



PE3416AT N-Channel Enhancement Mode Power MOSFET

PE3416AT Description

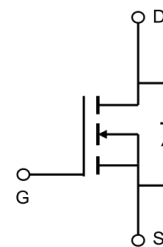
The PE3416AT uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

PE3416AT General Features

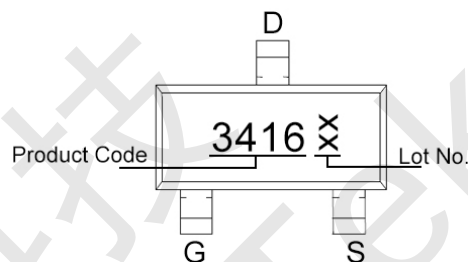
- $V_{DS} = 20V$, $I_D = 6A$
- $R_{DS(ON)} < 20m\Omega$ @ $V_{GS}=4.5V$
- $R_{DS(ON)} < 28m\Omega$ @ $V_{GS}=2.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

PE3416AT Application

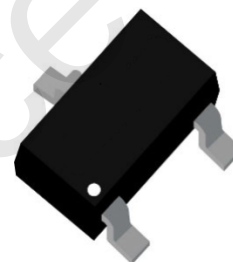
- PWM applications
- Load switch



Schematic diagram



Marking and pin assignment



SOT-23

PE3416AT Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current-Continuous	I_D	6	A
Drain Current-Continuous ($T_A=70^\circ C$)	I_D	4.7	A
Pulsed Drain Current (Note 1)	I_{DM}	30	A
Maximum Power Dissipation	P_D	1.25	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

PE3416AT Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	100	$^\circ C/W$
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PE3416AT 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 =250μA	20	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =18V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±12V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.45	0.7	1.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =4.5A	-	15	20	mΩ
		V _{GS} =2.5V, I _D =4A	-	20	28	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =4A	-	50	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, F=100KHz	-	460	-	pF
Output Capacitance	C _{oss}		-	70	-	pF
Reverse Transfer Capacitance (Note 4)	C _{rss}		-	60	-	pF
Gate Resistance	R _g	V _{DS} =0V, V _{GS} =0V, F=100KHz	-	2.3	-	KΩ
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =10V ,R _L =1Ω, V _{GS} =4.5V,R _G =3Ω	-	10.6	-	nS
Turn-on Rise Time	t _r		-	6	-	nS
Turn-Off Delay Time	t _{d(off)}		-	27.4	-	nS
Turn-Off Fall Time	t _f		-	7	-	nS
Total Gate Charge	Q _g	V _{DS} =10V, I _D =5A, V _{GS} =4.5V	-	10.9	-	nC
Gate-Source Charge	Q _{gs}		-	0.6	-	nC
Gate-Drain Charge	Q _{gd}		-	1.2	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =1A	-	-	1.2	V
Diode Reverse Recovery Time	t _{rr}	I _F =4.5A, di/dt=100A/μs	-	19.3	-	nS
Diode Reverse Recovery Charge	Q _{rr}		-	4.2	-	nC

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.



PE3416AT Typical Electrical and Thermal Characteristics

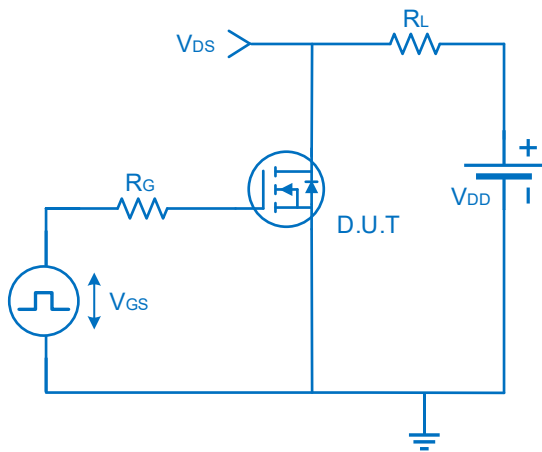


Figure 1 Switching Test Circuit

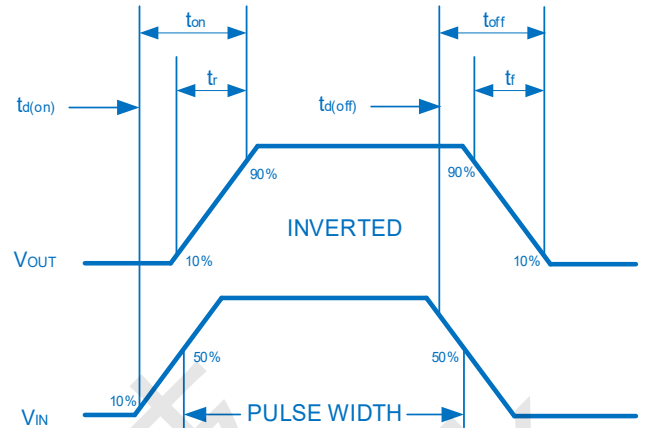


Figure 2 Switching Waveform

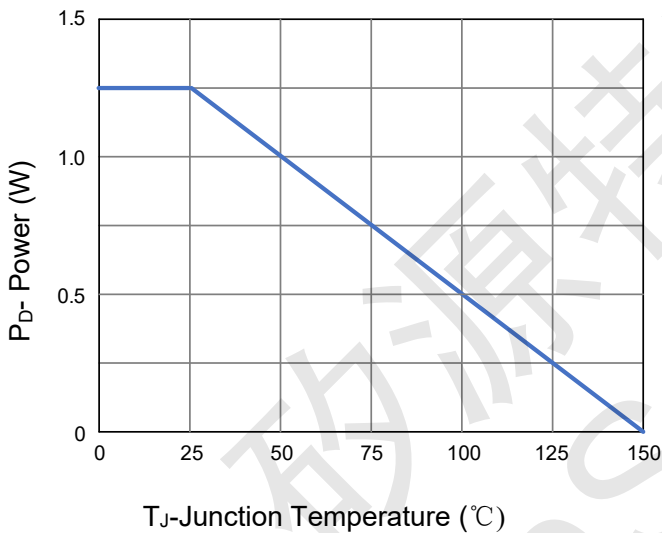


Figure 3 Power Dissipation

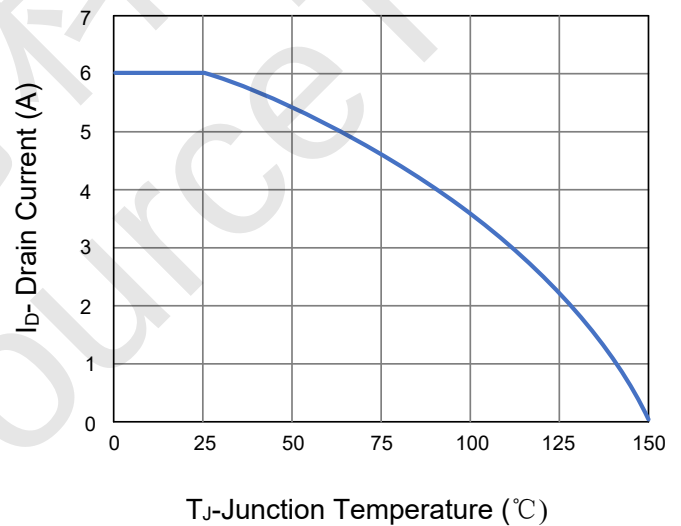


Figure 4 Drain Current

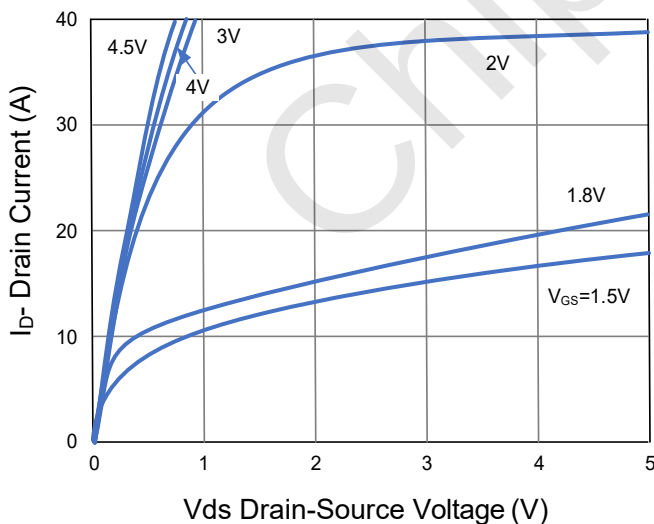


Figure 5 Output Characteristics

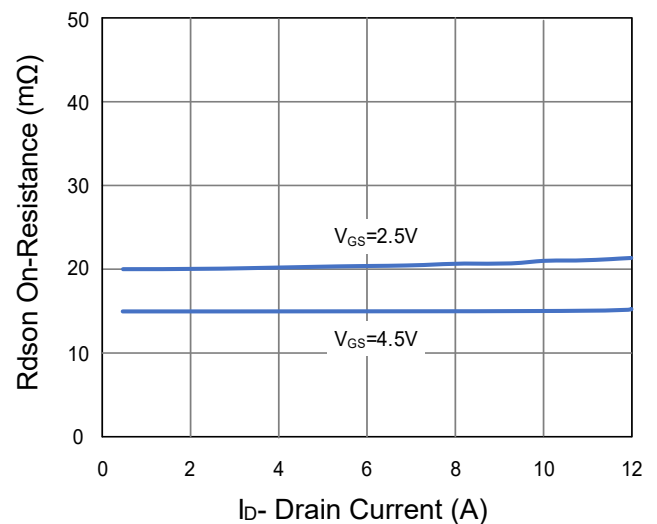


Figure 6 Rdson vs Drain Current

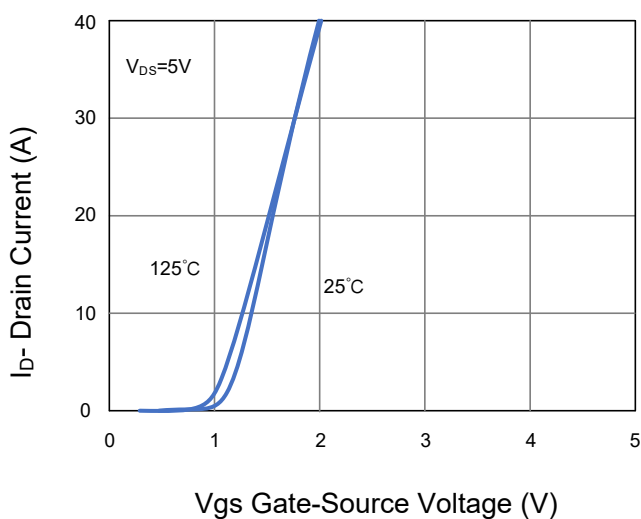


Figure 7 Transfer Characteristics

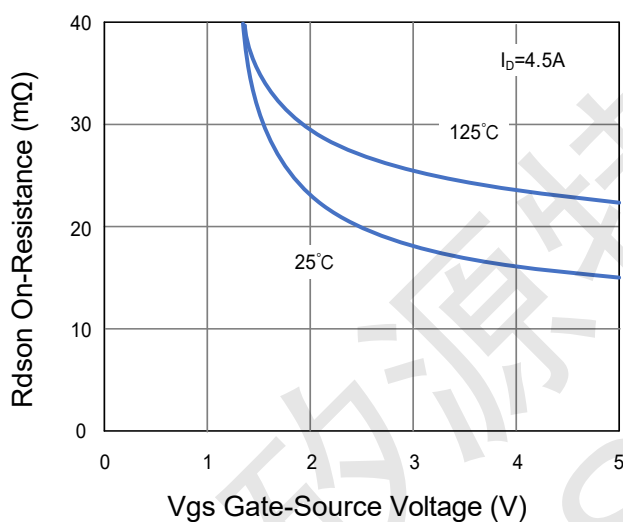


Figure 9 $R_{DS(on)}$ vs V_{GS}

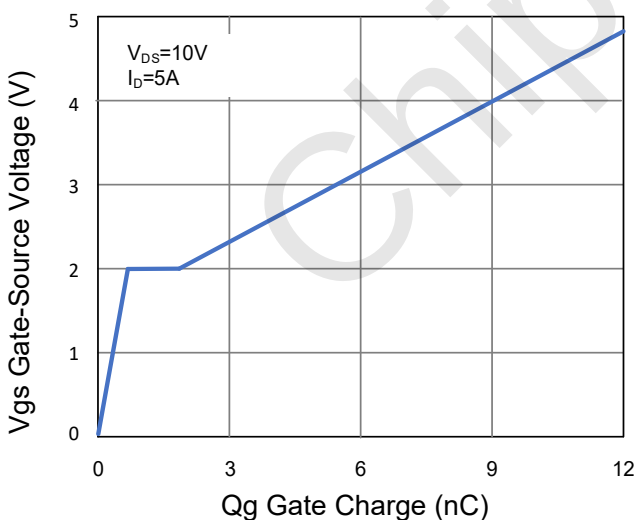


Figure 11 Gate Charge

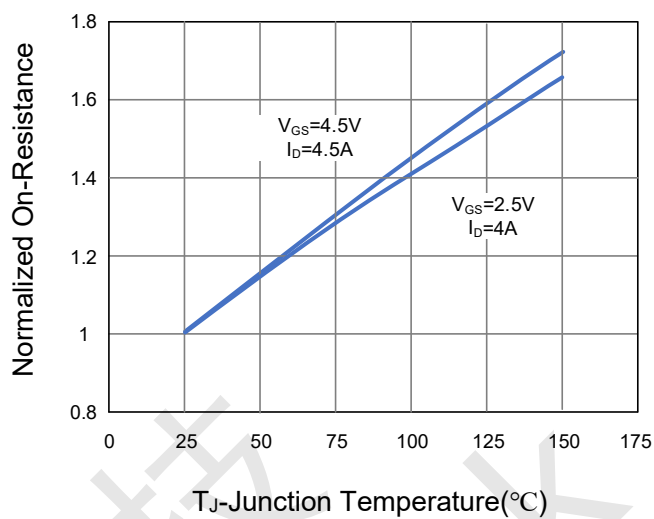


Figure 8 $R_{DS(on)}$ vs Junction Temperature

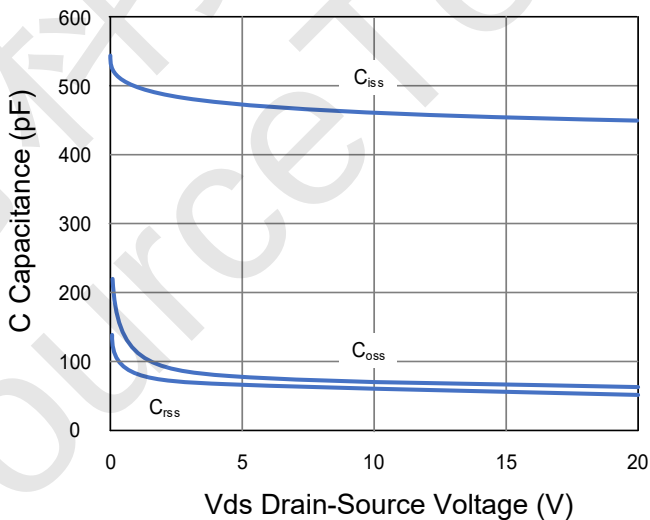


Figure 10 Capacitance vs V_{DS}

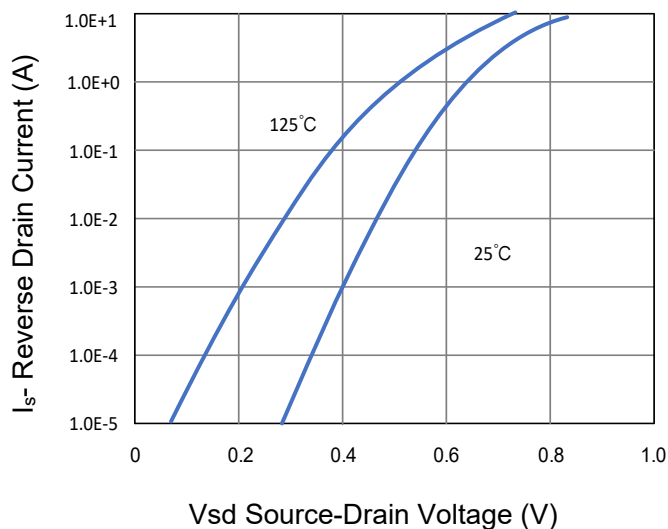


Figure 12 Source- Drain Diode Forward

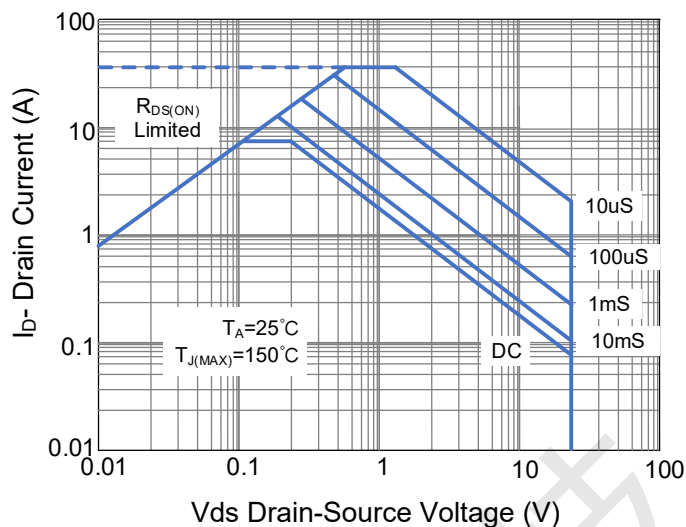


Figure 13 Safe Operation Area

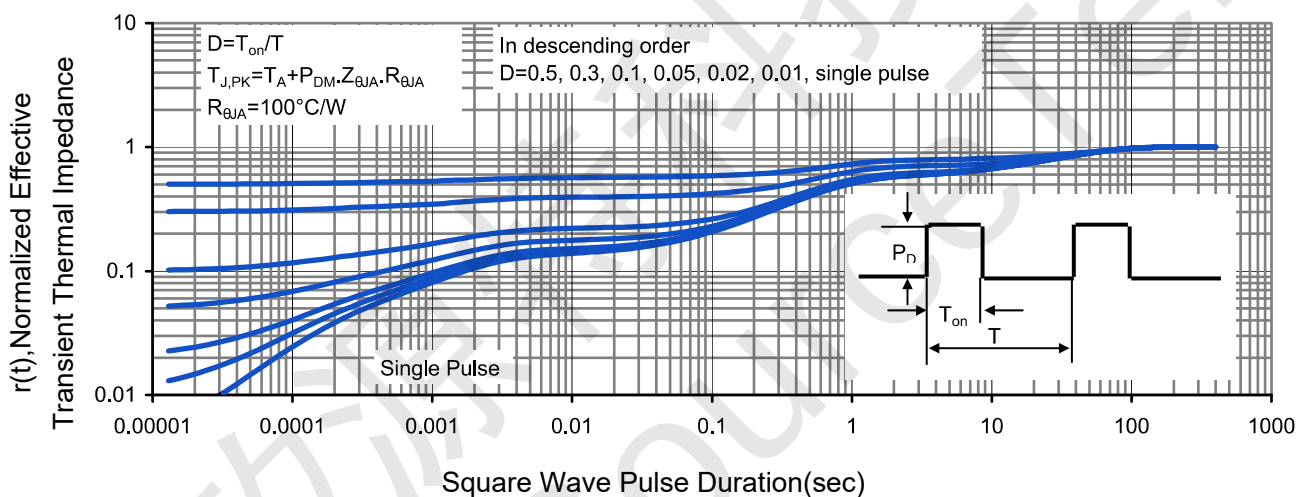
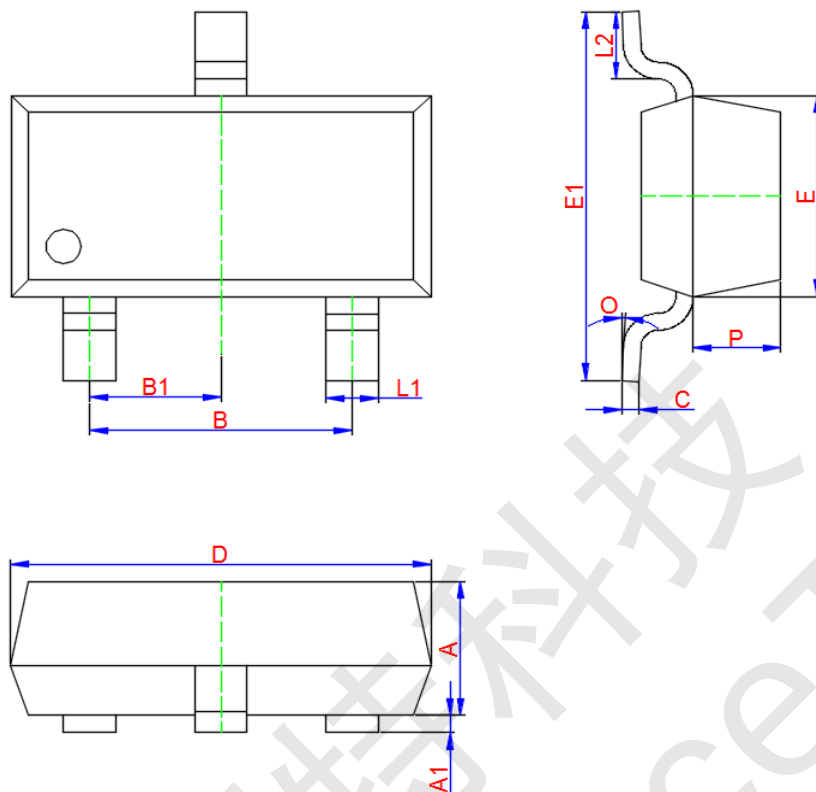


Figure 14 Normalized Maximum Transient Thermal Impedance



PE3416AT SOT-23 Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.900	1.000	1.100
A1	0.000	0.050	0.100
L1	0.300	0.400	0.500
C	0.100	0.110	0.120
D	2.800	2.900	3.000
E	1.250	1.300	1.350
E1	2.250	2.400	2.550
B	1.800	1.900	2.000
B1	0.950 TYP.		
L2	0.200	0.350	0.450
P	0.550	0.575	0.600
O	0°	4°	8°