

MOSFET – Power, Single MCPH6, P-Channel

-12 V, -9 A, 16.9 mΩ

MCH6351

Features

- ON-Resistance $R_{DS(on)1} = 14 \text{ m}\Omega$ (typ)
- 1.5 V Drive
- Protection Diode in
- This Device is Pb-Free and Halogen Free and RoHS Compliant

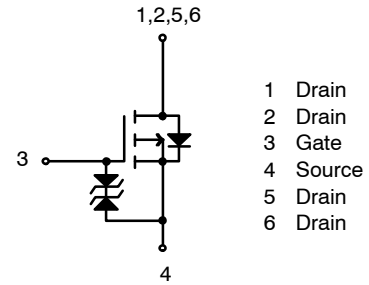
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C) (Note 1)

Parameter	Symbol	Conditions	Value	Unit
Drain-to-Source Voltage	V_{DSS}		-12	V
Gate-to-Source Voltage	V_{GSS}		± 10	V
Drain Current (DC)	I_D		-9	A
Drain Current (Pulse)	I_{DP}	$PW \leq 10 \mu s$, duty cycle $\leq 1\%$	-36	A
Allowable Power Dissipation	P_D	When mounted on ceramic substrate (1500 mm ² x 0.8 mm)	1.5	W
Channel Temperature	T_{ch}		150	°C
Storage Temperature	T_{stg}		-55 to +150	°C

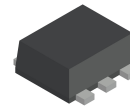
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. $V_{DD} = -10 \text{ V}$, $L = 500 \mu\text{H}$, $I_{AV} = -18 \text{ A}$

V_{DSS}	$R_{DS(ON)} \text{ MAX}$	$I_D \text{ MAX}$
-12 V	16.9 mΩ @ -4.5 V	-9 A
	24 mΩ @ -2.5 V	
	40 mΩ @ -1.8 V	
	74 mΩ @ -1.5 V	

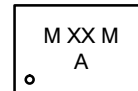


ELECTRICAL CONNECTION P-CHANNEL



SC-88FL / MCPH6
CASE 419AS

MARKING DIAGRAM



- XX = Specific Device Code, NA
- M = Date Code
Left Side = Jan to Jun
Right Side = Jul to Dec
- A = Location Code

ORDERING INFORMATION

Device	Package	Shipping†
MCH6351-TL-W	MCPH6 SC-88, SOT-363 (Pb-Free, Halogen Free)	3000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, [BRD8011/D](#).

MCH6351

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = -1 \text{ mA}, V_{GS} = 0 \text{ V}$	-12	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -12 \text{ V}, V_{GS} = 0 \text{ V}$	-	-	-1	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = \pm 8 \text{ V}, V_{DS} = 0 \text{ V}$	-	-	± 10	μA
Cutoff Voltage	$V_{GS(off)}$	$V_{DS} = -6 \text{ V}, I_D = -1 \text{ mA}$	-0.4	-	-1.3	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS} = -6 \text{ V}, I_D = -4.5 \text{ A}$	-	16.5	-	S
Static Drain to Source On-State Resistance	$R_{DS(on)1}$	$I_D = -4.5 \text{ A}, V_{GS} = -4.5 \text{ V}$	-	14	16.9	$\text{m}\Omega$
	$R_{DS(on)2}$	$I_D = -2.0 \text{ A}, V_{GS} = -2.5 \text{ V}$	-	19	24	$\text{m}\Omega$
	$R_{DS(on)3}$	$I_D = -1.0 \text{ A}, V_{GS} = -1.8 \text{ V}$	-	28	40	$\text{m}\Omega$
	$R_{DS(on)4}$	$I_D = -1.0 \text{ A}, V_{GS} = -1.5 \text{ V}$	-	37	74	$\text{m}\Omega$
Input Capacitance	C_{iss}	$V_{DS} = -6 \text{ V}, f = 1 \text{ MHz}$	-	2200	-	pF
Output Capacitance	C_{oss}		-	350	-	pF
Reverse Transfer Capacitance	C_{rss}		-	320	-	pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit	-	12.3	-	ns
Rise Time	t_r		-	89	-	ns
Turn-OFF Delay Time	$t_d(off)$		-	260	-	ns
Fall Time	t_f		-	122	-	ns
Total Gate Charge	Q_g	$V_{DS} = -6 \text{ V}, V_{GS} = -4.5 \text{ V}, I_D = -9 \text{ A}$	-	20.5	-	nC
Gate to Source Charge	Q_{gs}		-	4.2	-	nC
Gate to Drain "Miller" Charge	Q_{gd}		-	3.2	-	nC
Diode Forward Voltage	V_{SD}	$I_S = -9 \text{ A}, V_{GS} = 0 \text{ V}$	-	-0.83	-1.2	V

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

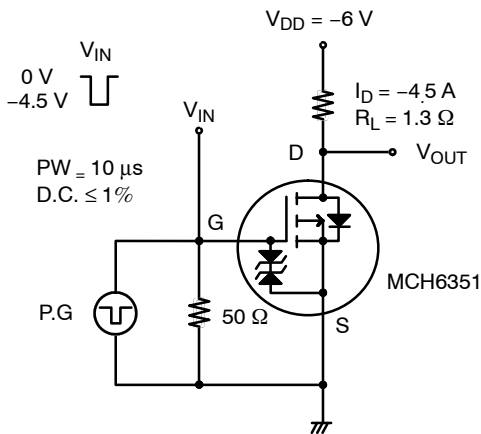


Figure 1. Switching Time Test Circuit

TYPICAL CHARACTERISTICS

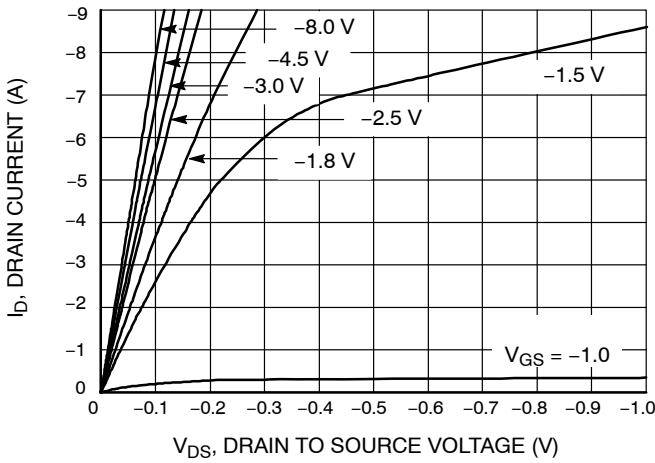


Figure 2. $I_D - V_{DS}$

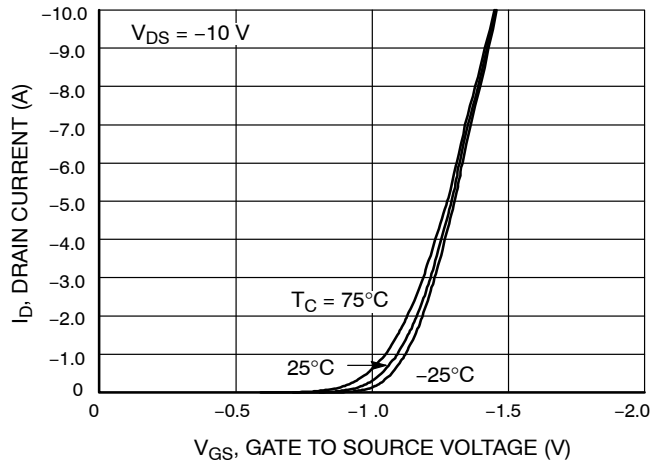


Figure 3. $I_D - V_{GS}$

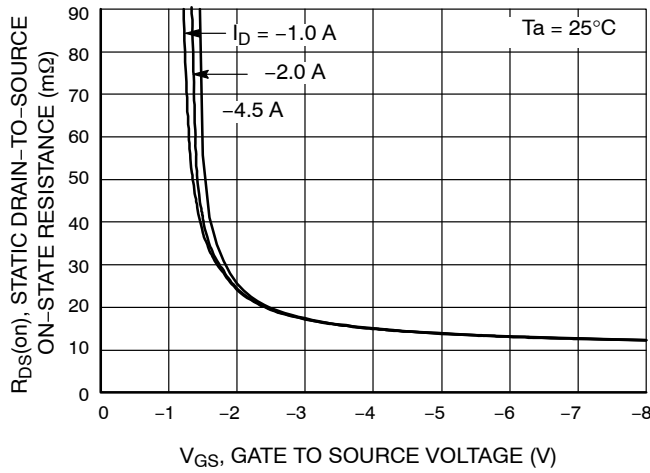


Figure 4. $R_{DS(on)} - V_{GS}$

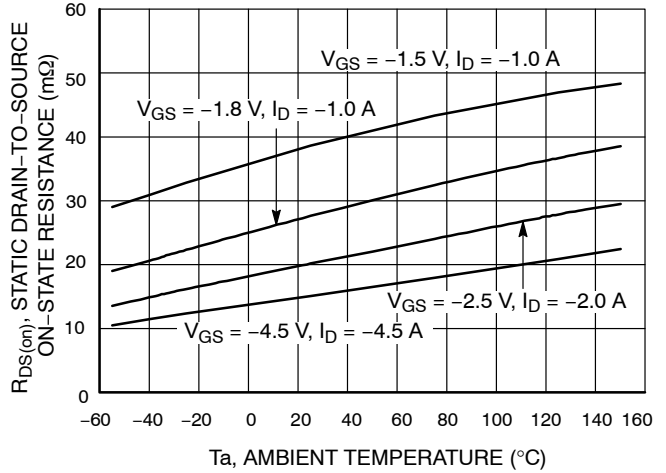


Figure 5. $R_{DS(on)} - T_a$

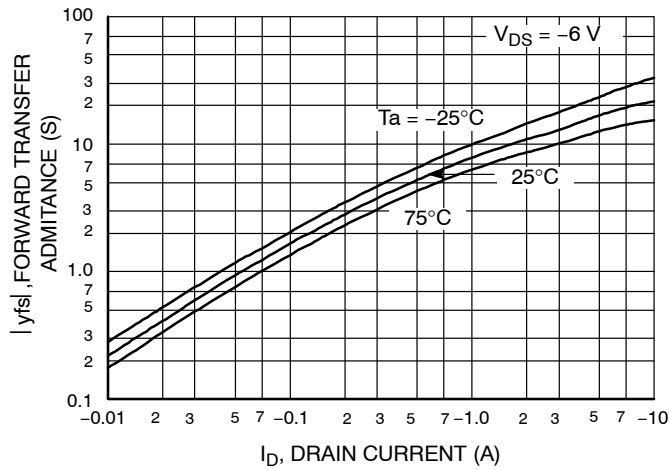


Figure 6. $|y_{fs}| - I_D$

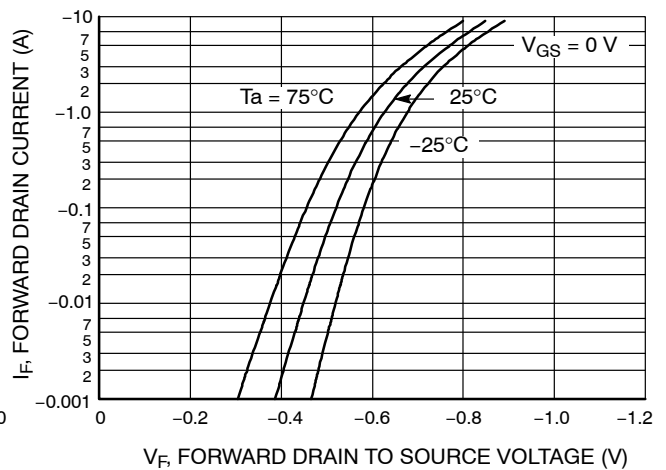


Figure 7. $I_F - V_{SD}$

TYPICAL CHARACTERISTICS (CONTINUED)

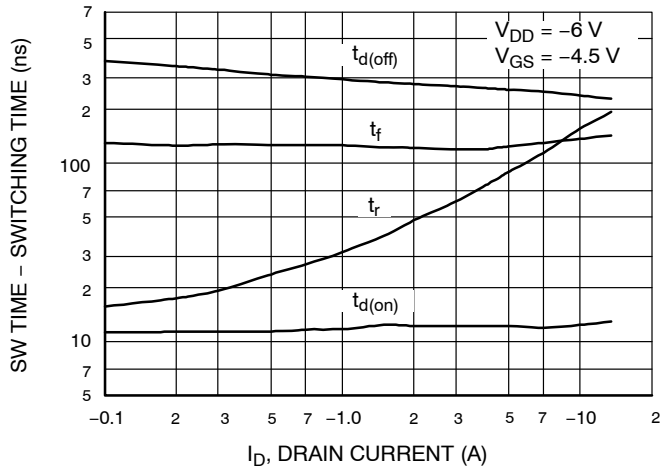


Figure 8. SW Time - I_D

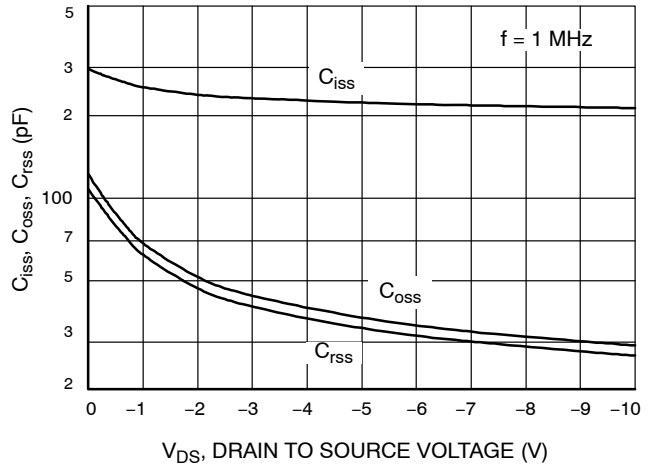


Figure 9. C_{iss} , C_{oss} , C_{rss} - V_{DS}

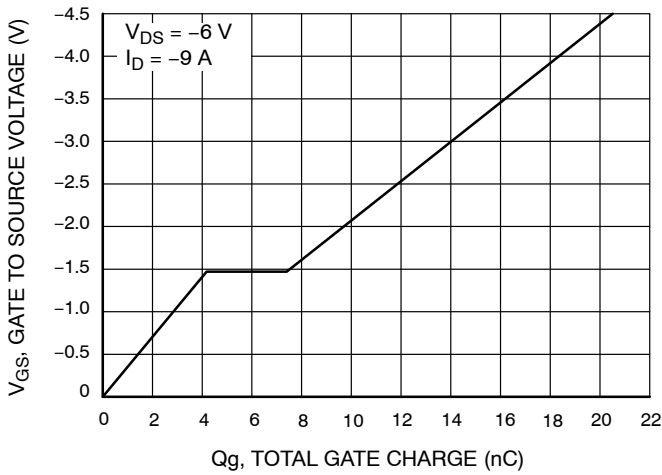


Figure 10. Q_g - V_{GS}

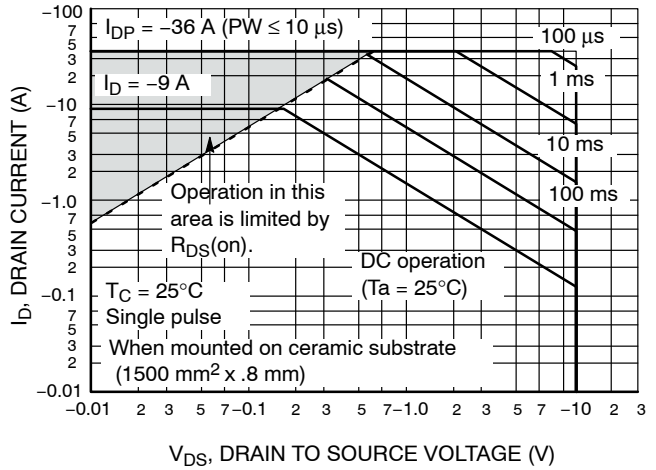


Figure 11. ASO

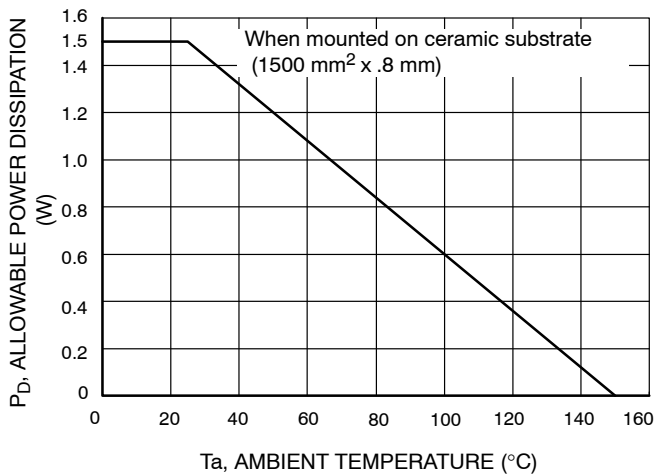
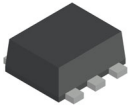


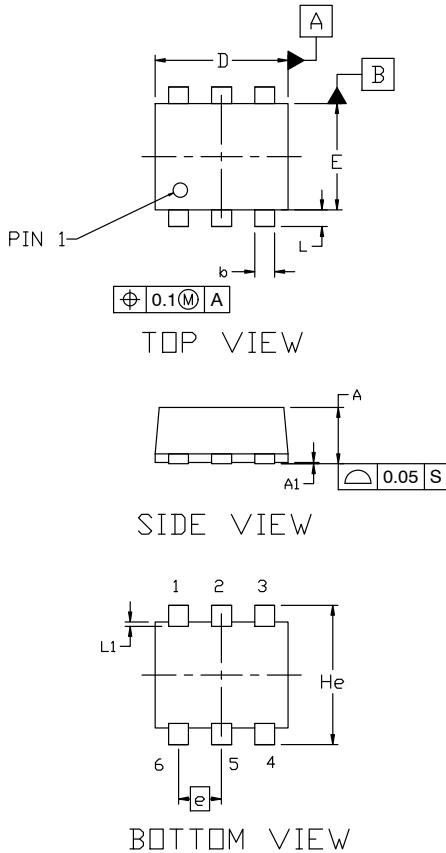
Figure 12. P_D - T_a

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS



SC-88FL / MCPH6
CASE 419AS
ISSUE A

DATE 28 SEP 2022

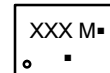


NOTES:

1. NO INDUSTRY STANDARD APPLIES TO THIS PACKAGE.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND THE BAR PROTRUSIONS.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.80	0.85	0.90
A1	0.00	---	0.02
b	0.25	0.30	0.40
c	0.12	0.15	0.25
D	1.94	2.00	2.06
E	1.54	1.60	1.66
He	2.05	2.10	2.15
L	0.19	0.25	0.31
L1	0.00	0.07	0.12
e	0.65 BSC		

GENERIC MARKING DIAGRAM*



- XXX = Specific Device Code
- M = Date Code
- = Pb-Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

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