Bay Linear
Inspire the Linear Power

N-CHANNEL DMOS FET SWITCH

High Gain Level Shifter

B3520/B3540

Series

Description

The B3520 series consists of enhancement-mode MOSFETs designed for high speed low-glitch switching in audio, video, and high-frequency wireless applications. The CT3520 is optimized as a high speed driver. With a source feedback resistor it can be uses as a high speed LED Driver.

The B3520 series uses Bay Linear ULTRA REL DMOS Process for reliability and robust performance.

These MOSFETs utilize lateral construction to achieve low capacitance and ultra-fast switching speeds. An integrated Zener diode provides ESD protection.

Features

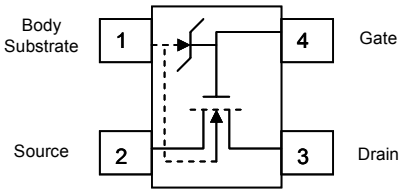
- **Low capacitance – 0.3pF typical**
- **Low threshold – <1.5V max**
- **Fast switching – ton<1ns**
- **CMOS and TTL Compatible Input**

Application

- **LED Drivers**
- **Level Shifting**
- **Switch Drivers**
- **VHF/UHF Amplifiers**

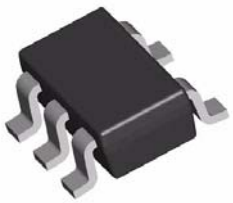
Pin Connection

SOT-143 Package
Lead Code Identification
(top view)



Ordering Information

Package	Part No.
SOT-143	B3520K4 -X.X
SOT-143	B3540K4-XX

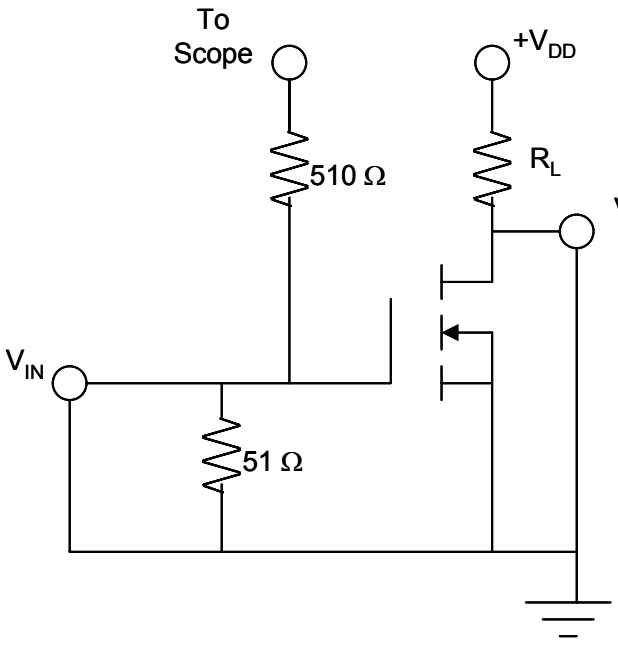


Electrical Specifications (TC = +25°C unless otherwise noted)

	Parameter	Symbol	Test Conditions		B3520			B3540			Units
					Min	Typ	Max	Min	Typ	Max	
STATIC	Drain-Source Breakdown Voltage	BVDS	ID=1 µA VGS=VBS=0		15	25		15	25		V
	Source-Drain Breakdown Voltage	BVSD	IS=50 nA VGD=VBD=-5		10	15					V
	Drain-Substrate Breakdown Voltage	BVDB	ID=50 nA, VGB=0 Source Open		10	15					V
	Source-Substrate Breakdown Voltage	B_{VSB}	I_D=10 µA, VGB=0 Drain Open		10	15					V
	Drain-Source Leakage	$I_{D\ (OFF)}$	$V_{GS/BS}$=-5 $V_{GS/BS}$=0	V_{DS}=10V		1	50				nA
				V_{DS}=15V					0.1	1	µA
	Source - Drain Leakage	$IS_{\ (OFF)}$	$V_{GD/BS}$=-5 $V_{GS/BS}$=0	V_{DS}=10V		1	50				nA
				V_{DS}=15V					0.1	1	µA
	Gate Leakage	I_{GBS}	$V_{DB/SB}$= 0	V_{GS}=20V		1	10		1	10	µA
	Gate Threshold Voltage	V_{GS} (th)	V_{DS}=V_{GS} ID=1 µA V_{SB}=0		0.3	0.7	1.5	0.3	0.7	1.5	V
	Drain-Source ON Resistance	$r_{DS\ (ON)}$	ID=1 mA V_{SB}= 0V	V_{GS}=2.4V		140	175		140	175	Ohm
				V_{GS}=4.5V		40	60		40	60	Ohm

	Parameter	Symbol	Test Conditions	B3520			B3540			Units
				Min	Typ	Max	Min	Typ	Max	
DYNAMIC	Common-Source Forward Transconductance	gfS	V_{DS}= 10V I_D= 20mA f = 1MHz, VSB=0 Pulsed	14	18		14	18		V
	Gate Node Capacitance	C(gs+gd+gb)	V_{DS}= 10V V_{GS}=V_{BS}= -15V f = 1MHz		4.5	6.0		4.5	6.0	pF
	Drain Node Capacitance	C(gd+db)			2.0	3.0		2.0	3.0	pF
	Source Node Capacitance	C(gs+sb)			5.5	7.0		5.5	7.0	pF
	Reverse Transfer Capacitance	C(dg)			0.3	0.5		0.3	0.5	pF
	Turn On Delay Time	td(on)	V∞= 10V VG(on)= 10V R_L= 680 Ω R_G= 51Ω C_L = 1.5pF		0.7	1.0		0.7	1.0	ns
	Rise Time	tr			0.8	1.0		0.8	1.0	ns
	Turn Off Delay Time	Td(off)			1.5			1.5		ns

Switching Time Test Circuit



Input Pulse: t_d, t_r < 1ns

Pulse width: 100 ns

Rep rate: 1 MHz

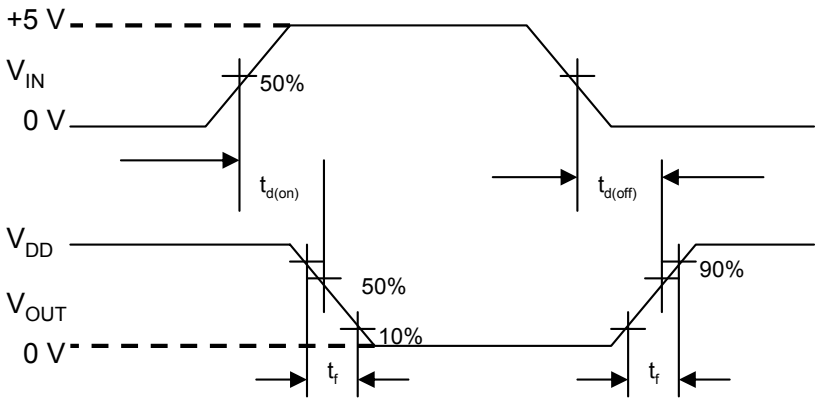
Sampling Scope

T_r < 360 ps

R_{IN} = 1 MΩ

C_{IN} = 2 pF

BW = 500 MHz



Absolute Maximum Ratings, T_c = +25°C

Parameter	Unit	Absolute Maximum[1]
		SOT-143
Drain-Source Voltage	V	+15
Gate-Source Voltage	V	-0.3 / +20
Gate-Drain Voltage	V	-0.3 / +20
Continuous Drain Current	mA	50
Power dissipation Tc=25	mW	300
Linear Derating Factor	mW/C	3
Junction Temperature	°C	-55 to +125
Storage Temperature	°C	-55 to +125

Notes:

1. Operation in excess of any one of these conditions may result in permanent damage to the device
2. T_C = +25°C, where T_C is defined to be the temperature at the package pins where contact is made to the circuit board.

ESD WARNING: Handling Precautions Should Be Taken To Avoid Static Discharge.