



PE4614 N and P Channel Enhancement Mode Power MOSFET

PE4614 Description

The PE4614 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

PE4614 General Features

- **N-Channel**

- $V_{DS} = 40V$, $I_D = 8A$

$$R_{DS(ON)} < 19m\Omega @ V_{GS}=10V$$

$$R_{DS(ON)} < 28m\Omega @ V_{GS}=4.5V$$

- **P-Channel**

- $V_{DS} = -40V$, $I_D = -7A$

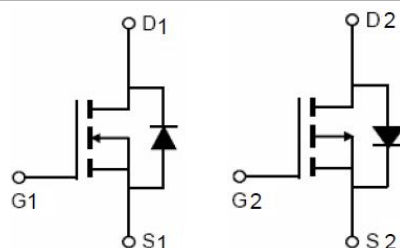
$$R_{DS(ON)} < 35m\Omega @ V_{GS}=-10V$$

$$R_{DS(ON)} < 45m\Omega @ V_{GS}=-4.5V$$

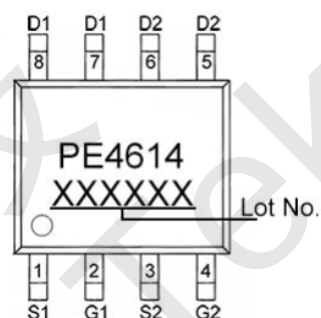
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

PE4614 Application

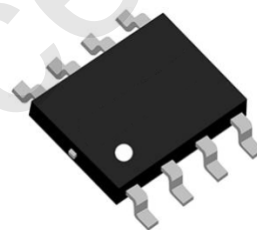
- DC motor
- PWM applications



Schematic diagram



Marking and pin assignment



SOP-8

PE4614 Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V_{DS}	40	-40	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Drain Current-Continuous	I_D	8	-7	A
Pulsed Drain Current (Note 1)	I_{DM}	32	-28	A
Maximum Power Dissipation	P_D	2	2	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150		°C

PE4614 Thermal Characteristic

Parameter	Symbol	N-Channel	P-Channel	Unit
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	62.5	62.5	°C/W



PE4614 N-Channel Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=40V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.5	2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=8A$	-	15	19	m Ω
		$V_{GS}=4.5V, I_D=7A$	-	20	28	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=8A$	-	25	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=20V, V_{GS}=0V,$ $F=1.0MHz$	-	1160	-	pF
Output Capacitance	C_{oss}		-	110	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	100	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=20V, I_D=2A, R_L=1\Omega,$ $V_{GS}=10V, R_G=3\Omega$	-	5.5	-	nS
Turn-on Rise Time	t_r		-	14	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	22	-	nS
Turn-Off Fall Time	t_f		-	9	-	nS
Total Gate Charge	Q_g	$V_{DS}=20V, I_D=8A, V_{GS}=10V$	-	23	-	nC
Gate-Source Charge	Q_{gs}		-	3.5	-	nC
Gate-Drain Charge	Q_{gd}		-	5.3	-	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		-	-	3	A

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.



PE4614 Typical Electrical and Thermal Characteristics

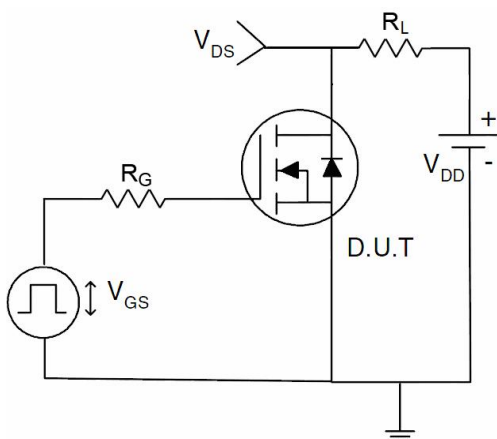


Figure 1 Switching Test Circuit

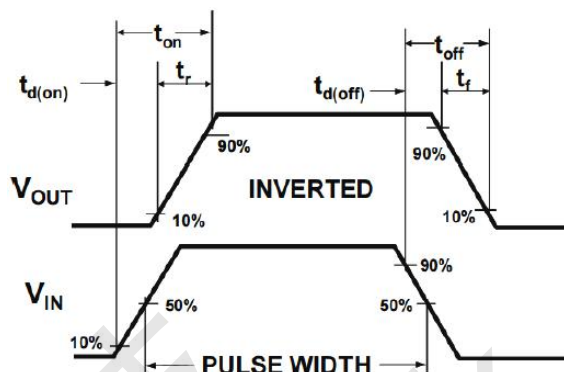


Figure 2 Switching Waveform

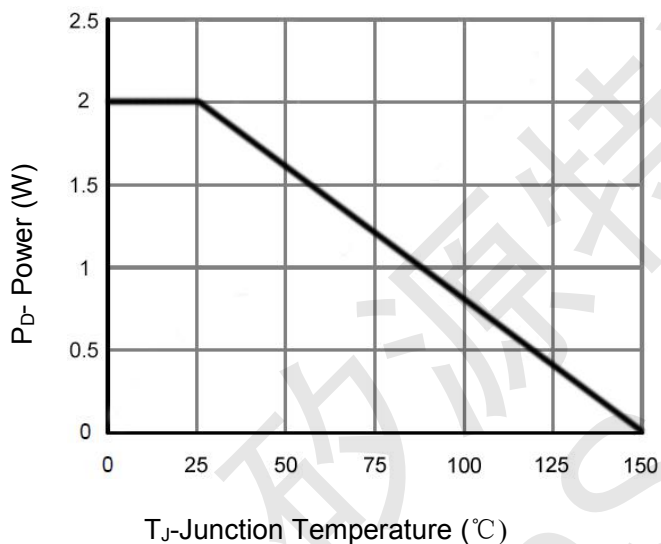


Figure 3 Power De-rating

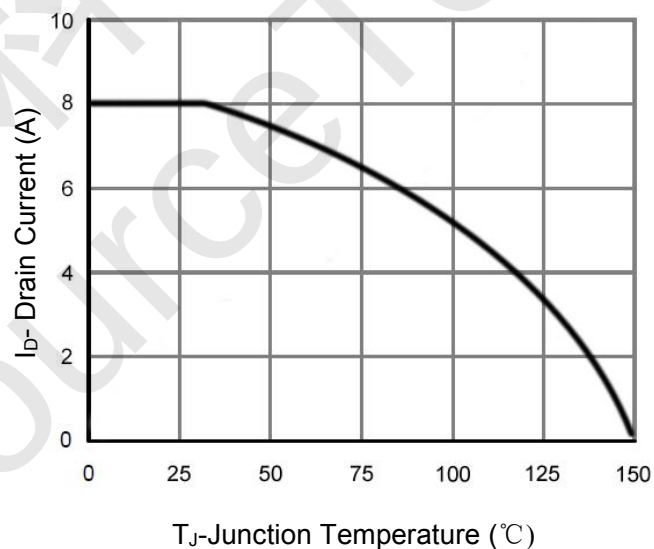


Figure 4 Drain Current

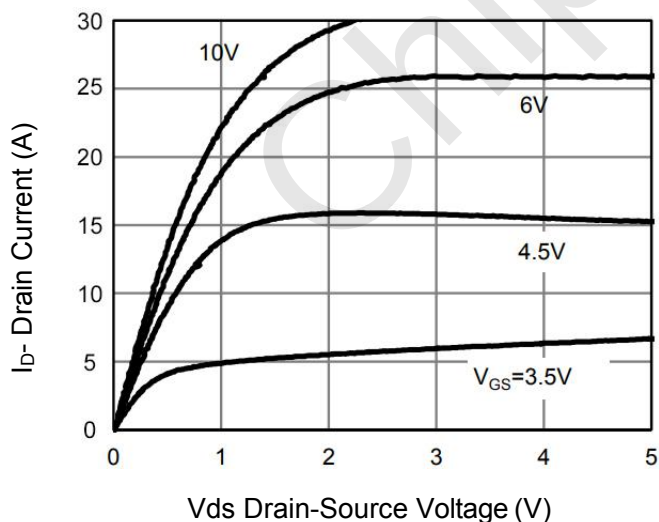


Figure 5 Output Characteristics

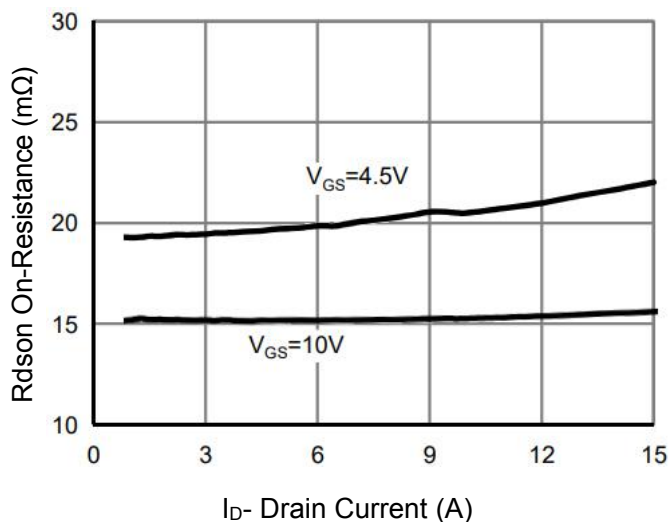


Figure 6 Rdson vs Drain Current

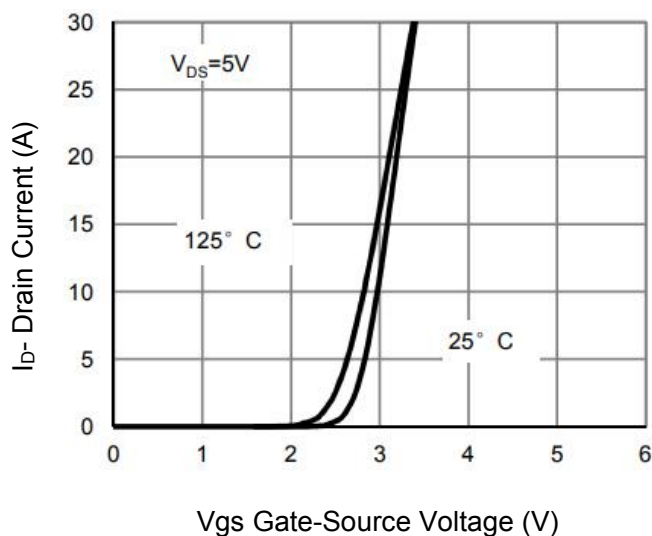


Figure 7 Transfer Characteristics

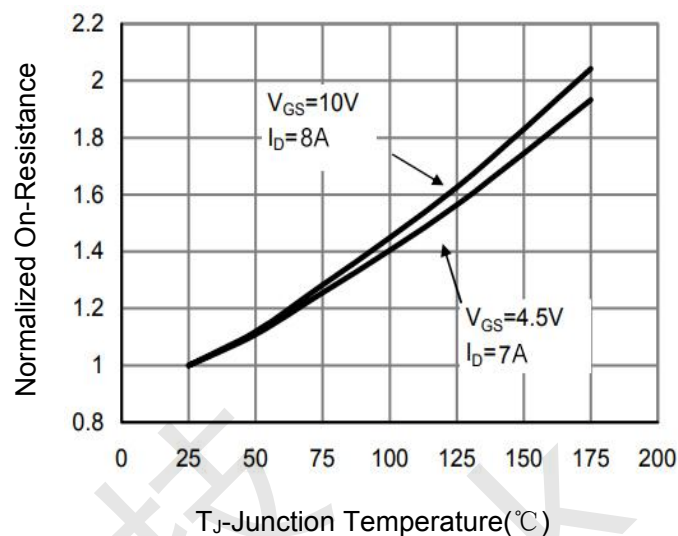


Figure 8 Rdson vs Junction Temperature

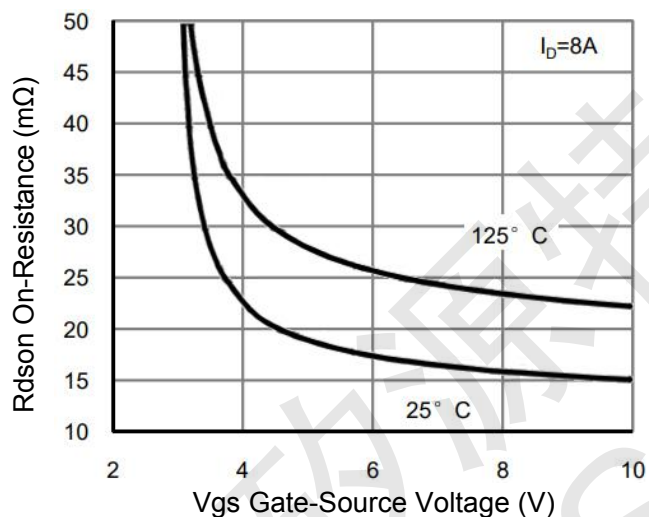


Figure 9 Rdson vs Vgs

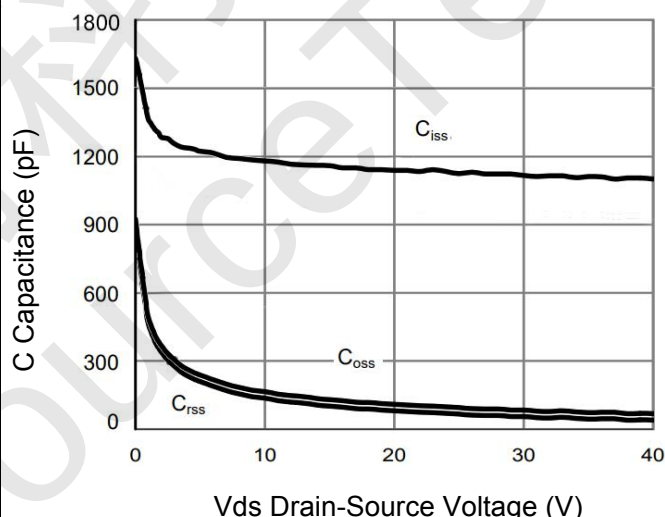


Figure 10 Capacitance vs Vds

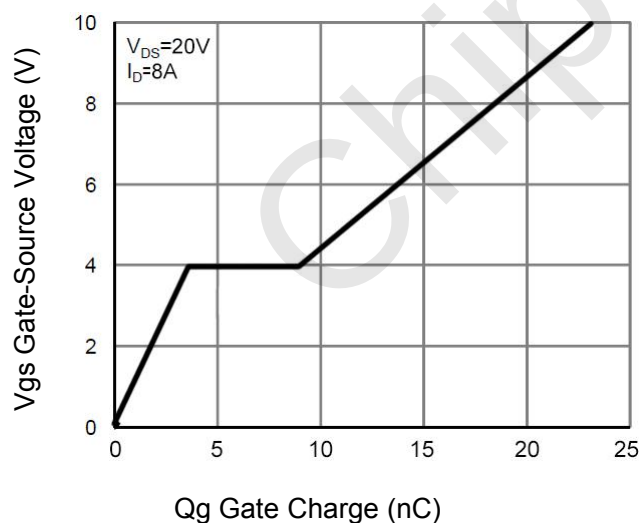


Figure 11 Gate Charge

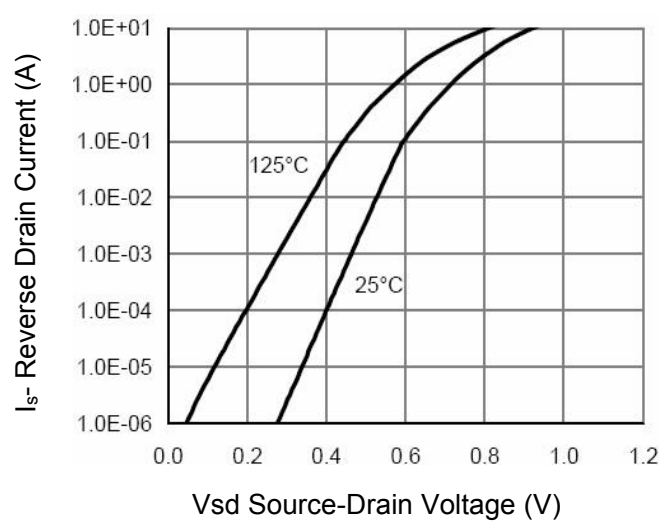


Figure 12 Source- Drain Diode Forward

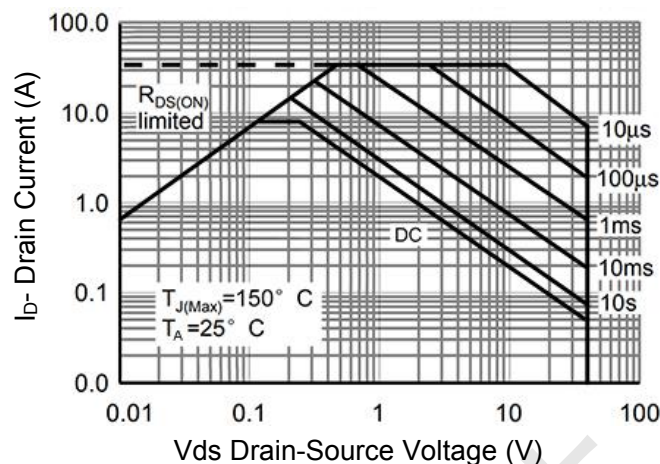


Figure 13 Safe Operation Area

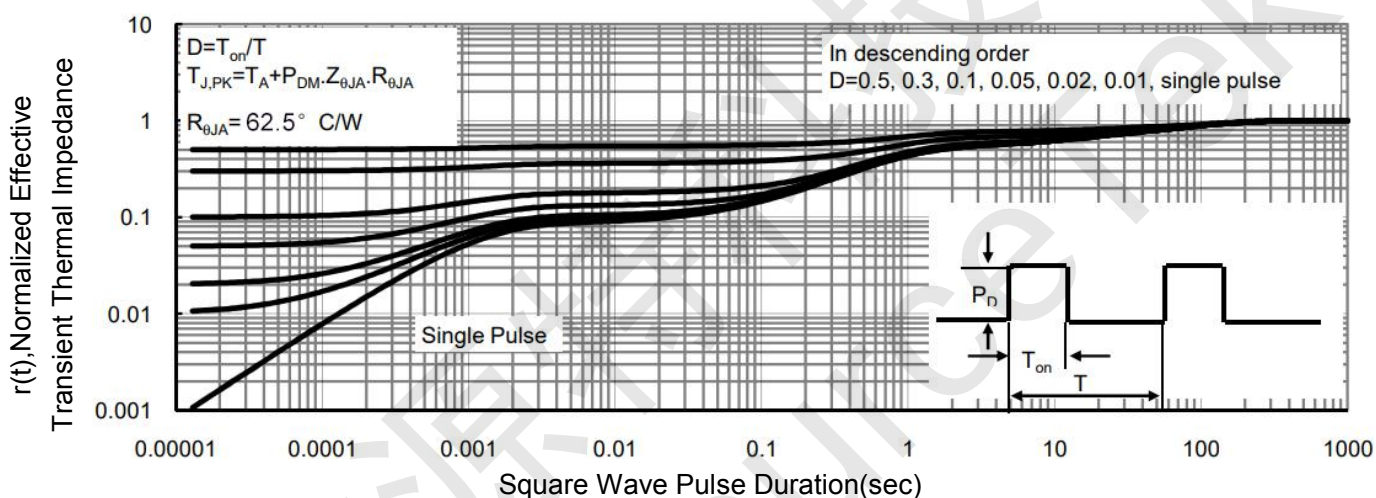


Figure 14 Normalized Maximum Transient Thermal Impedance



PE4614 P-Channel Electrical Characteristics (TC=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-40V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.5	-2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-7A$	-	27	35	m Ω
		$V_{GS}=-4.5V, I_D=-6A$	-	37	45	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-10V, I_D=-6A$	-	23	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=-20V, V_{GS}=0V,$ $F=1.0MHz$	-	1250	-	pF
Output Capacitance	C_{oss}		-	120	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	105	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-20V, R_L=1\Omega,$ $V_{GS}=-10V, R_G=3\Omega$	-	10	-	nS
Turn-on Rise Time	t_r		-	18	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	38	-	nS
Turn-Off Fall Time	t_f		-	24	-	nS
Total Gate Charge	Q_g	$V_{DS}=-20V, I_D=-6A,$ $V_{GS}=-10V$	-	28	-	nC
Gate-Source Charge	Q_{gs}		-	4.5	-	nC
Gate-Drain Charge	Q_{gd}		-	8	-	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		-	-	-3	A

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.



PE4614 Typical Electrical and Thermal Characteristics

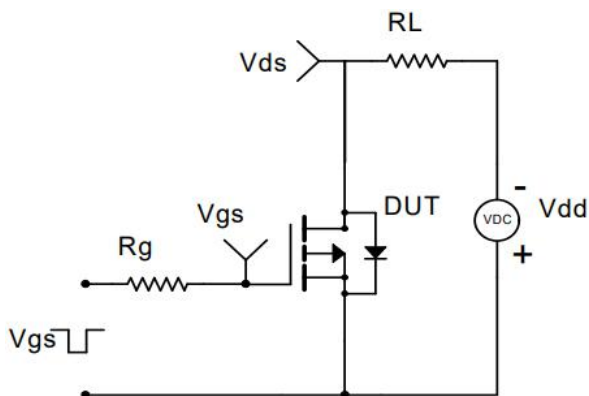


Figure 1 Switching Test Circuit

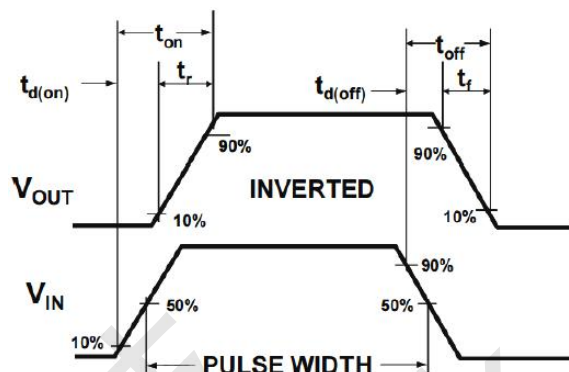


Figure 2 Switching Waveform

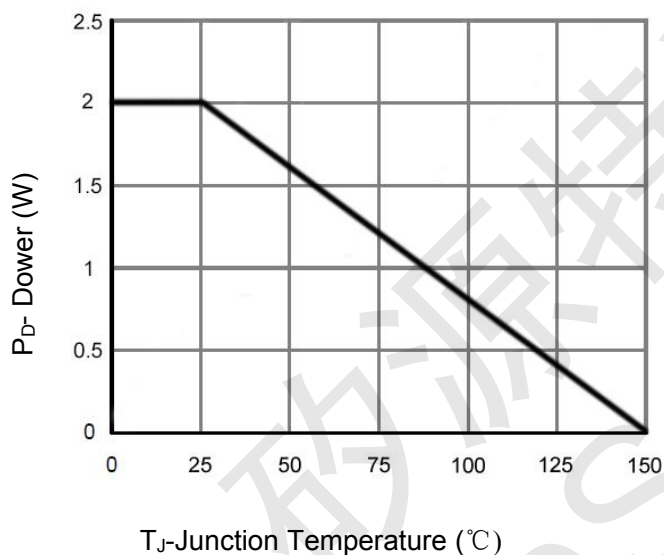


Figure 3 Power De-rating

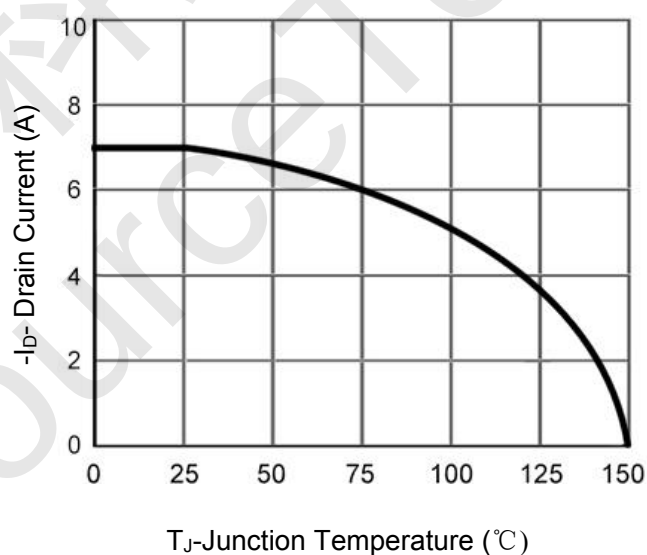


Figure 4 Drain Current

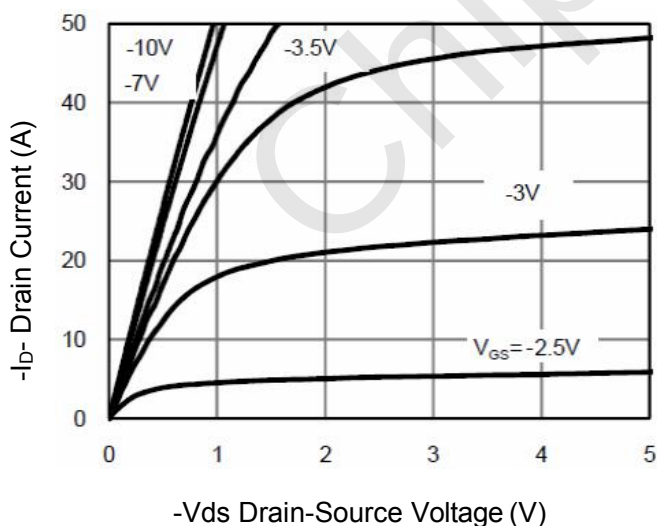


Figure 5 Output Characteristics

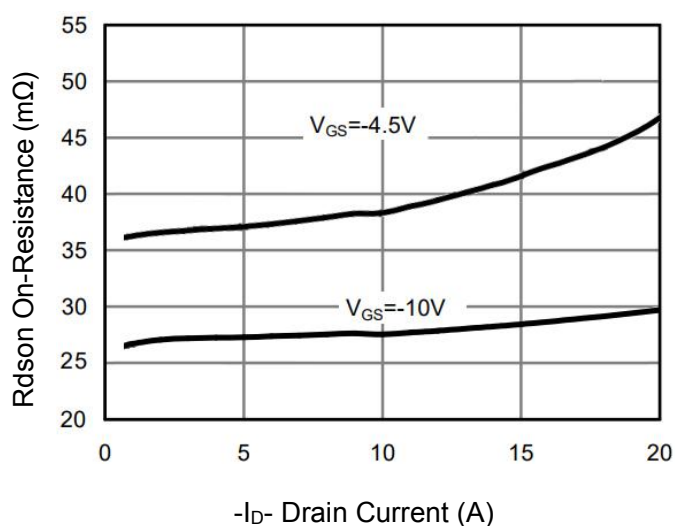


Figure 6 Rdson vs Drain Current

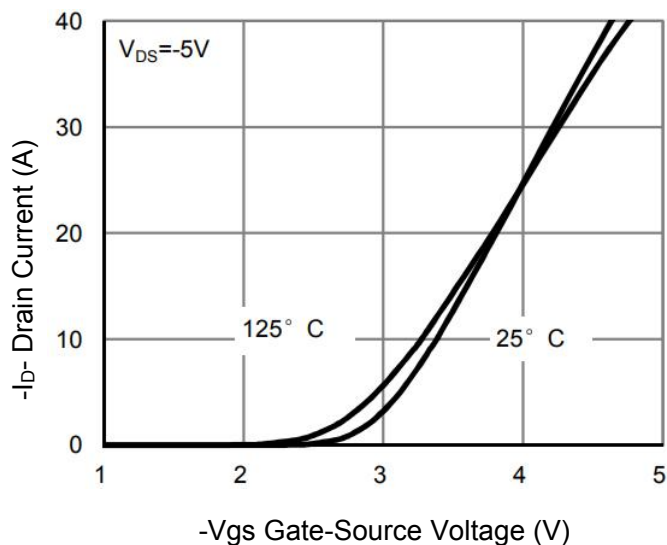


Figure 7 Transfer Characteristics

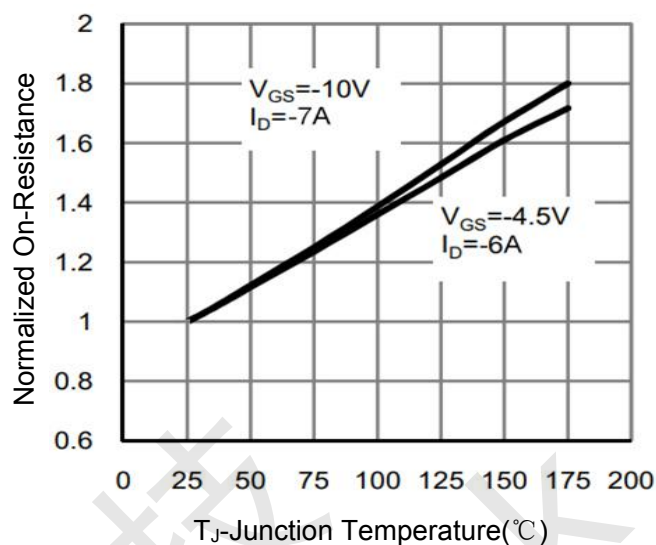


Figure 8 Rdson vs Junction Temperature

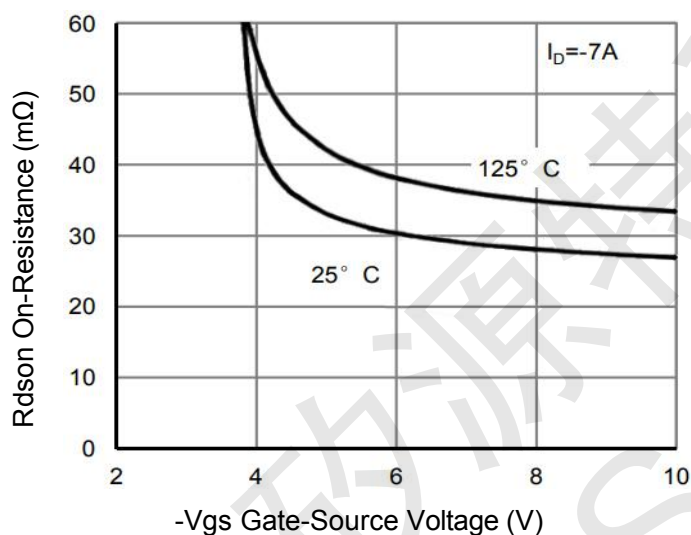


Figure 9 Rdson vs VGS

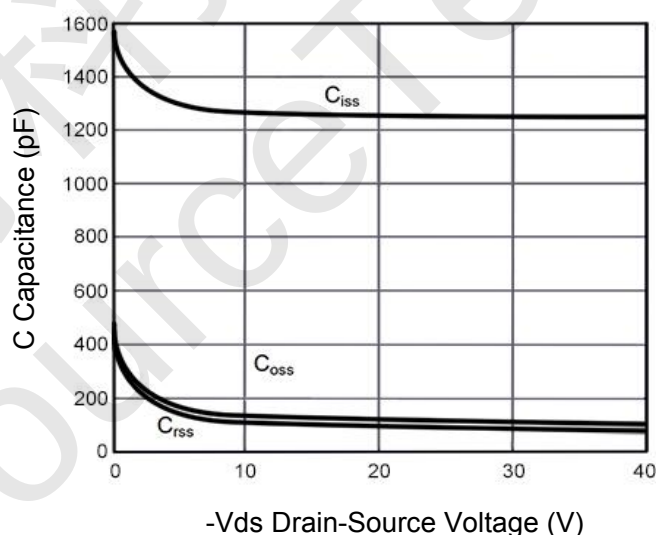


Figure 10 Capacitance vs Vds

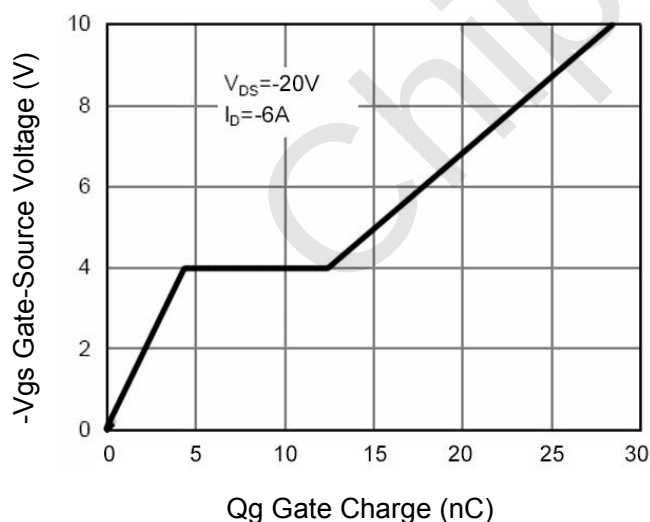


Figure 11 Gate Charge

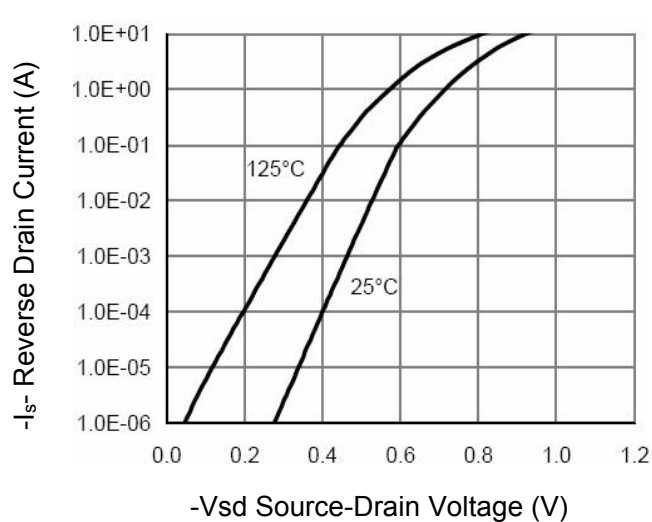


Figure 12 Source- Drain Diode Forward

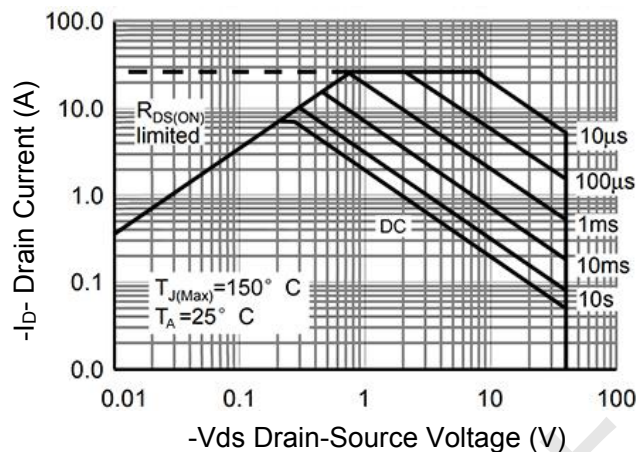


Figure 13 Safe Operation Area

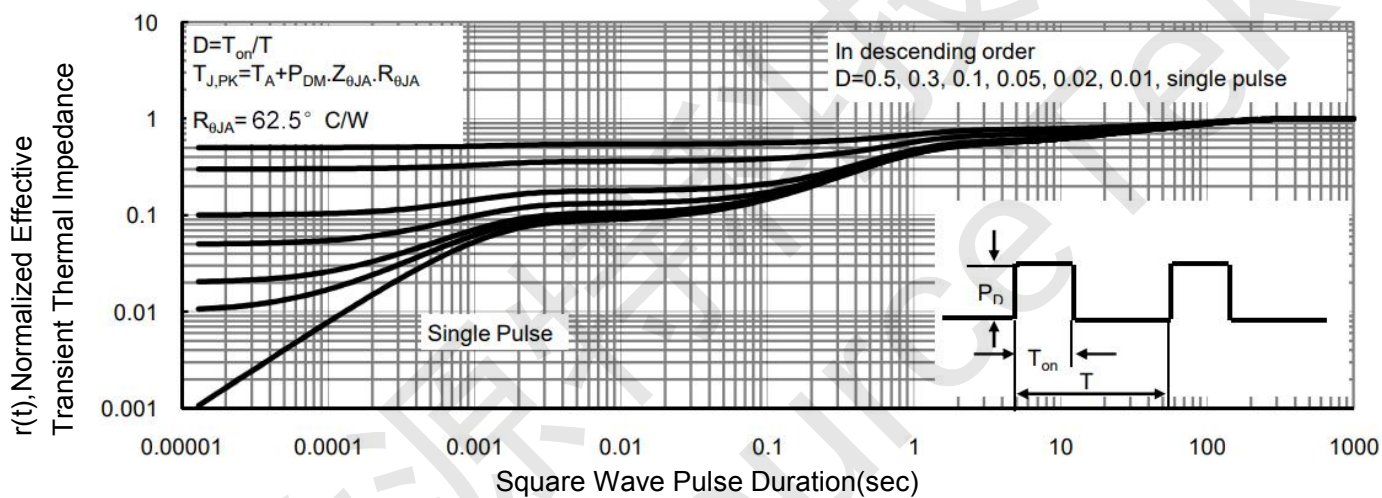
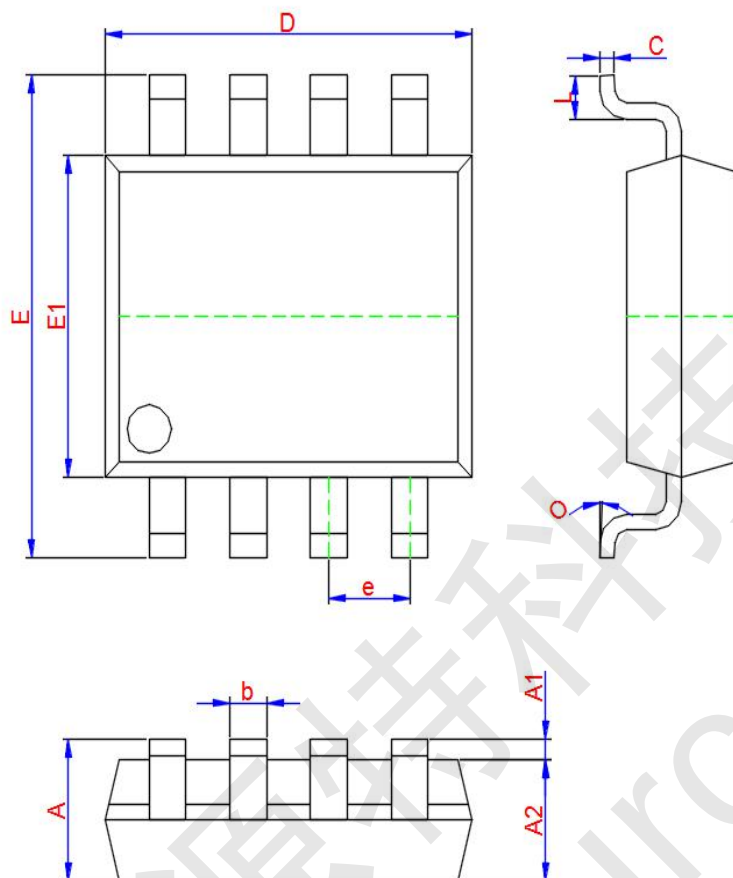


Figure 14 Normalized Maximum Transient Thermal Impedance



PE4614 SOP-8 Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	1.350	1.550	1.750
A1	0.100	0.175	0.250
A2	1.350	1.450	1.550
b	0.330	0.420	0.510
c	0.170	0.210	0.250
D	4.700	4.900	5.100
e	1.270 TYP.		
E	5.800	6.000	6.200
E1	3.750	3.900	4.050
L	0.400	0.835	1.270
O	0°	4°	8°