

DESCRIPTION

The EMF50N03J is the N-Channel logic enhancement mode power field effect transistor is produced using high cell density advanced trench technology..

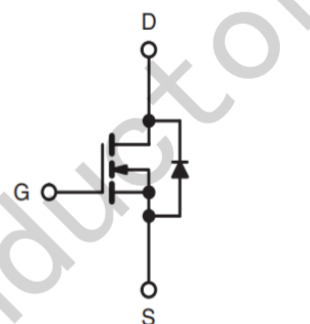
This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application, and low in-line power loss are needed in a very small outline surface mount package.

FEATURE

- ◆ 30V/6.0A, $R_{DS(ON)}=18m\Omega(\text{typ.})@V_{GS}=10V$
- ◆ 30V/4.8A, $R_{DS(ON)}=25m\Omega(\text{typ.})@V_{GS}=4.5V$
- ◆ Super high design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and Maximum DC current capability
- ◆ Full RoHS compliance
- ◆ SOT23 package design

APPLICATIONS

- ◆ Power Management
- ◆ Portable Equipment
- ◆ DC/DC Converter
- ◆ Load Switch
- ◆ DSC



N-Channel MOSFET



TOP VIEW
SOT-23

ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}\text{C}$ Unless otherwise noted)

Symbol	Parameter		Typical	Unit
V _{DSS}	Drain-Source Voltage		30	V
V _{GSS}	Gate-Source Voltage		±20	V
I _D	Continuous Drain Current (T _C =25°C)	V _{GS} =10V	6.0	A
	Continuous Drain Current (T _C =70°C)		5.0	
I _{DM}	Pulsed Drain Current		20	A
I _S	Continuous Source Current (Diode Conduction)		1.5	A
P _D	Power Dissipation	T _A =25°C	1.5	W
		T _A =70°C	0.9	
T _J	Operation Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55~+150	°C
R _{θJA}	Thermal Resistance Junction to Ambient		90	°C/W

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress rating only and functional device operation is not implied

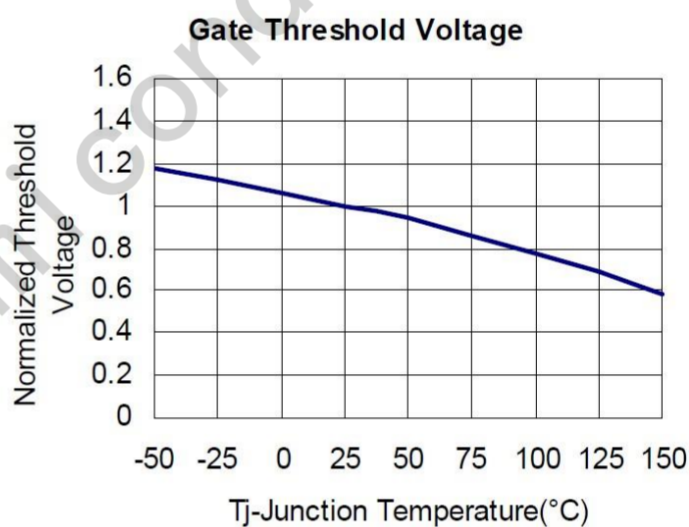
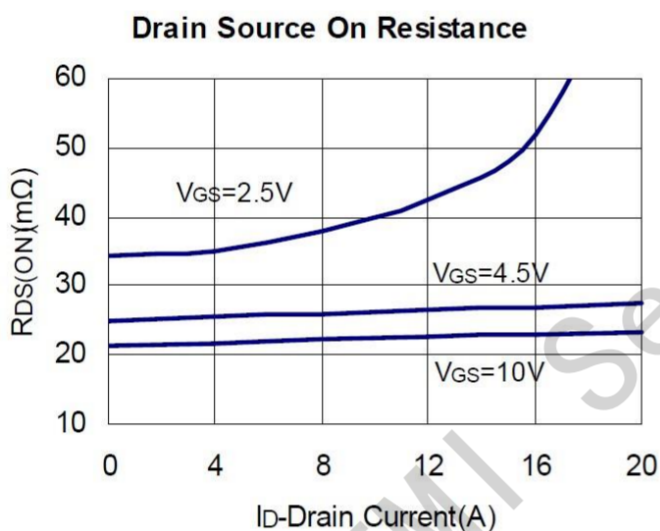
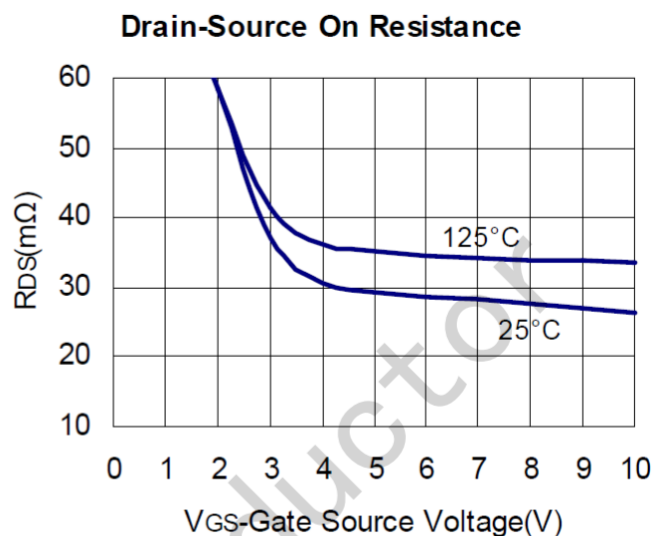
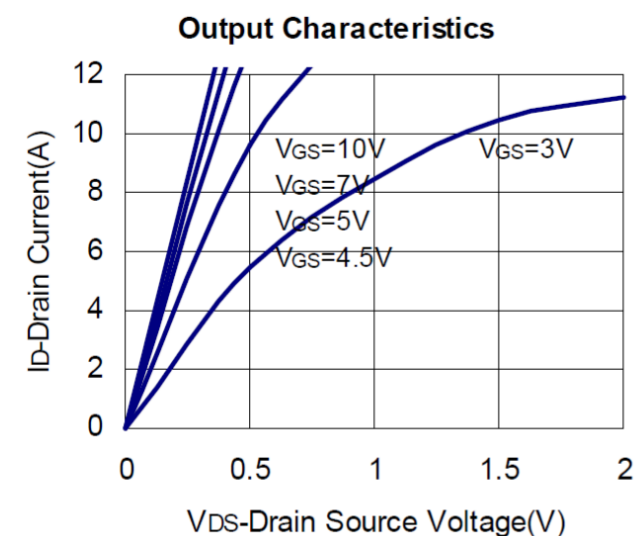
ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ Unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	30			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1		2	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0			1	uA
		V _{DS} =24V, V _{GS} =0 T _J =55°C			5	
R _{DS(ON)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =6.0A		18	30	mΩ
		V _{GS} =4.5V, I _D =4.8A		25	40	
Source-Drain Diode						
V _{SD}	Diode Forward Voltage	I _S =1.0A, V _{GS} =0V		0.7	1.0	V
Dynamic Parameters						
Q _g	Total Gate Charge	V _{DS} =20V V _{GS} =4.5V I _D =6.0A		6		nC
Q _{gs}	Gate-Source Charge			1.1		
Q _{gd}	Gate-Drain Charge			2.5		
C _{iss}	Input Capacitance	V _{DS} =15V V _{GS} =0V f=1MHz		414		pF
C _{oss}	Output Capacitance			60		
C _{rss}	Reverse Transfer Capacitance			49		
T _{d(on)}	Turn-On Time	V _{DS} =15V I _D =5A		7.5		nS
T _r				45		
T _{d(off)}	Turn-Off Time	V _{GEN} =10V R _G =3.3Ω		10		
T _f				4		

Note: 1. Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$

2. Static parameters are based on package level with recommended wire bonding

■ TYPICAL CHARACTERISTICS (25°C Unless Note)



■ TYPICAL CHARACTERISTICS (continuous)

Source Drain Diode Forward



Capacitance



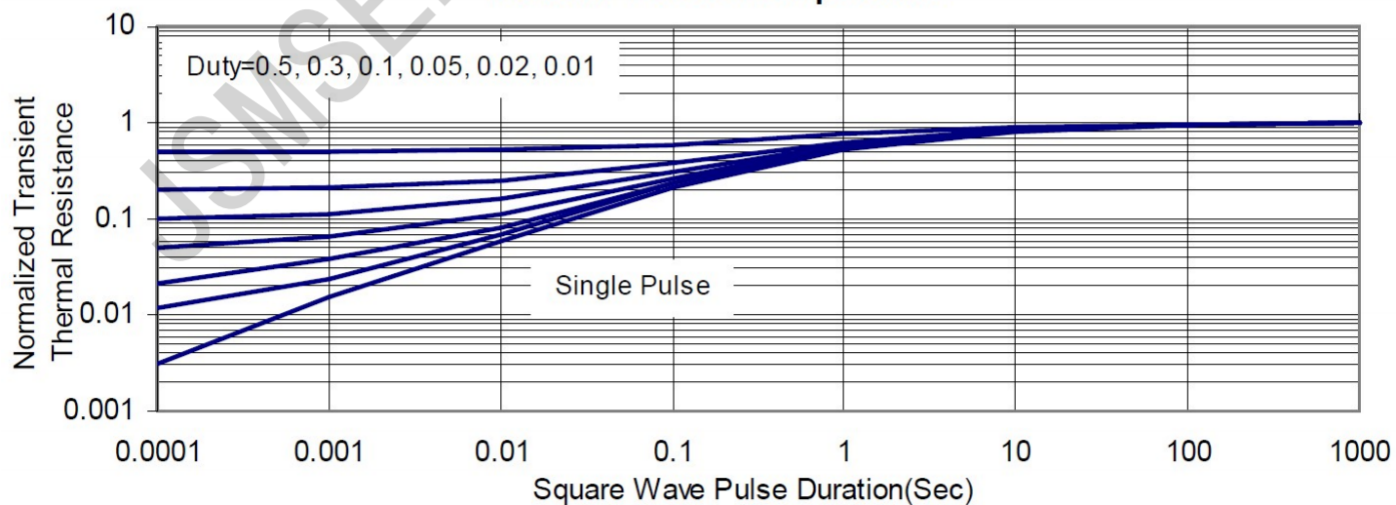
Power Dissipation



Drain Current



Thermal Transient Impedance



Package Information

SOT-23



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°