PE8324CKT N and P Channel Enhancement Mode Power MOSFET

PE8324CKT Description

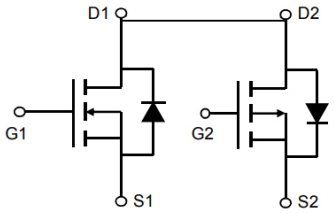
The PE8324CKT uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

PE8324CKT General Features

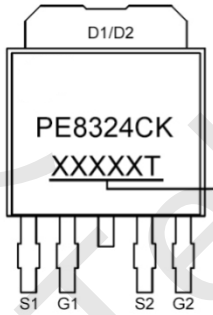
- **N-Channel**
- V_{DS} = 30V, I_D = 18A
  $R_{DS(ON)}$ < 14mΩ @ V_{GS}=10V
  $R_{DS(ON)}$ < 23mΩ @ V_{GS}=4.5V
- **P-Channel**
- V_{DS} = -30V, I_D = -14A
  $R_{DS(ON)}$ < 29mΩ @ V_{GS}=-10V
  $R_{DS(ON)}$ < 40mΩ @ V_{GS}=-4.5V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

PE8324CKT Application

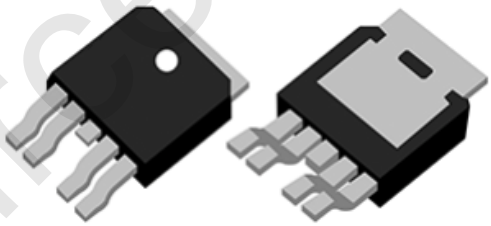
- DC motor
- PWM applications



Schematic diagram



Marking and pin assignment



TO-252-4L

PE8324CKT Absolute Maximum Ratings (TC=25℃ unless otherwise noted)

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Drain Current-Continuous	I_D	18	-14	A
Pulsed Drain Current (Note 1)	I_{DM}	50	-36	A
Maximum Power Dissipation	P_D	15.5	27	W
Single Pused Avalache Energy (L=0.1mH)	E_{AS}	24	26	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150		℃

Thermal Characteristic

Parameter	Symbol	N-Channel	P-Channel	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	8	4.6	℃/W

PE8324CKT N-Channel 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	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,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	1.5	2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=8A	-	11	14	mΩ
		V_{GS}=4.5V,I_D=6A	-	15	23	mΩ
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	V_{DS}=15V,V_{GS}=0V, F=1.0MHz	-	600	-	pF
Output Capacitance	C_{oss}		-	90	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	70	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=15V,I_D=8A,R_L=1Ω, V_{GS}=10V,R_G=3Ω	-	11.1	-	nS
Turn-on Rise Time	t_r		-	3.1	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	26.2	-	nS
Turn-Off Fall Time	t_f		-	3.6	-	nS
Total Gate Charge	Q_g	V_{DS}=15V,I_D=10A,V_{GS}=10V	-	12	-	nC
Gate-Source Charge	Q_{gs}		-	2.1	-	nC
Gate-Drain Charge	Q_{gd}		-	2.6	-	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		-	-	10	A
Reverse Recovery Time	t_{rr}	I_F=10A, di/dt=100A/μs	-	18.6	-	nS
Reverse Recovery Charge	Q_{rr}		-	6	-	μC

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.

PE8324CKT Typical Electrical and Thermal Characteristics

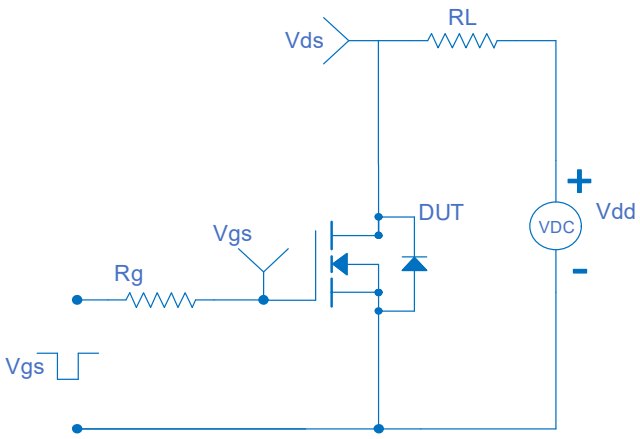


Figure 1 Switching Test Circuit

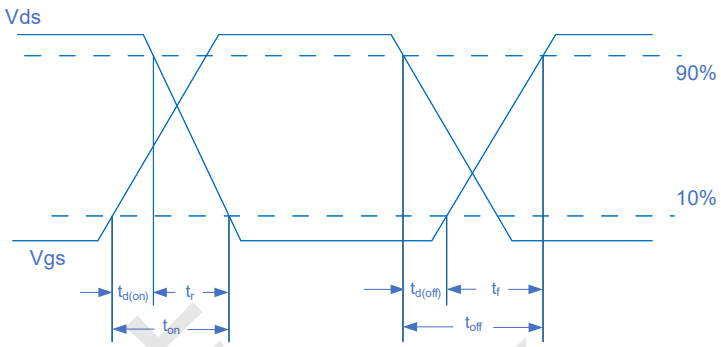


Figure 2 Switching Waveform

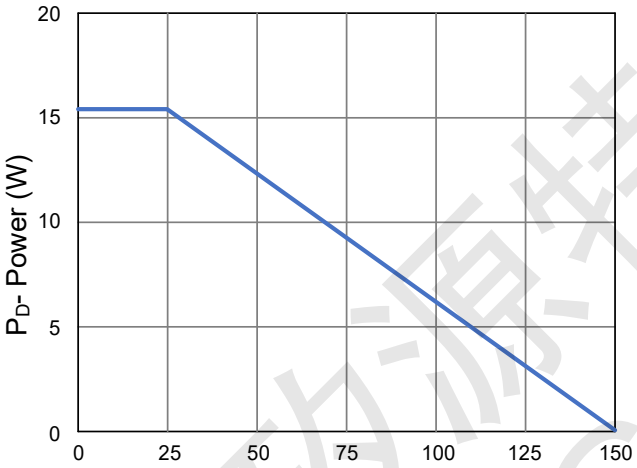


Figure 3 Power De-rating

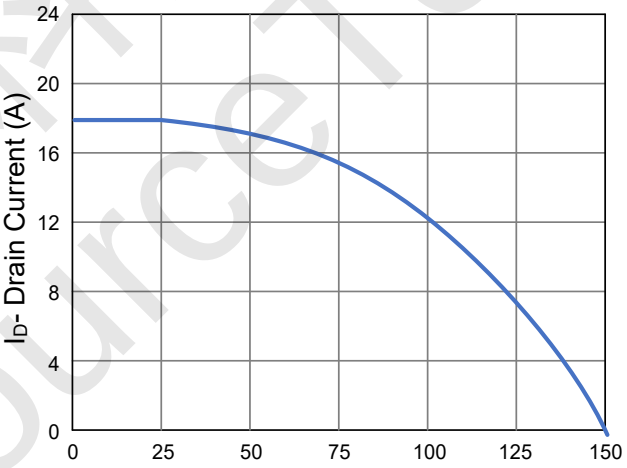


Figure 4 Drain Current

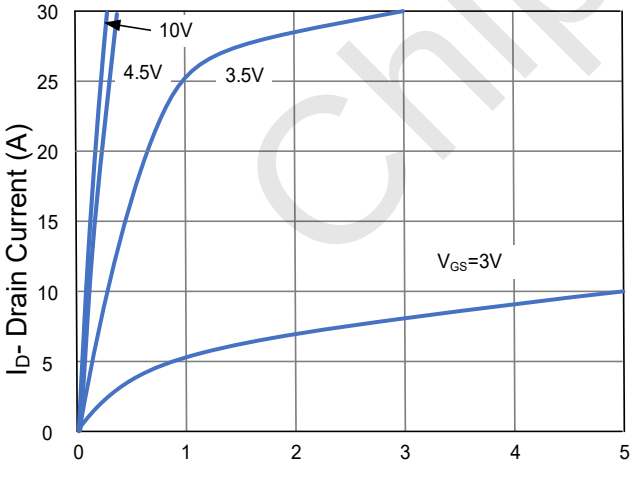


Figure 5 Output Characteristics

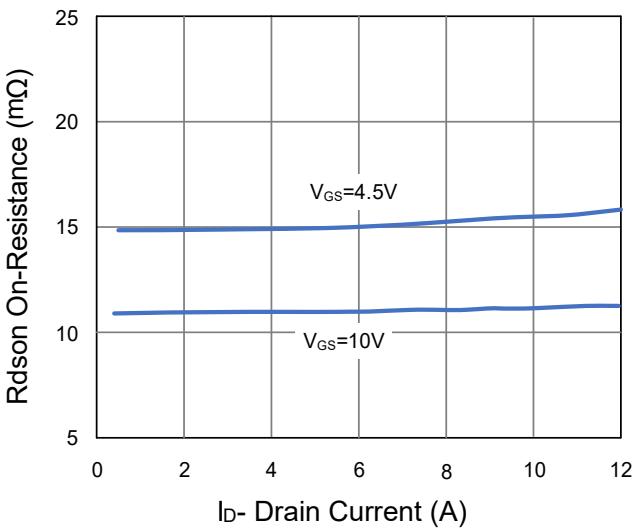


Figure 6 Rdson vs Drain Current

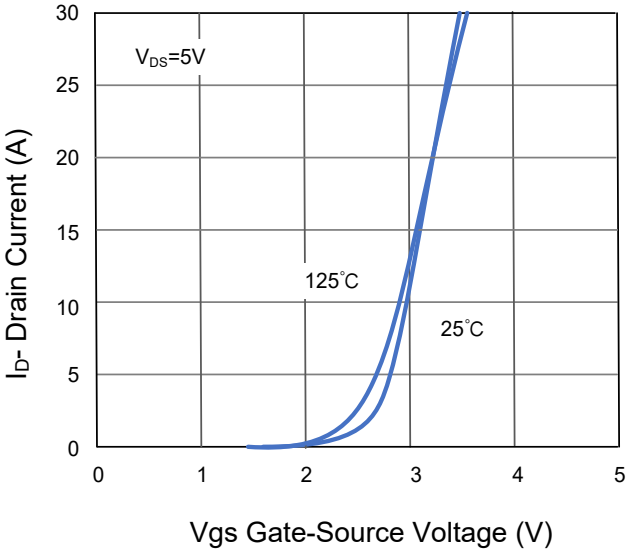


Figure 7 Transfer Characteristics

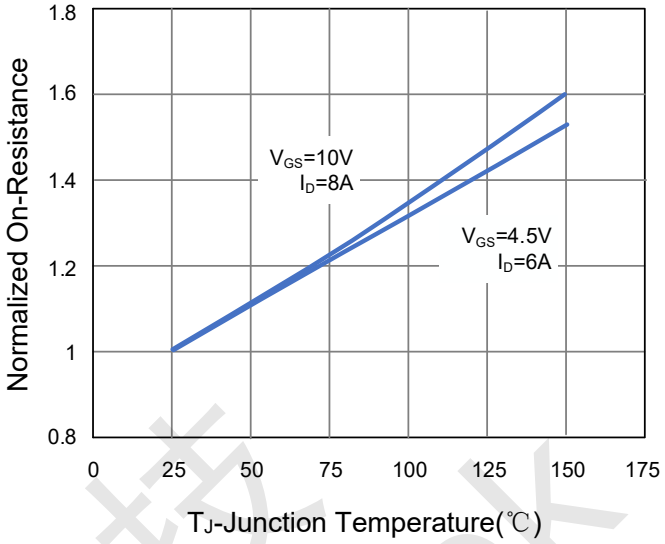


Figure 8 Rdson vs Junction Temperature

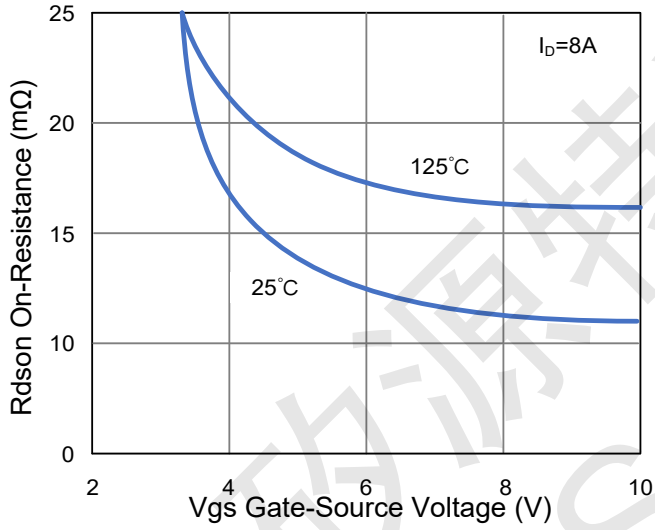


Figure 9 Rdson vs Vgs

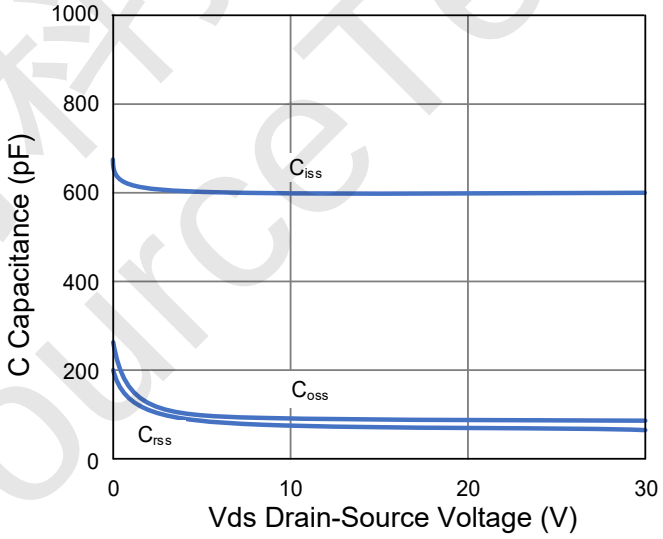


Figure 10 Capacitance vs Vds

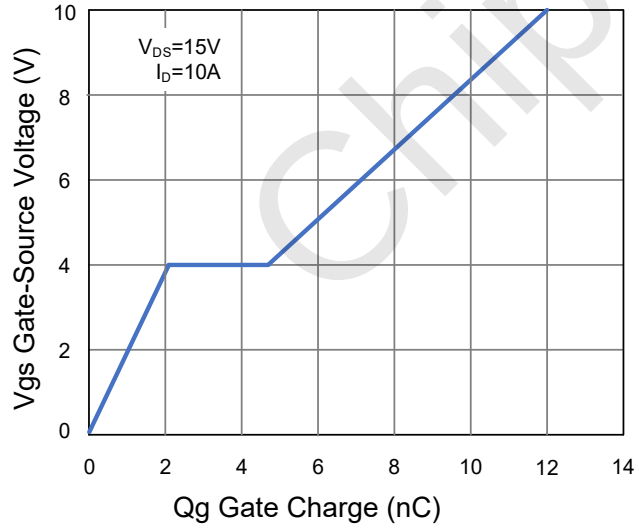


Figure 11 Gate Charge

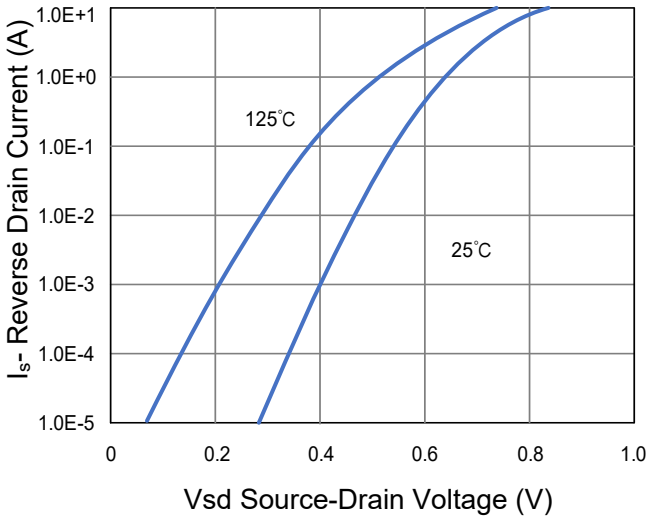


Figure 12 Source- Drain Diode Forward

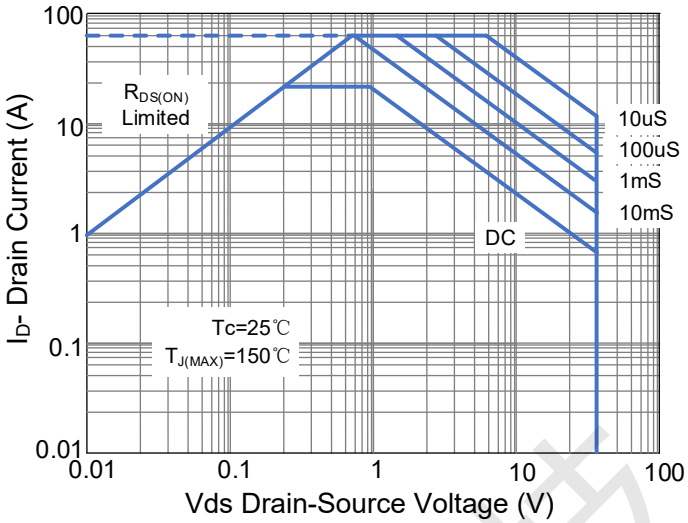


Figure 13 Safe Operation Area

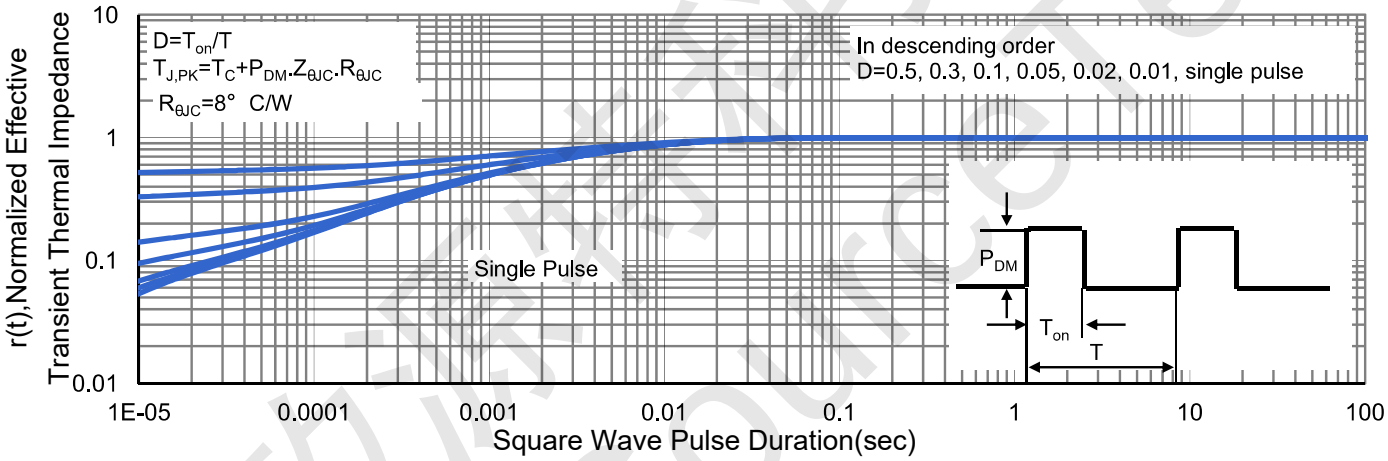


Figure 14 Normalized Maximum Transient Thermal Impedance

PE8324CKT P-Channel 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	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-30V,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	-1.5	-2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V,I_D=-7A	-	23	29	mΩ
		V_{GS}=-4.5V,I_D=-5A	-	30	40	mΩ
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	V_{DS}=-15V,V_{GS}=0V, F=1.0MHz	-	760	-	pF
Output Capacitance	C_{oss}		-	90	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	70	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V,I_D=-2A,R_L=1Ω, V_{GS}=-10V,R_G=3Ω	-	10.8	-	nS
Turn-on Rise Time	t_r		-	4.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	25	-	nS
Turn-Off Fall Time	t_f		-	8.4	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V,I_D=-4A,V_{GS}=-10V	-	12.4	-	nC
Gate-Source Charge	Q_{gs}		-	2.4	-	nC
Gate-Drain Charge	Q_{gd}		-	2	-	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		-	-	-10	A
Reverse Recovery Time	t_{rr}	I_F=-4A, di/dt=100A/μs	-	20.3	-	nS
Reverse Recovery Charge	Q_{rr}		-	6.9	-	μC

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.

PE8324CKT Typical Electrical and Thermal Characteristics

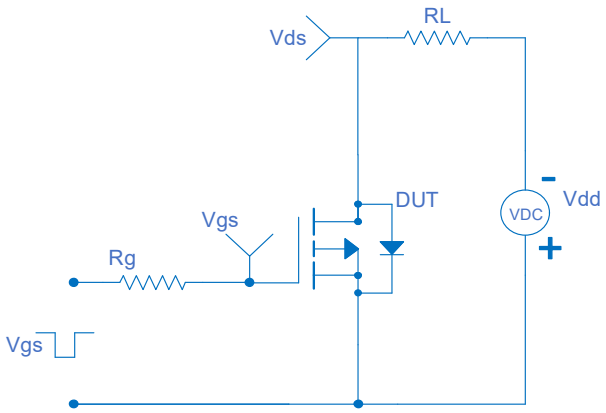


Figure 1 Switching Test Circuit

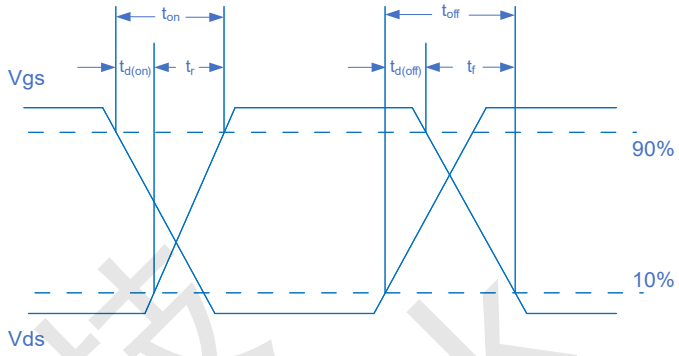


Figure 2 Switching Waveform

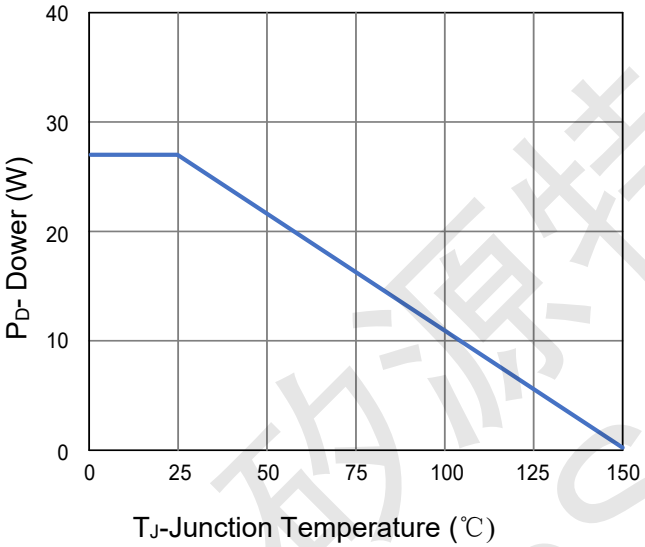


Figure 3 Power De-rating

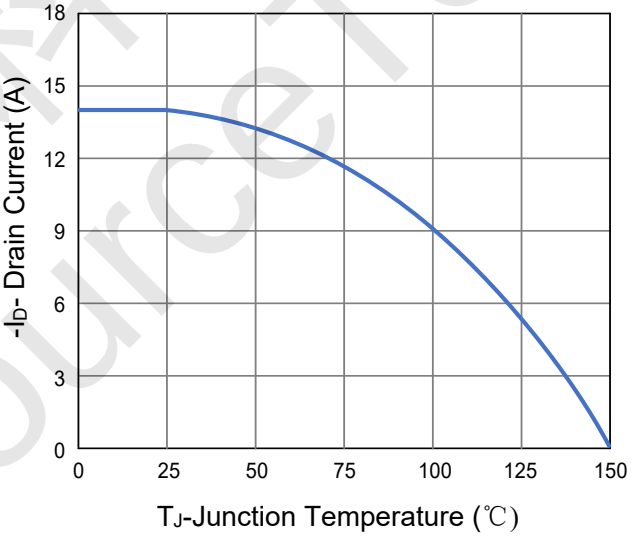


Figure 4 Drain Current

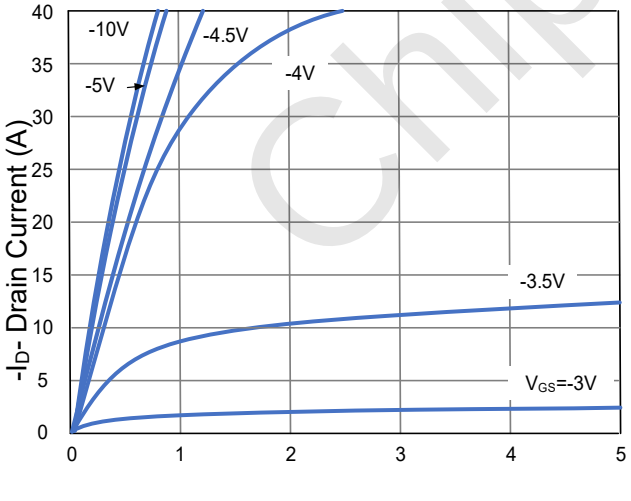


Figure 5 Output Characteristics

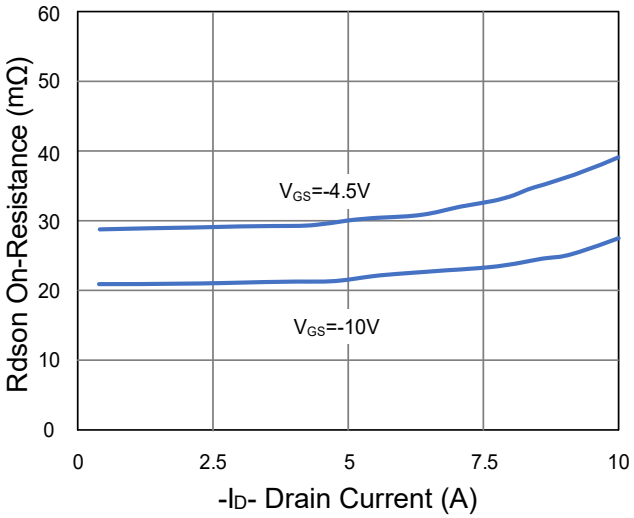


Figure 6 Rdson vs Drain Current

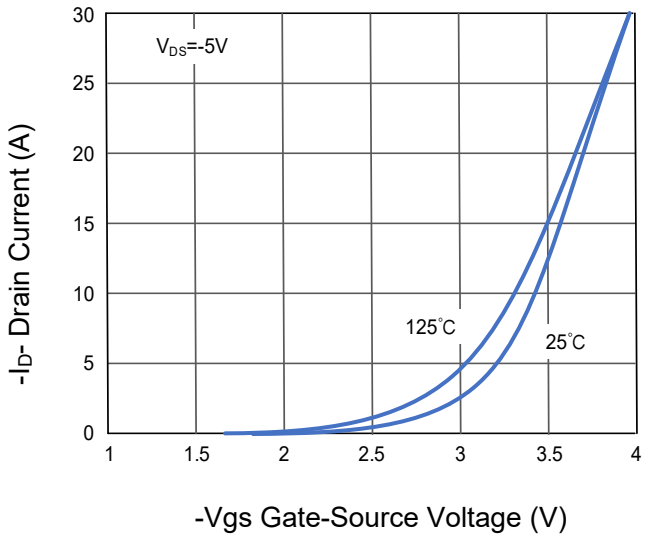


Figure 7 Transfer Characteristics

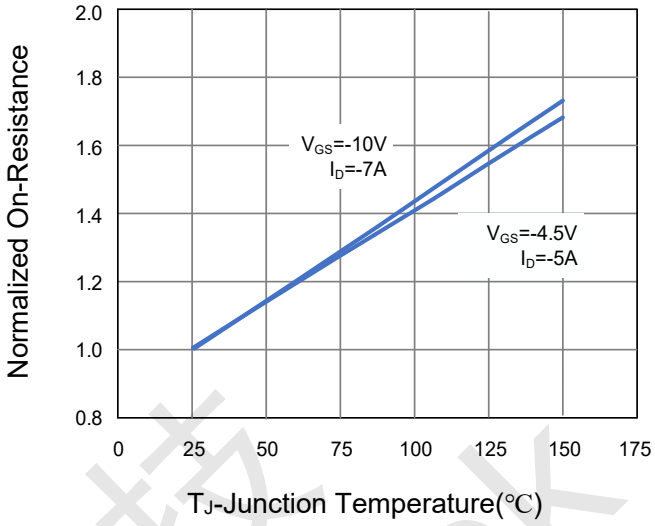


Figure 8 Rdson vs Junction Temperature

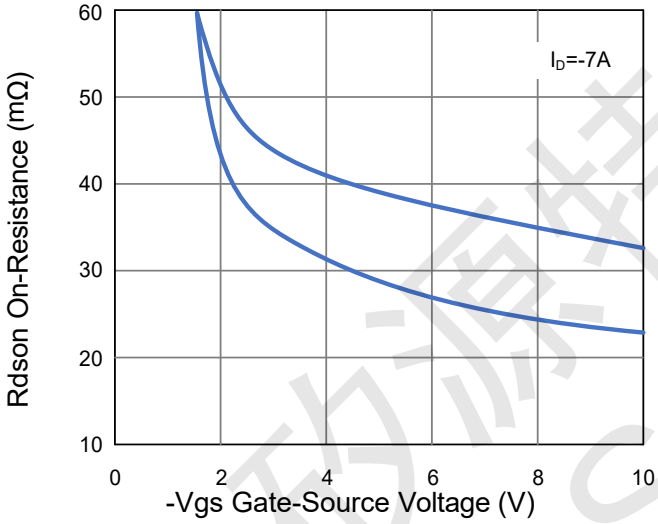


Figure 9 Rdson vs Vgs

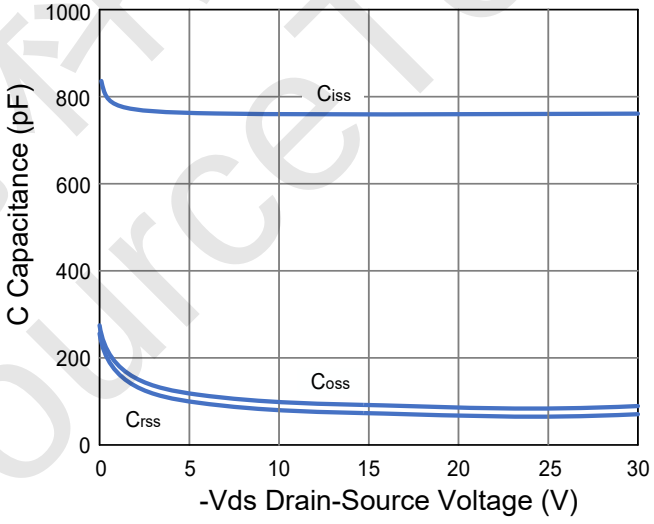


Figure 10 Capacitance vs Vds

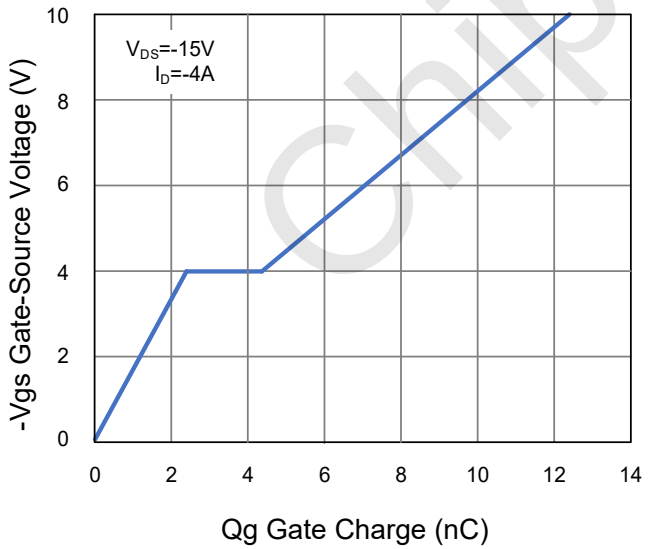


Figure 11 Gate Charge

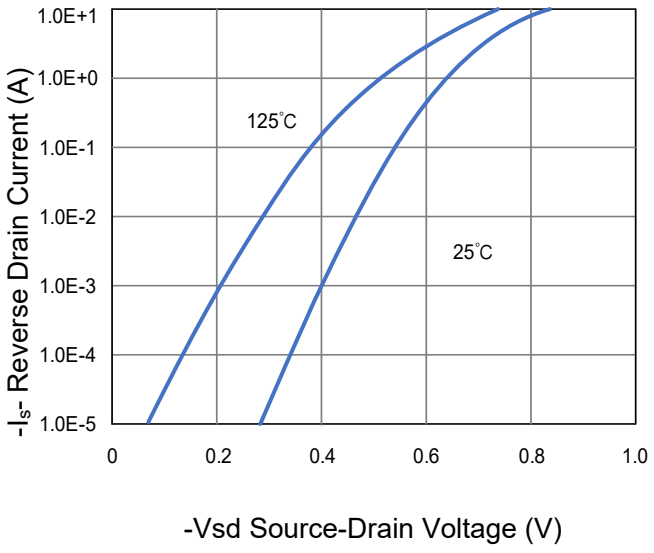


Figure 12 Source- Drain Diode Forward

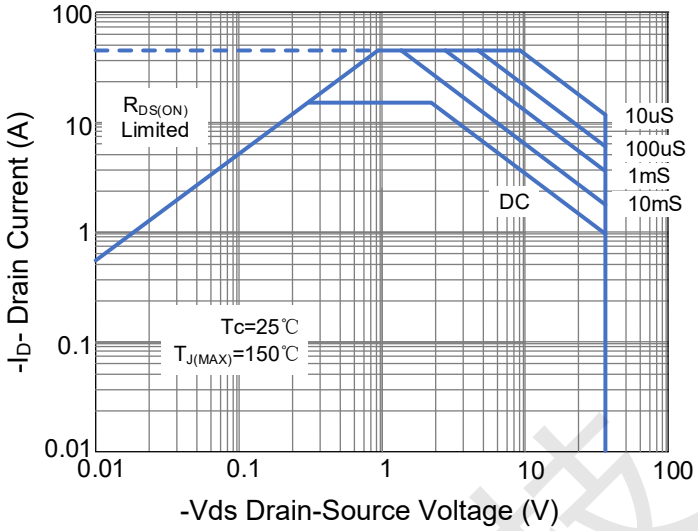


Figure 13 Safe Operation Area

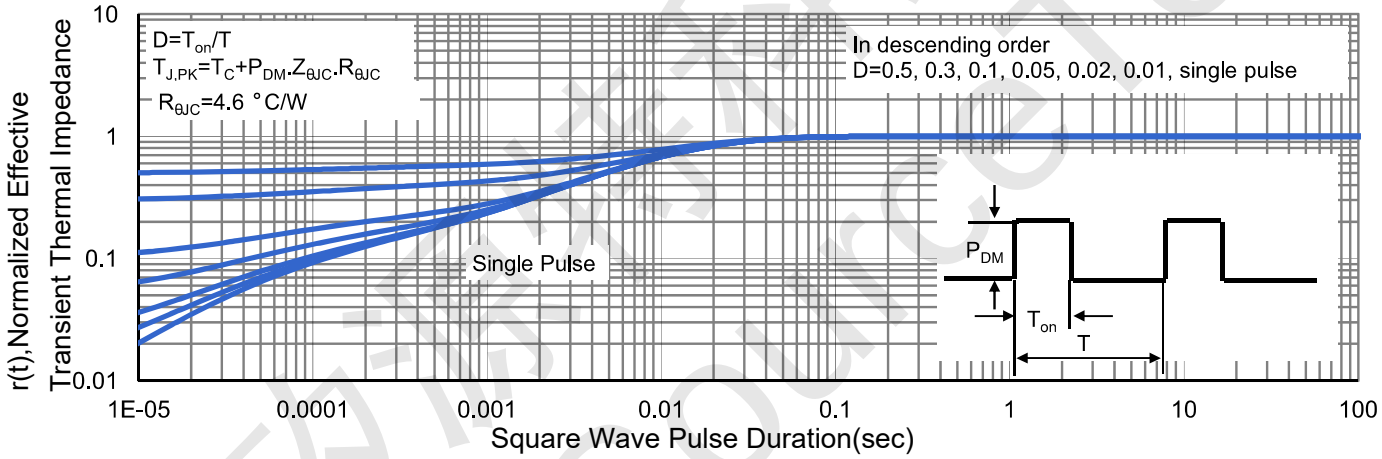
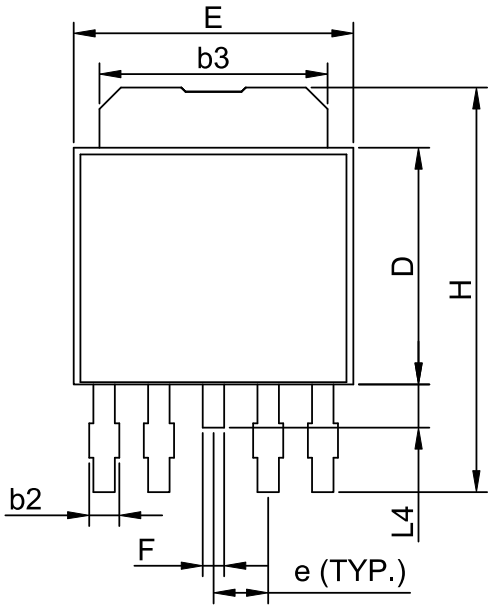
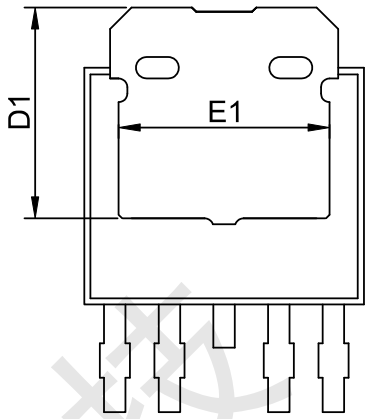
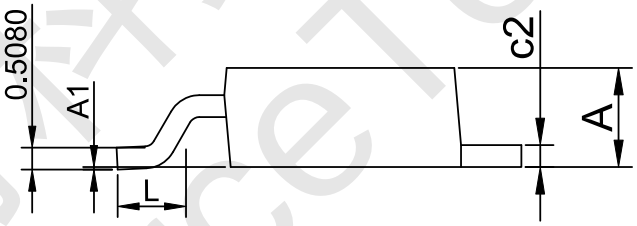


Figure 14 Normalized Maximum Transient Thermal Impedance

PE8324CKT TO-252-4L Package Information







Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	2.200	2.300	2.400
A1	0.000	0.080	0.150
b	0.450	0.530	0.600
b2	0.500	0.650	0.800
b3	5.200	5.350	5.500
c2	0.450	0.500	0.550
D	5.400	5.600	5.800
D1	4.570	-	-
E	6.400	6.600	6.800
E1	3.810	-	-
e	1.27TYP.		
F	0.400	0.500	0.600
H	9.400	9.800	10.200
L	1.400	1.590	1.770
L1	2.400	2.700	3.000
L4	0.800	1.000	1.200