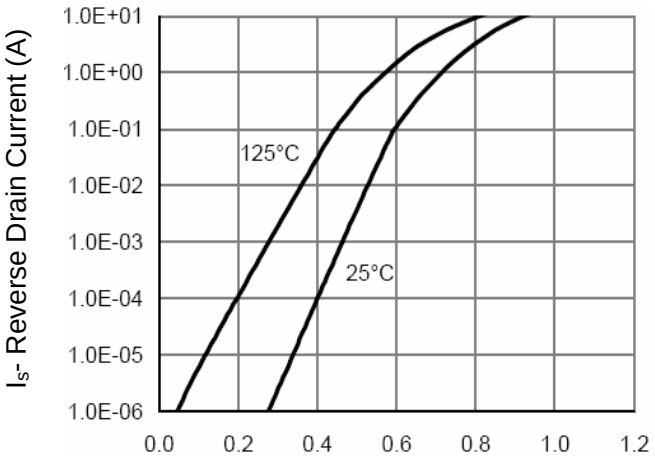


Figure 12 Source- Drain Diode Forward

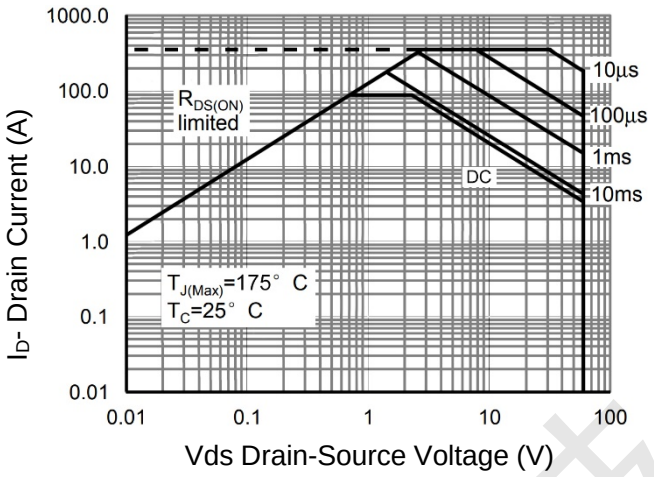


Figure 13 Safe Operation Area

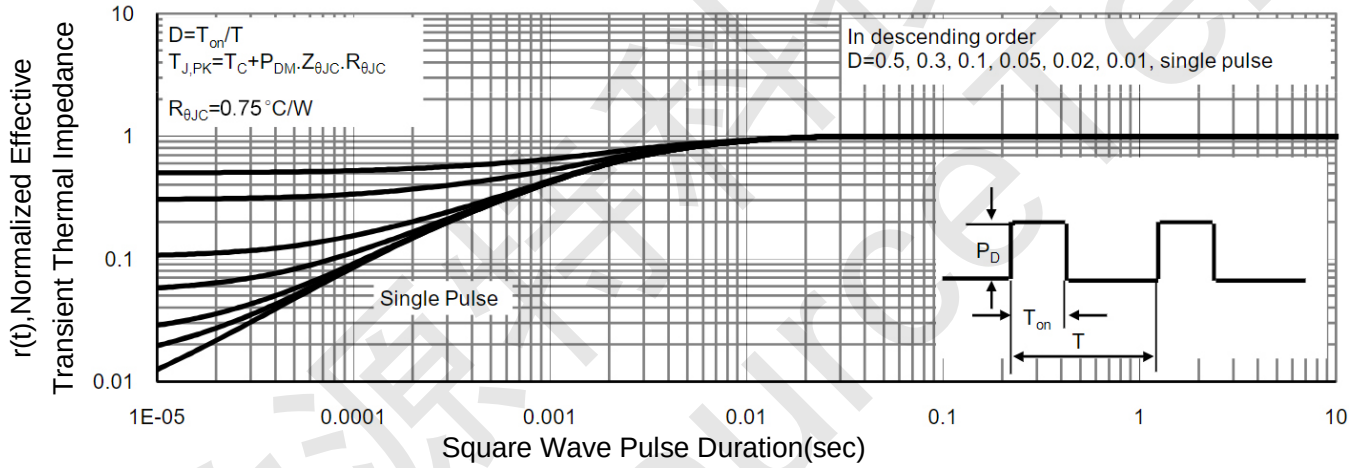
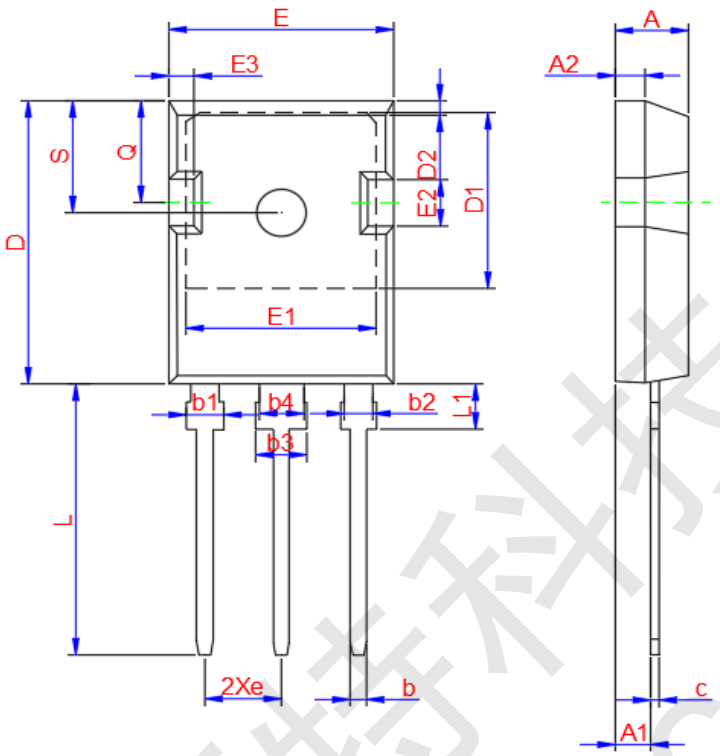


Figure 14 Normalized Maximum Transient Thermal Impedance

PE8688W TO-247 Package Information



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min.	Max.		Min.	Max.
A	4.830	5.210	D2	0.950	1.350
A1	2.270	2.540	E	15.70	16.130
A2	1.850	2.160	E1	13.10	14.150
b	1.070	1.330	E2	3.680	5.100
b1	1.900	2.410	E3	1.000	2.600
b2	1.900	2.160	e	5.440	
b3	2.870	3.380	N	3	
b4	2.870	3.130	L	19.800	20.320
c	0.550	0.680	L1	4.100	4.470
D	20.800	21.10	Q	5.490	6.000
D1	16.250	17.650	S	6.040	6.300