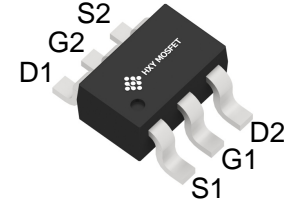




## Description

The DMG1016UDWQ-7 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.



SOT-363

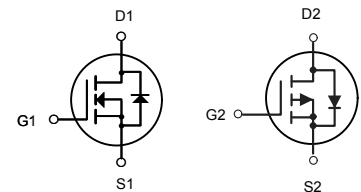
## General Features

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

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

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

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



N-Channel MOSFET

P-Channel MOSFET

## Application

Wireless charging

Boost driver

Brushless motor

## Ordering Information

Product ID	Pack	Brand	Qty(PCS)
DMG1016UDWQ-7	SOT-363	HXY MOSFET	3000

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

Symbol	Parameter	Rating		Units
		N-Channel	P-Channel	
VDS	Drain-Source Voltage	20	-20	V
VGS	Gate-Source Voltage	$\pm 12$	$\pm 12$	V
$I_D@T_A=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	0.75	-0.66	A
IDM	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 ( $T_a=25^\circ\text{C}$  unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 20V, V_{GS} = 0V$			1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 10V, V_{DS} = 0V$			$\pm 20$	$\mu A$
Gate threshold voltage (note 2)	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.35		1.1	V
Drain-source on-resistance(note 2)	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 0.65A$		210	380	$m\Omega$
		$V_{GS} = 2.5V, I_D = 0.55A$		320	450	$m\Omega$
		$V_{GS} = 1.8V, I_D = 0.45A$		390	800	$m\Omega$
Forward tranconductance(note 2)	$g_{FS}$	$V_{DS} = 10V, I_D = 0.8A$		1.6		S
Diode forward voltage	$V_{SD}$	$I_S = 0.15A, V_{GS} = 0V$			1.2	V
<b>Dynamic Characteristics (note 4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 16V, V_{GS} = 0V, f = 1MHz$		79	120	pF
Output Capacitance	$C_{oss}$			13	20	pF
Reverse Transfer Capacitance	$C_{rss}$			9	15	pF
<b>Switching Characteristics (note 3,4)</b>						
Turn-on delay time	$t_{d(on)}$	$V_{GS} = 4.5V, V_{DS} = 10V, I_D = 500mA, R_{GEN} = 10\Omega$		6.7		ns
Turn-on rise time	$t_r$			4.8		ns
Turn-off delay time	$t_{d(off)}$			17.3		ns
Turn-off fall time	$t_f$			7.4		ns

**P-ch MOSFET Electrical Characteristics ( $T_a=25^\circ\text{C}$  unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = -20V, V_{GS} = 0V$			-1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 10V, V_{DS} = 0V$			$\pm 20$	$\mu A$
Gate threshold voltage (note 2)	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.35		-1.1	V
Drain-source on-resistance(note 2)	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -1A$		430	570	$m\Omega$
		$V_{GS} = -2.5V, I_D = -0.8A$		624	700	$m\Omega$
		$V_{GS} = -1.8V, I_D = -0.5A$		950		$m\Omega$
Forward tranconductance(note 2)	$g_{FS}$	$V_{DS} = -10V, I_D = -0.54A$		1.2		S
Diode forward voltage	$V_{SD}$	$I_S = -0.5A, V_{GS} = 0V$			-1.2	V
<b>Dynamic Characteristics (note 4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -16V, V_{GS} = 0V, f = 1MHz$		113	170	pF
Output Capacitance	$C_{oss}$			15	25	pF
Reverse Transfer Capacitance	$C_{rss}$			9	15	pF
<b>Switching Characteristics (note 3, 4)</b>						
Turn-on delay time	$t_{d(on)}$	$V_{GS} = -4.5V, V_{DS} = -10V, I_D = -200mA, R_{GEN} = 10\Omega$		9		ns
Turn-on rise time	$t_r$			5.8		ns
Turn-off delay time	$t_{d(off)}$			32.7		ns
Turn-off fall time	$t_f$			20.3		ns

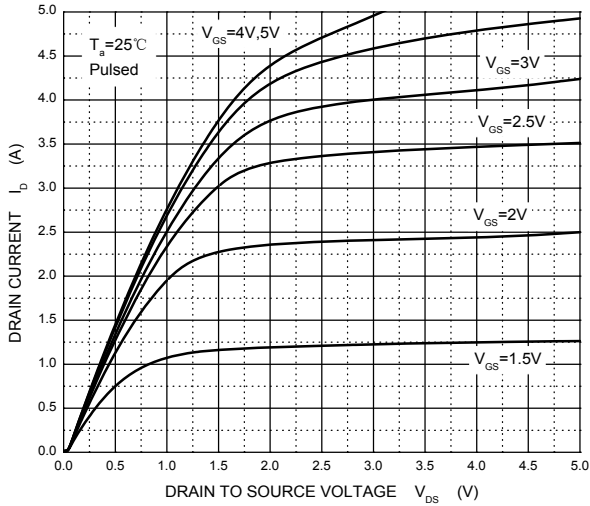
**Notes :**

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

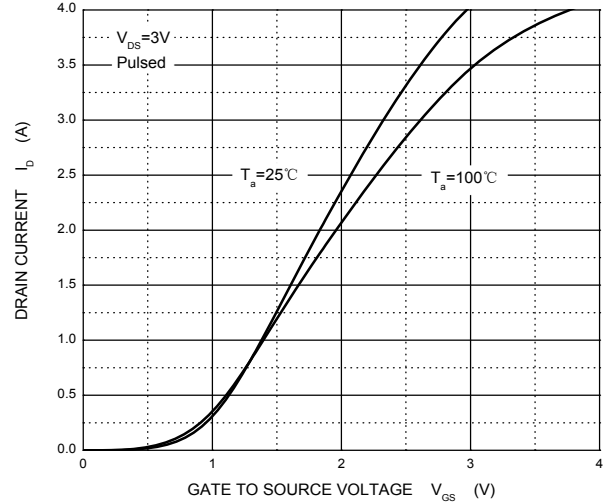


### N-Channel Typical Characteristics

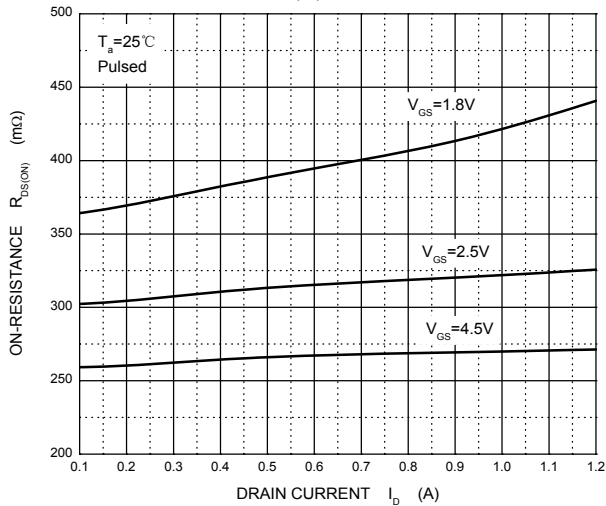
Output Characteristics



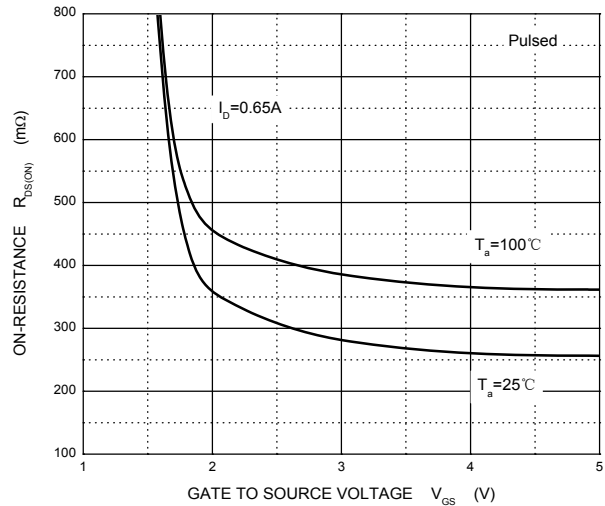
Transfer Characteristics



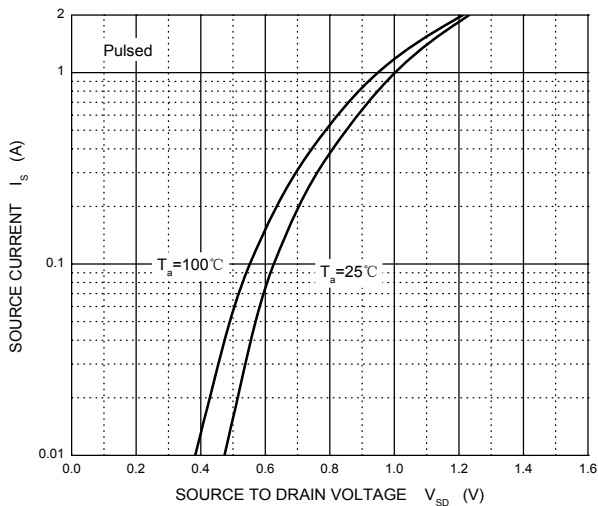
$R_{DS(ON)}$  —  $I_D$



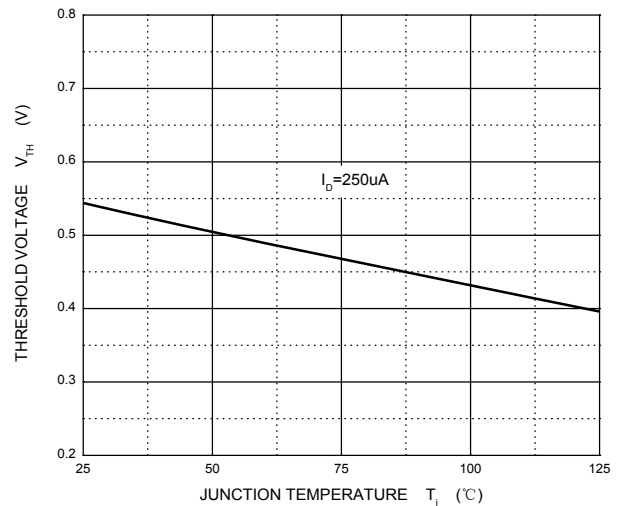
$R_{DS(ON)}$  —  $V_{GS}$



$I_S$  —  $V_{SD}$

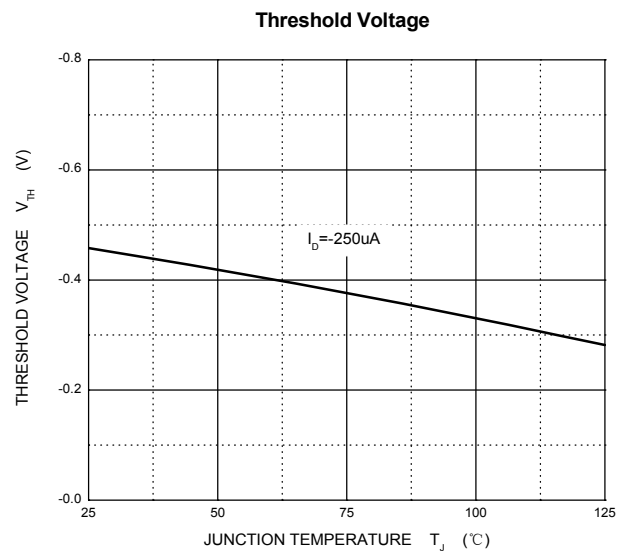
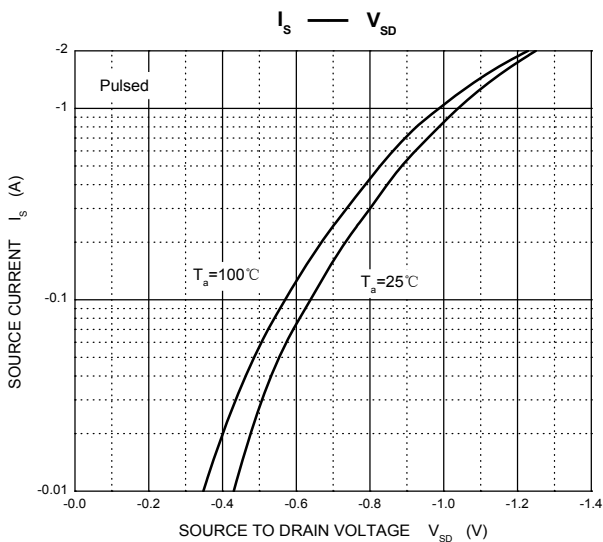
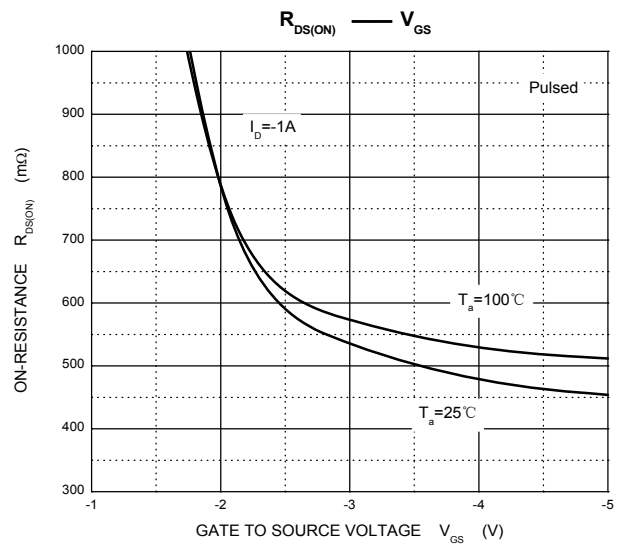
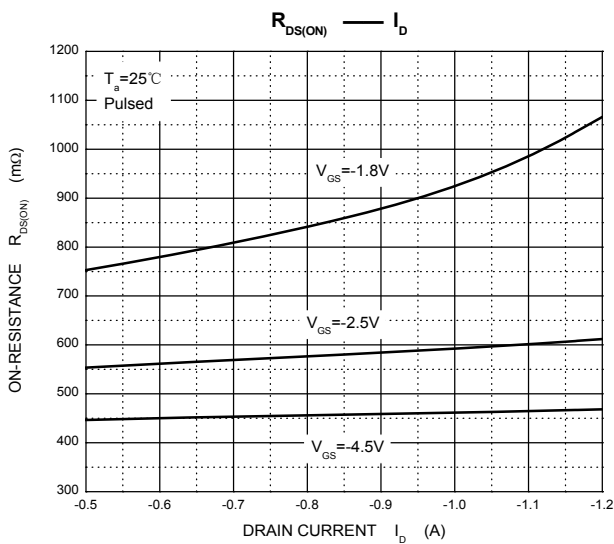
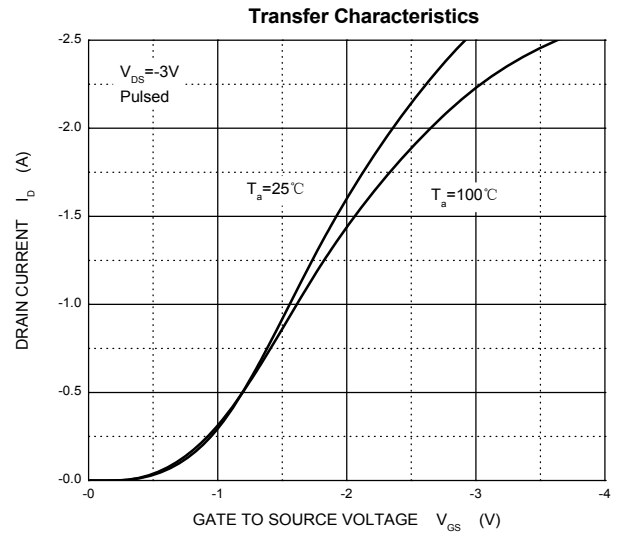
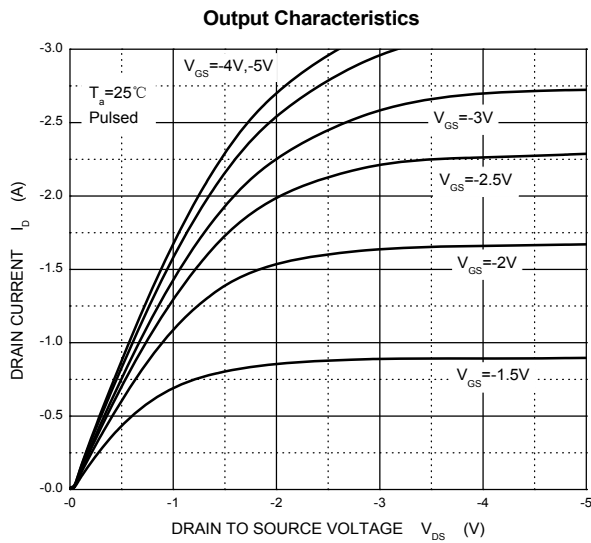


Threshold Voltage



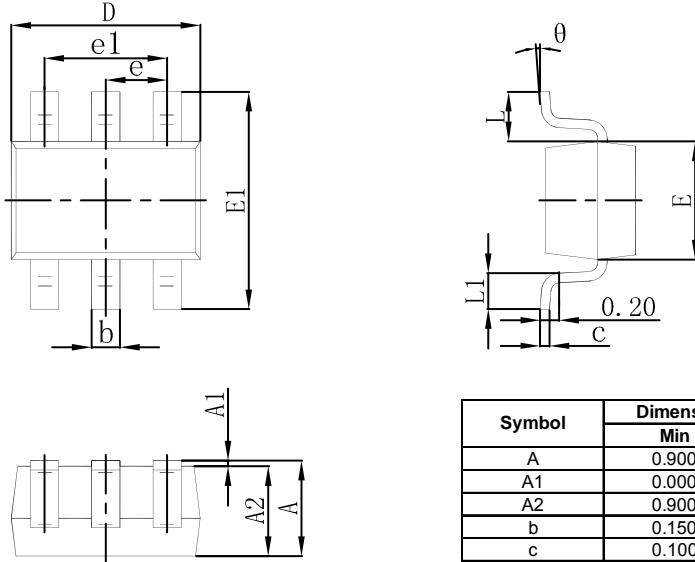


### P-Channel Typical Characteristics



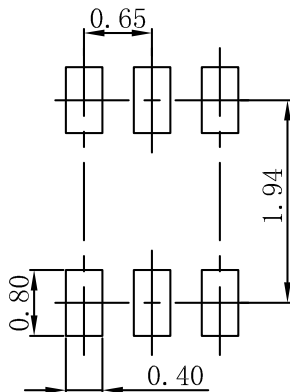


### SOT-363 Package Outline Dimensions



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
theta	0°	8°	0°	8°

### SOT-363 Suggested Pad Layout



**Note:**

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



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