To all our customers

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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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HAT1059C

Silicon P Channel Power MOS FET
Power Switching

ADE-208-1450A (Z)

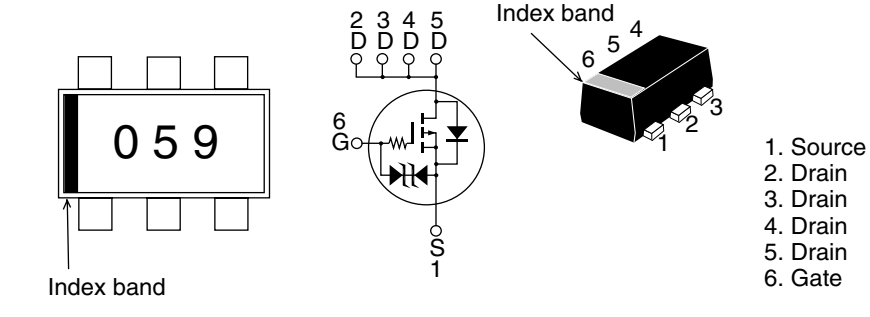
Rev.1
Sep. 2001

Features

- Low on-resistance
  $R_{DS(on)}$ = 52 mΩ typ (at V_{GS} = –4.5 V, I_D = –1.5 A)
  $R_{DS(on)}$ = 71 mΩ typ (at V_{GS} = –2.5 V, I_D = –1.5 A)
  $R_{DS(on)}$ = 98 mΩ typ (at V_{GS} = –1.8 V, I_D = –1.5 A)
- Capable of 1.8 V gate drive
- Small Package: CMFPAK-6

Outline

CMFPAK - 6



1. Source
2. Drain
3. Drain
4. Drain
5. Drain
6. Gate

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	–12	V
Gate to source voltage	V_{GSS}	±8	V
Drain current	I_D	–3	A
Channel dissipation	Pch*	0.65	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

*Value on the FR4. (40 × 40 × 1.6 mm)

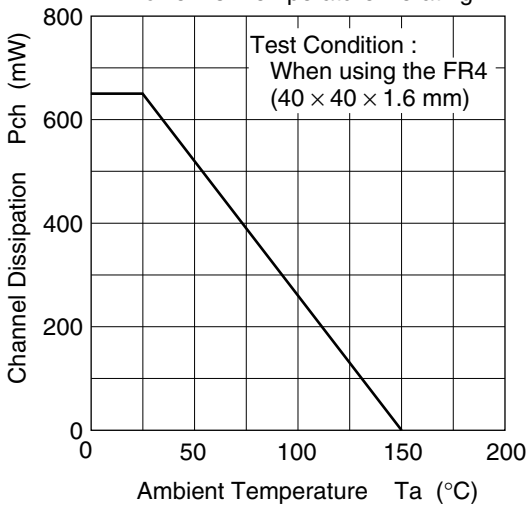
Electrical Characteristics

(Ta = 25°C)

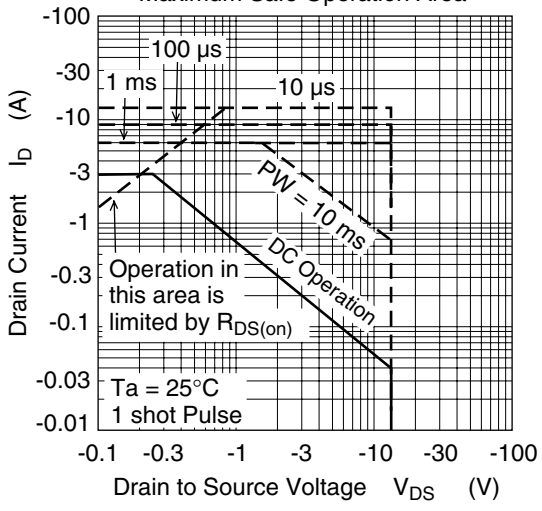
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	–12	—	—	V	I_D = –10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	±8	—	—	V	I_G = ±100 µA, V_{DS} = 0
Gate to source leak current	I_{GSS}	—	—	± 10	µA	V_{GS} = ±6.4 V, V_{DS} = 0
Zero gate voltege drain current	I_{DSS}	—	—	–1	µA	V_{DS} = –12 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	–0.2	—	–1.0	V	I_D = –1 mA, V_{DS} = –10 V
Static drain to source on state resistance	$R_{DS(on)}$	—	52	64	mΩ	I_D = –1.5 A, V_{GS} = –4.5 V
	$R_{DS(on)}$	—	71	88	mΩ	I_D = –1.5 A, V_{GS} = –2.5 V
	$R_{DS(on)}$	—	98	126	mΩ	I_D = –1.5 A, V_{GS} = –1.8 V
Forward transfer admittance	$\|y_{fs}\|$	4	5	—	S	I_D = –1.5 A, V_{DS} = –10 V
Input capacitance	Ciss	—	1080	—	pF	V_{DS} = –10 V
Output capacitance	Coss	—	215	—	pF	V_{GS} = 0
Reverse transfer capacitance	Crss	—	150	—	pF	f = 1 MHz
Total gate charge	Qg	—	13	—	nC	V_{DS} = –10 V
Gate to source charge	Qgs	—	2.2	—	nC	V_{GS} = –4.5 V
Gate to drain charge	Qdg	—	3.8	—	nC	I_D = –3 A
Turn-on delay time	$t_{d(on)}$	—	35	—	ns	V_{GS} = –4 V, I_D = –1.5 A
Rise time	t_r	—	170	—	ns	R_L = 6.66 Ω
Turn-off delay time	$t_{d(off)}$	—	690	—	ns	
Fall time	t_f	—	460	—	ns	
Body–drain diode forward voltage	V_{SDF}	—	–0.85	–1.20	V	I_F = –3.0 A, V_{GS} = 0

Main Characteristics

Power vs. Temperature Derating

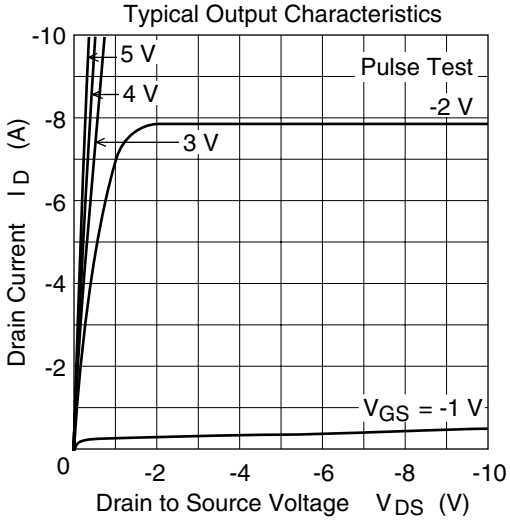


Maximum Safe Operation Area

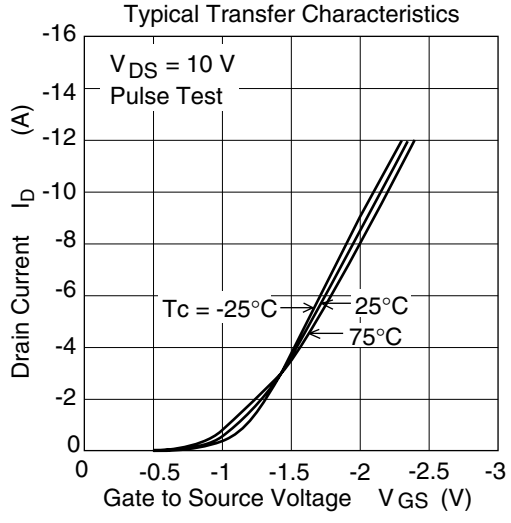


*When using the FR4 (40 × 40 × 1.6 mm)

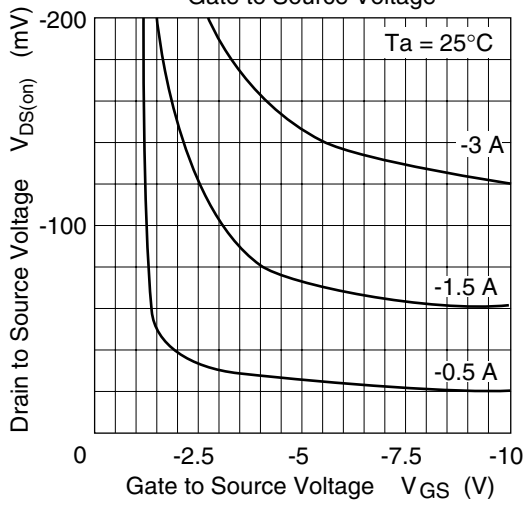
Typical Output Characteristics



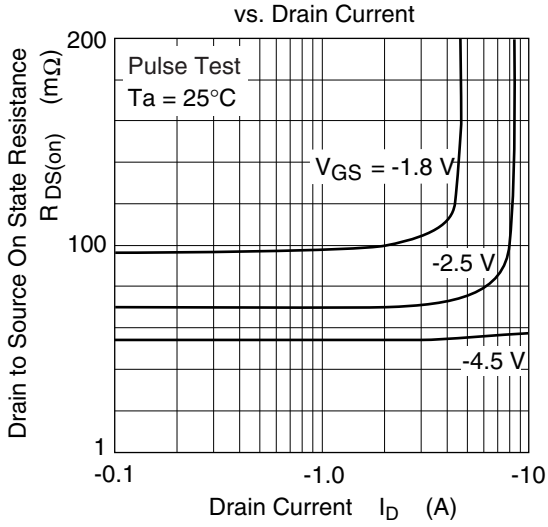
Typical Transfer Characteristics



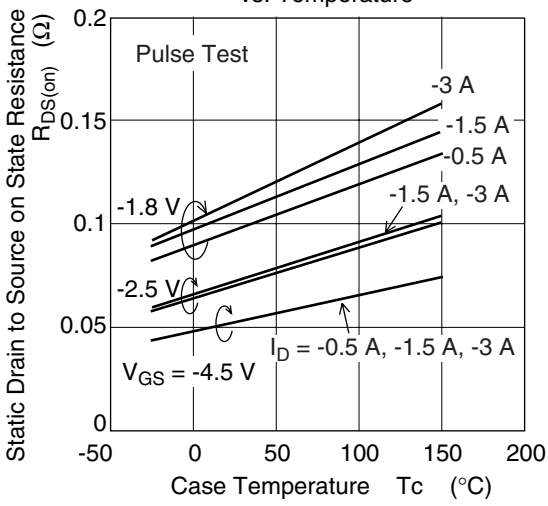
Drain to Source Saturation Voltage vs. Gate to Source Voltage



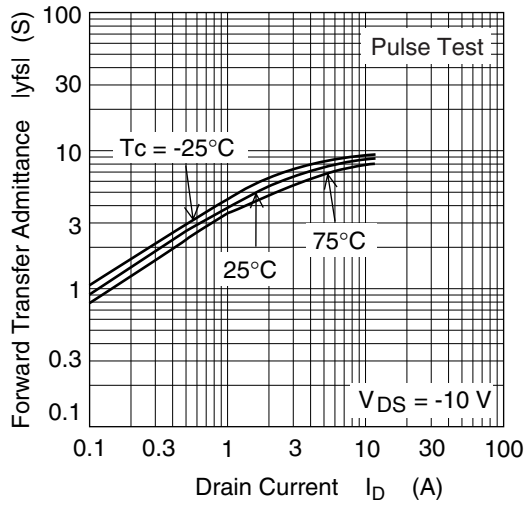
Static Drain to Source on State Resistance vs. Drain Current



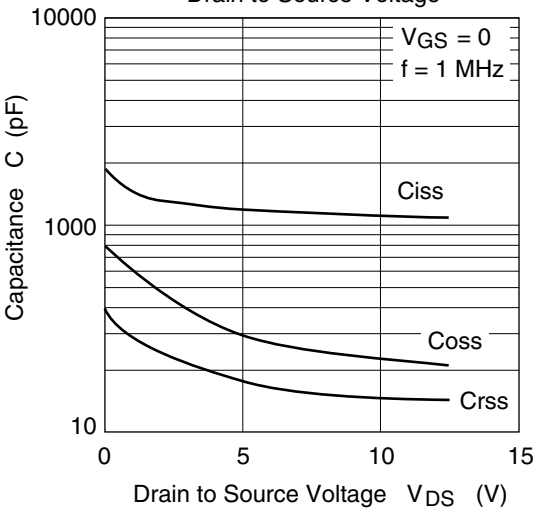
Static Drain to Source on State Resistance vs. Temperature



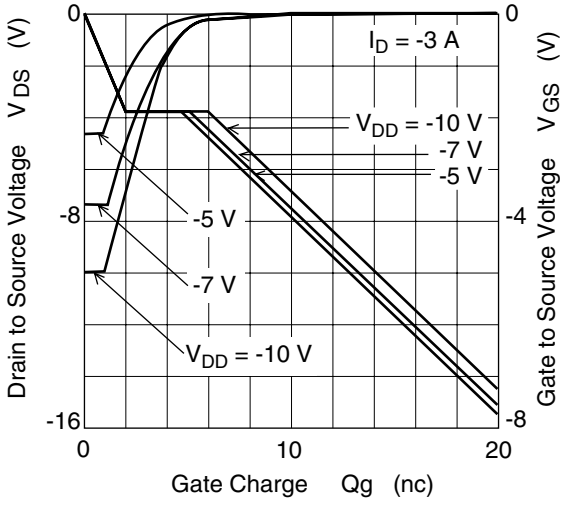
Forward Transfer Admittance vs. Drain Current



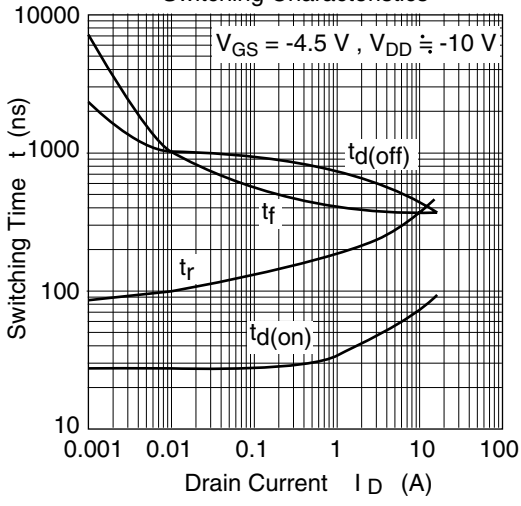
Typical Capacitance vs. Drain to Source Voltage



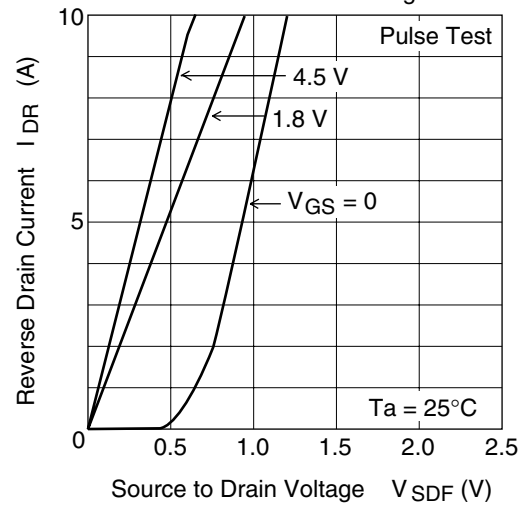
Dynamic Input Characteristics



Switching Characteristics

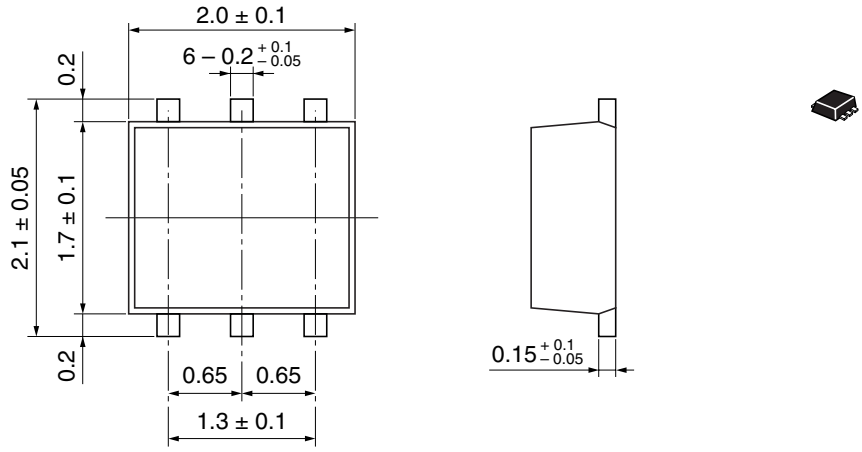


Reverse Drain Current vs. Souece to Drain Voltage



Package Dimensions

Unit: mm



Hitachi Code	CMFPAK-6
JEDEC	—
JEITA	Conforms
Mass (reference value)	1.2 mg

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