Ordering number : ENA1262

SANYO Semiconductors

DATA SHEET

N-Channel Silicon MOSFET

EFC4601R — General-Purpose Switching Device Applications

Features

- 2.5V drive.
- Best suited for LiB charging and discharging switch.
- Common-drain type.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Source-to-Source Voltage	V_{SSS}		24	V
Gate-to-Source Voltage	V_{GSS}		±12	V
Source Current (DC)	I_S		6	A
Source Current (Pulse)	I_{SP}	PW≤10μs, duty cycle≤1%	60	A
Total Dissipation	P_T	When mounted on ceramic substrate (5000mm²×0.8mm)	1.6	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C

Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions		Ratings min	Ratings typ	Ratings max	Unit
Source-to-Source Breakdown Voltage	$V_{(BR)SSS}$	I_S=1mA, V_{GS}=0V	Test Circuit 1	24			V
Zero-Gate Voltage Source Current	I_{SSS}	V_{SS}=20V, V_{GS}=0V	Test Circuit 1			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{SS}=0V	Test Circuit 2			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{SS}=10V, I_S=1mA	Test Circuit 3	0.5		1.3	V
Forward Transfer Admittance	|yfs|	V_{SS}=10V, I_S=3A	Test Circuit 4	3.7	6.2		S
Static Source-to-Source On-State Resistance	R_{SS}(on)1	I_S=3A, V_{GS}=4.5V	Test Circuit 5	23.5	34	44	mΩ
	R_{SS}(on)2	I_S=3A, V_{GS}=4.0V	Test Circuit 5	25	36	47	mΩ
	R_{SS}(on)3	I_S=3A, V_{GS}=3.7V	Test Circuit 5	27	38	49	mΩ
	R_{SS}(on)4	I_S=3A, V_{GS}=3.1V	Test Circuit 5	27	42	55	mΩ
	R_{SS}(on)5	I_S=3A, V_{GS}=2.5V	Test Circuit 5	30	50	70	mΩ

Marking : FC

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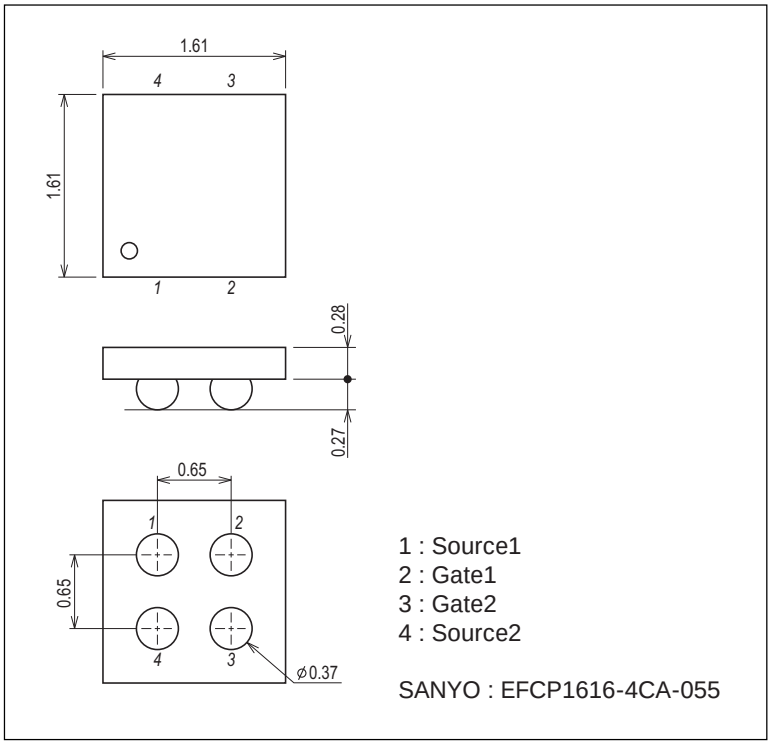
Parameter	Symbol	Conditions		Ratings min	Ratings typ	Ratings max	Unit
Input Capacitance	Ciss	V_{SS}=10V, f=1MHz	Test Circuit 8		680		pF
Output Capacitance	Coss	V_{SS}=10V, f=1MHz	Test Circuit 8		125		pF
Reverse Transfer Capacitance	Crss	V_{SS}=10V, f=1MHz	Test Circuit 8		42		pF
Turn-ON Delay Time	t_{d}(on)	See specified Test Circuit.	Test Circuit 7		28		ns
Rise Time	t_{r}	See specified Test Circuit.	Test Circuit 7		105		ns
Turn-OFF Delay Time	t_{d}(off)	See specified Test Circuit.	Test Circuit 7		220		ns
Fall Time	t_{f}	See specified Test Circuit.	Test Circuit 7		190		ns
Total Gate Charge	Qg	V_{SS}=10V, V_{GS}=4.5V, I_{S}=6A			9.3		nC
Forward Source-to-Source Voltage	$V_{F(S-S)}$	I_{S}=6A, V_{GS}=0V	Test Circuit 6		1	1.2	V

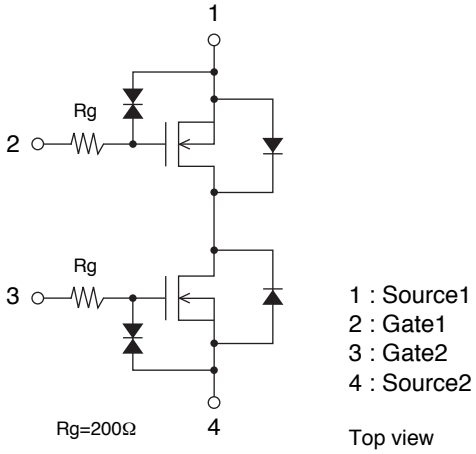
Package Dimensions

unit : mm (typ)

7058-001

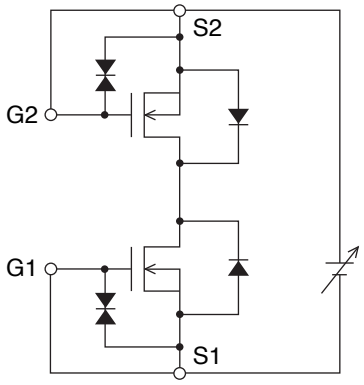


Electrical Connection



Test Circuits are example of measuring FET1 side

Test Circuit 1
V_{SSS} / I_{SSS}



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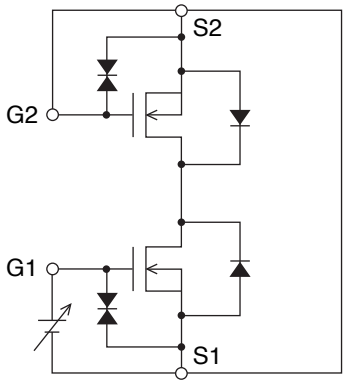
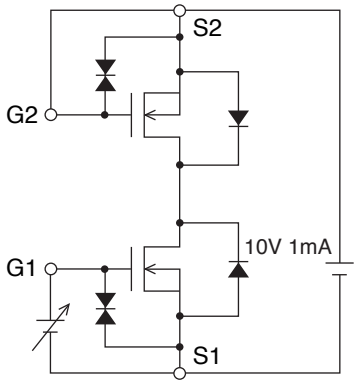
Test Circuit 2
I_{GSS} (+) / (−)



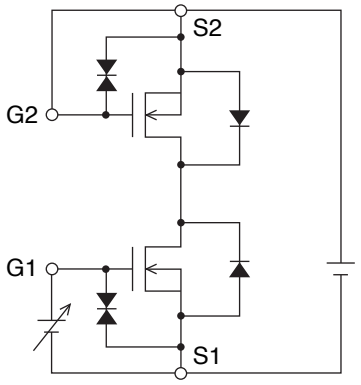
IT11566

Test Circuit 3
V_{GS} (off)



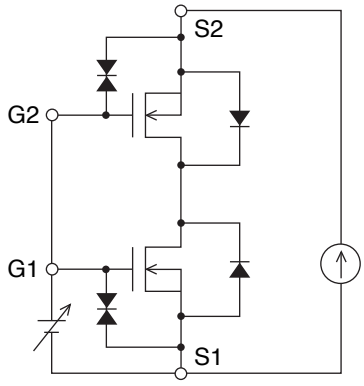
IT11567

Test Circuit 4
|yfs|



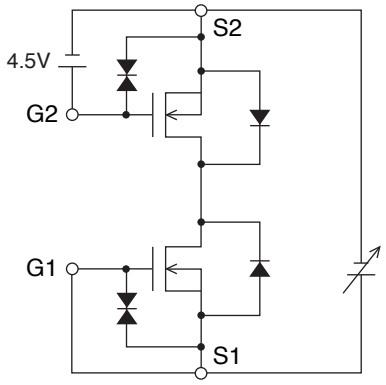
IT11568

Test Circuit 5
R_{SS} (on)



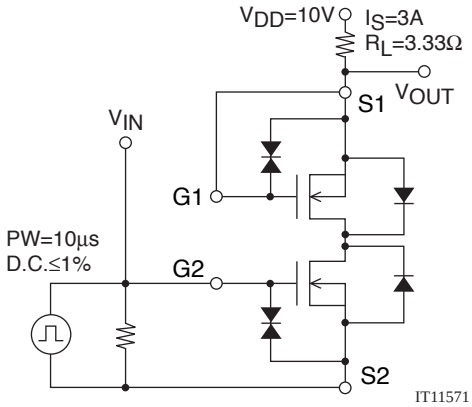
IT11569

Test Circuit 6
V_F (S-S)



IT11570

Test Circuit 7
t_d (on), t_r, t_d (off), t_f

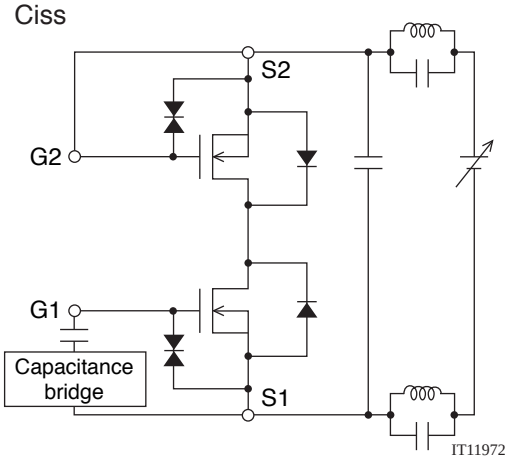


IT11571

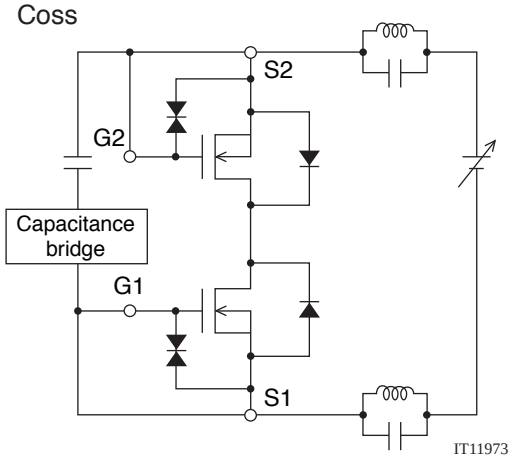
* Note: Connect the mesurement terminal reversely if you want to measure the FET2 side.

Test Circuit 8

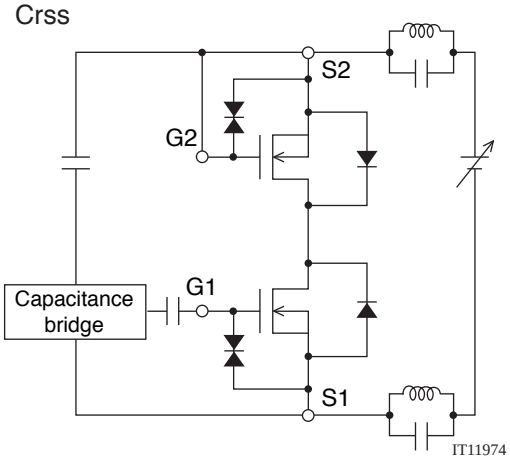
Ciss



Coss

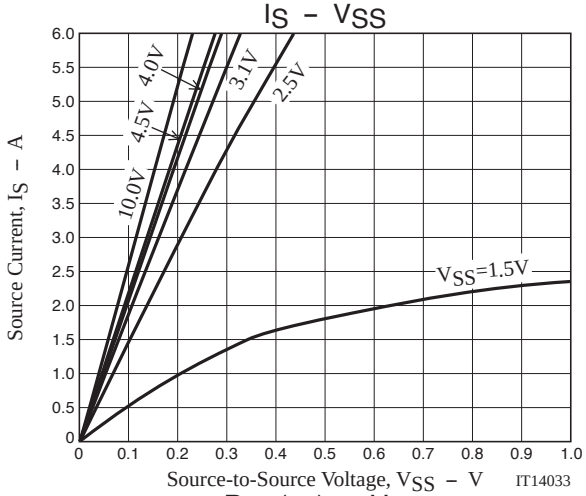


Crss

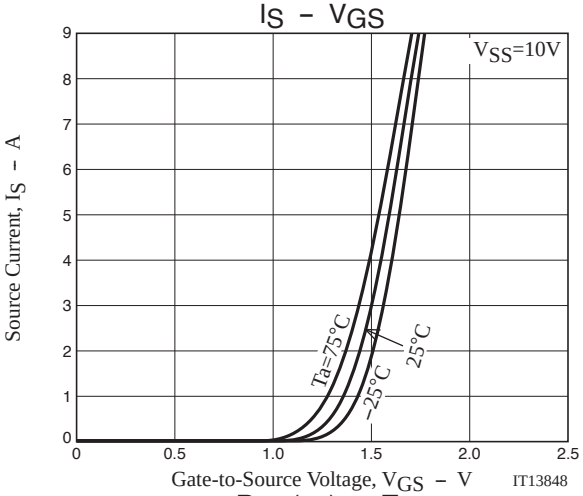


* Note: Connect the mesurement terminal reversely if you want to measure the FET2 side.

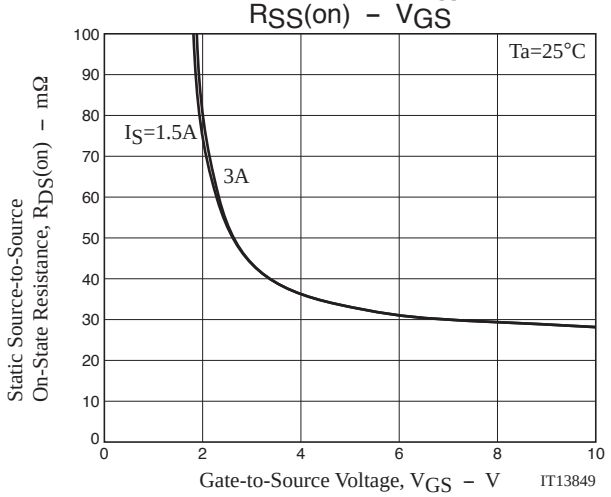
I_S – V_{SS}



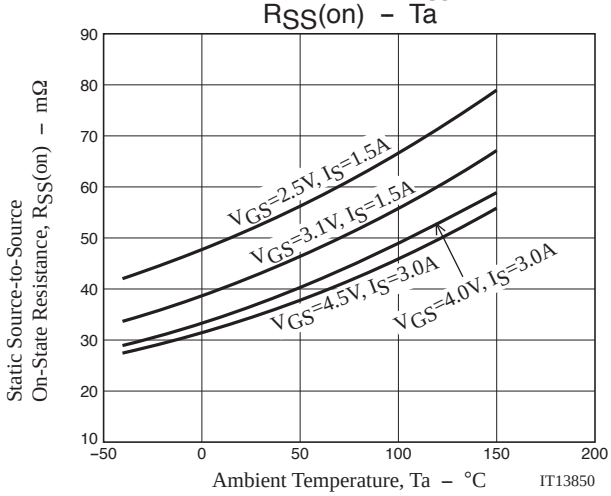
I_S – V_{GS}

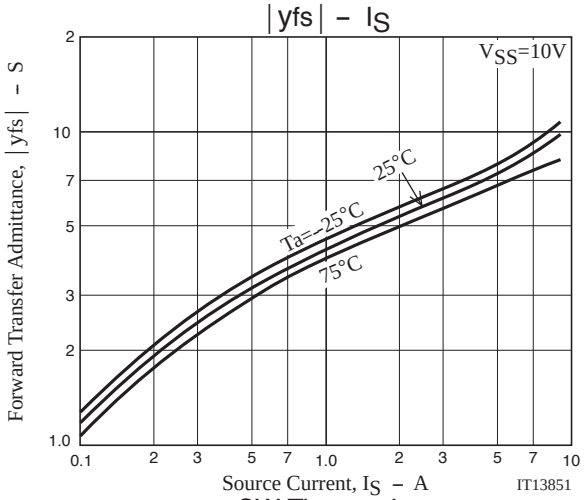


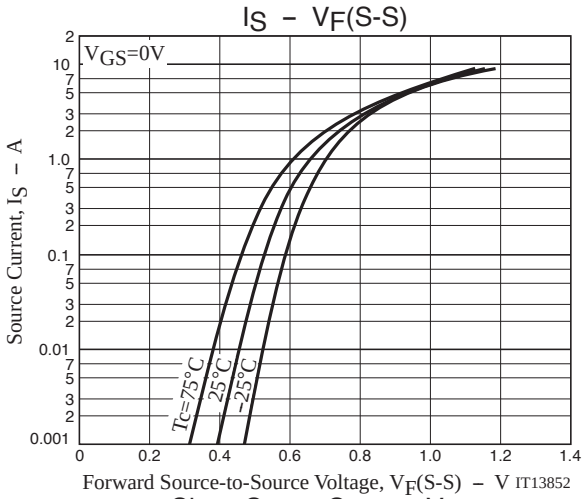
$R_{SS(on)}$ – V_{GS}

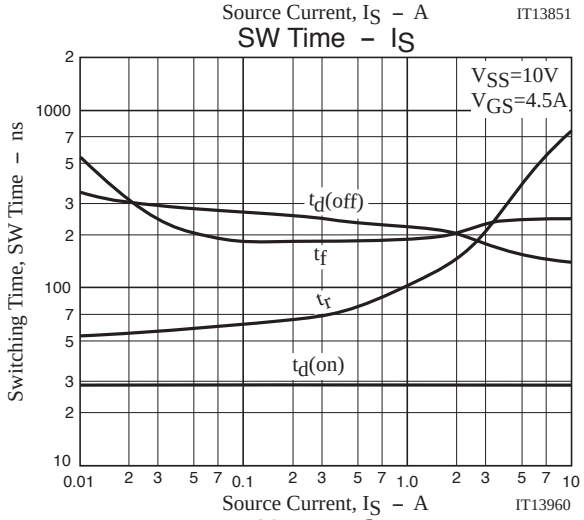


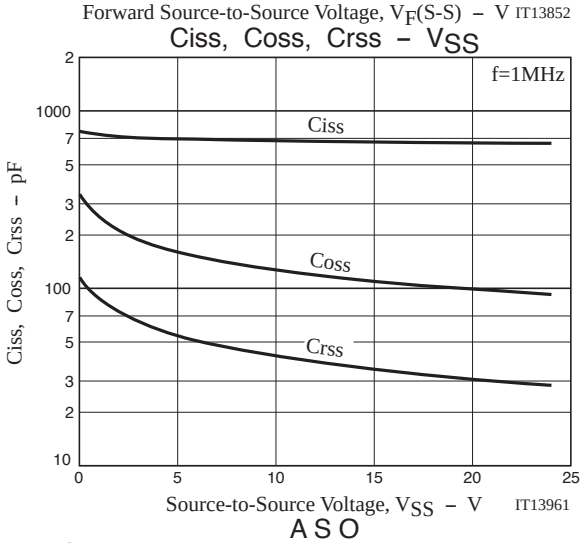
$R_{SS(on)}$ – Ta

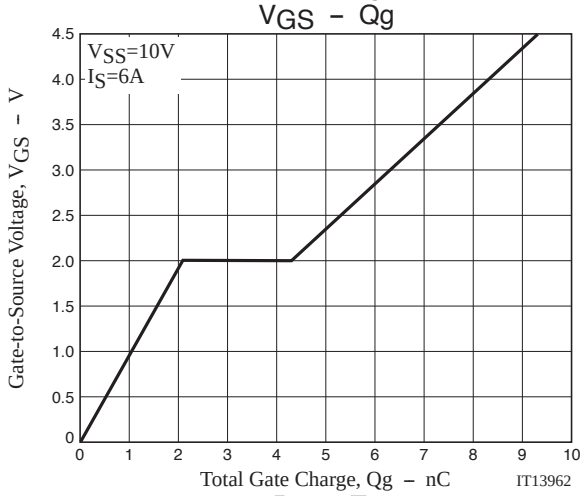


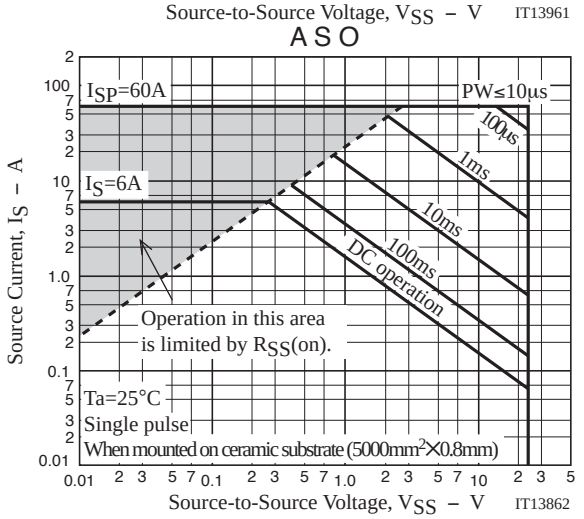

|yfs| – IS
VSS=10V
25°C
Ta=–25°C
75°C
Forward Transfer Admittance, |yfs| – S
Source Current, IS – A
IT13851

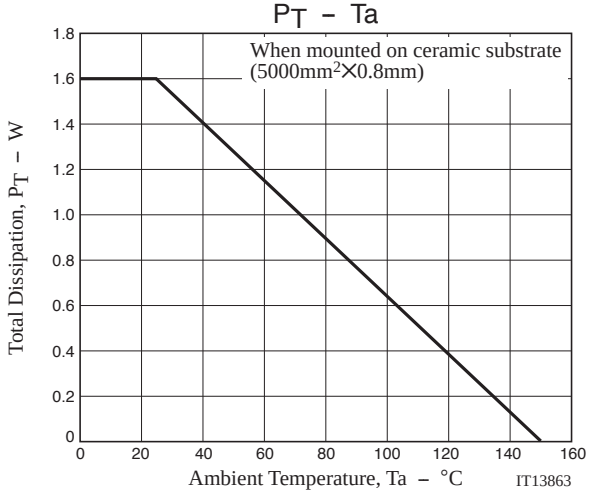

IS – VF(S-S)
VGS=0V
Tc=75°C
25°C
–25°C
Source Current, IS – A
Forward Source-to-Source Voltage, VF(S-S) – V
IT13852


SW Time – IS
VSS=10V
VGS=4.5A
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Source Current, IS – A
IT13960


Ciss, Coss, Crss – VSS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Source-to-Source Voltage, VSS – V
IT13961


VGS – Qg
VSS=10V
IS=6A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT13962


ASO
ISP=60A
PW≤10μs
100μs
1ms
10ms
100ms
DC operation
IS=6A
Operation in this area
is limited by RSS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate (5000mm2×0.8mm)
Source Current, IS – A
Source-to-Source Voltage, VSS – V
IT13862


PT – Ta
When mounted on ceramic substrate
(5000mm2×0.8mm)
Total Dissipation, PT – W
Ambient Temperature, Ta – °C
IT13863

Note on usage : Since the EFC4601R is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

This catalog provides information as of September, 2008. Specifications and information herein are subject to change without notice.