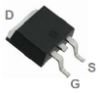
BCX10N65D

650V N-Channel Power MOSFET

Features

Low $R_{DS(on)}$
Low FOM
Extremely low switching loss
Good stability and uniformity

TOP VIEW

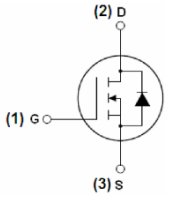


TO-252 TO-220F

General Description

BCX10N65D uses advanced technology to provide low $R_{DS(on)}$, low gate charge and fast switching characteristics. This device is suitable for power applications.

SCHEMATIC DIAGRAM



Applications

- ❑ Consumer electronics power supply
- ❑ LCD/LED/PDP
- ❑ Portable digital power management
- ❑ PFC

BV_{DSS}	650	V
I_D	10	A
$R_{DS(on),typical@10V}$	1.1	Ω
$V_{GS(th),typical}$	3	V

Ordering Information

Part Number	Package	Form	Minimum Order Quantity
BCD10N65D	TO-252	Tape&Reel	2500
BCT10N65D	TO-220F	Tube	1000

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Drain Current-Continuous(Note 1)	I_D	10	A
Drain Current-Pulsed(Note 2)	I_{DM}	28	A
Power Dissipation for TO-252 (Note 3)	P_D	97	W
Power Dissipation for TO-220F (Note 3)		42	
Single Pulsed-Avalanche Energy(Note 4)	E_{AS}	265	mJ
Operation and Storage Junction Temperature	T_J,T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	TO-252	TO-220F	Unit
Thermal Resistance, Junction-to-Case	$R_{θJC}$	1.29	2.98	°C/W
Thermal Resistance, Junction-to-Ambient (Note 5)	$R_{θJA}$	62	62	°C/W

Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-Source Breakdown Voltage	BV_{DSS}	650			V	V_{GS} = 0V, I_D = 250μA
Gate Threshold Voltage	$V_{GS(th)}$	2	3	4	V	V_{DS} = V_{GS}, I_D = 250μA
Drain-Source On-State Resistance	$R_{DS(on)}$		1.1	1.35	Ω	V_{GS} = 10V,I_D = 3A
Gate-Source Leakage Current	I_{GSS}			100	nA	V_{GS} = 30V
				-100	nA	V_{GS} = -30V
Drain-Source Leakage Current	I_{DSS}			1	μA	V_{DS} = 650V,V_{GS} = 0V

Dynamic Characteristics

Input Capacitance	C_{iss}		1050		pF	V_{GS} = 0V,
Output Capacitance	C_{oss}		100		pF	V_{DS} = 100V,
Reverse Transfer Capacitance	C_{rss}		7.1		pF	f = 1MHz
Turn-On Delay Time	$t_{d(on)}$		25		ns	I_D = 3A,
Turn-On Rise Time	t_r		55		ns	V_{GS} = 10V,
Turn-Off Delay Time	$t_{d(off)}$		68		ns	V_{DS} = 520V,
Turn-Off Fall Time	t_f		40		ns	R_G = 3Ω

Gate Charge Characteristics

Total Gate Charge	Q_g		24		nC	I_D = 3A,
Gate-Source Charge	Q_{gs}		2		nC	V_{DS} = 520V,
Gate-Drain Charge	Q_{gd}		2.7		nC	V_{GS} = 10V

Body Diode Characteristics

Body Diode Forward Current	I_S			8	A	V_{GS} < V_{th}
Diode Forward Voltage	V_{SD}			1.5	V	I_S = 3A, V_{GS} = 0V
Reverse Recovery Time	t_{rr}		190		ns	I_S = 3A, V_{GS} = 0V
Reverse Recovery Charge	Q_{rr}		2.2		μC	di/dt = 100A/μs

Notes

1. Calculated continuous current based on maximum allowable junction temperature.
2. Repetitive rating, pulse width limited by maximum junction temperature.
3. P_D is based on maximum junction temperature, using junction-to-case thermal resistance.
4. V_{DD} = 50V, R_G = 25Ω, L = 1mH, Starting T_J = 25°C.
5. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C.

Electrical Characteristics Diagrams

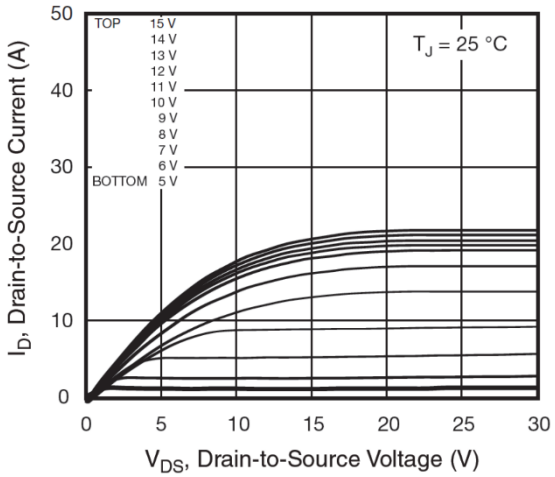


Figure 1. Typical Output Characteristics

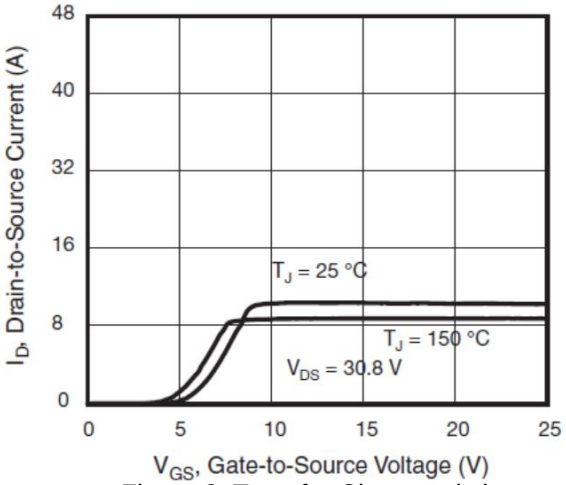


Figure 2. Transfer Characteristics

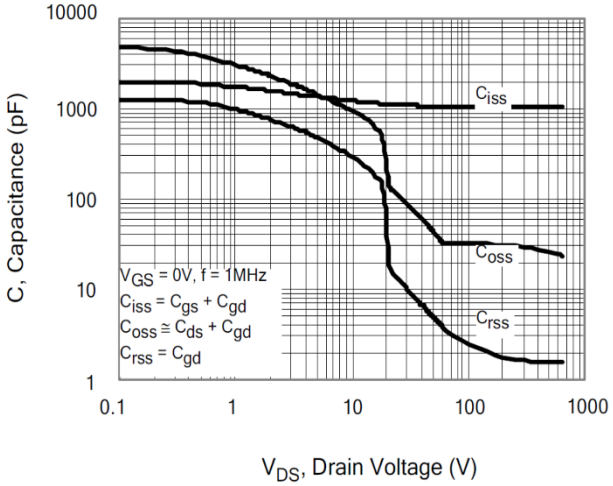


Figure 3. Typical Capacitances

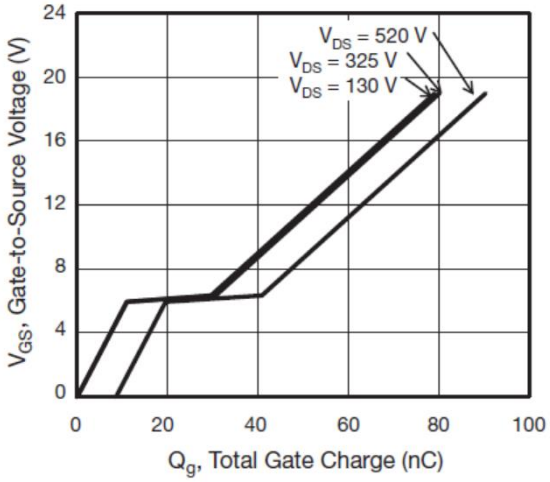


Figure 4. Typical Gate Charge

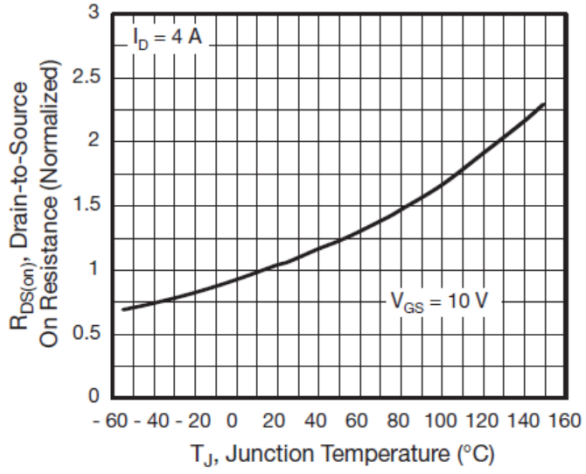


Figure 5. Drain Current On-State Resistance

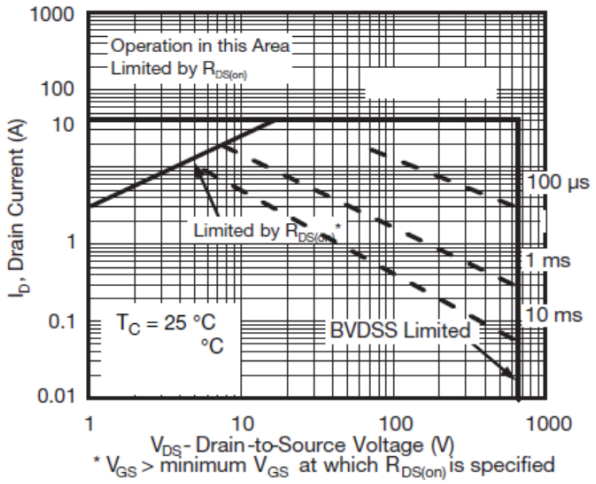
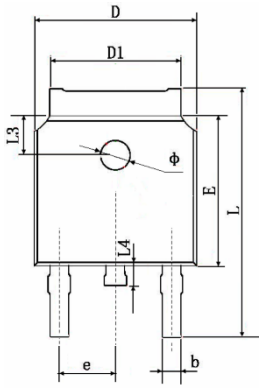


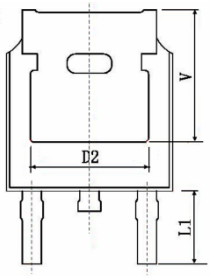
Figure 6. Safe Operation Area

Package Outline Dimensions

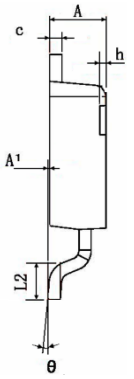
TO-252



Top View



Bottom View



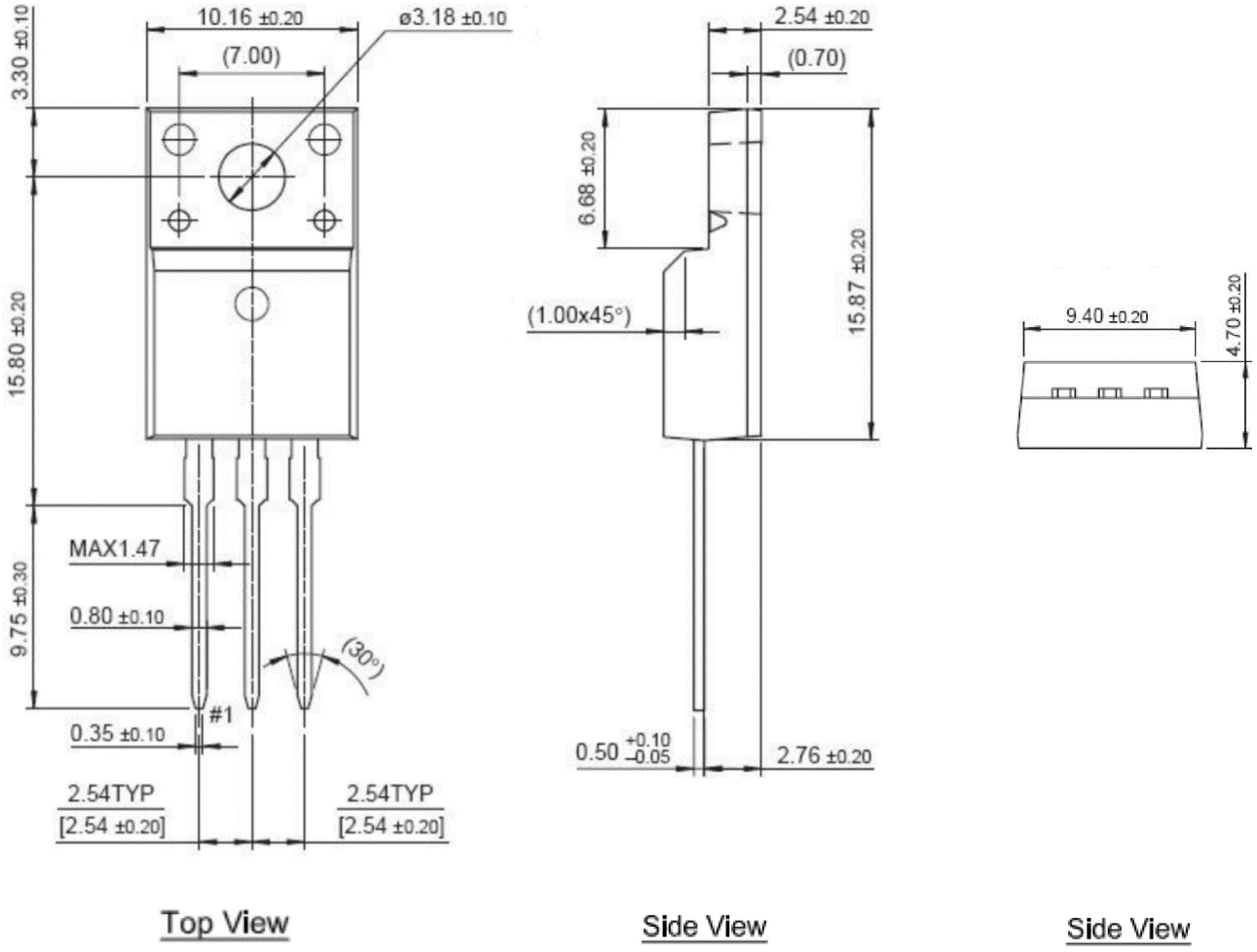
Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

Package	Units/Tape	Tapes/Inner Box	Units/Inner Box	Inner Box/Carton Box	Units/Carton Box
TO-252	2500	2	5000	5	25000

Package Outline Dimensions

TO-220F



Package	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Box/Carton Box	Units/Carton Box
TO-220F	50	20	1000	5	5000