N-Channel Enhancement Mode Power MOSFET

Description

The PE50150P uses deep trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

General Features

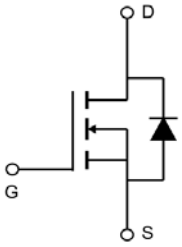
- V_{DS} =100V, I_D =150A

  $R_{DS(ON)}$ < 4.5mΩ @V_{GS}=10V

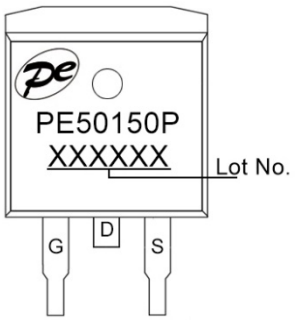
- High Power and current handing capability
- Lead free product is acquired

Application

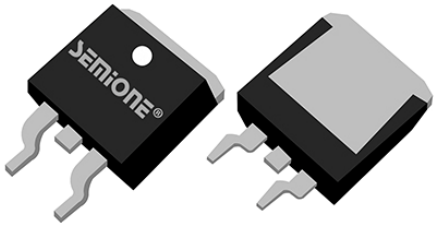
- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and pin assignment



TO-263

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	150	A
Drain Current-Continuous (T_C=100℃)	I_D(T_C=100℃)	124	A
Pulsed Drain Current (Note 1)	I_{DM}	600	A
Maximum Power Dissipation	P_D	227	W
Single Pulse Avalanche Energy (L=0.5mH)	E_{AS}	900	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	0.66	℃/W

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}=100V,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	2.8	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=60A	-	4.1	4.5	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=60A	-	110	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	V_{DS}=50V,V_{GS}=0V, F=1.0MHz	-	6300	-	pF
Output Capacitance	C_{oss}		-	560	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	40	-	pF
Gate Resistance	R_g	F=1.0MHz	-	3	-	Ω
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=50V,I_D=50A, V_{GS}=10V,R_G=3Ω	-	33	-	nS
Turn-on Rise Time	t_r		-	20	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	123	-	nS
Turn-Off Fall Time	t_f		-	45	-	nS
Total Gate Charge	Q_g	V_{DS}=50V,I_D=50A, V_{GS}=10V	-	110	-	nC
Gate-Source Charge	Q_{gs}		-	33	-	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	-	0.9	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F=50A,dI/dt=100A/μs		70		ns
Body Diode Reverse Recovery Charge	Q_{rr}			117		nC

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.

Typical Electrical and Thermal Characteristics

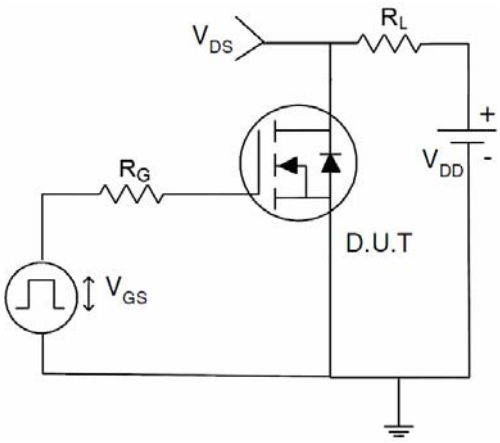


Figure 1 Switching Test Circuit

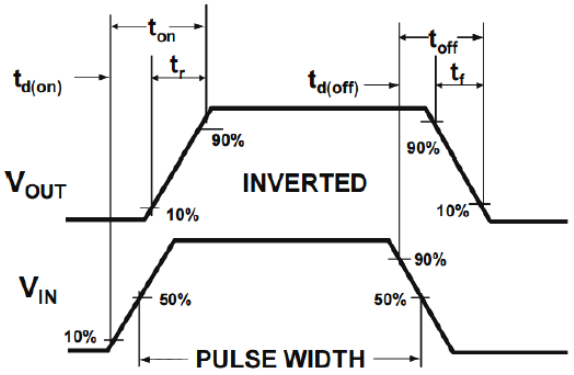


Figure 2 Switching Waveform

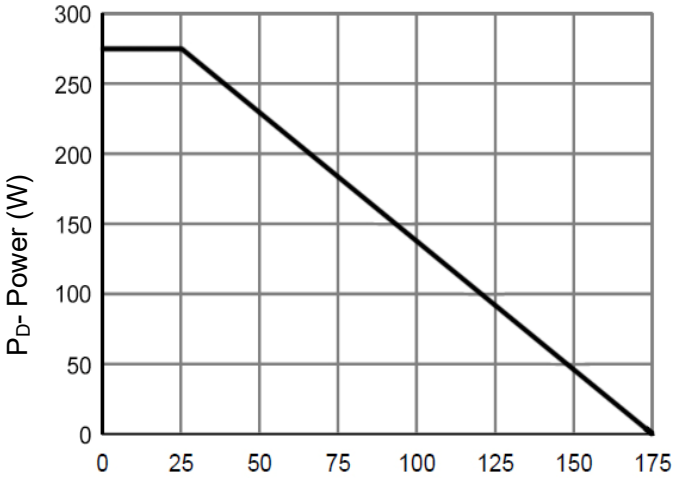


Figure 3 Power De-rating

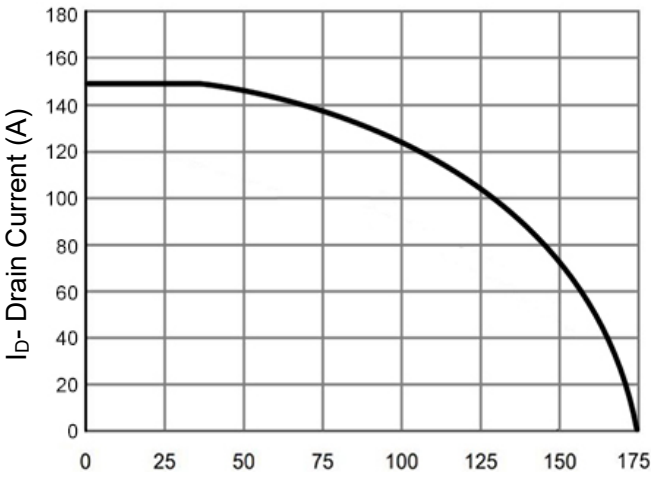


Figure 4 Drain Current

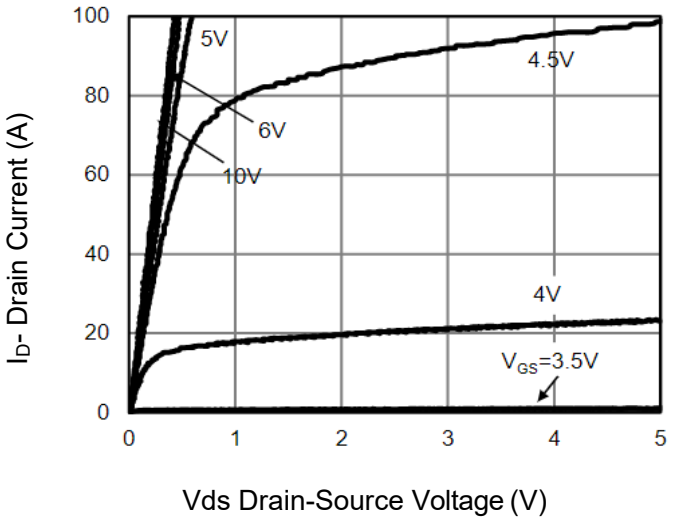


Figure 5 Output Characteristics

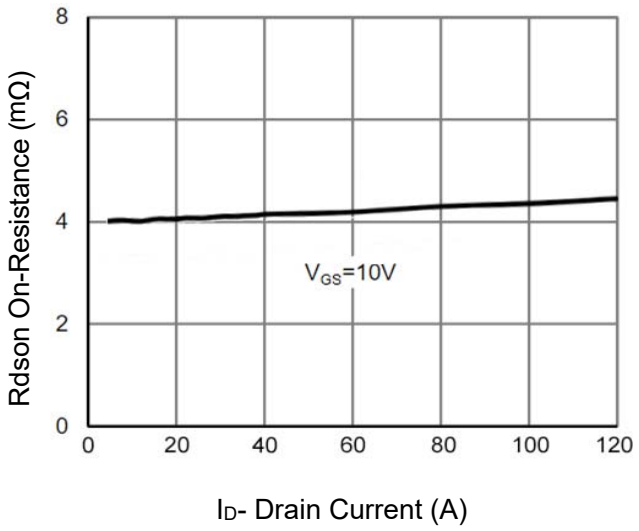


Figure 6 Rdson vs Drain Current

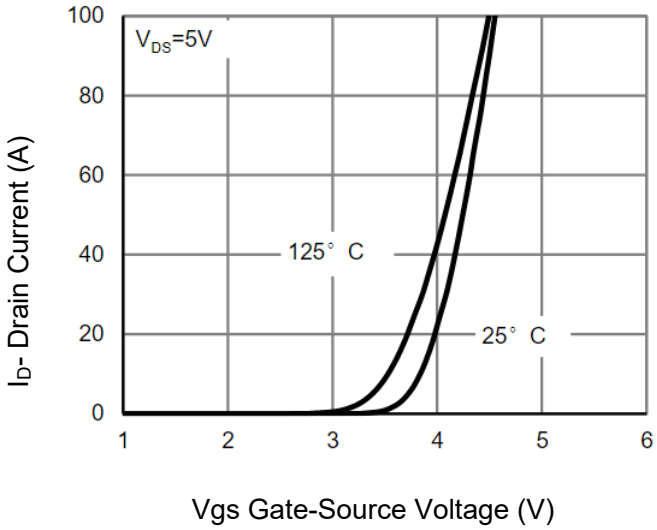


Figure 7 Transfer Characteristics

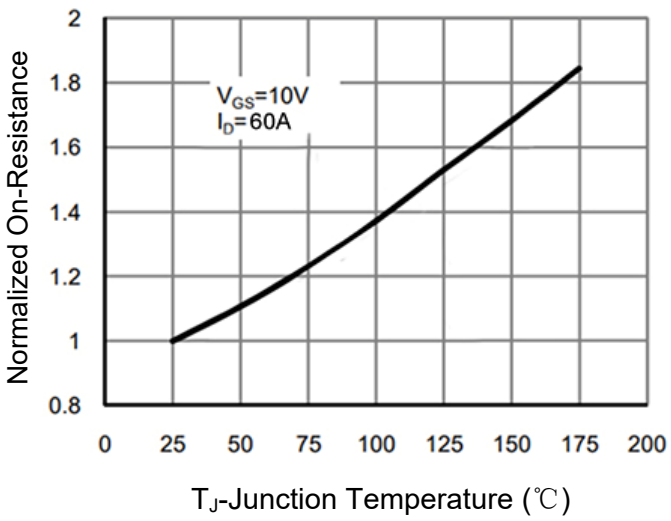


Figure 8 Rdson vs Junction Temperature

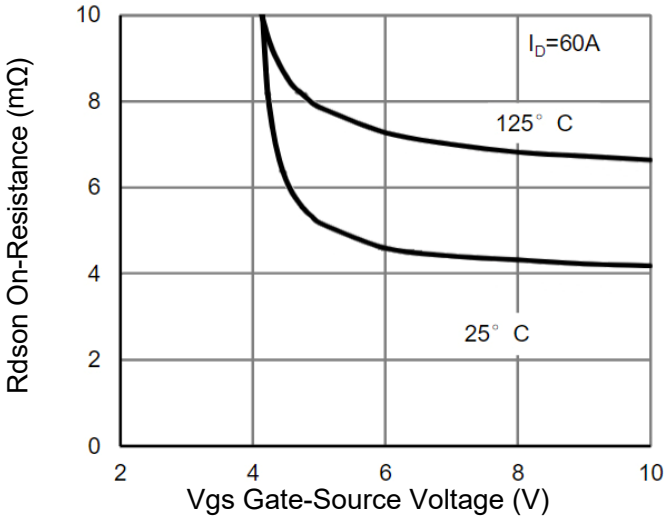


Figure 9 Rdson vs Vgs

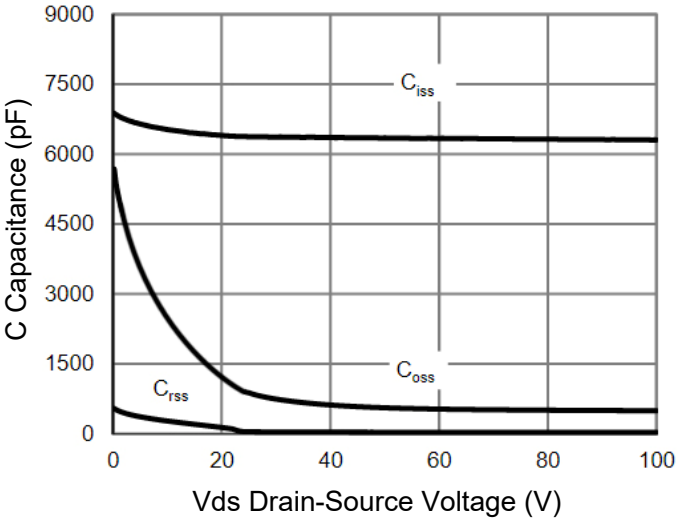


Figure 10 Capacitance vs Vds

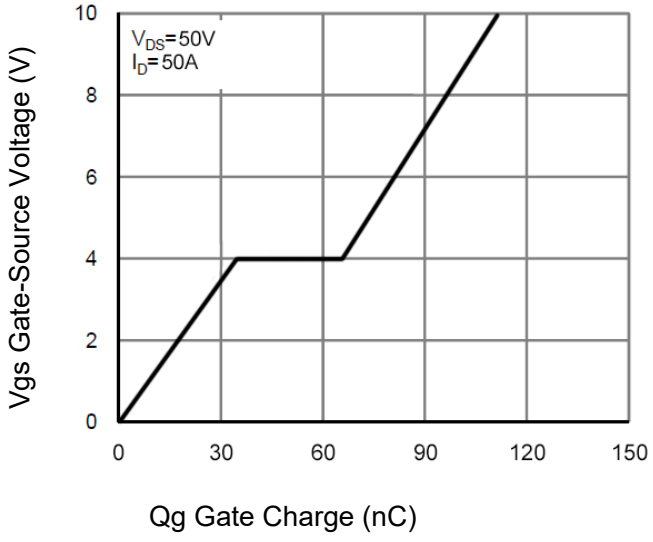


Figure 11 Gate Charge

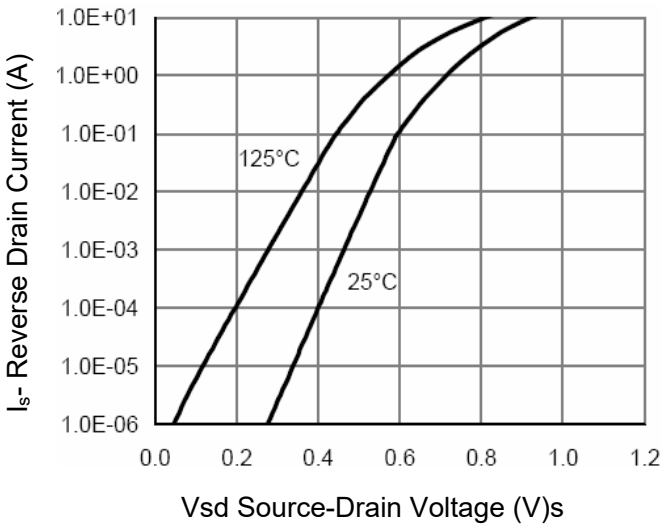


Figure 12 Source- Drain Diode Forward

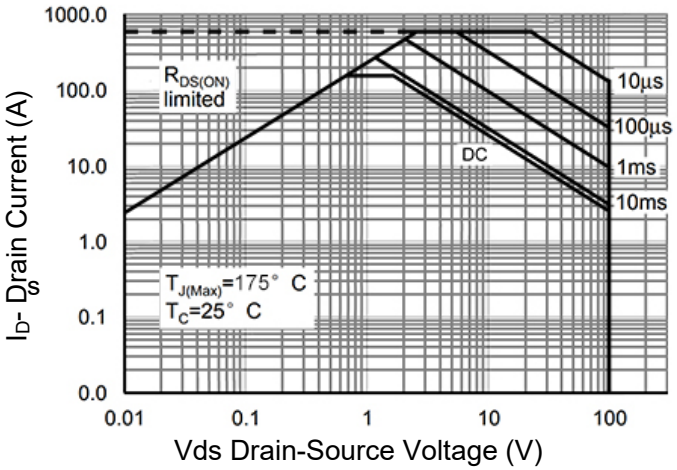


Figure 13 Safe Operation Area

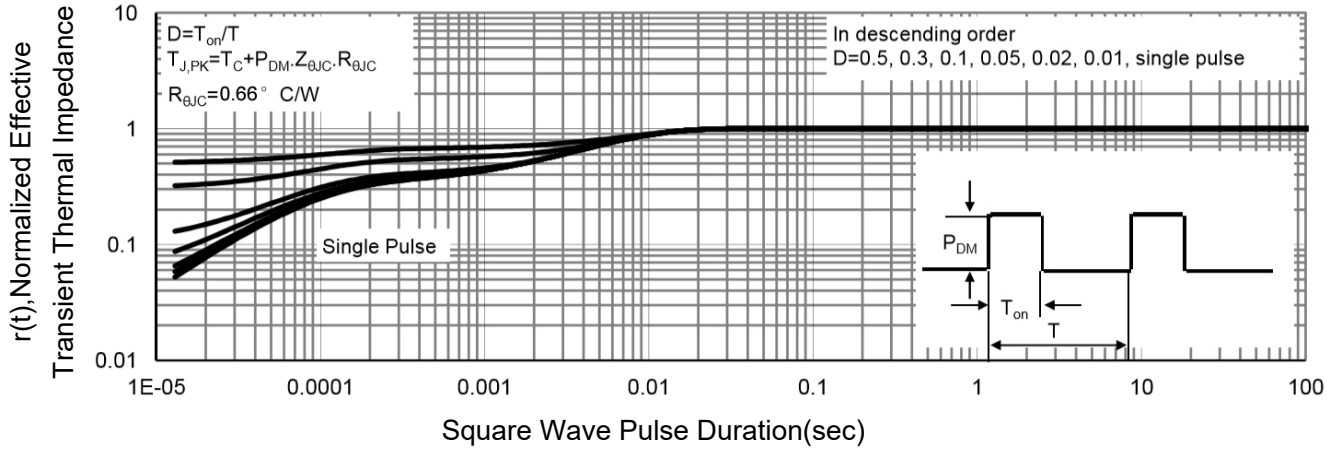
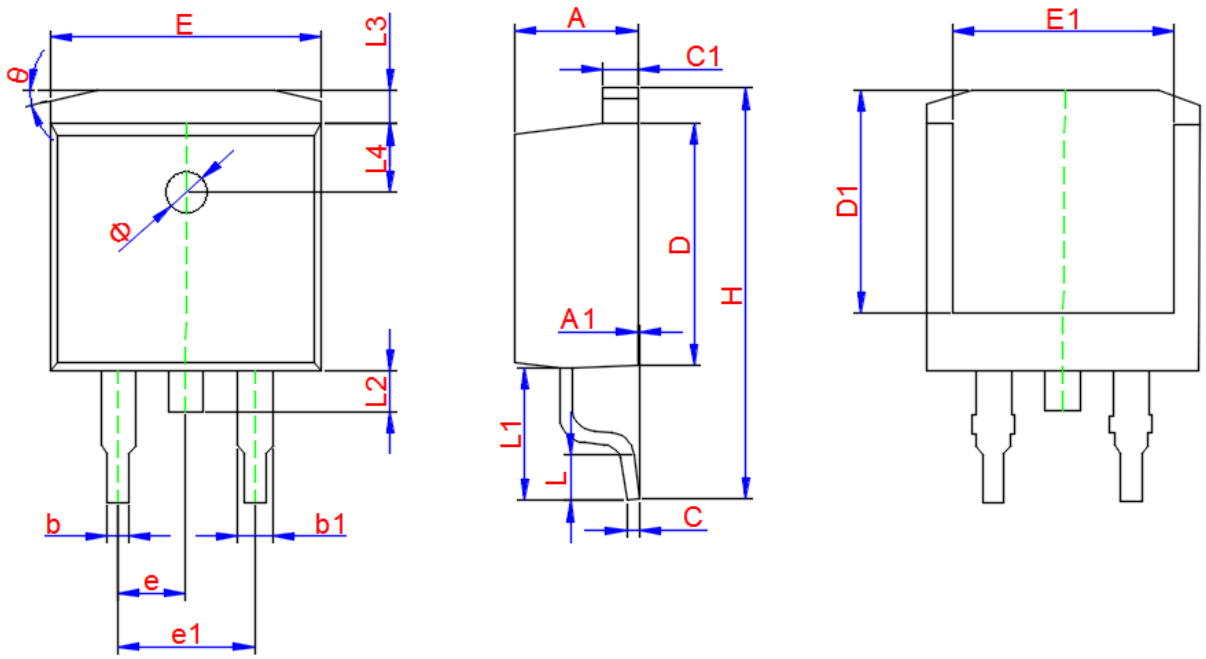


Figure 14 Normalized Maximum Transient Thermal Impedance

TO-263 Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	4.300	4.500	4.700
A1	0.000	- -	0.250
b	0.700	0.800	0.900
b1	1.200	1.300	1.400
c	0.400	0.470	0.550
c1	1.250	1.300	1.350
D	9.000	9.100	9.200
D1	8.000	8.100	8.200
H	14.90	15.20	15.50
E	9.800	10.00	10.20
E1	7.850	8.000	8.150
e1	4.930	5.080	5.230
L	2.000	2.200	2.450
L1	4.600	4.800	5.000
L2	1.300	1.500	1.700
L3	1.150	1.250	1.350
L4	2.400	2.500	2.600
Φ	1.5TYP.		
e	2.54TYP.		
θ	13° TYP.		