



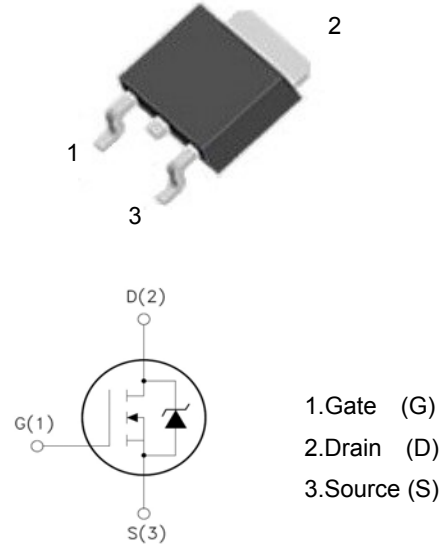
BCD2030K

20V N-Channel MOSFET

Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge : $Q_g = 11.05\text{nC}$ (Typ.).
- ☐ $BVDSS = 20\text{V}$, $I_D = 30\text{A}$
- ☐ $R_{DS(on)} : 15\text{m}\Omega$ (Max) @ $V_G = 4.5\text{V}$
- ☐ 100% Avalanche Tested

TO-252

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain-Source Voltage		20	V
I_D	Drain Current	$T_C = 25^\circ\text{C}$	30	A
		$T_C = 100^\circ\text{C}$	13	
V_{GSS}	Gate-Source Voltage		± 12	V
E_{AS}	Single Pulse Avalanche Energy (note1)		8.1	mJ
I_{AR}	Avalanche Current (note2)		30	A
P_D	Power Dissipation ($T_a = 25^\circ\text{C}$)		20.8	W
T_j	Junction Temperature(Max)		150	$^\circ\text{C}$
T_{stg}	Storage Temperature		-55~+150	
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds		300	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	-	6.0	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	-	62	$^\circ\text{C/W}$

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	20	22		V
ΔBVDSS/ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.018	---	V/°C
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.50	0.65	1.0	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =7.6A		11	15	mΩ
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =2.5V, I _D =3.5A		15.5	20	
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =1.8V, I _D =2.5A		20.5	35	
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V			1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±10V, V _{DS} =0V			±100	nA
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1MHZ		888		pF
C _{oss}	Output Capacitance			133		
C _{rss}	Reverse Transfer Capacitance			117		
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =6.8A		11.05		nC
Q _{gs}	Gate-Source Charge			1.73		
Q _{gd}	Gate-Drain Charge			3.1		
t _{D(on)}	Turn-on Delay Time	V _{GS} =4.5V, V _{DS} =10V, I _D =6.8A R _{GEN} =3Ω		7		ns
t _r	Turn-on Rise Time			46		
t _{D(off)}	Turn-off Delay Time			30		
t _f	Turn-off fall Time			52		
V _{SD}	Diode Forward Voltage	I _S =7.6A, V _{GS} =0V			1.2	V

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2、The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
- 3、The power dissipation is limited by 150°C junction temperature
- 4、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

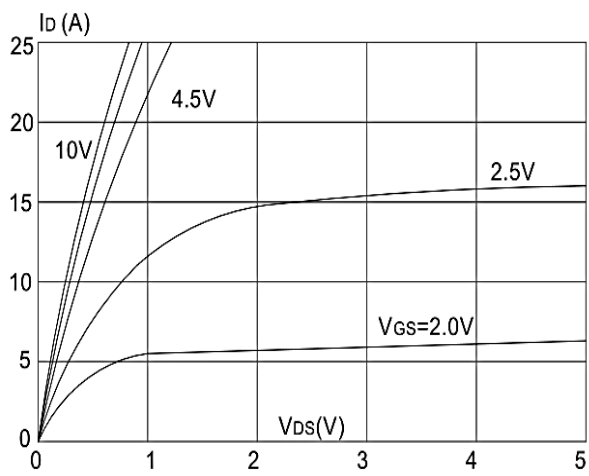


Figure1: Output Characteristics

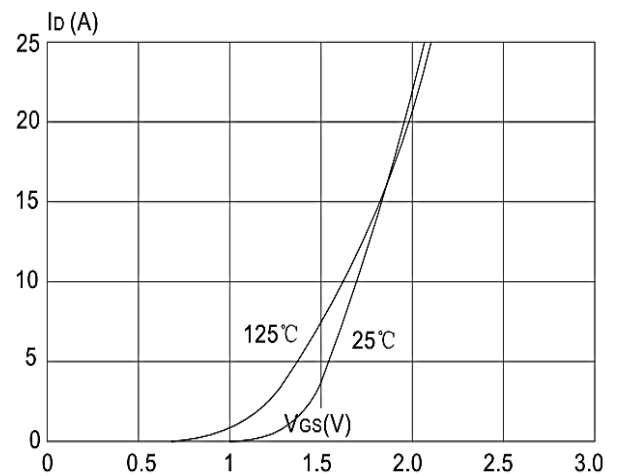


Figure 2: Typical Transfer Characteristics

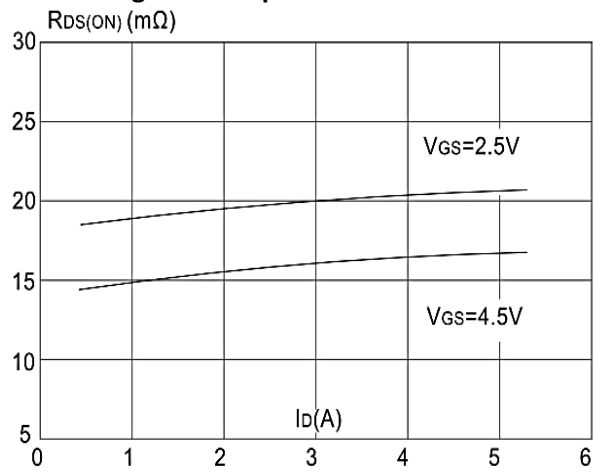


Figure 3: On-resistance vs. Drain Current

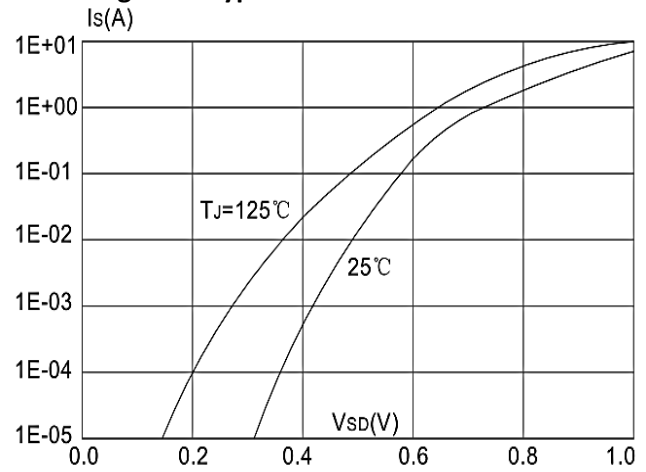


Figure 4: Body Diode Characteristics

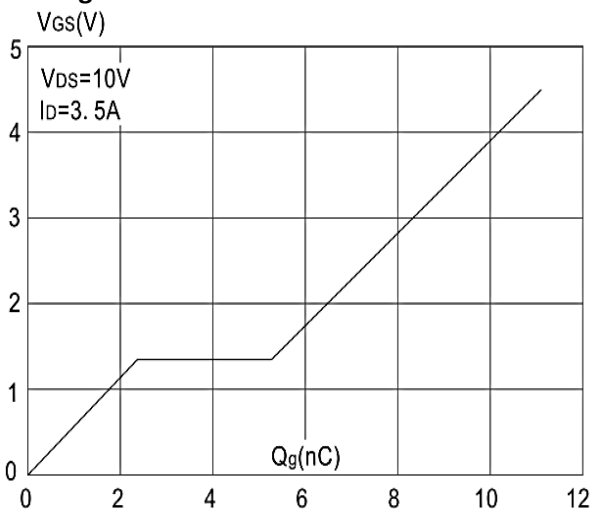


Figure 5: Gate Charge Characteristics

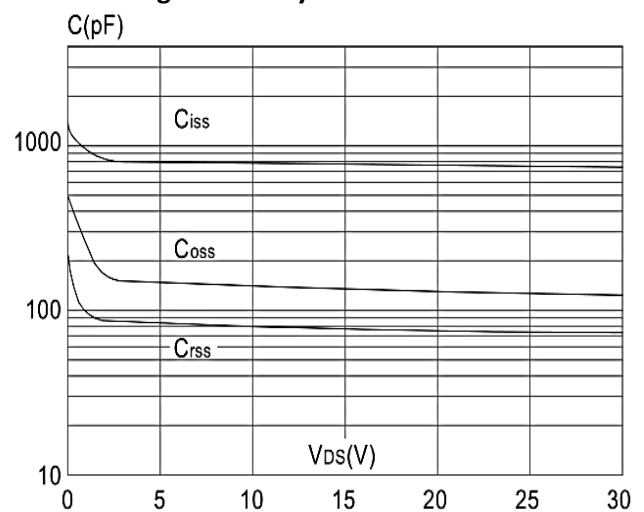


Figure 6: Capacitance Characteristics

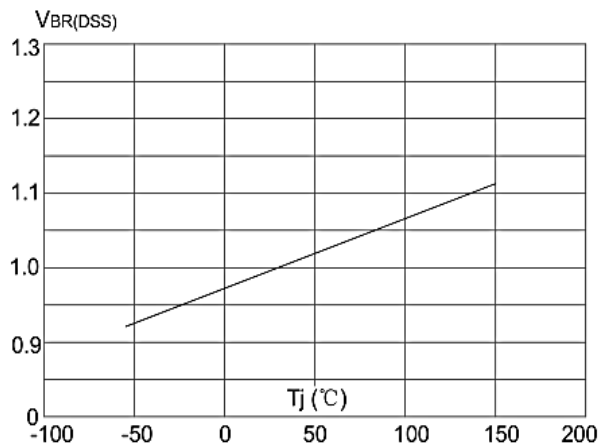


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

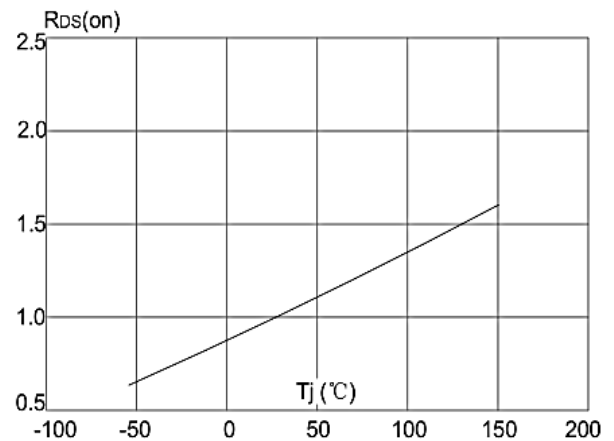


Figure 8: Normalized on Resistance vs. Junction Temperature

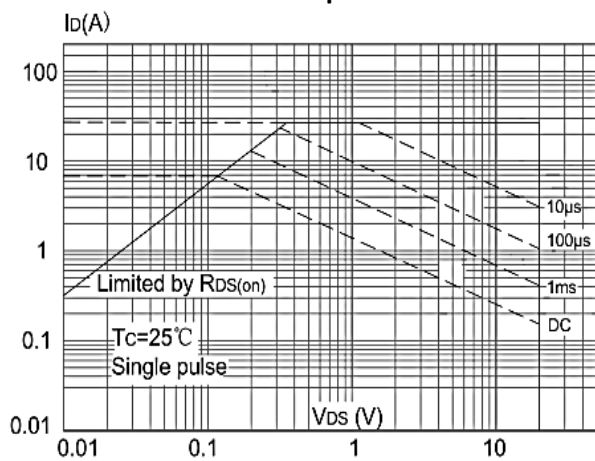


Figure 9: Maximum Safe Operating Area vs. Case Temperature

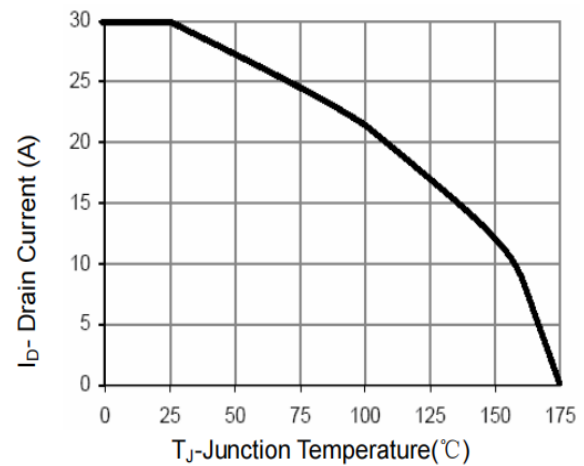


Figure 10 Current De-rating

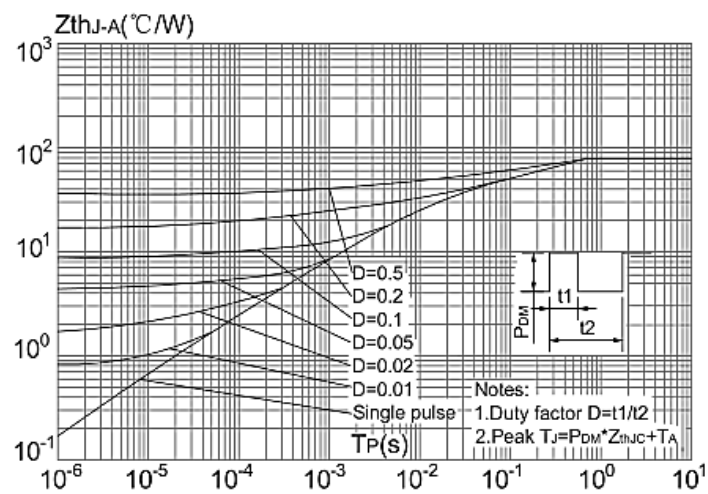
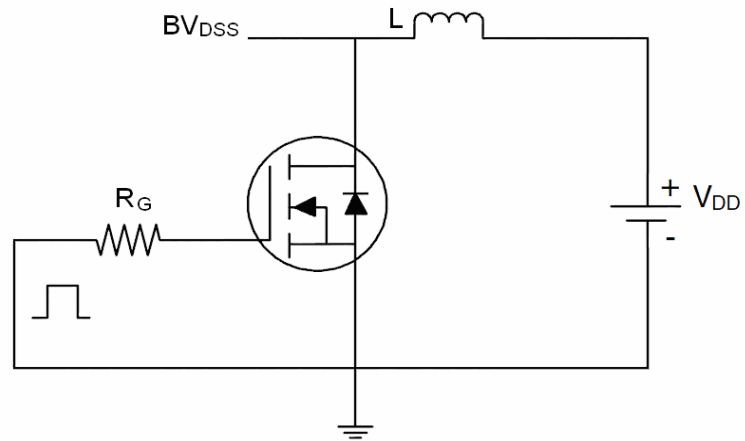


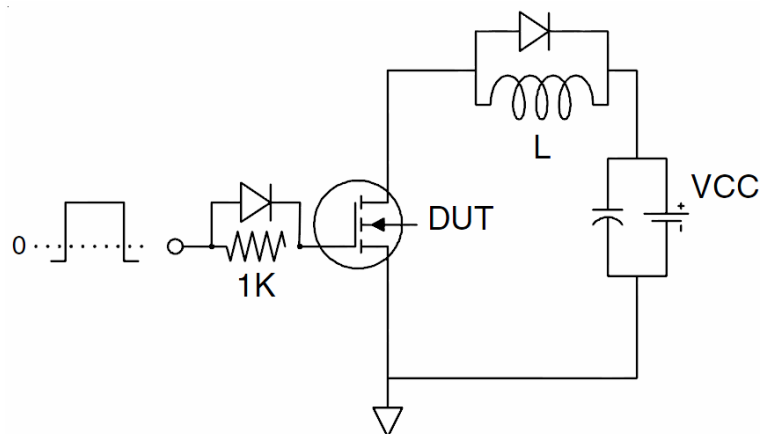
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

Gate Charge Test Circuit & Waveform

1) E_{AS} test Circuits



2) Gate charge test Circuit:



3) Switch Time Test Circuit:

