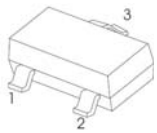
Plastic-Encapsulate MOSFETS

N-Channel, 20V, 0.89A, Small Signal MOSFET

V_{DS} (V)	Rds(on) (Ω)	I_D (A)
20	0.220@ V_{GS}=4.5V	0.55
	0.260@ V_{GS}=2.5V	0.45
	0.320@ V_{GS}=1.8V	0.35

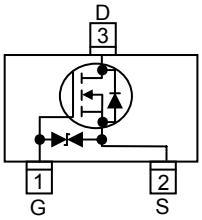
SOT-23



1. GATE
2. SOURCE
3. DRAIN

Descriptions

The CB2021 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS\ (ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, load switch and level shift. Standard Product CB2021 is Pb-free.



Pin configuration (Top view)

Marking = 21

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage
- Small package SOT-23

Applications

- DC-DC converter circuit
- Small Signal Switch
- Load Switch
- Level Shift

Absolute Maximum ratings

Parameter		Symbol	10 S	Steady State	Unit
Drain-Source Voltage		V_{DS}	20		V
Gate-Source Voltage		V_{GS}	±6		
Continuous Drain Current [a]	T_A=25°C	I_D	0.89	0.82	A
	T_A=70°C		0.71	0.65	
Maximum Power Dissipation [a]	T_A=25°C	P_D	0.37	0.31	W
	T_A=70°C		0.23	0.20	
Continuous Drain Current [b]	T_A=25°C	I_D	0.78	0.70	A
	T_A=70°C		0.62	0.56	
Maximum Power Dissipation [b]	T_A=25°C	P_D	0.29	0.23	W
	T_A=70°C		0.18	0.14	
Pulsed Drain Current [c]		I_{DM}	1.4		A
Operating Junction Temperature		T_J	150		°C
Lead Temperature		T_L	260		°C
Storage Temperature Range		T_{stg}	-55 to 150		°C

Thermal resistance ratings

Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	275	335	°C/W
	Steady State		325	395	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	375	430	
	Steady State		445	535	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	260	300	

a Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper

b Surface mounted on FR4 board using minimum pad size, 1oz copper

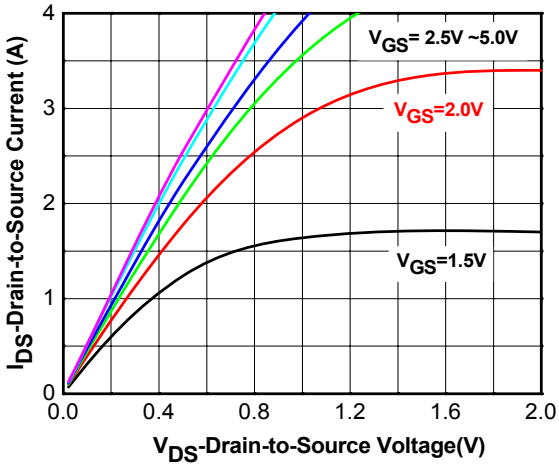
c Repetitive rating, pulse width limited by junction temperature, t_p=10μs, Duty Cycle=1%

d Repetitive rating, pulse width limited by junction temperature T_J=150°C.

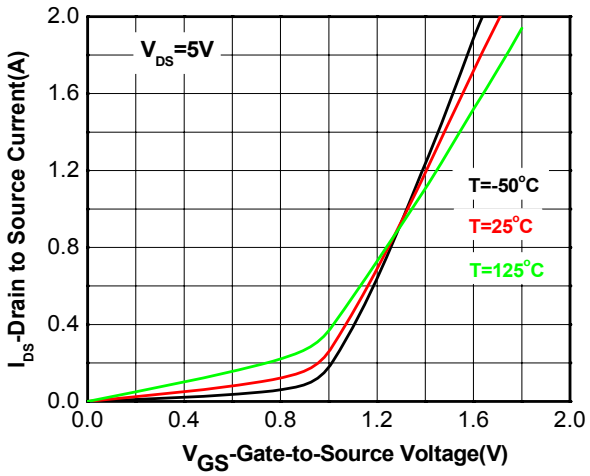
Electronics Characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250uA	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =16 V, V_{GS} = 0V			100	nA
Gate-to-source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} =±5V			5	uA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250uA	0.45	0.58	0.85	V
Drain-to-source On-resistance	$R_{DS(on)}$	VGS = 4.5V, ID = 0.55A		220	260	mΩ
		VGS = 2.5V, ID = 0.45A		260	310	
		VGS = 1.8V, ID = 0.35A		320	380	
Forward Transconductance	g_{FS}	VDS = 5 V, ID = 0.55A		2.0		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1.0 MHz, V_{DS} = 10 V		50		pF
Output Capacitance	C_{OSS}			13		
Reverse Transfer Capacitance	C_{RSS}			8		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 10 V, I_D = 0.55A		1.15		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.06		
Gate-to-Source Charge	Q_{GS}			0.15		
Gate-to-Drain Charge	Q_{GD}			0.23		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V_{GS} = 4.5 V, V_{DS} = 10V, R_L=3 Ω, R_G=6 Ω		22		ns
Rise Time	tr			80		
Turn-Off Delay Time	td(OFF)			700		
Fall Time	tf			380		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 0.35A	0.5	0.7	1.1	V

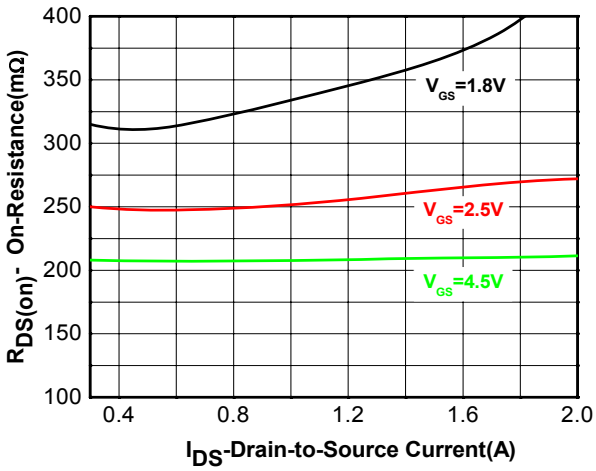
Typical Characteristics (Ta=25°C, unless otherwise noted)



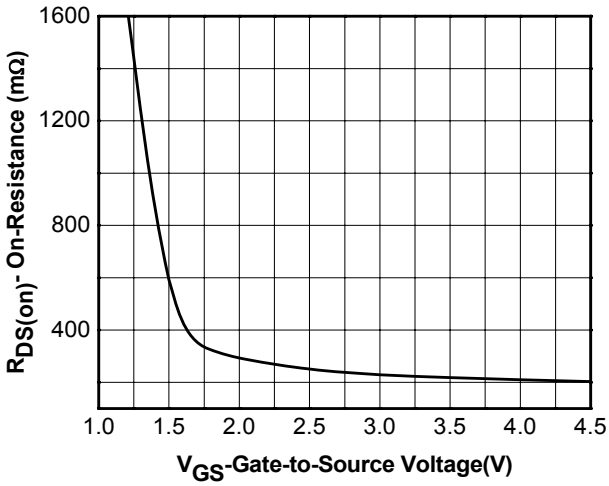
Output characteristics



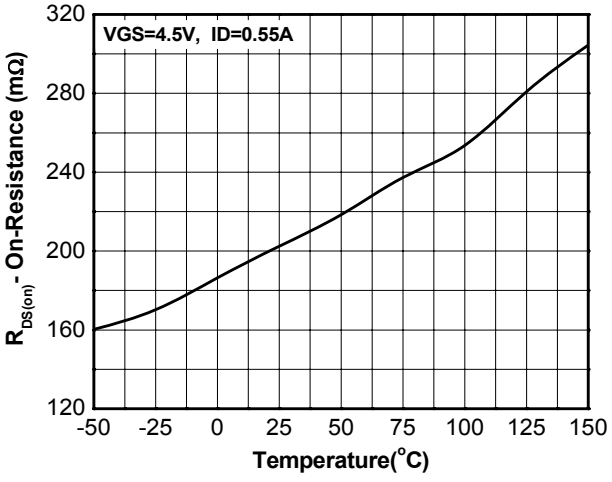
Transfer characteristics



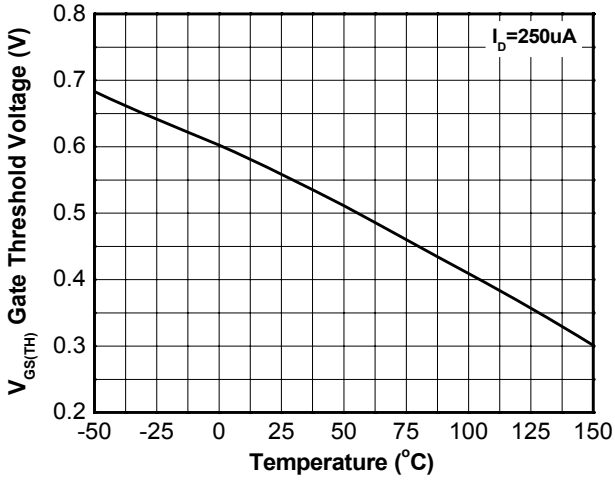
On-Resistance vs. Drain current



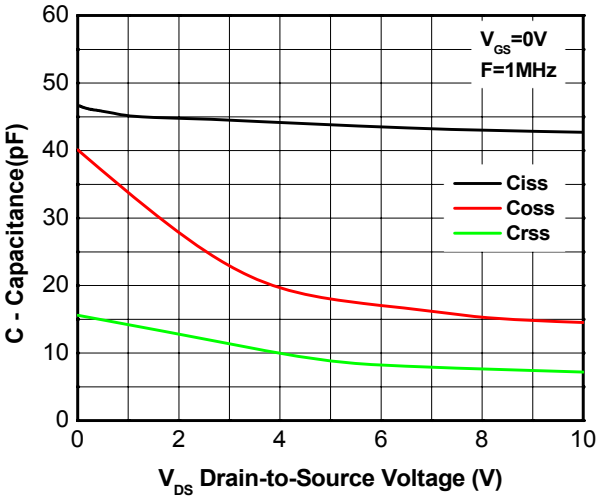
On-Resistance vs. Gate-to-Source voltage



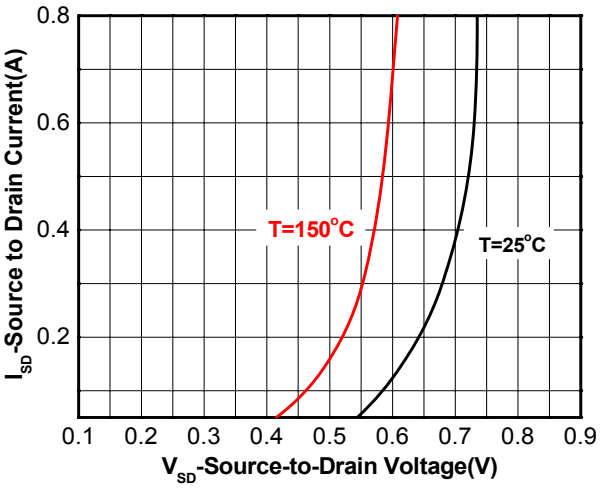
On-Resistance vs. Junction temperature



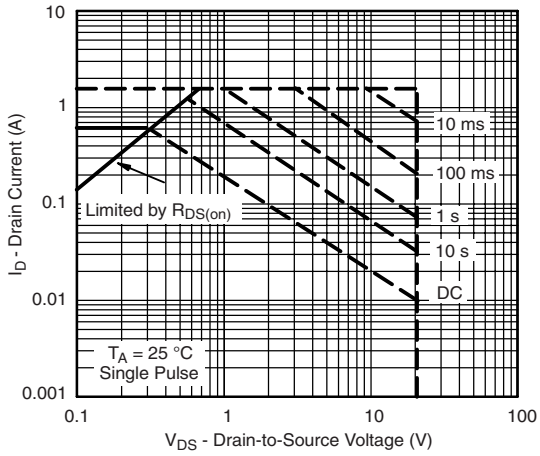
Threshold voltage vs. Temperature



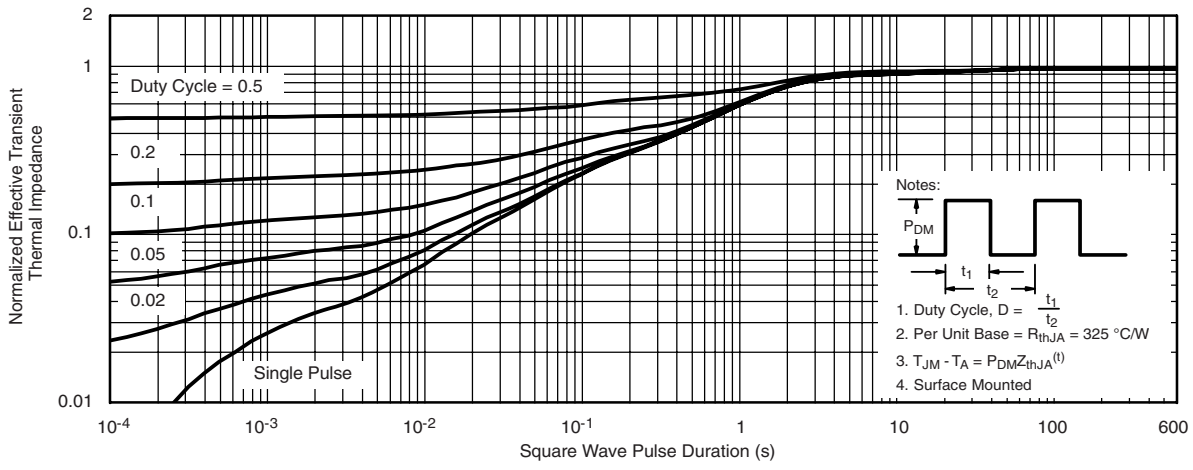
Capacitance



Body diode forward voltage



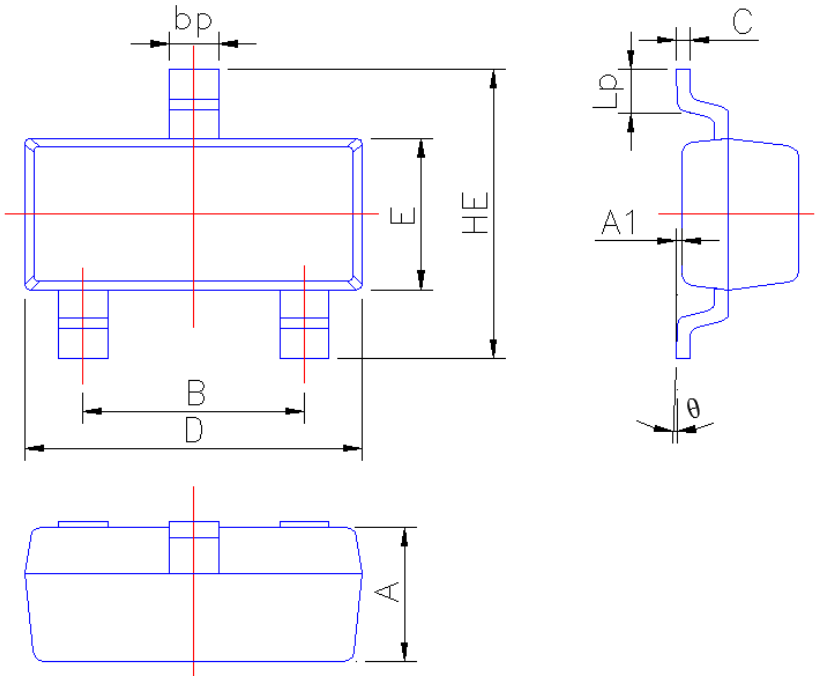
Safe operating power



Transient thermal response (Junction-to-Ambient)

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads **SOT-23**



Symbol	Dimension in Millimeters	
	Min	Max
A	0.90	1.10
A1	0.013	0.100
B	1.80	2.00
bp	0.35	0.50
C	0.09	0.150
D	2.80	3.00
E	1.20	1.40
HE	2.20	2.80
Lp	0.20	0.50
θ	0°	5°