



## Description

The HBSD235CH6327 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

## General Features

$V_{DS} = 20V$   $I_D = 0.75A$

$R_{DS(ON)} < 380m\Omega$  @  $V_{GS}=4.5V$

$V_{DS} = -20V$   $I_D = -0.66A$

$R_{DS(ON)} < 570m\Omega$  @  $V_{GS}=-4.5V$

## Application

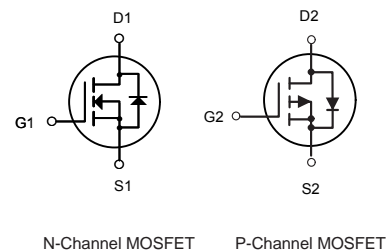
Wireless charging

Boost driver

Brushless motor



SOT-363  
(SC-70-6)



N-Channel MOSFET

P-Channel MOSFET

## Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
HBSD235CH6327	SOT-363(SC-70-6)		3000

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

Symbol	Parameter	Rating		Units
		N-Channel	P-Channel	
$V_{DS}$	Drain-Source Voltage	20	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	$\pm 12$	V
$I_{D@T_A=25^{\circ}C}$	Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup>	0.75	-0.66	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	1.8	-1.2	A
TSTG	Storage Temperature Range	-55 to 150	-55 to 150	$^{\circ}C$
$T_J$	Operating Junction Temperature Range	-55 to 150	-55 to 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	833		$^{\circ}C/W$



**N-ch MOSFET ELECTRICAL CHARACTERISTICS(T<sub>a</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
STATIC CHARACTERISTICS						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	20			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> = 0V			1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±10V, V <sub>DS</sub> = 0V			±20	uA
Gate threshold voltage (note 2)	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.35		1.1	V
Drain-source on-resistance(note 2)	R <sub>DS(on)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.65A		210	380	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =0.55A		320	450	mΩ
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =0.45A		390	800	mΩ
Forward tranconductance(note 2)	g <sub>FS</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =0.8A		1.6		S
Diode forward voltage	V <sub>SD</sub>	I <sub>S</sub> =0.15A, V <sub>GS</sub> = 0V			1.2	V
DYNAMIC CHARACTERISTICS (note 4)						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V, f =1MHz		79	120	pF
Output Capacitance	C <sub>oss</sub>			13	20	pF
Reverse Transfer Capacitance	C <sub>rss</sub>			9	15	pF
SWITCHING CHARACTERISTICS (note 3,4)						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =10V, I <sub>D</sub> =500mA, R <sub>GEN</sub> =10Ω		6.7		ns
Turn-on rise time	t <sub>r</sub>			4.8		ns
Turn-off delay time	t <sub>d(off)</sub>			17.3		ns
Turn-off fall time	t <sub>f</sub>			7.4		ns

**P-ch MOSFET ELECTRICAL CHARACTERISTICS(T<sub>a</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
STATIC CHARACTERISTICS						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =-250μA	-20			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> = 0V			-1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±10V, V <sub>DS</sub> = 0V			±20	uA
Gate threshold voltage (note 2)	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-0.35		-1.1	V
Drain-source on-resistance(note 2)	R <sub>DS(on)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1A		430	570	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-0.8A		624	700	mΩ
		V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-0.5A		950		mΩ
Forward tranconductance(note 2)	g <sub>FS</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-0.54A		1.2		S
Diode forward voltage	V <sub>SD</sub>	I <sub>S</sub> =-0.5A, V <sub>GS</sub> = 0V			-1.2	V
DYNAMIC CHARACTERISTICS (note 4)						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-16V, V <sub>GS</sub> =0V, f =1MHz		113	170	pF
Output Capacitance	C <sub>oss</sub>			15	25	pF
Reverse Transfer Capacitance	C <sub>rss</sub>			9	15	pF
SWITCHING CHARACTERISTICS (note 3, 4)						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-10V, I <sub>D</sub> =-200mA, R <sub>GEN</sub> =10Ω		9		ns
Turn-on rise time	t <sub>r</sub>			5.8		ns
Turn-off delay time	t <sub>d(off)</sub>			32.7		ns
Turn-off fall time	t <sub>f</sub>			20.3		ns

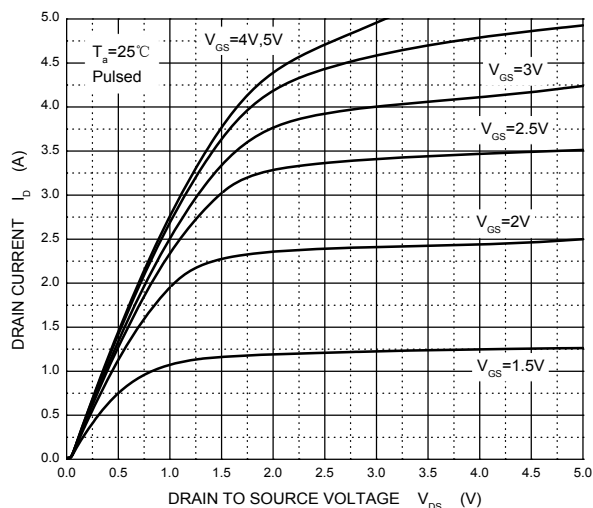
**Notes :**

- 1.Surface mounted on FR4 board using the minimum recommended pad size.
2. Pulse Test : Pulse width=300μs, duty cycle≤2%.
3. Switching characteristics are independent of operating junction temperature.
4. Garanted by design, not subject to producing.

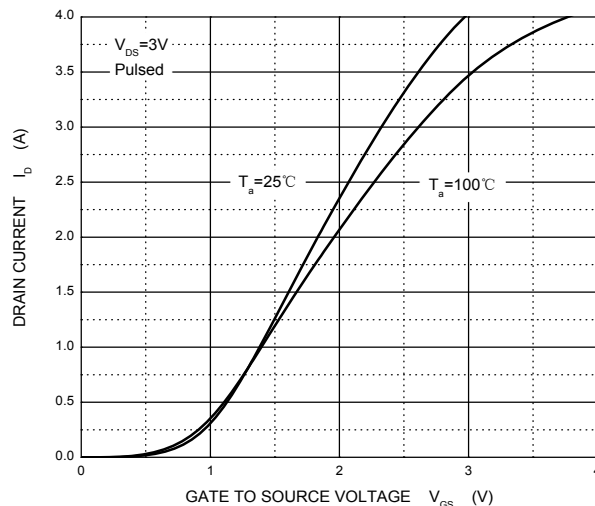


## N-Channel Typical Characteristics

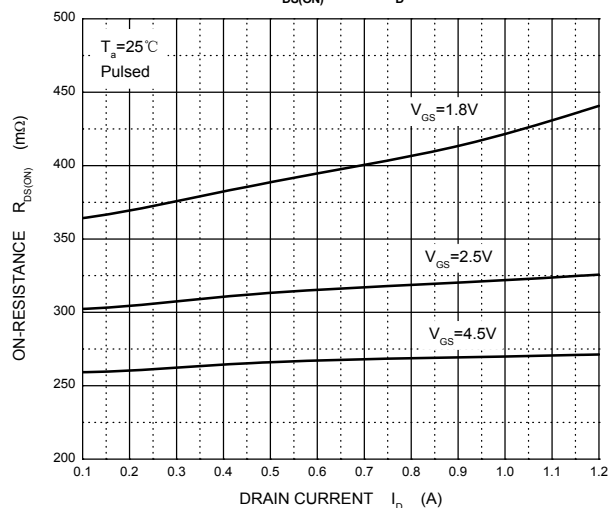
Output Characteristics



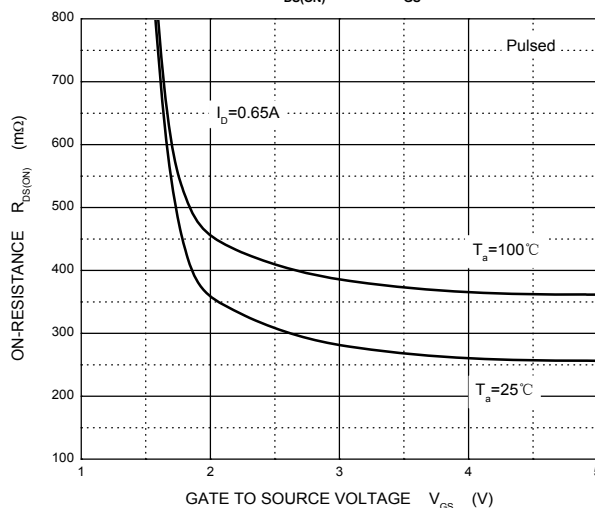
Transfer Characteristics



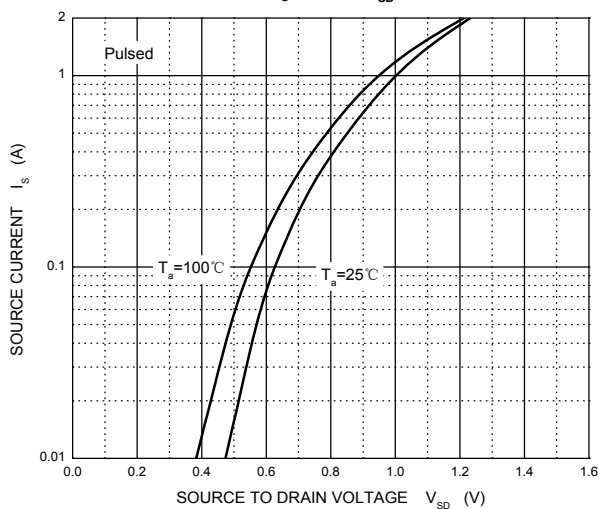
$R_{DS(ON)}$  —  $I_D$



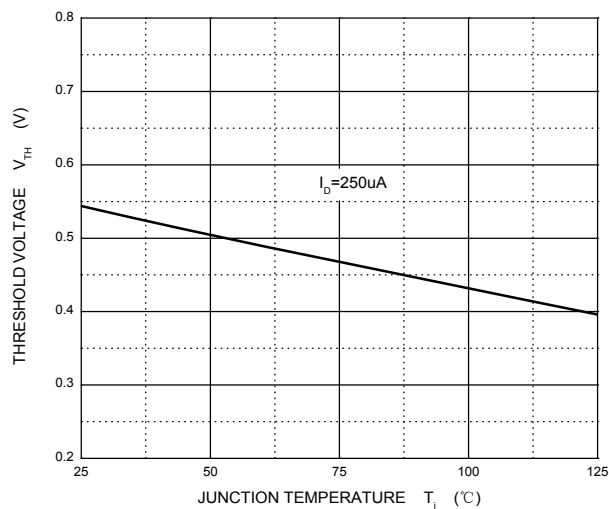
$R_{DS(ON)}$  —  $V_{GS}$



$I_S$  —  $V_{SD}$



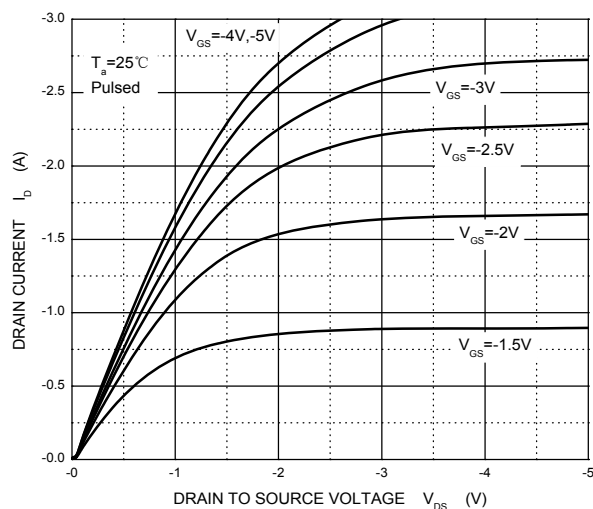
Threshold Voltage



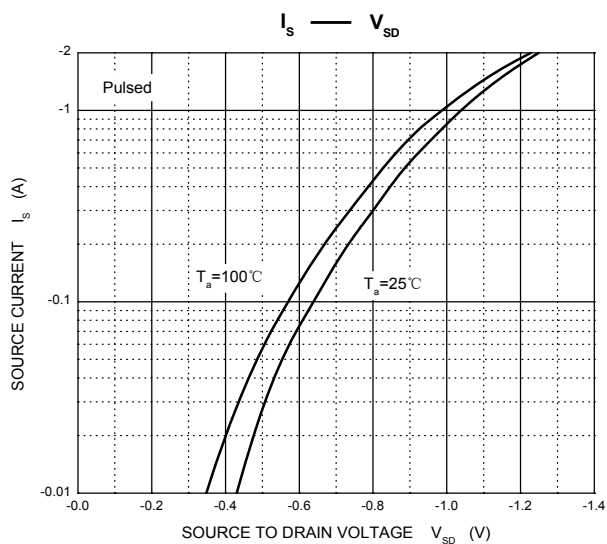
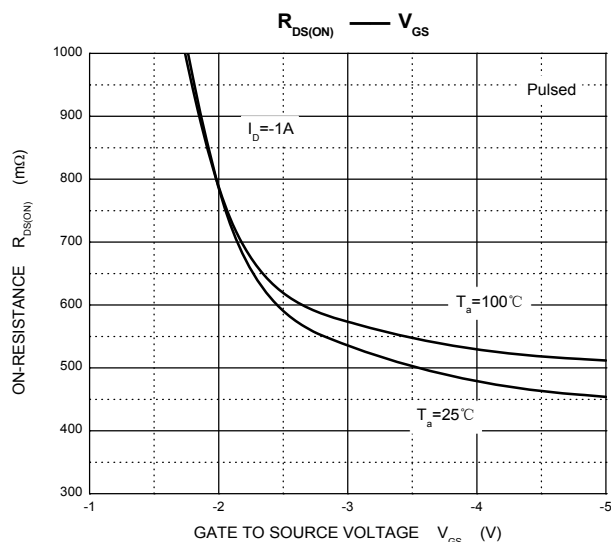
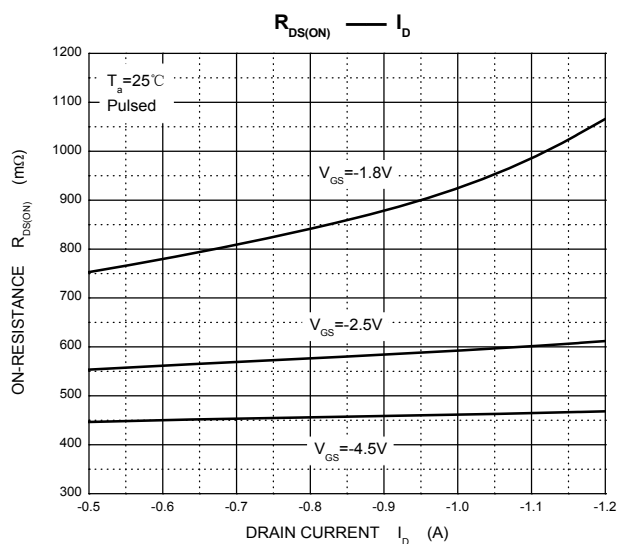
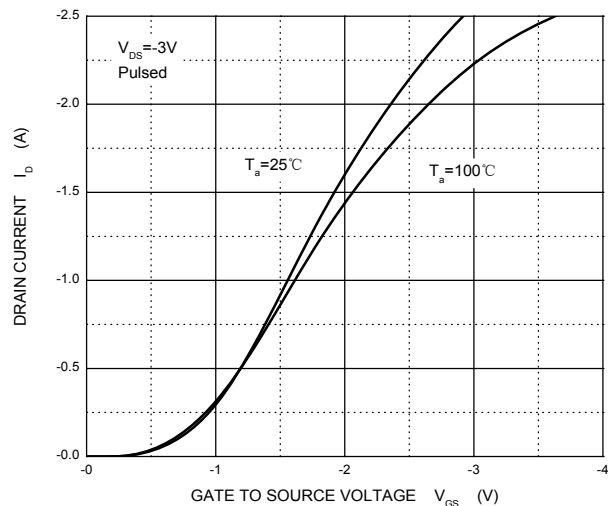


## P-Channel Typical Characteristics

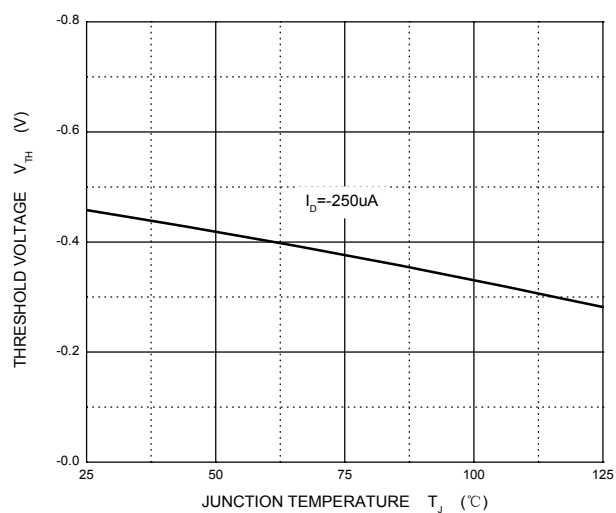
Output Characteristics



Transfer Characteristics

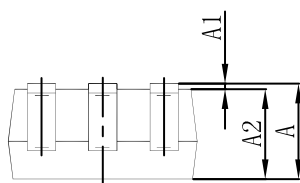
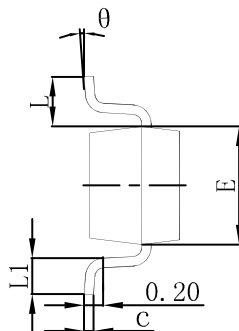
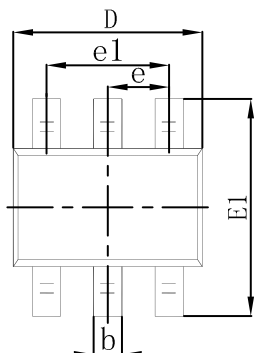


Threshold Voltage



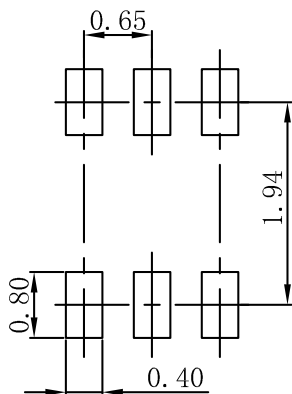


## SOT-363(SC-70-6 ) Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.100	0.150	0.004	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.400	0.085	0.094
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

## SOT-363(SC-70-6) Suggested Pad Layout



### Note:

- 1.Controlling dimension:in millimeters.
- 2.General tolerance:± 0.05mm.
- 3.The pad layout is for reference purposes only.



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