N-Channel 30V Enhancement MOSFET

GENERAL DESCRIPTION

The ME20N03 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits where high-side switching, and low in-line power loss are needed in a very small outline surface mount package.
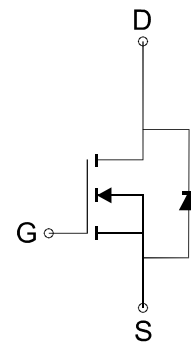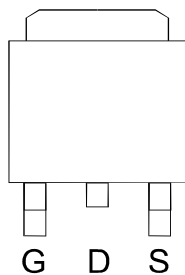
FEATURES

● $R_{DS(ON)} \leqq 15m\Omega @ V_{GS}=10V$

● $R_{DS(ON)} \leqq 20m\Omega @ V_{GS}=4.5V$

● Super high density cell design for extremely low $R_{DS(ON)}$

● Exceptional on-resistance and maximum DC current capability

APPLICATIONS

● Power Management in Desktop Computer
● Video Graphic Accelerate Card
● Battery Powered System
● DC/DC Converter

PIN   CONFIGURATION

(TO-252)

Top View

G   D   S

N-Channel MOSFET

Ordering Information: ME20N03 (Pb-free)

ME20N03-G (Green product-Halogen free)

Absolute Maximum Ratings (Tc=25℃ Unless Otherwise Noted)

Parameter		Symbol	Maximum Ratings	Unit
Drain-Source Voltage		V$_{DS}$	30	V
Gate-Source Voltage		V$_{GS}$	±20	V
Continuous Drain Current	Tc=25℃	I$_D$	39	A
	Tc=70℃		32	
Pulsed Drain Current		I$_{DM}$	159	A
Maximum Power Dissipation	Tc=25℃	P$_D$	37	W
	Tc=70℃		24	
Operating Junction Temperature		T$_J$	-55 to 150	℃
Thermal Resistance-Junction to Case		RθJC	3.3	℃/W

Note 1: Bonding wire current limit

Note 2: The device mounted on 1in^2 FR4 board with 2 oz copper

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Electrical Characteristics (Tc =25℃ Unless Otherwise Specified)

Symbol	Parameter	Limit	Min	Typ	Max	Unit
STATIC						
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V, I$_D$=250μA	30			V
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=250μA	1		3	
I$_{GSS}$	Gate-Body Leakage Current	V$_{DS}$=0V, V$_{GS}$=±20V			±100	nA
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=30V, V$_{GS}$=0V			1	μA
R$_{DS(ON)}$	Drain-Source On-State Resistance	V$_{GS}$=10V, I$_D$= 15A		11	15	mΩ
		V$_{GS}$=4.5V, I$_D$= 15A		16	20	
V$_{SD}$	Diode Forward Voltage	I$_S$=1A, V$_{GS}$=0V		0.75	1.1	V
DYNAMIC						
Qg	Total Gate Charge	V$_{DS}$=15V, V$_{GS}$=10V,I$_D$=15A		18		nC
Qg	Total Gate Charge	V$_{DS}$=15V,V$_{GS}$=4.5V,I$_D$=15A		9		
Qgs	Gate-Source Charge			4.2		
Qgd	Gate-Drain Charge			4.2		
Ciss	Input Capacitance	V$_{DS}$=15V, V$_{GS}$=0V, f =1MHz		700		pF
Coss	Output Capacitance			120		
Crss	Reverse Transfer Capacitance			35		
td(on)	Turn-On Delay Time	V$_{DS}$=15V, R$_L$ =1.5Ω V$_{GS}$=10V, R$_G$=6Ω I$_D$=15A		13.8		ns
tr	Turn-On Rise Time			178		
td(off)	Turn-Off Delay Time			28.7		
tf	Turn-Off Fall Time			8.8		

Notes: a. Matsuki Electric/ Force mos reserves the right to improve product design, functions and reliability without notice.

b, Matsuki Electric/ Force mos reserves the right to improve product design, functions and reliability without notice.
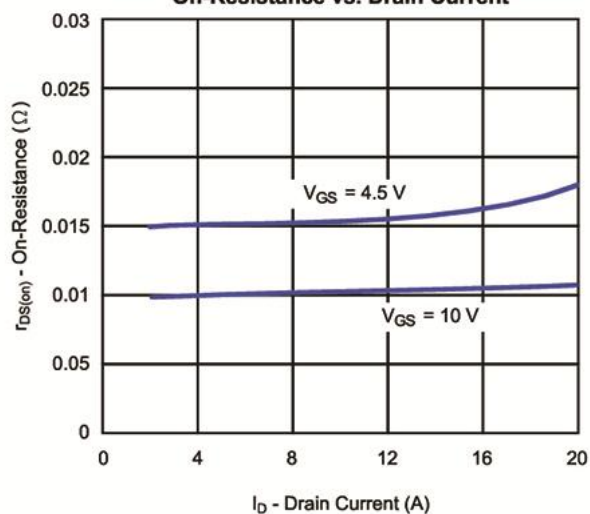
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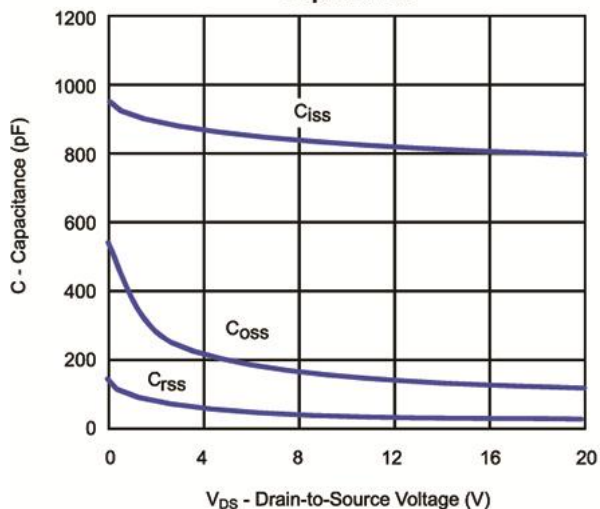### Typical Characteristics (T$_J$ =25℃ Noted)

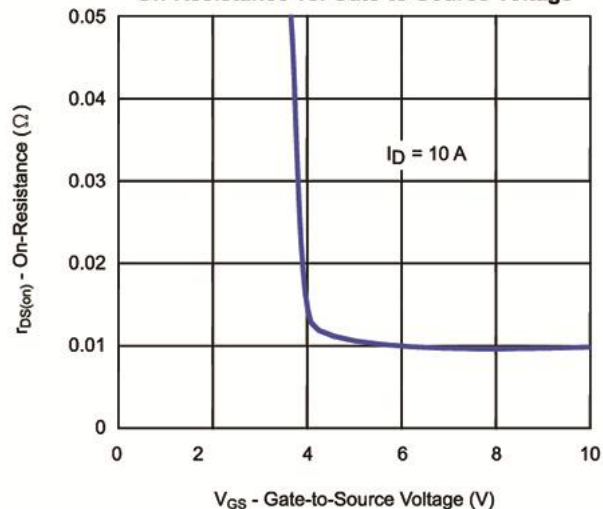On Resistance vs. Junction Temperature
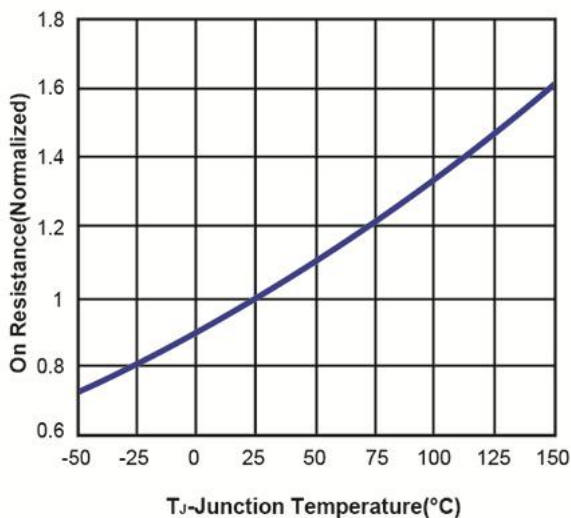
On-Resistance vs. Drain Current

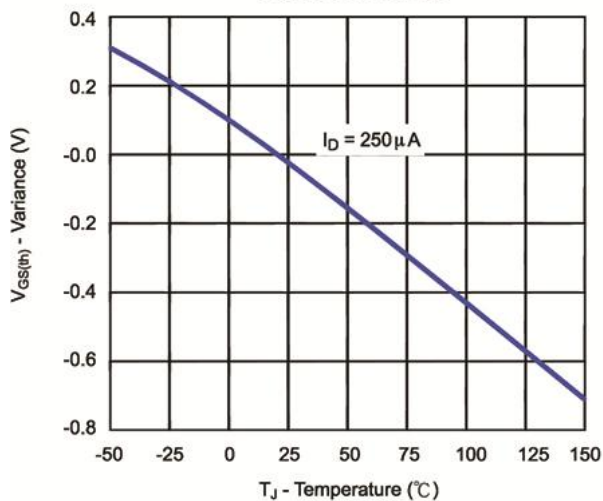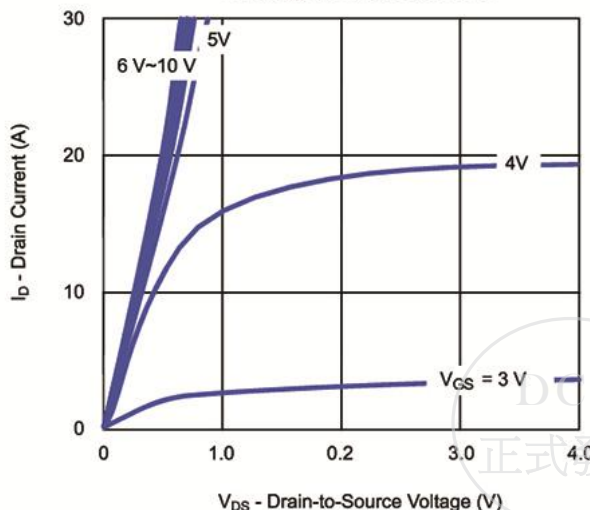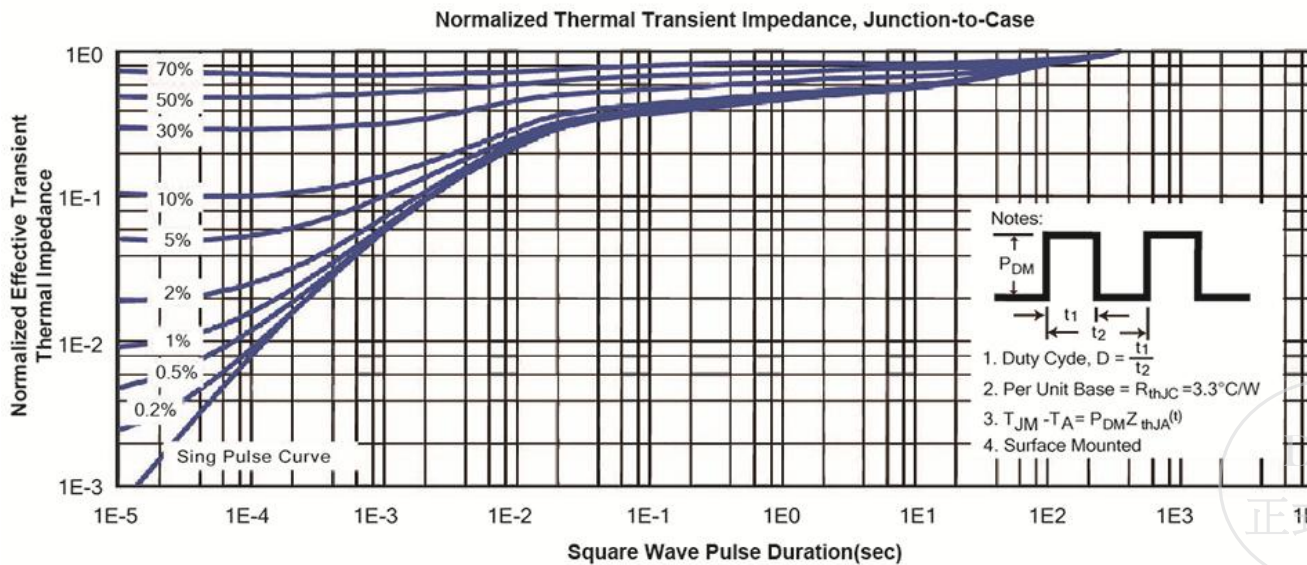Capacitance

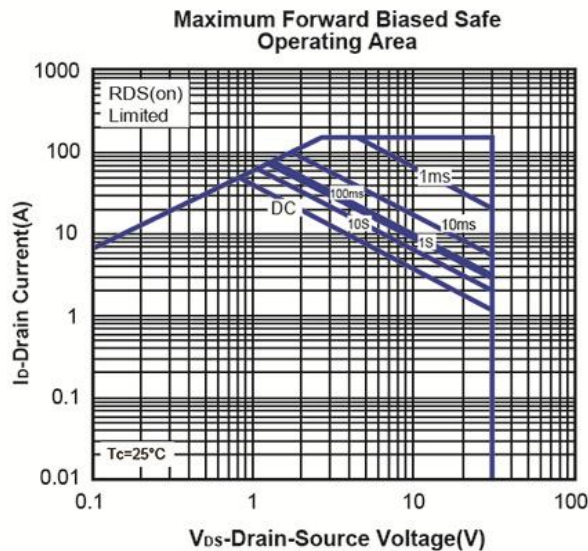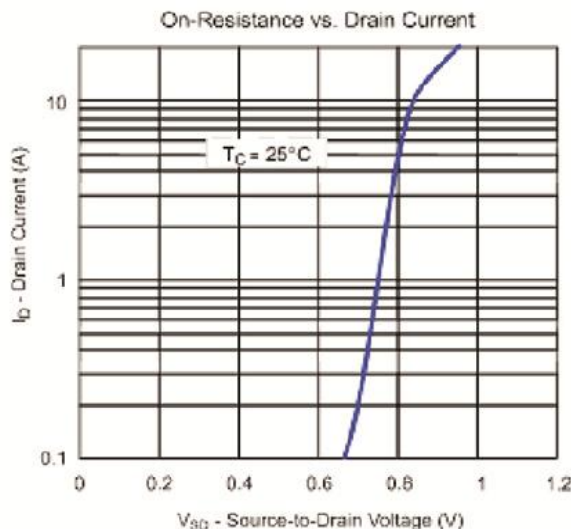On-Resistance vs. Gate-to-Source Voltage

Threshold Voltage

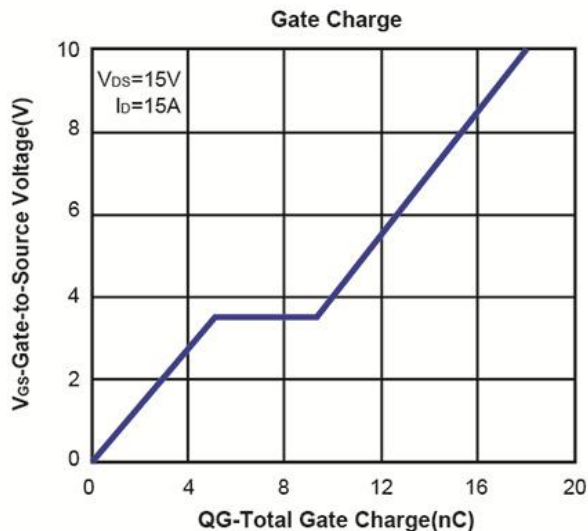

On-Region Characteristics

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N-Channel 30V Enhancement MOSFET

Typical Characteristics (TJ =25℃ Noted)

Gate Charge

$V_{DS}=15V$
$I_D=15A$

V_{GS}-Gate-to-Source Voltage(V)

QG-Total Gate Charge(nC)

On-Resistance vs. Drain Current

$T_C = 25°C$

I_D - Drain Current (A)

V_{SD} - Source-to-Drain Voltage (V)

Maximum Forward Biased Safe Operating Area

RDS(on) Limited

DC
100ms
1ms
10S
10ms
1S

Tc=25°C

I_D-Drain Current(A)

V_{DS}-Drain-Source Voltage(V)

Normalized Thermal Transient Impedance, Junction-to-Case

70%
50%
30%
10%
5%
2%
1%
0.5%
0.2%

Sing Pulse Curve

Normalized Effective Transient Thermal Impedance

Notes:
P_{DM}
t_1
t_2

1. Duty Cyde, $D = \dfrac{t_1}{t_2}$
2. Per Unit Base = $R_{thJC} = 3.3°C/W$
3. $T_{JM} - T_A = P_{DM} Z_{thJA}^{(t)}$
4. Surface Mounted

Square Wave Pulse Duration(sec)

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TO-252 Package Outline

SYMBOL	MIN	MAX
A	2.10	2.50
B	0.40	0.90
C	0.40	0.90
D	5.30	6.30
D1	2.20	2.90
E	6.30	6.75
E1	4.80	5.50
L1	0.90	1.80
L2	0.50	1.10
L3	0.00	0.20
H	8.90	10.40
P	2.30 BSC	

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