HM2301BWKR

Dual P-Channel Enhancement Mode Field Effect Transistor

General Description

The HM2301BWKR uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge, and operation with gate voltages as low as 1.8V, in the small SOT363 footprint. It can be used for a wide variety of applications, including load switching, low current inverters and low current DC-DC converters. It is ESD protected to 2KV HBM.

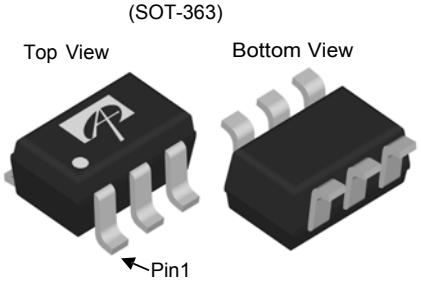
Features

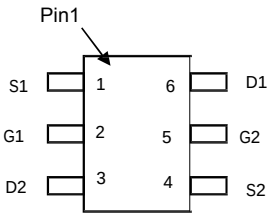
V_{DS} (V) = -20V
I_D = -0.8A (V_{GS} = -4.5V)

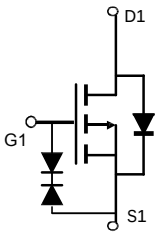
$R_{DS(ON)}$ < 480m (V_{GS} = -4.5V)
$R_{DS(ON)}$ < 950m (V_{GS} = -2.5V)
$R_{DS(ON)}$ <2200m (V_{GS} = -1.8V)

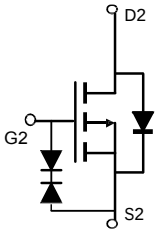
Green Product

SC70-6L
(SOT-363)









Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±8	V
Continuous Drain Current [A]	T_A=25°C	I_D	-0.8	A
	T_A=70°C		-0.56	
Pulsed Drain Current [B]		I_{DM}	-2.4	
Power Dissipation [A]	T_A=25°C	P_D	0.3	W
	T_A=70°C		0.19	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	R_{JA}	360	415	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		400	460	°C/W
Maximum Junction-to-Lead [C]	Steady-State	R_{JL}	300	350	°C/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=-250 A, V_{GS}=0V	-20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-16V, V_{GS}=0V			-1	A
		T_J=55°C			-5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±8V			±10	A
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=-250 A	-0.45		-1.2	V
$I_{D(ON)}$	On state drain current	V_{GS}=-4.5V, V_{DS}=-5V	-3			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-4.5V, I_D=-0.8A		350	480	m
		T_J=125°C		440	670	
		V_{GS}=-2.5V, I_D=-0.5A		550	950	m
		V_{GS}=-1.8V, I_D=-0.4A		780	2200	m
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-0.8A		1.7		S
V_{SD}	Diode Forward Voltage	I_S=-0.5A,V_{GS}=0V		-0.86	-1	V
I_S	Maximum Body-Diode Continuous Current				-0.4	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-10V, f=1MHz		114	140	pF
C_{oss}	Output Capacitance			17		pF
C_{rss}	Reverse Transfer Capacitance			14		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		12	17	
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=-4.5V, V_{DS}=-10V, I_D=-0.8A		1.44	1.8	nC
Q_{gs}	Gate Source Charge			0.14		nC
Q_{gd}	Gate Drain Charge			0.35		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-4.5V, V_{DS}=-10V, R_L=16.7 , R_{GEN}=3		6.5		ns
t_r	Turn-On Rise Time			6.5		ns
$t_{D(off)}$	Turn-Off DelayTime			18.2		ns
t_f	Turn-Off Fall Time			5.5		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-0.8A, dI/dt=100A/ s		10	13	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-0.8A, dI/dt=100A/ s		3		nC

A: The value of R_{JA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any a given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.
B: Repetitive rating, pulse width limited by junction temperature.
C. The R_{JA} is the sum of the thermal impedence from junction to lead R_{JL} and lead to ambient.
D. The static characteristics in Figures 1 to 6,12,14 are obtained using 80 s pulses, duty cycle 0.5% max.
E. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

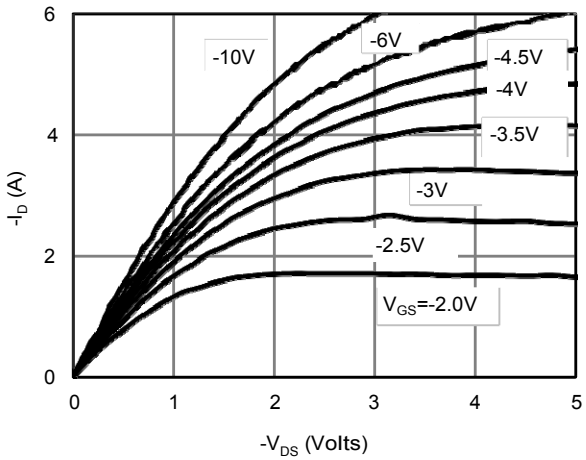


Fig 1: On-Region Characteristics

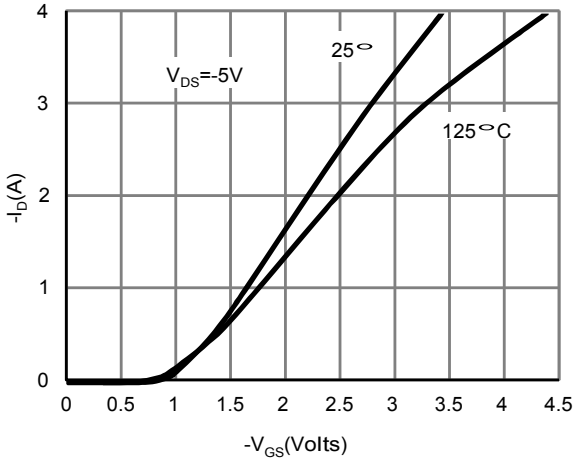


Figure 2: Transfer Characteristics

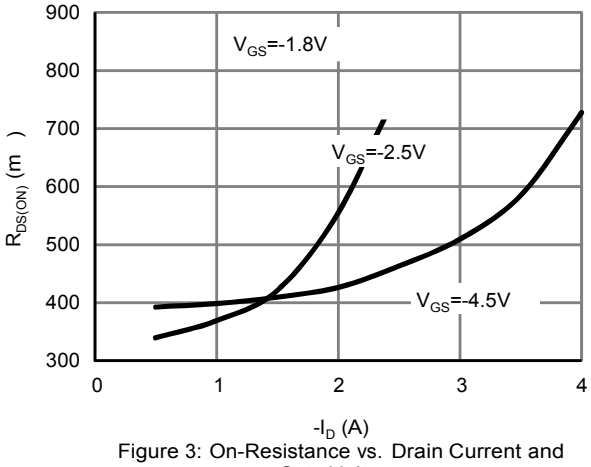


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

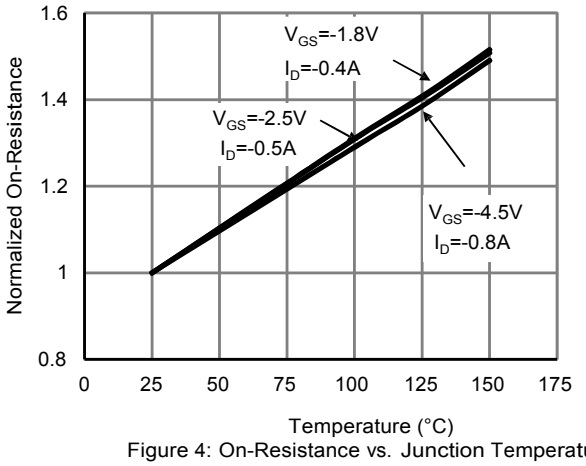


Figure 4: On-Resistance vs. Junction Temperature

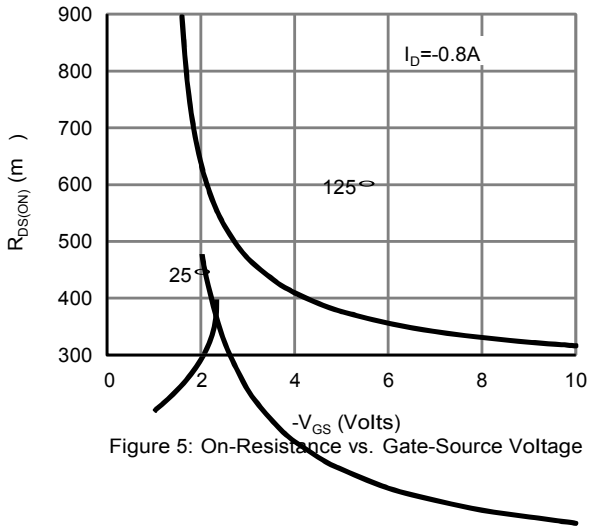


Figure 5: On-Resistance vs. Gate-Source Voltage

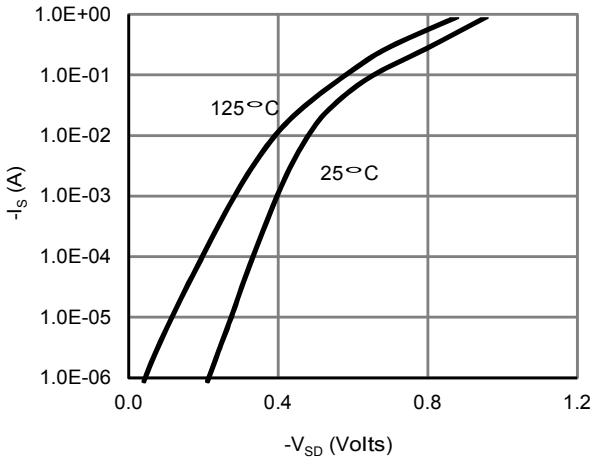


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

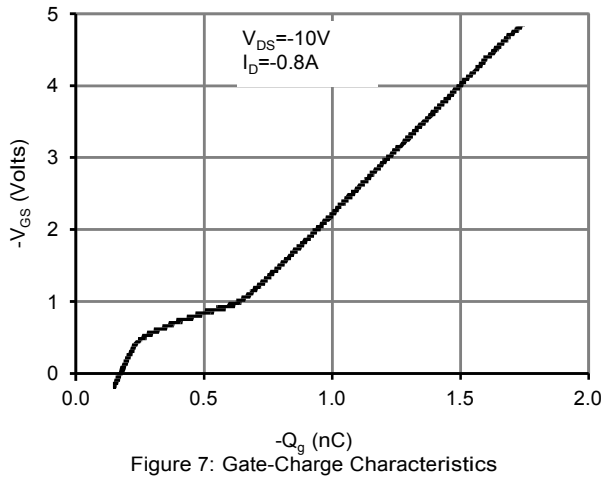


Figure 7: Gate-Charge Characteristics

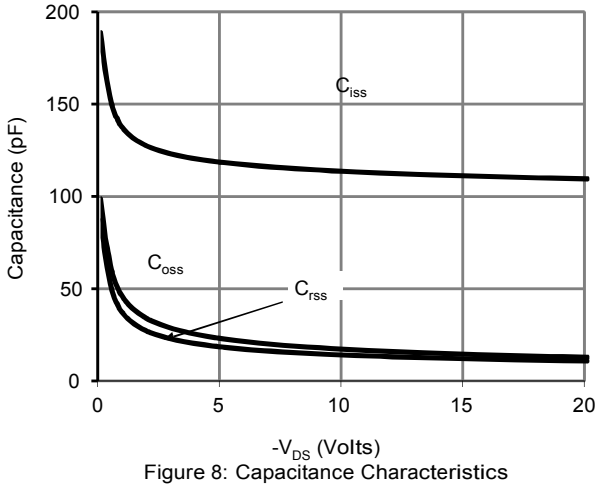


Figure 8: Capacitance Characteristics

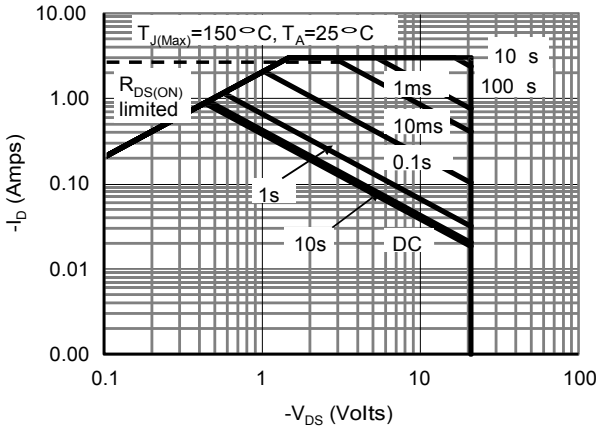


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

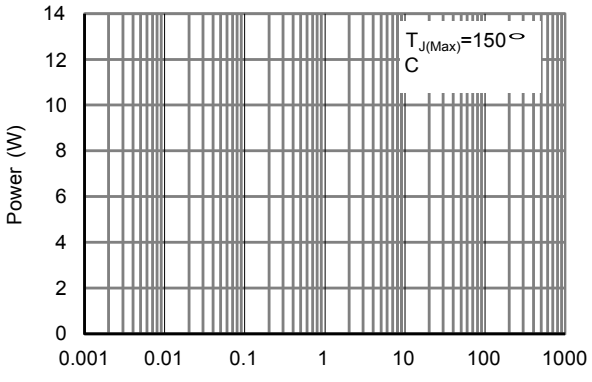


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

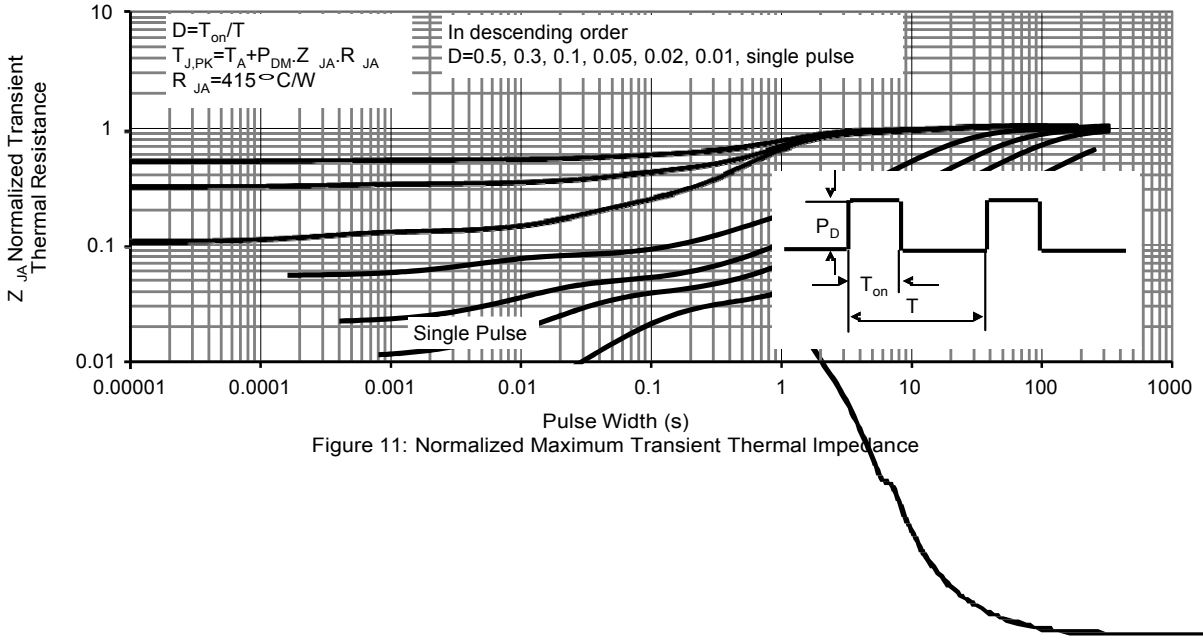
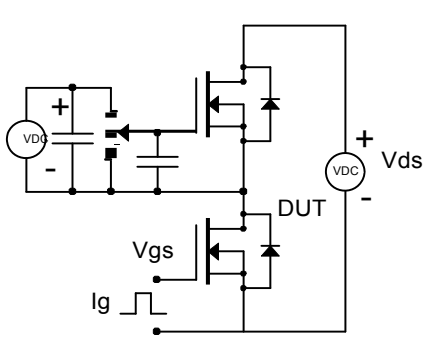
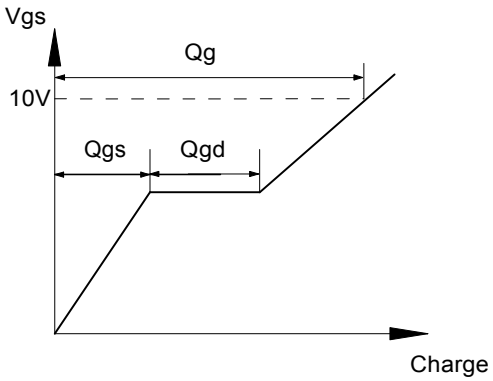


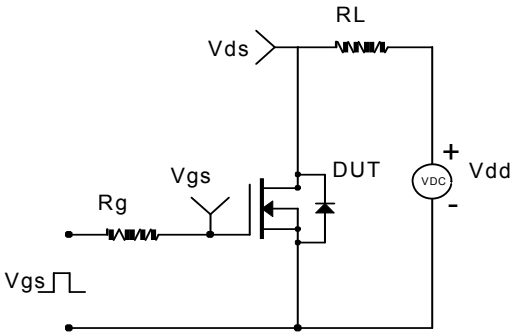
Figure 11: Normalized Maximum Transient Thermal Impedance

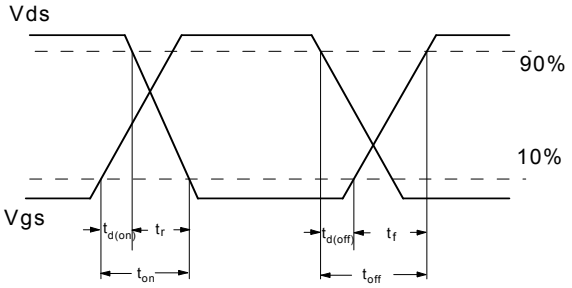
Gate Charge Test Circuit & Waveform



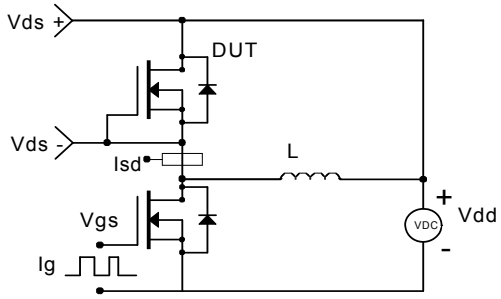


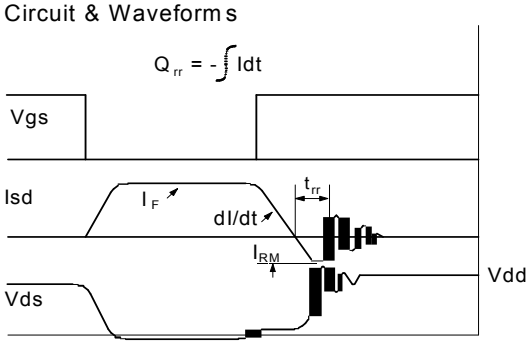
Resistive Switching Test Circuit & Waveforms





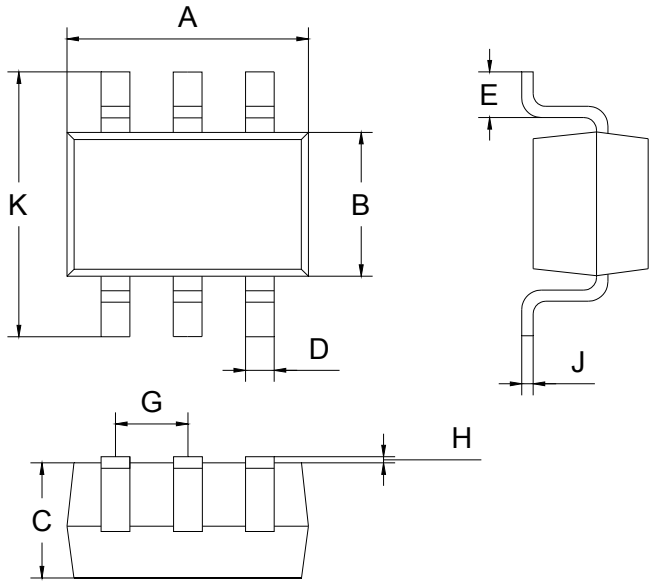
Diode Recovery Test Circuit & Waveforms





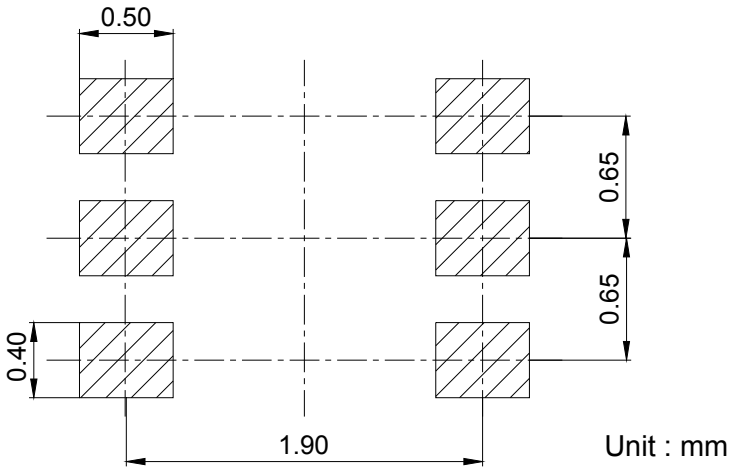
PACKAGE OUTLINE

Plastic surface mounted package SOT-363



SOT-363		
Dim	Min	Max
A	2.00	2.20
B	1.15	1.35
C	0.95 Typical	
D	0.25 Typical	
E	0.25	0.40
G	0.60	0.70
H	0.02	0.10
J	0.10 Typical	
K	2.2	2.4
All Dimensions in mm		

SOLDERING FOOTPRINT



Unit : mm

PACKAGE INFORMATION

Device	Package	Shipping
HM2301BWKR	SOT-363	3000/Tape&Reel