N-Channel 30-V (D-S) MOSFET

GENERAL DESCRIPTION

The ME4410A 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

- $R_{DS(ON)} \leqq 18m\Omega @ V_{GS}=10V$
- $R_{DS(ON)} \leqq 20m\Omega @ V_{GS}=4.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability

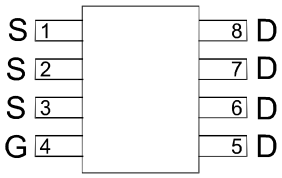
APPLICATIONS

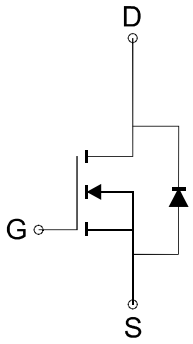
- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC

PIN CONFIGURATION

(SOP-8)

Top View





N-Channel MOSFET

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

Parameter		Symbol	10 sec	Steady State	Unit
Drain-Source Voltage		V_{DSS}	30		V
Gate-Source Voltage		V_{GSS}	±20		V
Continuous Drain Current	T_A=25℃	I_D	10	7.5	A
	T_A=70℃		8	6	
Pulsed Drain Current		I_{DM}	40		A
Continuous Source Current (Diode Conduction)		I_S	2.3	1.26	A
Maximum Power Dissipation	T_A=25℃	P_D	2.5	1.4	W
	T_A=70℃		1.6	0.9	
Operating Junction Temperature		T_J	-55 to 150		℃
Thermal Resistance-Junction to Ambient*		$R_{\theta JA}$	$T \leqq 10$ sec	35	℃/W
			Steady State	60	
Thermal Resistance-Junction to Case		$R_{\theta JC}$	32		℃/W

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

N-Channel 30-V (D-S) MOSFET

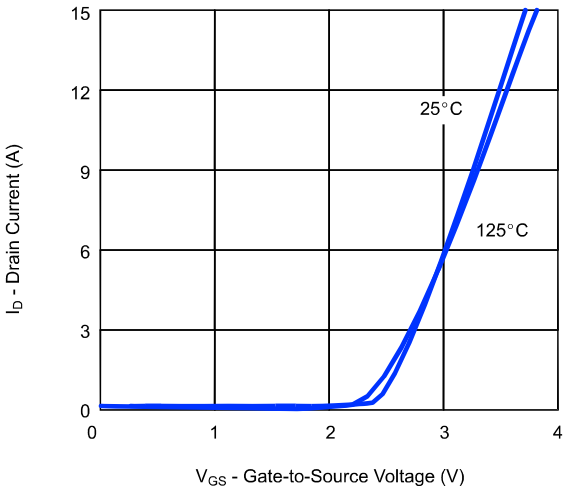
Electrical Characteristics (T_A=25℃ Unless Otherwise Specified)

Symbol	Parameter	Limit	Min	Typ	Max	Unit
STATIC						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.0	1.4	3.0	V
I_{GSS}	Gate 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
		V_{DS}=30V, V_{GS}=0V (T_J=55℃)			5	
$I_{D(ON)}$	On-State Drain Current [a]	V_{DS}=5V, V_{GS}= 10V	20			A
$R_{DS(ON)}$	Drain-Source On-State Resistance [a]	V_{GS}=10V, I_D= 10A		12	18	mΩ
		V_{GS}=4.5V, I_D= 8A		17	20	
G_{FS}	Forward Transconductance [a]	V_{DS}=15V, I_D=10A		17		S
V_{SD}	Diode Forward Voltage	I_S=2.3A, V_{GS}=0V		0.7	1.1	V
DYNAMIC						
Qg	Total Gate Charge	V_{DS}=15V, V_{GS}=4.5V, I_D=10A		11	15	nC
Qgt	Total Gate Charge	V_{DS}=15V, V_{GS}=10V, I_D=10A		20	26	
Qgs	Gate-Source Charge			5		
Qgd	Gate-Drain Charge			4.9		
Ciss	Input capacitance	V_{DS}=15V, V_{GS}=0V, f=1MHz		700	800	pF
Coss	Output Capacitance			120		
Crss	Reverse Transfer Capacitance			35		
Rg	Gate Resistance	V_{GS}=0V, V_{DS}=0V, f =1MHz		0.9		Ω
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=25V, R_L =25Ω I_D=1A, V_{GEN}=10V R_G=6Ω		14	17	ns
tr	Turn-On Rise Time			12	15	
$t_{d(off)}$	Turn-Off Delay Time			43	55	
tf	Turn-On Fall Time			4	6	

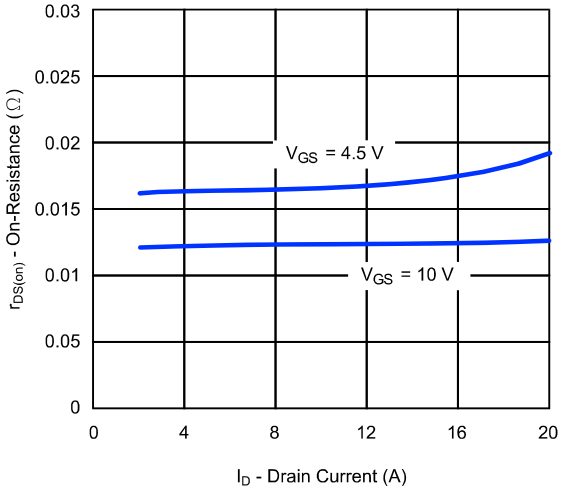
Notes: a. Pulse test; pulse width ≦ 300us, duty cycle≦ 2%

Typical Characteristics (T_J =25℃ Noted)

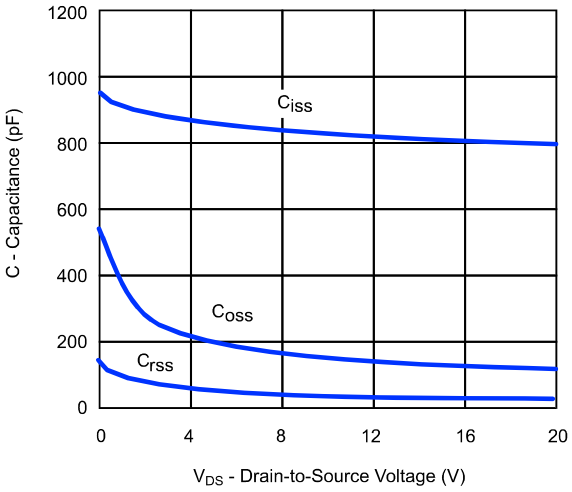
Transfer Characteristics



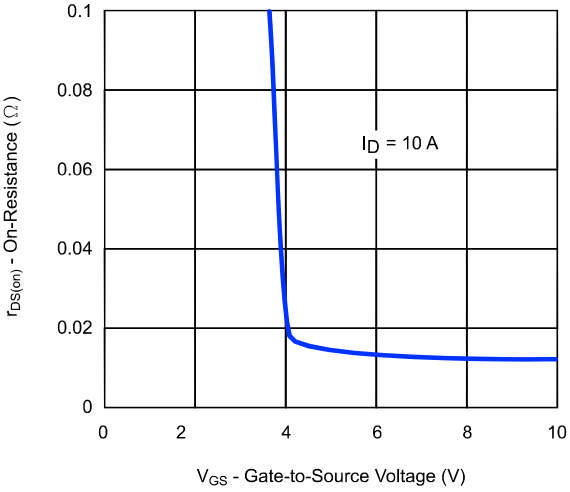
On-Resistance vs. Drain Current



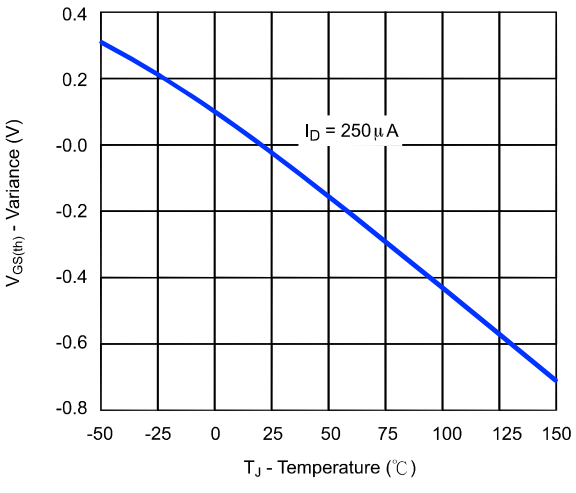
Capacitance



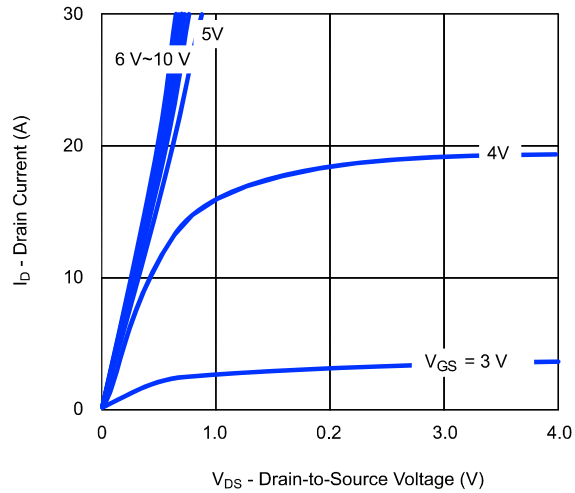
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



On-Region Characteristics



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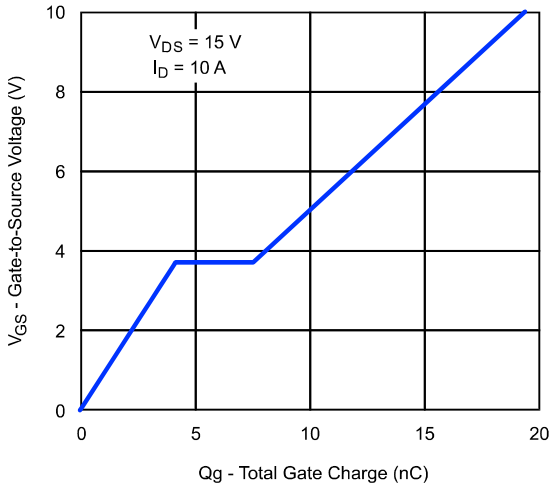
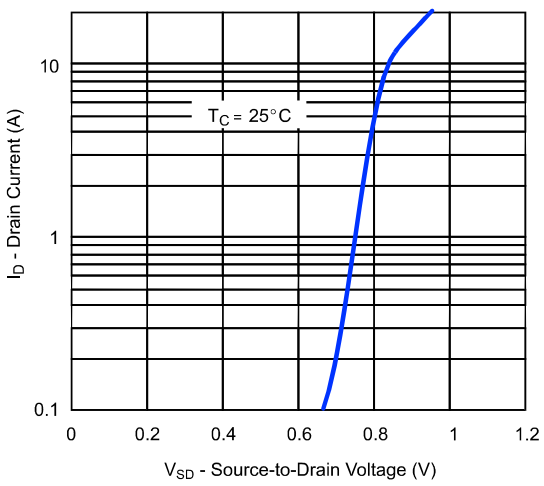
Typical Characteristics (T_J =25℃ Noted)

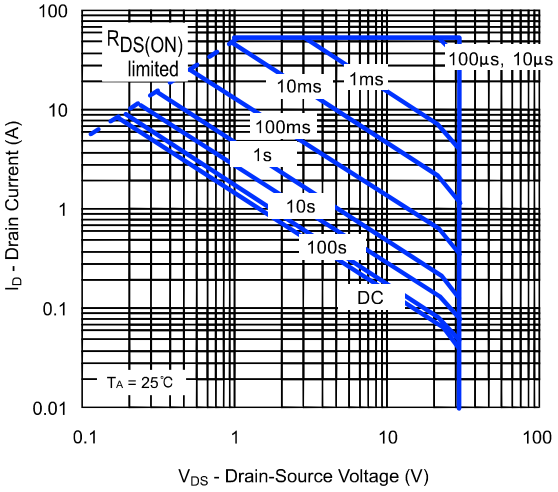
Gate Charge



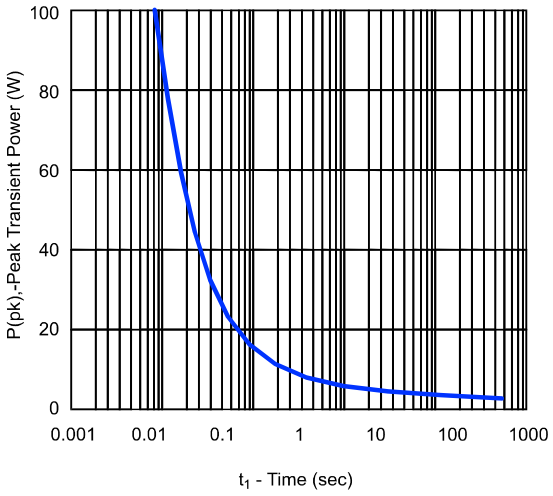
On-Resistance vs. Drain Current



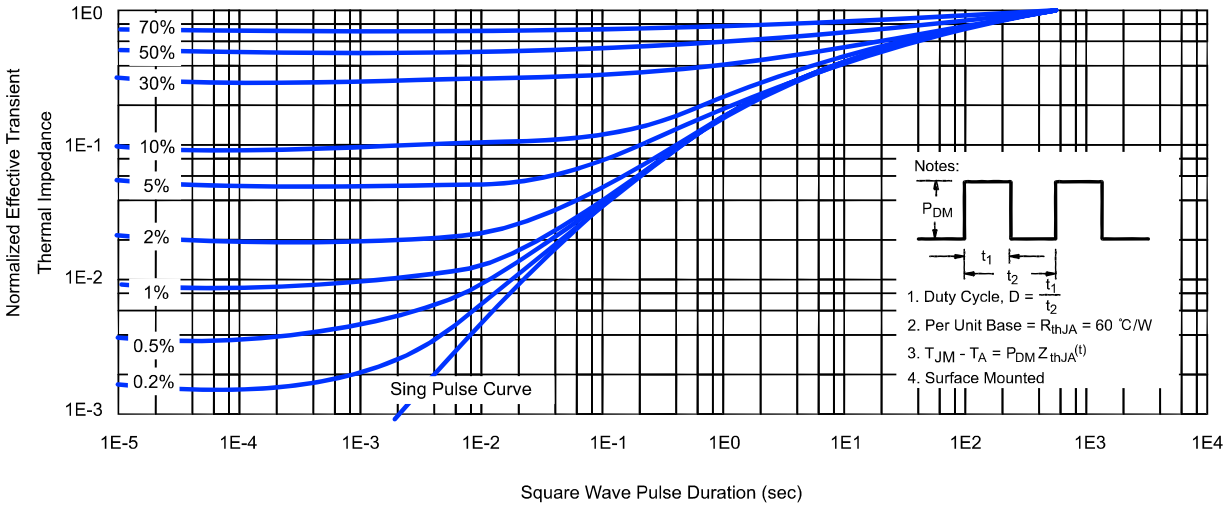
Maximum Forward Biased Safe Operating Area



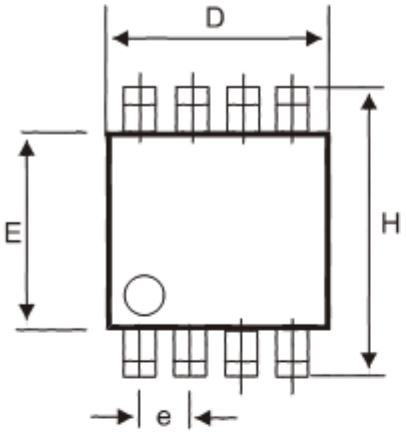
Single Pulse Maximum Power Dissipation

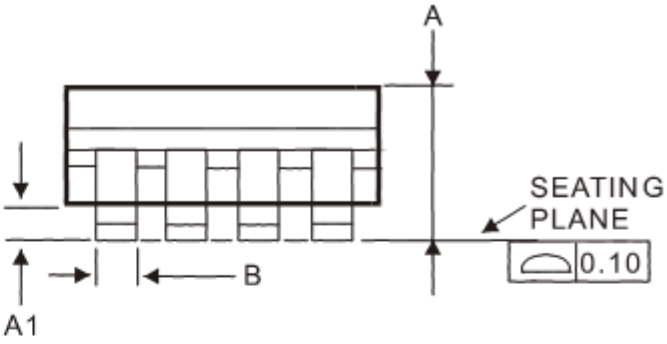


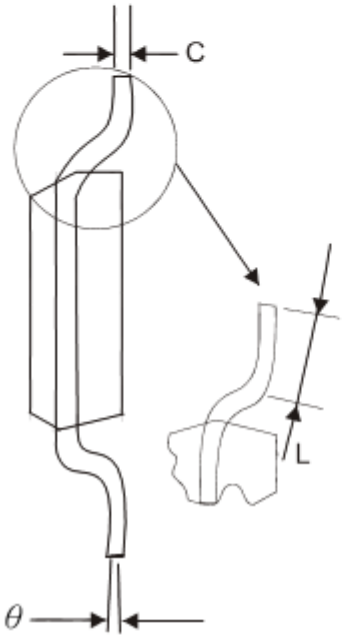
Normalized Thermal Transient Impedance, Junction-to-Ambient



SOP-8 Package Outline







DIM	MILLIMETERS (mm)	
	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.35	0.49
C	0.18	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
L	0.40	1.25
θ	0°	7°

Note: 1. Refer to JEDEC MS-012AA.

2. Dimension “D” does not include mold flash, protrusions or gate burrs . Mold flash, protrusions or gate burrs shall not exceed 0.15 mm per side.