瑞信半導體有限公司
MegaPower Semiconductor

MF5853

P-Channel 20V (D-S)MOSFET With Schottky Diode

General Description

These miniature surface mount MOSFET uses advance Trench process,low $R_{DS(ON)}$ assures minimal power loss and converts energy.Making this device idea for use in power management circuit.

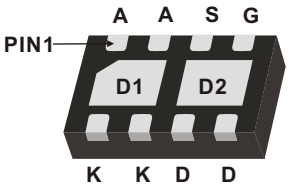
Applications

- Li–Ion Battery Charging
- High Side DC–DC Conversion Circuits
- High Side Drive for Small Brushless DC Motors
- Power Management in Portable,Battery Powered Products

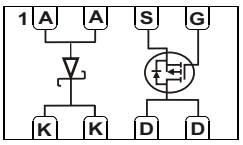
Features

MOSFET
- V_{DS} (V) = –20V
- I_D(A) = –3.0A (V_{GS} = –4.5V)
- $R_{DS(on)}$ = 0.110 ohm @ V_{GS} = –4.5V
- $R_{DS(on)}$ = 0.120 ohm@ V_{GS} = –2.5V

Schottky Diode
- V_{KA} (V) = 20V
- I_F(A) = 1.0A
- V_F = 0.42 V@ 0.5A



MDFN 2×3×0.75(mm) SlimFET™



Schottky Diode P-channel Mosfet

ABSOLUTE MAXIMUM RATINGS (TA = 25°C UNLESS OTHERWISE NOTED)

Parameter		Steady State	Unit
Drain-Source Voltage (MOSFET and Schottky)		–20	V
Reverse Voltage (Schottky)		20	
Gate–Source Voltage (MOSFET)		±8	
Continuous Drain Current(TJ=150C)(MOSFET)[a]	TA=25°C	–3.0	A
	TA=70°C	–2.4	
Pulsed Drain Current (MOSFET)		–12	
Continuous Source Current (MOSFET Diode Conduction)[a]		–1.25	
Average Foward Current (Schottky)[a]		1.0	
Pulsed Foward Current (Schottky)[a]		7.0	
Maximum Power Dissipation (MOSFET)[a]	TA=25°C	1.4	W
	TA=70°C	1.0	
Maximum Power Dissipation (Schottky)[a]	TA=25°C	0.96	
	TA=85°C	0.59	
Operating Junction and Storage Temperature Range		–55 to 150	°C
Soldering Recommendations (PeakTemperature)[b,c]		260	

Notes

a.Surface Mounted on 1"x1" FR4 Board.

b.See Reliability Manual for profile. The SlimFET is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.

c.Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.

Package Outlines and Ordering Information

Device Marking	Device	Reel Size	Tape Width	Quantity
MF5 • 853	MF5853	7''	8mm	3000 units

THERMAL RESISTANCE RATINGS

Parameter		Device	Symbol	Typical	Maximum	Unit
Junction-to-Ambient [a]	T ≤ 5 sec	MOSFET	R_{thJA}		100	C/W
		Schottky		77	95	
	Steady State	MOSFET			166	
		Schottky		110	130	
Junction-to-Foot	Steady State	MOSFET	R_{thJF}		40	
		Schottky		33	40	

Notes
a. Surface Mounted on 1"x 1" FR4 Board.

MOSFET SPECIFICATIONS (TJ=25°C UNLESS OTHERWISE NOTED)

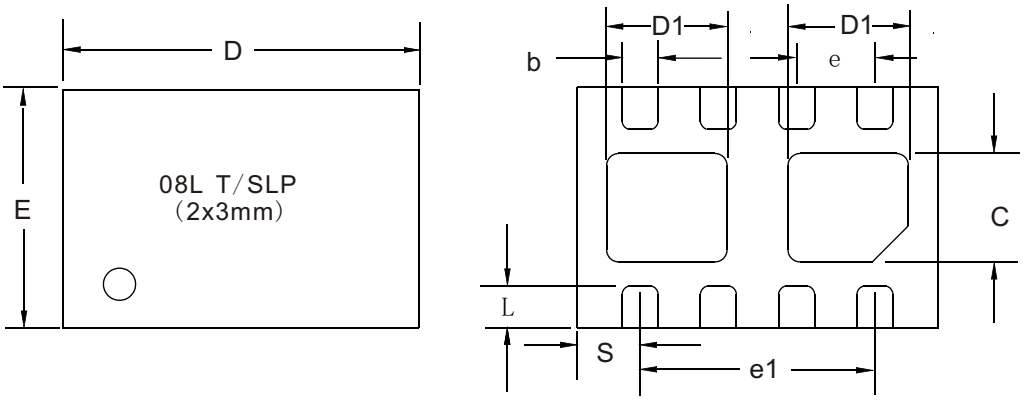
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain–Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=–250uA	–20			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = –250μA	–0.45	–0.72	–1.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 8V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = –20 V, V_{GS} = 0 V			–1. 0	uA
		V_{DS} = –20 V, V_{GS} = 0 V, T_J = 55°C			–10	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = – 5 V, V_{GS} = –4.5 V	–12			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = –4.5 V, I_D = –3.0A	82	96	110	mΩ
		V_{GS} = –2.5 V, I_D = –2.4 A	88	102	120	
Forward Transconductance[a]	G_{FS}	V_{DS} = –5 V, I_D = –2.8 A		3		S
Diode Forward Voltage[a]	V_{SD}	I_S = –1.0 A, V_{GS} = 0 V			–1. 0	V
Dynamic [b]						
Total Gate Charge	Q_g	V_{DS} = –10 V, V_{GS} = –4.5 V, I_D= –3.0 A		6.0		nC
Gate-Source Charge	Q_{gs}			0.8		
Gate-Drain Charge	Q_{gd}			1.3		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = –10 V, R_G= 6 ohm I_D = – 1 A, V_{GEN} = – 4.5 V		6.5	25	ns
Rise Time	t_r			20	60	
Turn-Off Delay Time	$t_{d(off)}$			31	70	
Fall Time	t_f			21	60	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = –0.9 A, di/dt = 100 A/ s		20	40	

Notes
a.Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2%.
b.Guaranteed by design, not subject to production testing.

SCHOTTKY SPECIFICATIONS (TJ=25°C UNLESS OTHERWISE NOTED)

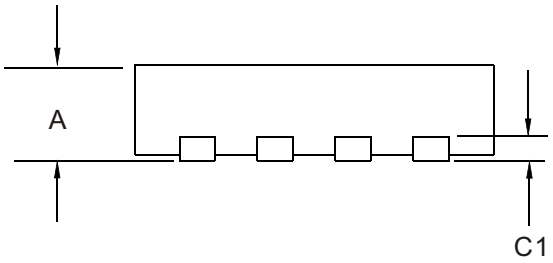
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Forward Voltage Drop	V_F	I_F = 0.1 A			350	mV
		I_F = 0.5 A			420	
	V_{BR}	I_r = 0.25mA	20	25		V
Maximum Reverse Leakage Current	I_R	V_r = 10 V		8	75	uA
		V_r= 20 V		40	250	
Junction Capacitance	C_T	V_r = 10 V		31		pF

MDFN 2x3x0. 75(mm) Package



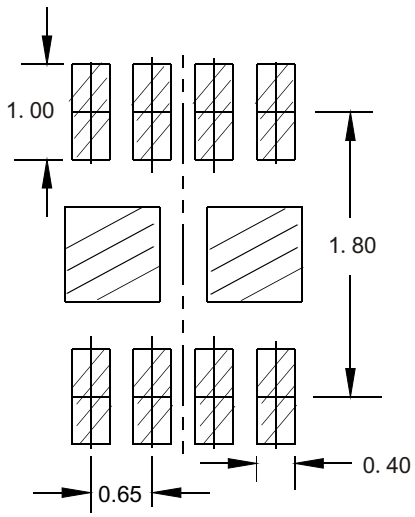
TOP VIEW

BOTTOM VIEW



SIDE VIEW

RECOMMENDED LAND PATTERN



UNIT:mm

Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	1.00	—	1.10	0.039	—	0.043
b	0.25	0.30	0.35	0.010	0.012	0.014
C	0.85	0.90	0.95	0.034	0.036	0.038
C1	0.203 Ref			0.008 Ref		
D	2.95	3.05	3.10	0.116	0.120	0.122
D1	0.95	1.00	1.05	0.038	0.039	0.041
E	1.83	1.90	1.975	0.072	0.075	0.078
e	0.65 BSC			0.026 BSC		
e1	1.95 Ref			0.077 Ref		
L	0.28	—	0.42	0.011	—	0.017
S	0.55 BSC			0.022 BSC		