List

FMOS054N03

5.4A 30V N-Channel Enhancement Mode Power MOSFET

Features

- V_{DS}=30V, I_D=5.4A.
- $R_{DS(ON)}$ ≤ 24mΩ @ V_{GS}=10V, I_D=5.8A.
- $R_{DS(ON)}$ ≤ 31mΩ @ V_{GS}=4.5V, I_D=5.0A.
- Simple drive requirement.
- Reliable and rugged.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates hologen-free part, ex:FMOS054N03-H.

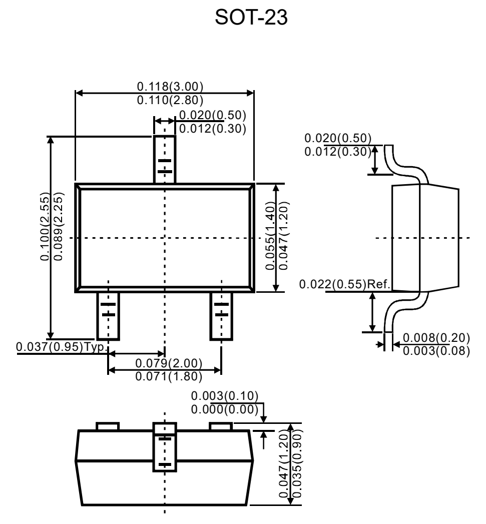
Applications

- Portable equipment.
- Battery powered system.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-23.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.

Package outline



Dimensions in inches and (millimeters)

Maximum ratings (T_J=25°C unless otherwise noted)

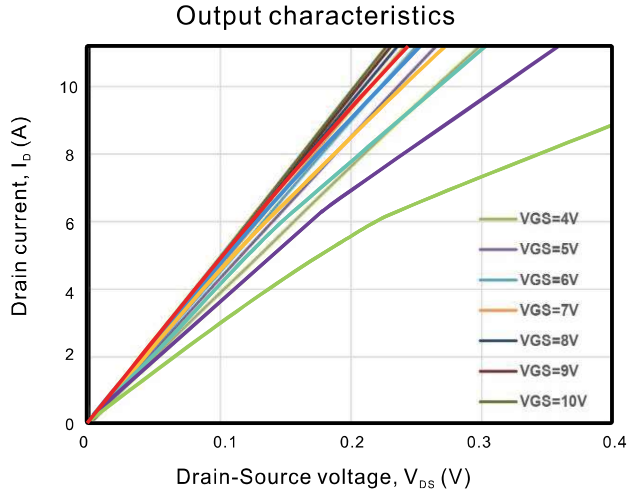
Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	30	V
Gate-source voltage	V_{GS}	±20	V
Continuous drain current (T_A=25°C)	I_D	5.4	A
(T_A=70°C)		4.3	
Pulse drain current tested (Note1) (T_A=25°C)	I_{DM}	11.2	A
Avalanche current, single pulse (Note2) (L=0.1mH)	I_{AS}	11	A
Avalanche energy, single pulse (Note2) (L=0.1mH)	E_{AS}	6	mJ
Power dissipation (T_A=25°C)	P_D	1.1	W
(T_A=70°C)		0.7	
Thermal resistance, junction to ambient (Note3) (steady state)	$R_{\theta JA}$	110	°C/W
Operating Junction temperature	T_J	+150	°C
Storage temperature range	T_{STG}	-55 to +150	°C

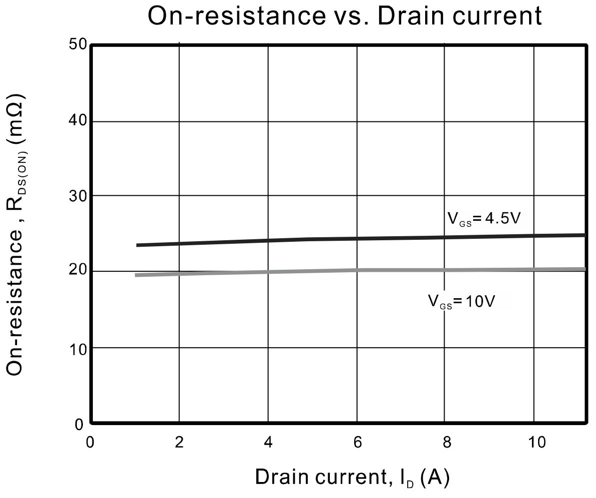
Electrical characteristics (At T_j=25°C unless otherwise specified)

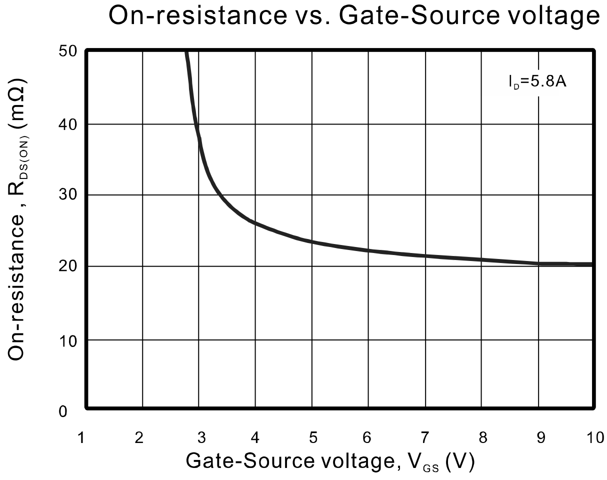
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	30			V
Drain-source leakage current	I_{DSS}	V_{DS}=24V, V_{GS}=0V			1	μA
Gate-source leakage current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
On characteristics						
Gate threshold voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1	1.5	2	V
Forward transconductance	g_{FS}	V_{DS}=3V, I_D=3A		8.6		S
Static drain-source on-resistance (Note4)	$R_{DS(ON)}$	V_{GS}=10V, I_D=5.8A		20	24	mΩ
		V_{GS}=4.5V, I_D=5A		24	31	
Dynamic Parameters (Note5)						
Gate resistance	R_G	V_{GS}=0V, V_{DS}=0V, f=1.0MHz		3.3		Ω
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V, f=1.0MHz		500		pF
Output capacitance	C_{oss}			62		
Reverse transfer capacitance	C_{rss}			53		
Switching parameters						
Total gate charge	Q_g	V_{GS}=4.5V, V_{DS}=15V, I_D=10A		8.4		nC
		V_{GS}=10V, V_{DS}=15V, I_D=10A		15		
Gate to source charge	Q_{gs}			1.2		
Gate to Drain charge	Q_{gd}			4.6		
Turn-on delay time	$t_{d(on)}$	V_{DS}=15V, V_{GS}=10V, I_D=1A, R_G=6Ω		3.1		ns
Rise time	t_r			21		
Turn-off delay time	$t_{d(off)}$			25		
Fall time	t_f			18		
Source-drain diode ratings and characteristics						
Drain - source diode forward voltage (Note4)	V_{SD}	I_{SD}=1A, V_{GS}=0V		0.8	1.1	V
Reverse recovery time	t_{rr}	I_F=1A, V_R=15V, dI_F/dt=100A/μs		1.3		ns
Reverse recovery charge	Q_{rr}			4.9		nC

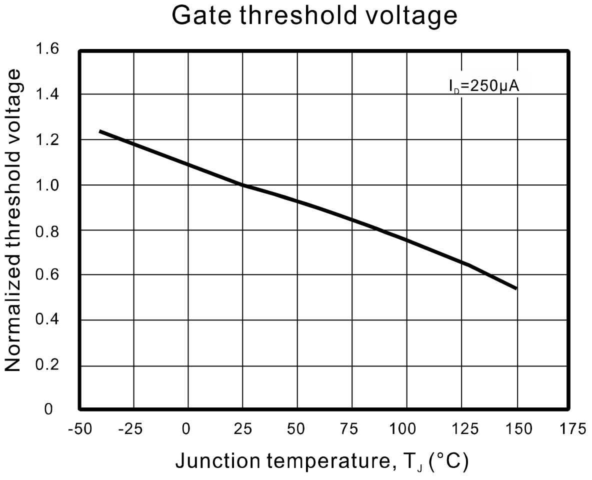
Note: 1. Max. current is limited by bonding wire.
2. UIS tested and pulse width are limited by maximum junction temperature 150°C.
3. Surface mounted on 1in^2 FR-4 board with 1oz.
4. Pulse test (pulse width ≤ 300μs, duty cycle ≤ 2%).
5. Guaranteed by design, not subject to production testing.

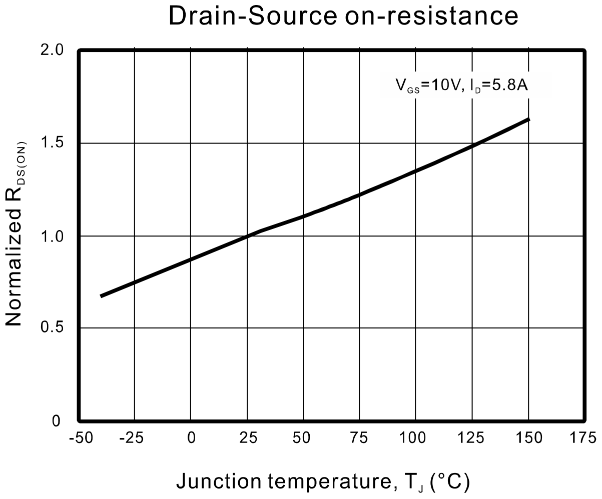
Rating and characteristic curves

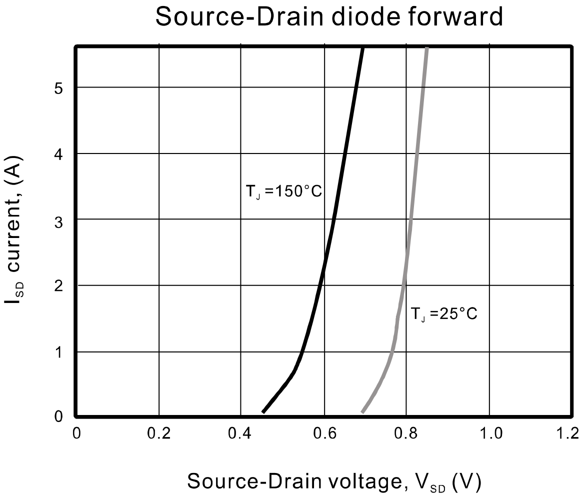

Output characteristics


On-resistance vs. Drain current


On-resistance vs. Gate-Source voltage

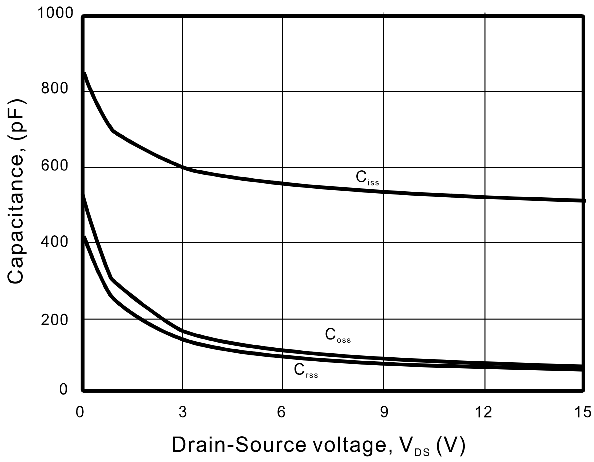

Gate threshold voltage


Drain-Source on-resistance

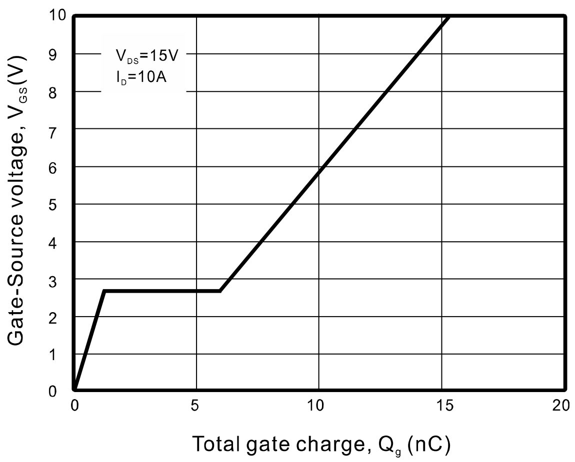

Source-Drain diode forward

Rating and characteristic curves

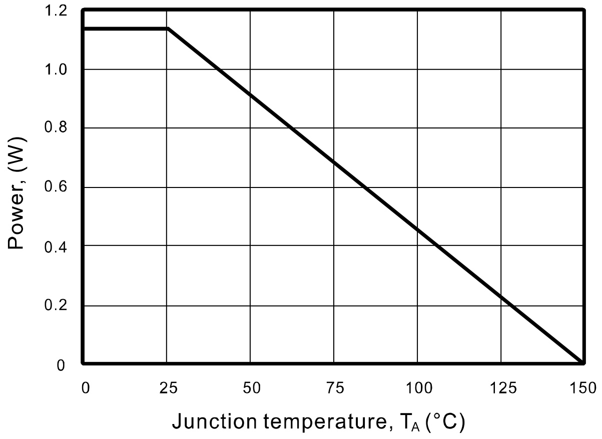
Capacitance



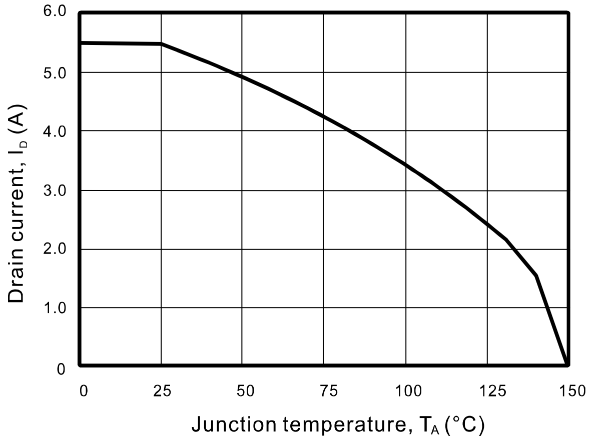
Gate charge characteristics



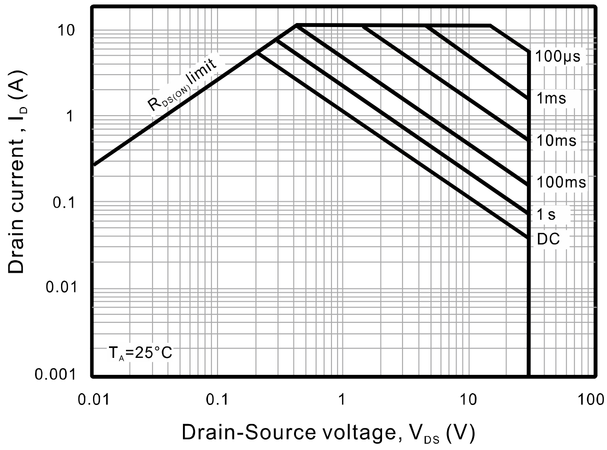
Power dissipation



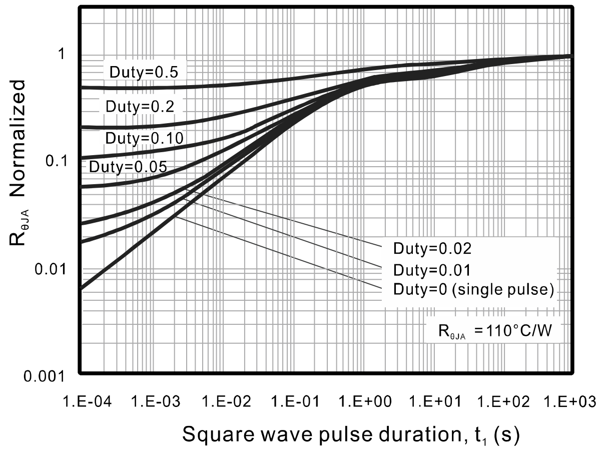
Drain current



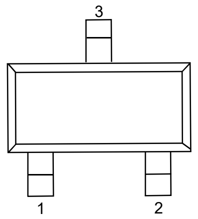
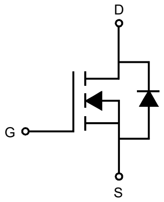
Safe operating area



$R_{\theta JA}$ transient thermal impedance



Pinning information

Pin	Simplified outline	Symbol
Pin1 Gate Pin2 Source Pin3 Drain		

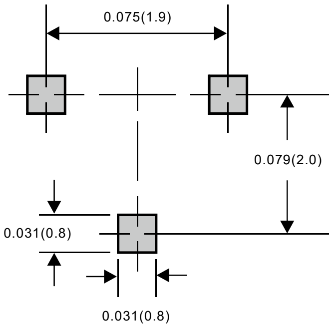
Marking

Type number	Marking code
FMOS054N03	15YWS

*15 : Product code.
YWS: Wafer lot code.
Y: Year
W: Weekly
S:Sequence

Suggested solder pad layout

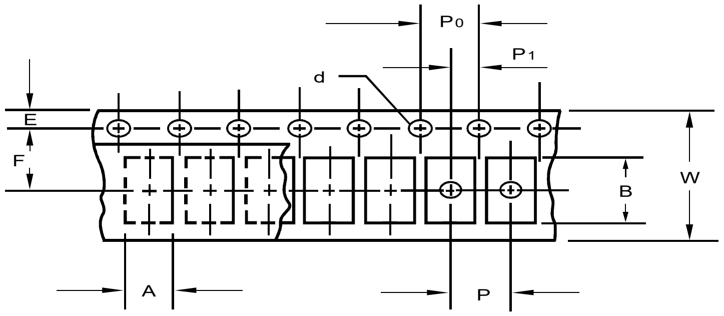
SOT-23

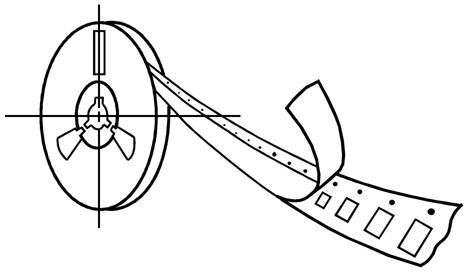


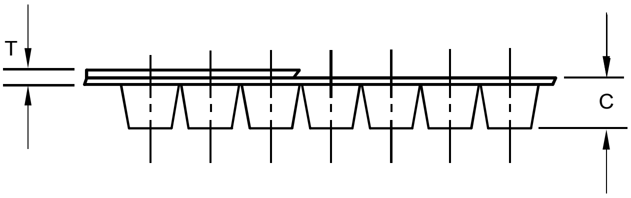
Dimensions in inches and (millimeters)

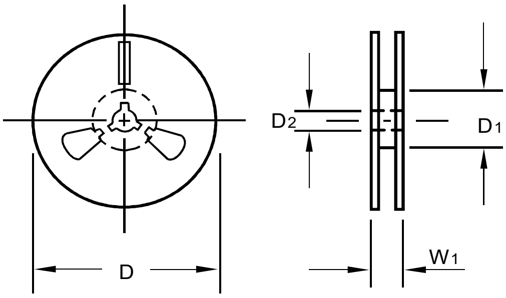
FMOS054N03

Packing information









unit:mm

Item	Symbol	Tolerance	SOT-23
Carrier width	A	0.1	3.15
Carrier length	B	0.1	2.77
Carrier depth	C	0.1	1.22
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D_1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D_1	min	54.40
Feed hole diameter	D_2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P_0	0.1	4.00
Embossment center	P_1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W_1	1.0	11.40

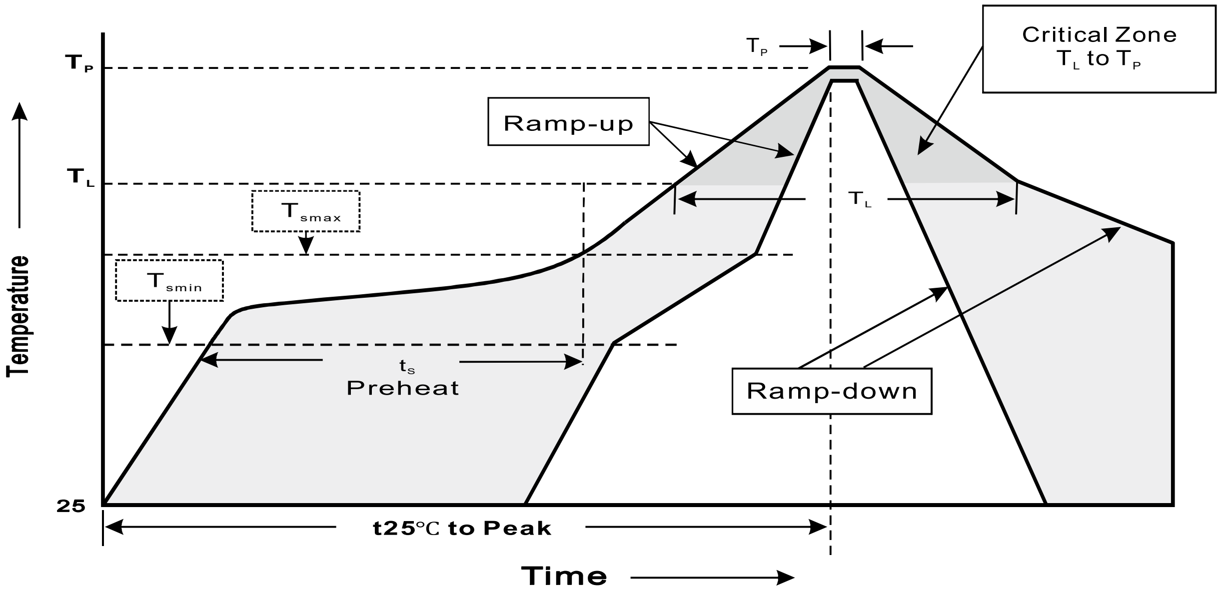
Note:Devices are packed in accordance with EIA standar RS-481-A and specifications listed above.

Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)
SOT-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000

Suggested thermal profiles for soldering processes

1.Storage environment: Temperature=5℃~40℃ Humidity=55%±25%
2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile feature	Soldering Condition
Average ramp-up rate (T_L to T_P)	＜3℃/sec
Prehaeat -Temperature Min (T_{smin}) -Temperature Max (T_{smax}) -Time (min to max) (t_S)	 150℃ 200℃ 60 ~120sec
T_{smax} to T_L -Ramp-up rate	 ＜ 3℃/sec
Time maintained above: -Temperature (T_L) -Time(T_L)	 217℃ 60 ~ 260 sec
Peak Temperature(T_P)	255℃ -0/+5℃
Time within 5℃ of actual peak Temperature(T_P)	10 ~ 30sec
Ramp-down rate	＜ 6℃/sec
Time 25℃ to peak temperature	＜ 6 minutes