



PE4612 N-Channel Enhancement Mode Power MOSFET

PE4612 Description

The PE4612 uses advanced trench technology to provide excellent $R_{SS(ON)}$ and low gate charge. It can be used in a wide variety of applications. It is ESD protected.

PE4612 General Features

- $V_{SSS} > 22V$, $I_S = 6A$

$R_{SS(ON)} < 35m\Omega @ V_{GS}=4.5V$

$R_{SS(ON)} < 36m\Omega @ V_{GS}=4.0V$

$R_{SS(ON)} < 39m\Omega @ V_{GS}=3.8V$

$R_{SS(ON)} < 43m\Omega @ V_{GS}=3.1V$

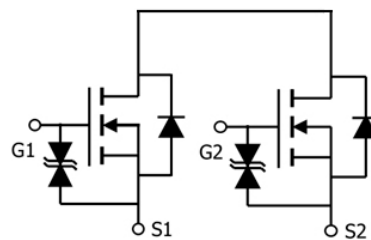
$R_{SS(ON)} < 50m\Omega @ V_{GS}=2.5V$

ESD Rating: 2000V HBM

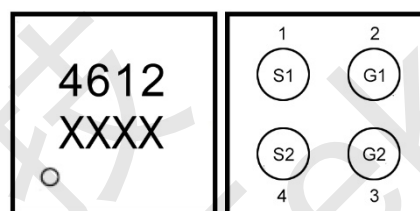
- Common drain

PE4612 Application

- Battery protection switch
- Mobile device battery charging and discharging



Schematic diagram



Marking and pin assignment



CSP

PE4612 Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Source-Source Voltage	V_{SSS}	22	V
Gate-Source Voltage	V_{GSS}	± 12	V
Source Current	I_S	6	A
Source Current(Pulse)	I_{SP}	60	A
Total Dissipation	P_T	1.7	W
Channel Temperature	T_{CH}	150	°C
Storage Temperature Range	T_{STG}	-55 To 150	°C



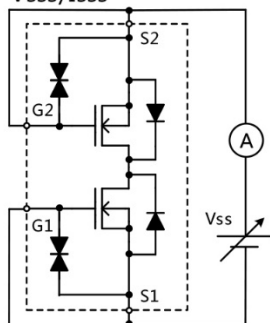
PE4612 Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Source-Source Breakdown Voltage	BV_{SSS}	$V_{GS}=0V, I_S=1mA$	22	-	-	V
Zero Gate Voltage Drain Current	I_{SSS}	$V_{SS}=20V, V_{GS}=0V$	-	-	1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 10V, V_{SS}=0V$	-	-	± 10	μA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{SS}=10V, I_S=1mA$	0.45	0.7	1.0	V
Static Source-Source On-State Resistance	$R_{SS(ON)}$	$V_{GS}=4.5V, I_S=3A$	21	28	35	$m\Omega$
		$V_{GS}=4.0V, I_S=3A$	22	29	36	$m\Omega$
		$V_{GS}=3.8V, I_S=3A$	23	30	39	$m\Omega$
		$V_{GS}=3.1V, I_S=3A$	25	33	43	$m\Omega$
		$V_{GS}=2.5V, I_S=3A$	29	38	50	$m\Omega$
Forward Transconductance	g_{FS}	$V_{SS}=5V, I_S=3A$	-	25	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{SS}=10V, V_{GS}=0V,$ $F=1MHz$	-	665	-	pF
Output Capacitance	C_{oss}		-	112	-	pF
Reverse Transfer Capacitance	C_{rss}		-	96	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{SS}=10V, I_S=3A, V_{GS}=4.5V$	-	21	-	nS
Turn-on Rise Time	t_r		-	140	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	97	-	nS
Turn-Off Fall Time	t_f		-	130	-	nS
Total Gate Charge	Q_g	$V_{SS}=10V, I_S=3A, V_{GS}=4.5V$	-	6	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	$V_{F(S-S)}$	$V_{GS}=0V, I_S=1A$	-	-	1.2	V

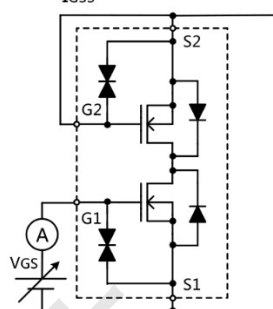


PE4612 Test Circuit

Test Circuit 1
 V_{SSS}/I_{SSS}

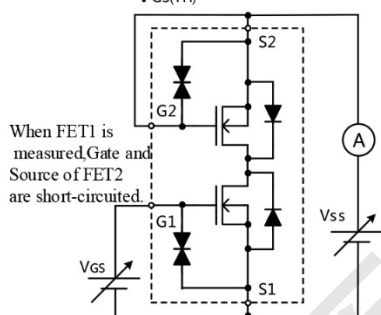


Test Circuit 2
 I_{GSS}



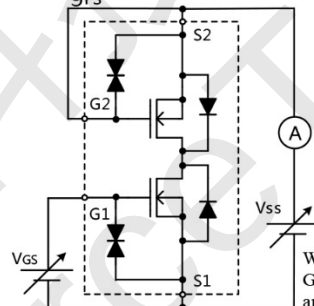
When FET1 is measured,
Gate and Source of FET2
are short-circuited.

Test Circuit 3
 $V_{GS(TH)}$



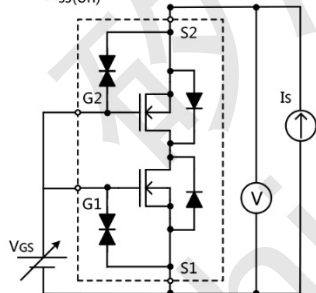
When FET1 is measured, Gate and
Source of FET2
are short-circuited.

Test Circuit 4
 g_{FS}

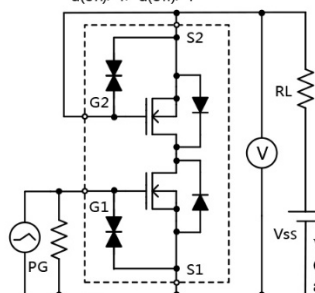


When FET1 is measured,
Gate and Source of FET2
are short-circuited.

Test Circuit 5
 $R_{SS(on)}$

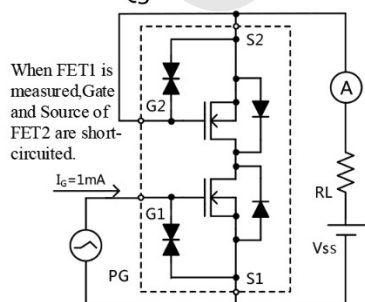


Test Circuit 6
 $t_{d(on)}, t_r, t_d(off), t_f$



When FET1 is measured,
Gate and Source of FET2
are short-circuited.

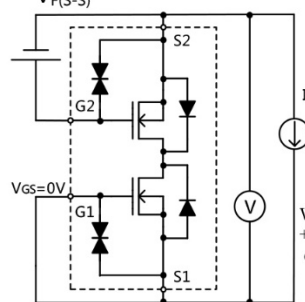
Test Circuit 7
 Q_g



When FET1 is measured, Gate and Source of
FET2 are short-circuited.

$I_G=1mA$

Test Circuit 8
 $V_{F(S-S)}$



When FET1 is measured,
+4.5V is added to V_{GS}
of FET2.



PE4612 Typical Electrical and Thermal Characteristics

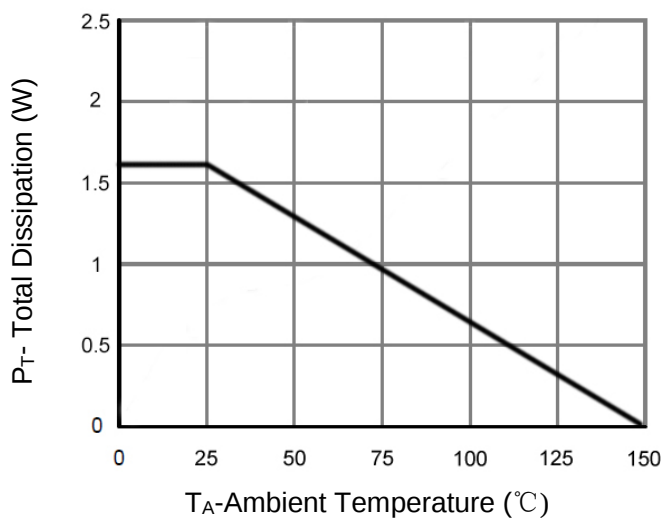


Figure 1 Power Dissipation

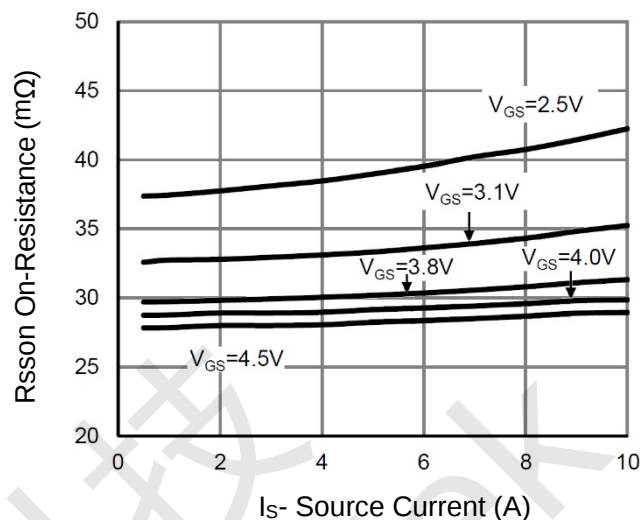


Figure 2 On-Resistance vs Drain Current

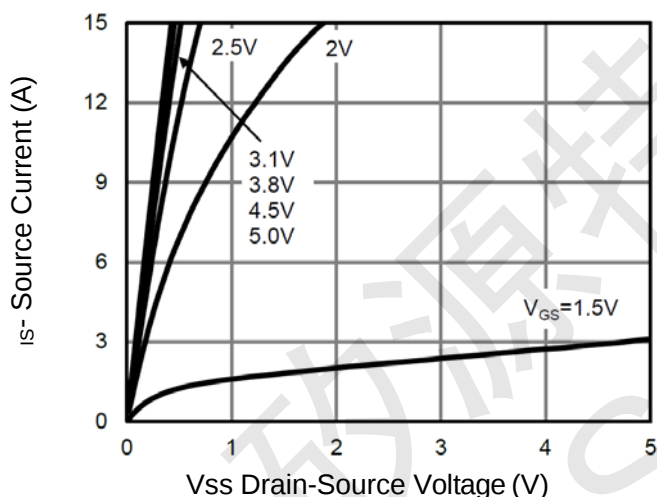


Figure 3 On-Region Characteristics

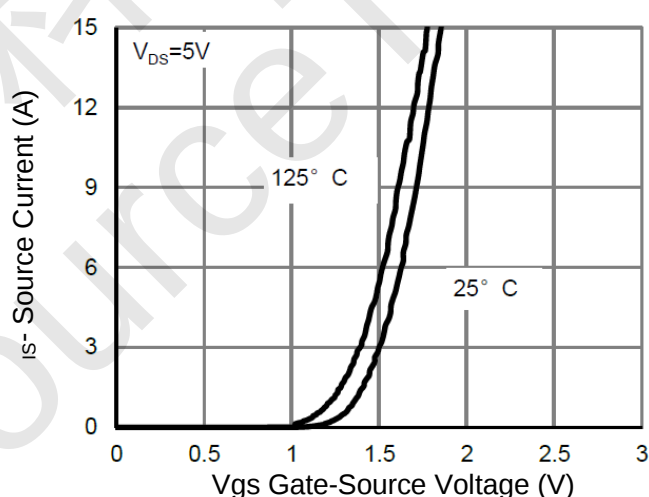


Figure 4 Transfer Characteristics

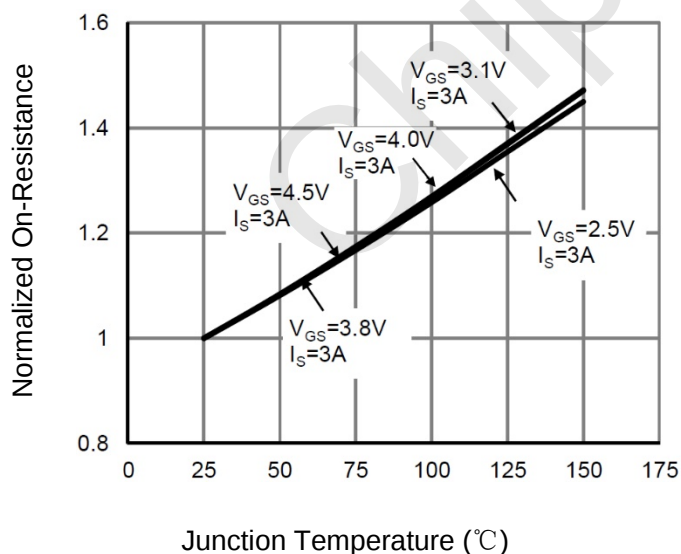


Figure 5 On-Resistance vs. Junction Temperature

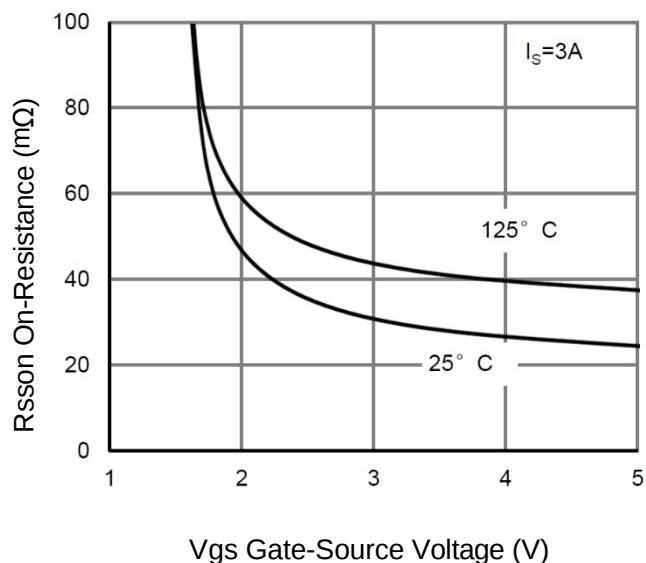
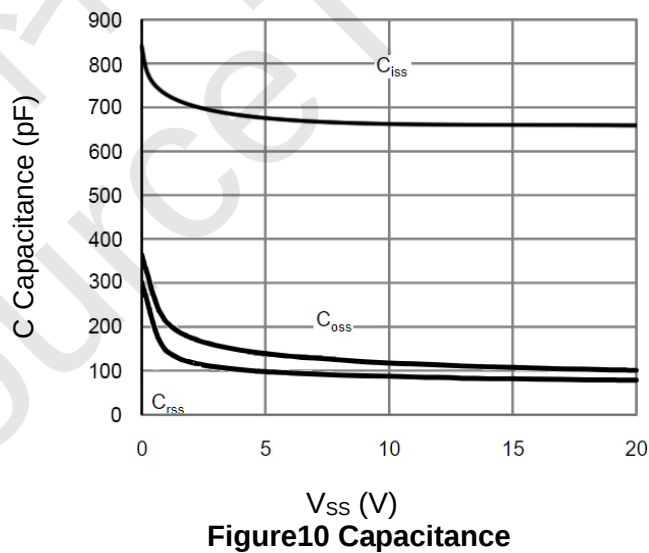
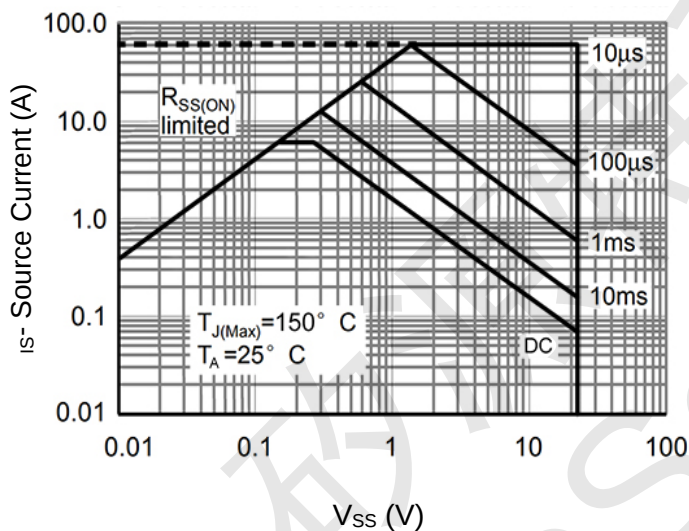
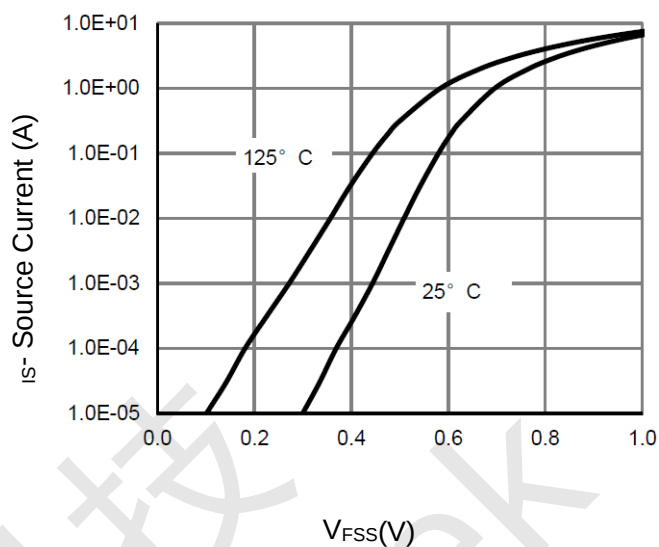
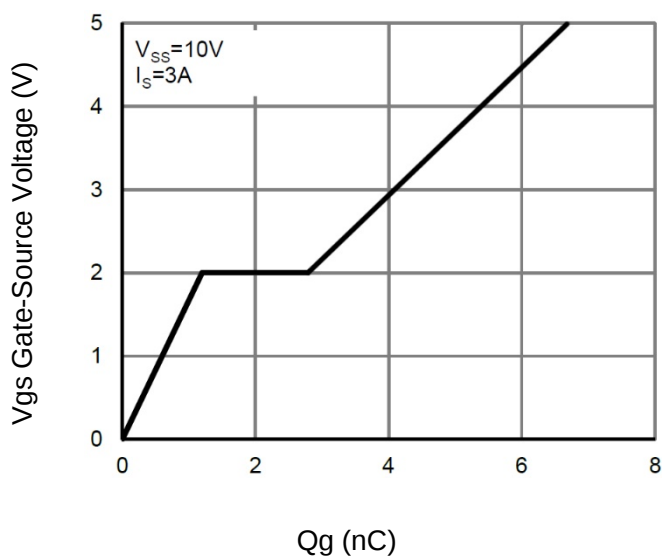


Figure 6 On-Resistance vs. Gate Source voltage





PE4612 Package Information

