

SOT23-3L 20V BV_{DSS} , 13m Ω $R_{DS(ON)}$, N-channel MOSFET

1. Description

The CCX3416A is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product CCX3416A is Pb-free.

2. Features

- 20V, $R_{DS(ON)}$ =13m Ω (Typ.) @ V_{GS} =4.5V
 $R_{DS(ON)}$ =16m Ω (Typ.) @ V_{GS} =2.5V
- Use trench MOSFET technology
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

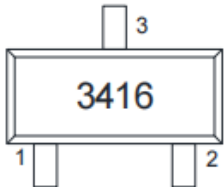
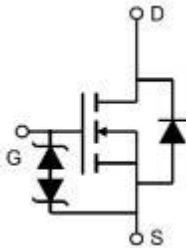
3. Applications

- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
CCX3416A	SOT23-3L	3416	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	7 inches

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
1	Gate		
2	Source		
3	Drain		

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		BV_{DSS}	20	V
Gate-Source Voltage		V_{GS}	± 10	V
Continuous Drain Current	$T_A=25^{\circ}\text{C}$	I_D	7.5	A
	$T_A=75^{\circ}\text{C}$		5.8	
Maximum Power Dissipation	$T_A=25^{\circ}\text{C}$	P_D	1.39	W
	$T_A=75^{\circ}\text{C}$		0.83	
Pulsed Drain Current		I_{DM}	30	A
Operating Junction Temperature		T_J	150	$^{\circ}\text{C}$
Lead Temperature		T_L	260	$^{\circ}\text{C}$
Storage Temperature Range		T_{stg}	-55 to 150	$^{\circ}\text{C}$

Thermal resistance ratings

Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	70	90	$^{\circ}\text{C/W}$

Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	B _V DSS	V _{GS} =0V, I _D =250uA	20			V
Zero Gate Voltage Drain Current	I _D SS	V _{DS} =20V, V _{GS} =0V			1	uA
Gate-to-source Leakage Current	I _G SS	V _{DS} =0V, V _{GS} =±10V			±10	uA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS} (TH)	V _{GS} =V _{DS} , I _D =250uA	0.5	0.7	0.9	V
Drain-to-source On-resistance	R _{DS} (on)	V _{GS} =4.5V, I _D =7.5A		13	17	mΩ
		V _{GS} =2.5V, I _D =5A		16	23	mΩ
Forward transconductance	g _{fs}	V _{DS} =5V, I _D =7.5A			40	S
CHARGES, CAPACITANCESAND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, f=1MHz, V _{DS} =10V		1300		pF
Output Capacitance	C _{OSS}			160		
Reverse Transfer Capacitance	C _{RSS}			88		
Total Gate Charge	Q _G (TOT)	V _{GS} =4.5V, V _{DS} =10V, I _D =7.5A		10		nC
Gate-to-Source Charge	Q _{GS}			4.5		
Gate-to-Drain Charge	Q _{GD}			2.5		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _d (ON)	V _{GS} =4.5V, V _{DS} =10V, R _L =1.5Ω, R _G =3Ω		280		ns
Rise Time	t _r			330		
Turn-Off Delay Time	t _d (OFF)			4		
Fall Time	t _f			2.5		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _S =7.5A			1.5	V

7. Typical Characteristic

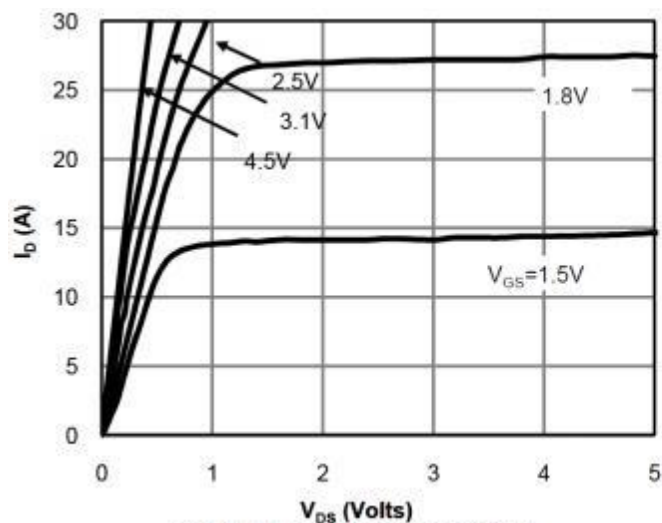


Fig 1: On-Region Characteristics

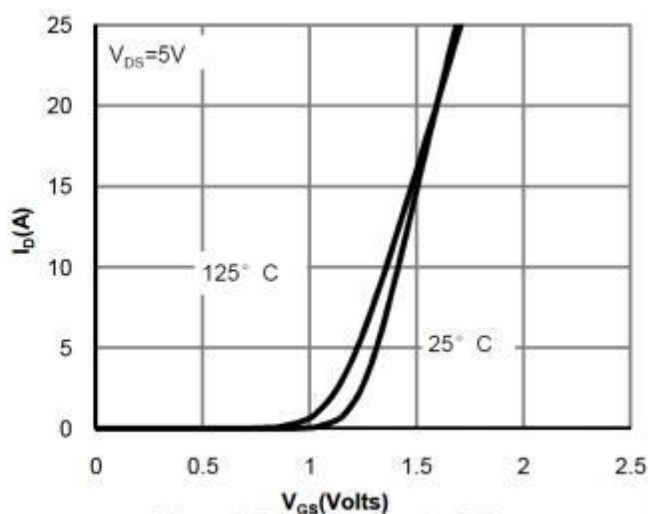


Figure 2: Transfer Characteristics

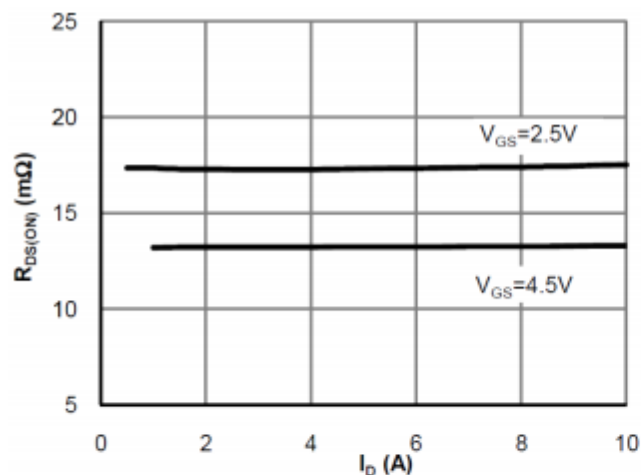


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

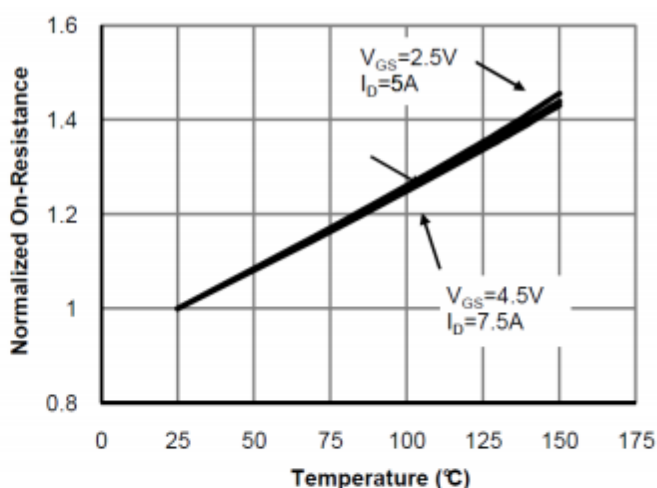


Figure 4: On-Resistance vs. Junction Temperature

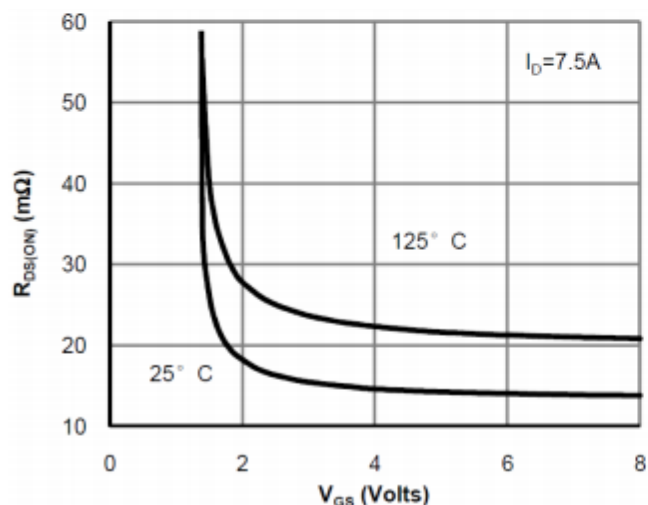


Figure 5: On-Resistance vs. Gate-Source Voltage

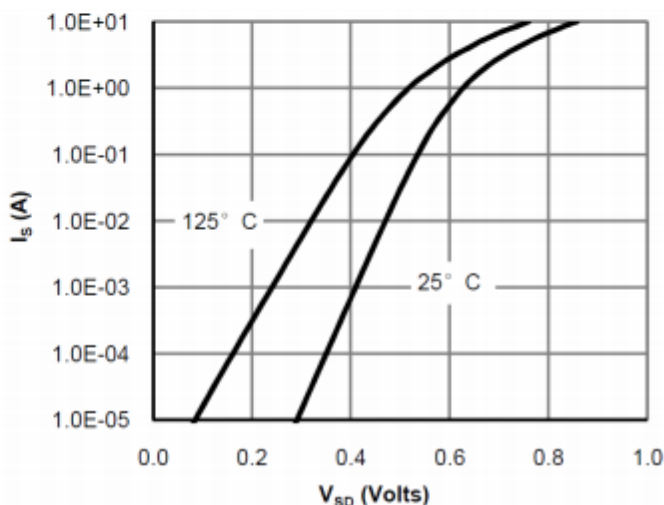


Figure 6: Body-Diode Characteristics

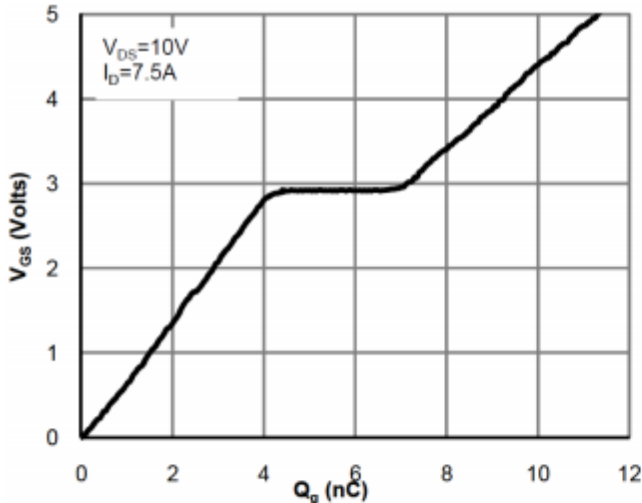


Figure 7: Gate-Charge Characteristics

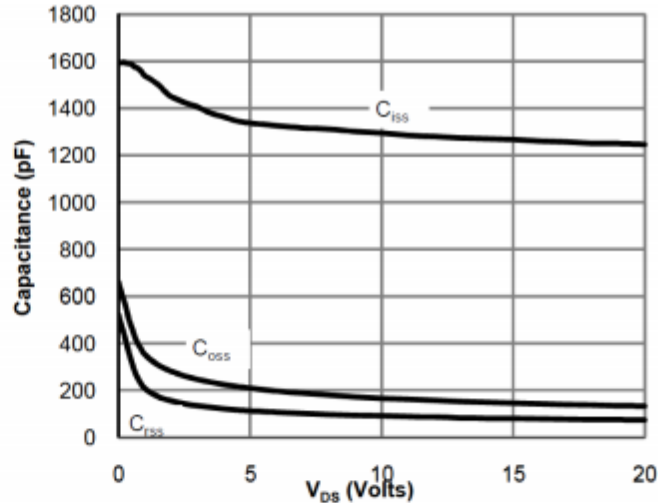


Figure 8: Capacitance Characteristics

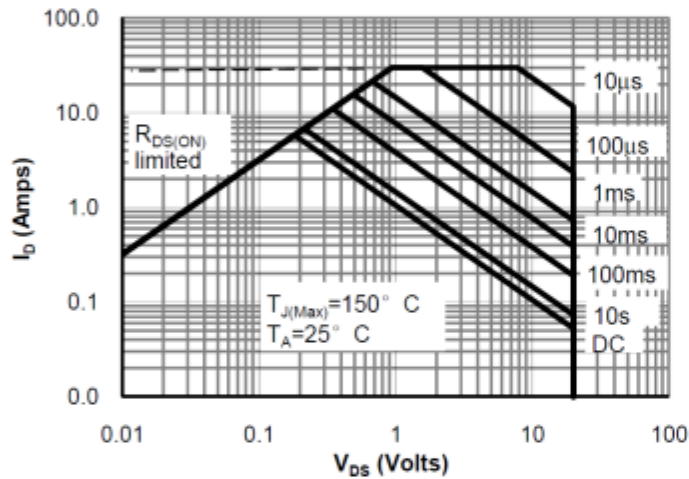


Figure 9: Maximum Forward Biased Safe Operating Area

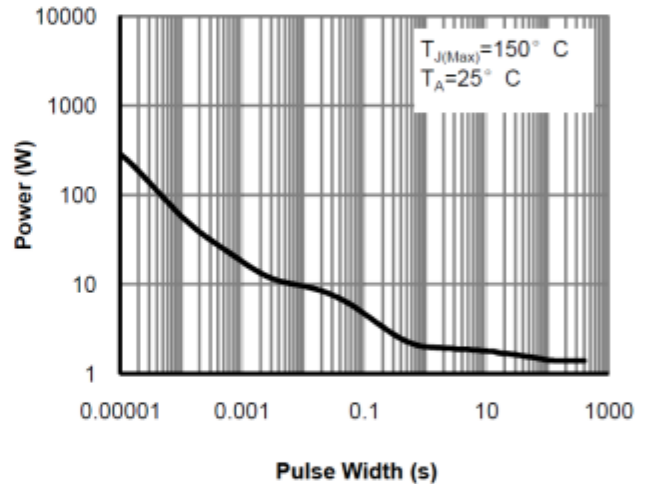


Figure 10: Single Pulse Power Rating Junction-to-Ambient

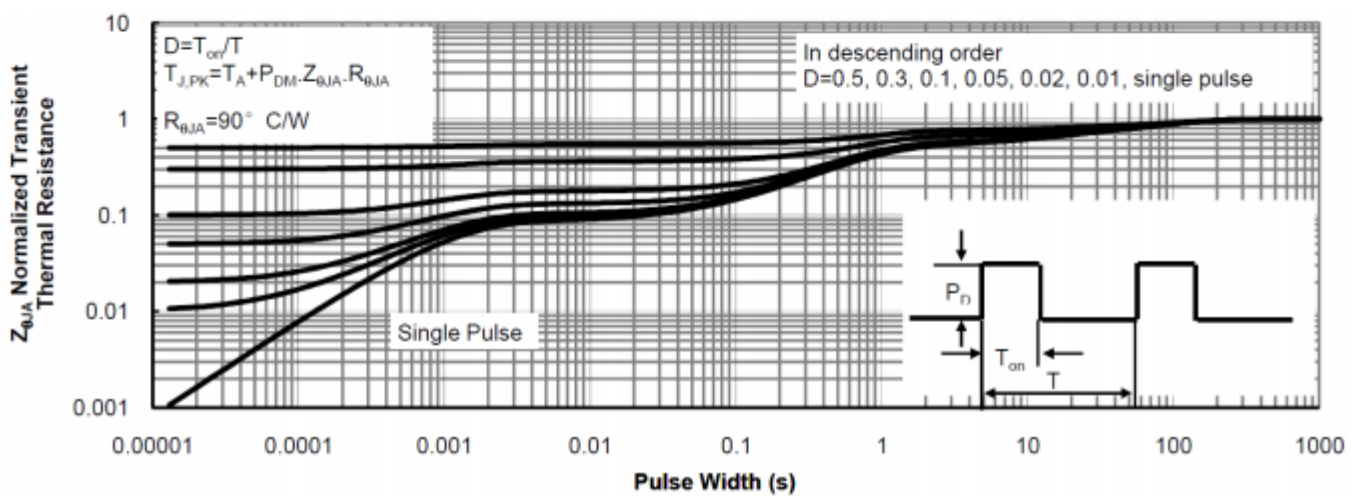
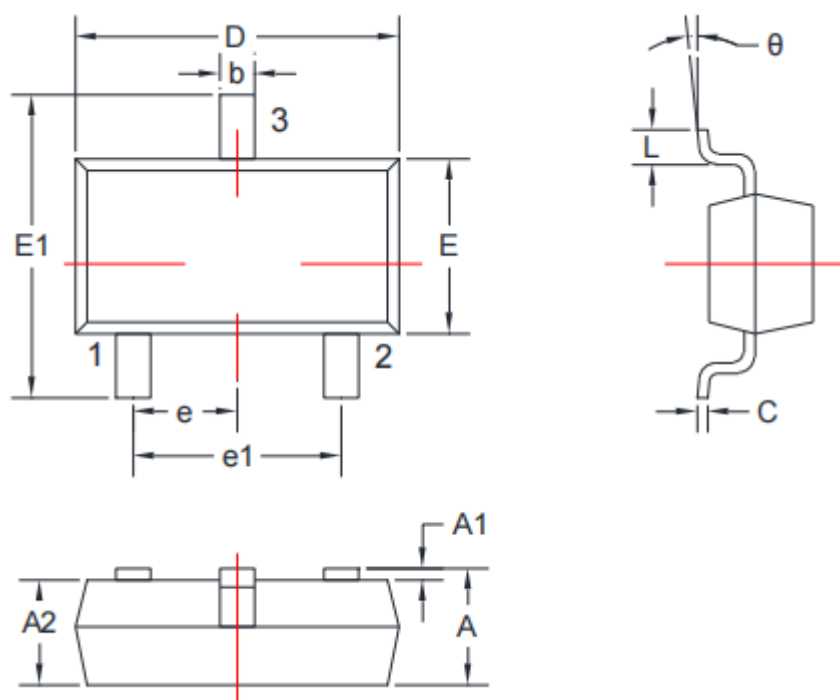


Figure 11: Normalized Maximum Transient Thermal Impedance

8. Dimension (SOT23-3L)



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	1.05	1.25	E	1.50	1.70
A1	0	0.10	E1	2.65	2.95
A2	1.05	1.15	e	0.95TYP	
b	0.30	0.50	e1	1.80	2.00
c	0.10	0.20	L	0.30	0.60
D	2.82	3.02	θ	0°	8°

Notice

1. All product, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise. The right to explain is owned by CCX electronics company.
2. Confirm that operation temperature is within the specified range described in the product specification.
Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
3. CCX shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.