P-Channel Enhancement Mode Power MOSFET

Description

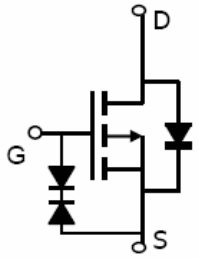
The PE3415A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as1.8V. This device is suitable for use as a load switch or in PWM applications. It is ESD protected.

General Features

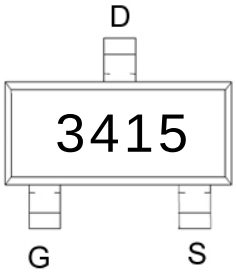
- V_{DS} = -20V,I_D =-4A
  $R_{DS(ON)}$ < 47mΩ @ V_{GS}=-4.5V
  $R_{DS(ON)}$ < 60mΩ @ V_{GS}=-2.5V
  ESD Rating: 2500V HBM
- High Power and current handing capability
- Lead free product is acquired
- Surface mount package

Application

- PWM application
- Load switch



Schematic diagram



Marking and pin Assignment

SOT-23 top view

Absolute Maximum Ratings (TA=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±10	V
Drain Current-Continuous	I_D	-4	A
Drain Current-Pulsed (Note 1)	I_{DM}	-25	A
Maximum Power Dissipation	P_D	1.4	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	89.3	℃/W

Electrical Characteristics (TA=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	-20	-23	-	V

Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±10V,V_{DS}=0V	-	-	±10	μA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-0.4	-0.65	-1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-4A	-	38	47	mΩ
		V_{GS}=-2.5V, I_D=-4A	-	54	60	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-4A	8	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-10V,V_{GS}=0V, F=1.0MHz	-	890	-	PF
Output Capacitance	C_{oss}		-	160	-	PF
Reverse Transfer Capacitance	C_{rss}		-	125	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-10V,R_L=2. 5Ω V_{GS}=-4.5V,R_{GEN}=3Ω	-	15.6		nS
Turn-on Rise Time	t_r		-	11.2		nS
Turn-Off Delay Time	$t_{d(off)}$		-	23.1		nS
Turn-Off Fall Time	t_f		-	32.7		nS
Total Gate Charge	Q_g	V_{DS}=-10V,I_D=-4A, V_{GS}=-4.5V	-	14.2		nC
Gate-Source Charge	Q_{gs}		-	3.2	-	nC
Gate-Drain Charge	Q_{gd}		-	5.8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-1A	-	-0.7	-	V
Diode Forward Current (Note 2)	I_S		-	-	-2.2	A

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 production

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

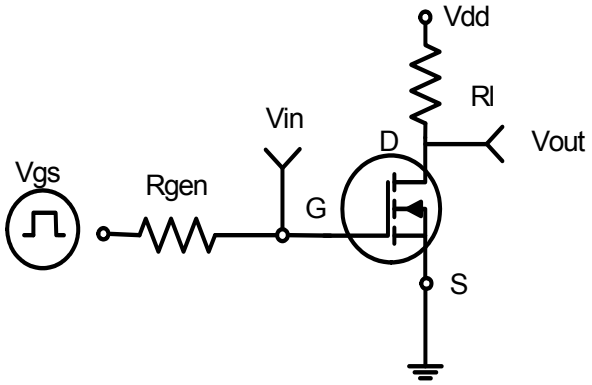


Figure 1:Switching Test Circuit

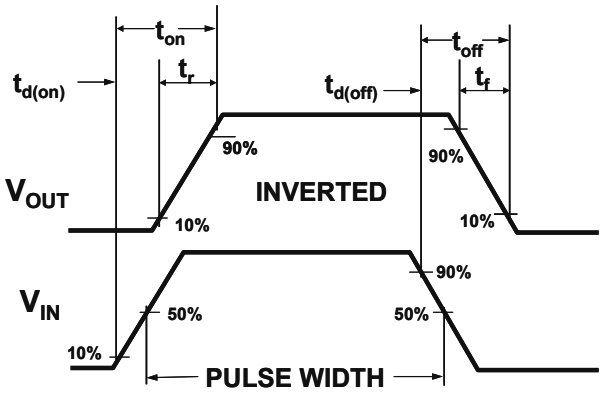


Figure 2:Switching Waveforms

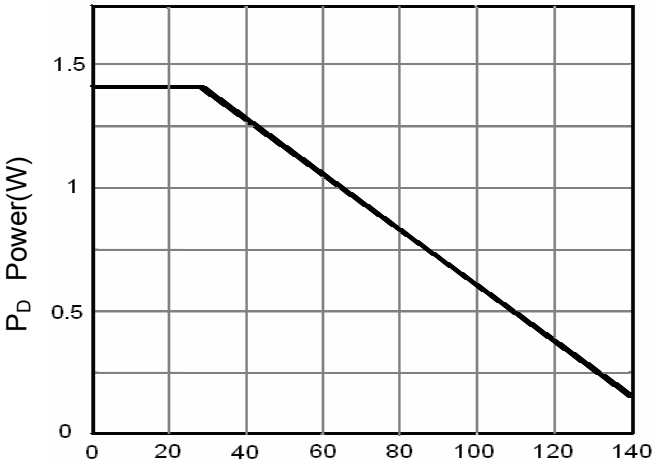


Figure 3 Power Dissipation

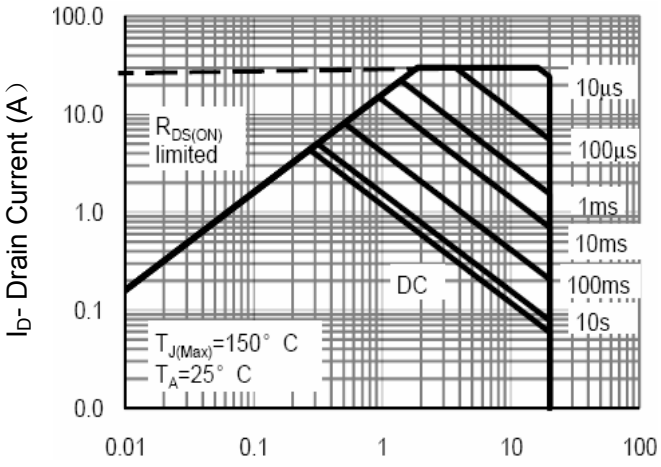


Figure 4 Safe Operation Area

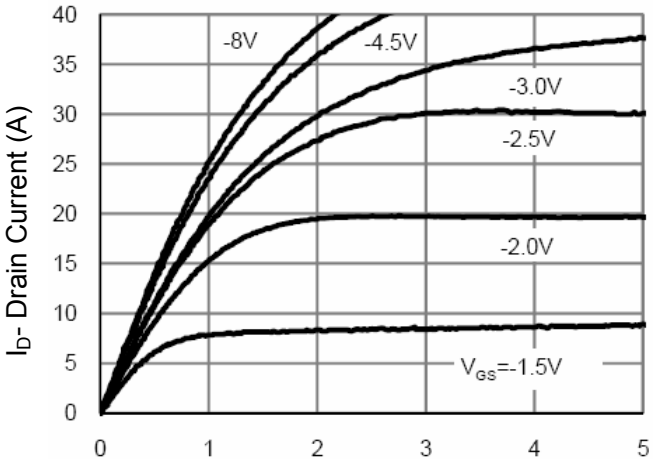


Figure 5 Output CHARACTERISTICS

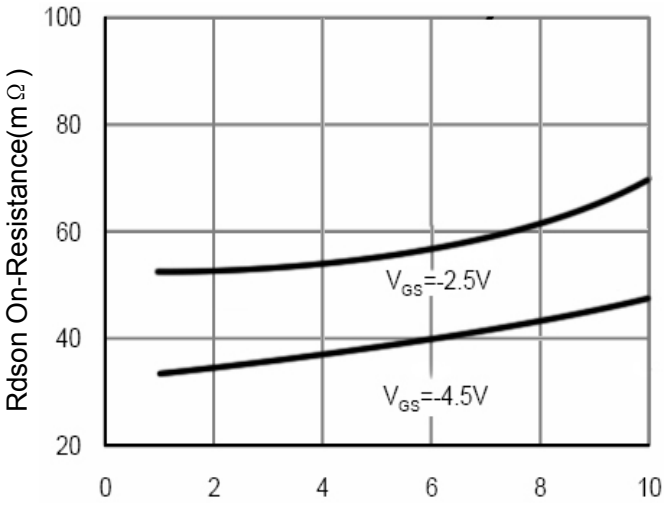


Figure 6 Drain-Source On-Resistance

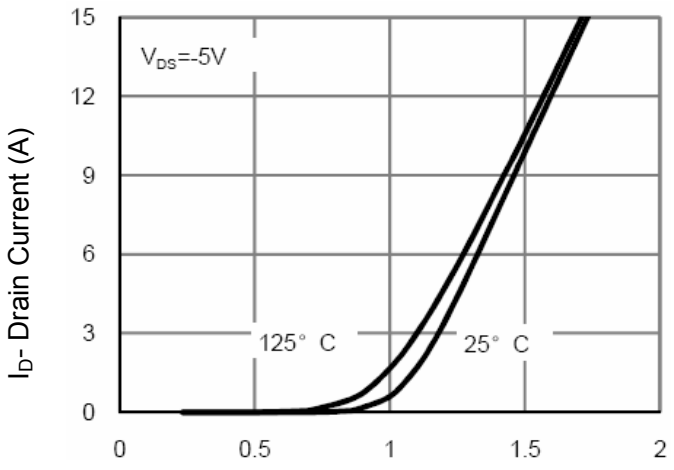


Figure 7 Transfer Characteristics

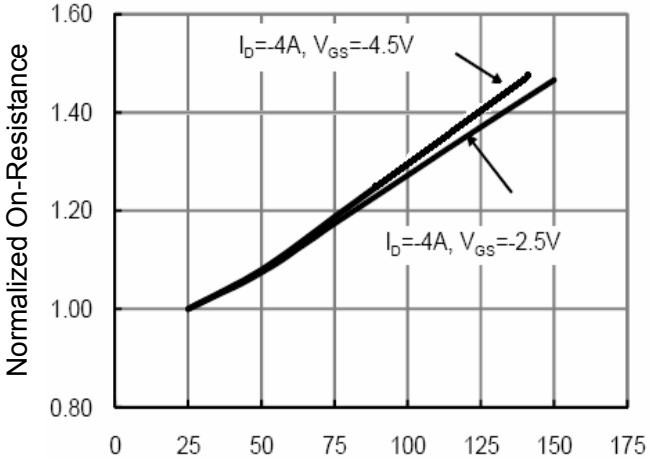


Figure 8 Drain-Source On-Resistance

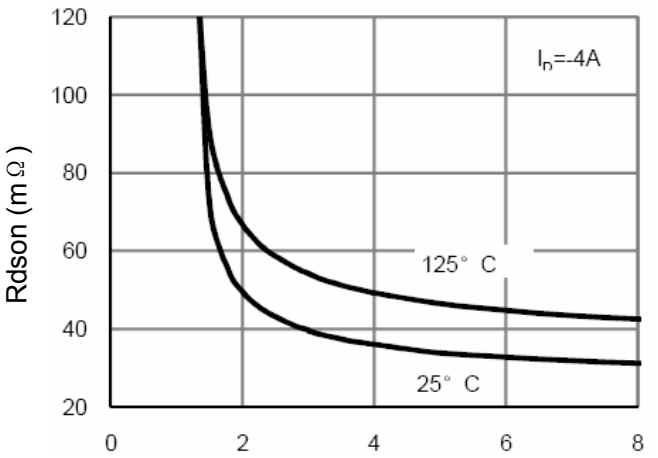


Figure 9 Rdson vs Vgs

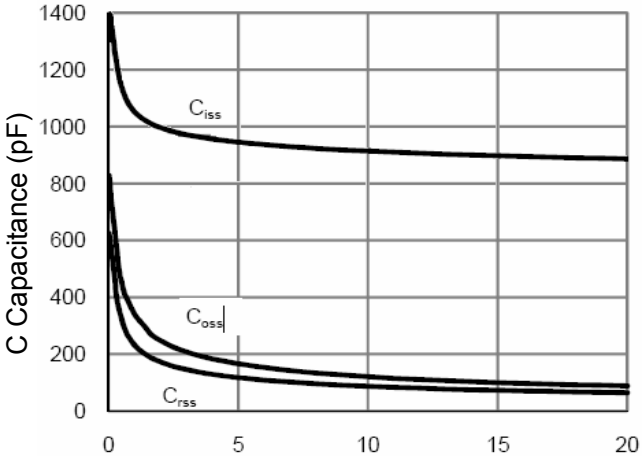


Figure 10 Capacitance vs Vds

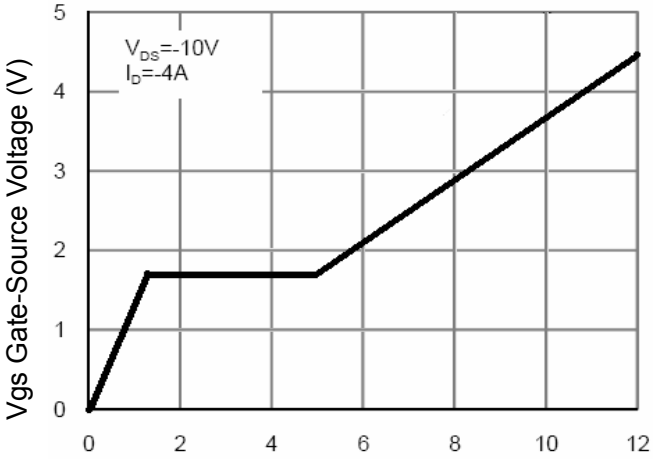


Figure 11 Gate Charge

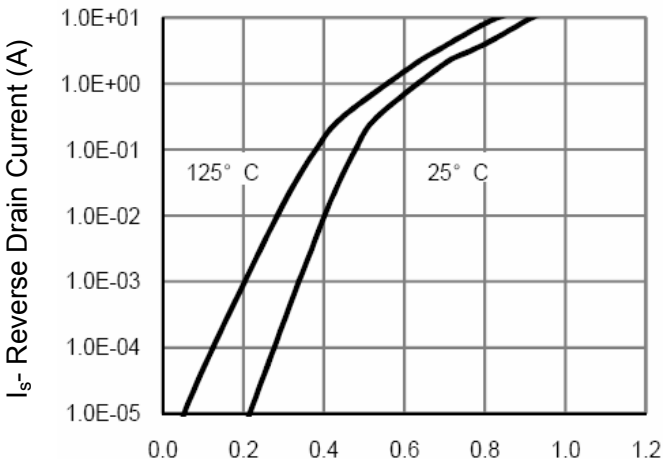


Figure 12 Source- Drain Diode Forward

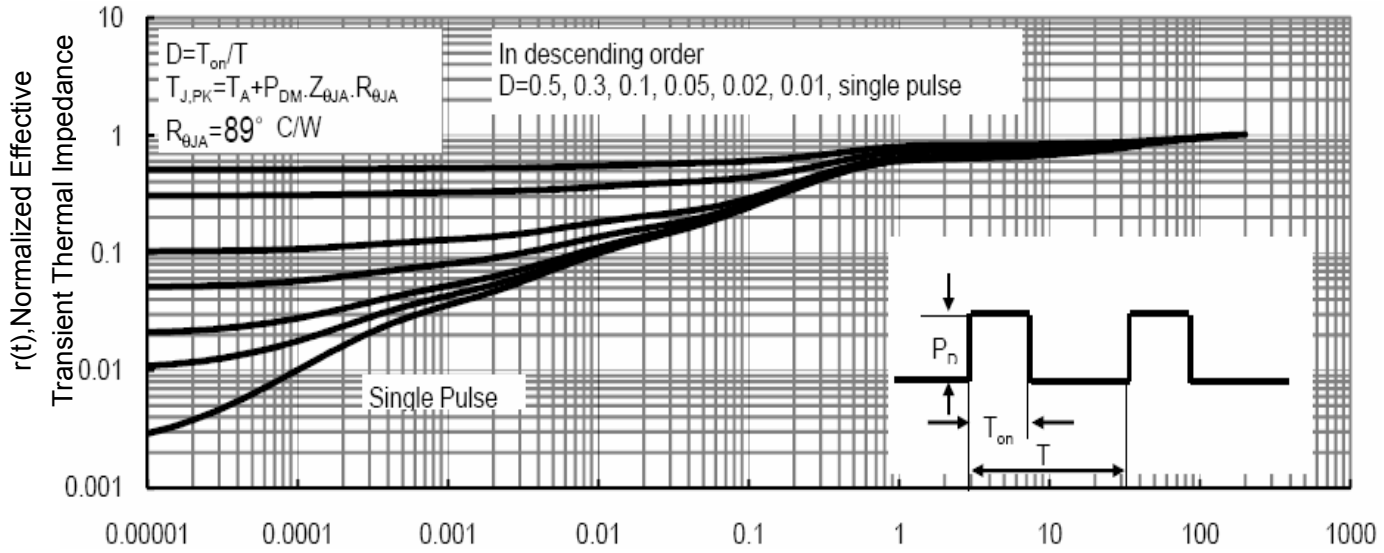
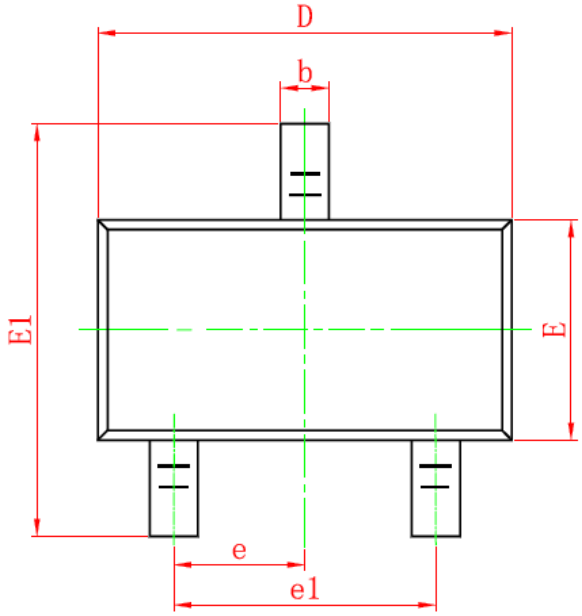
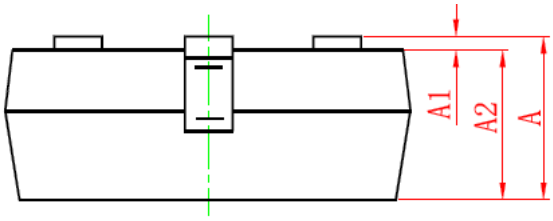
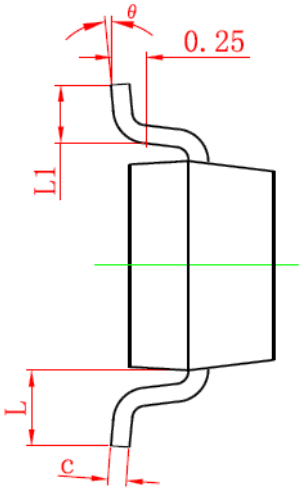


Figure 13 Normalized Maximum Transient Thermal Impedance

SOT-23 PACKAGE INFORMATION







Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500