Dual N-Channel 30-V (D-S) MOSFET , ESD Protection

GENERAL DESCRIPTION

The ME6978ED Dual 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

- $R_{DS(ON)} \leqq 20m\Omega @ V_{GS}=10V$
- $R_{DS(ON)} \leqq 22m\Omega @ V_{GS}=4.5V$
- $R_{DS(ON)} \leqq 23m\Omega @ V_{GS}=4V$
- $R_{DS(ON)} \leqq 32m\Omega @ V_{GS}=2.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability

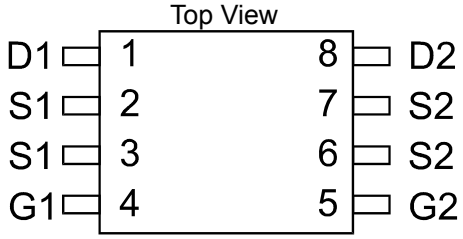
APPLICATIONS

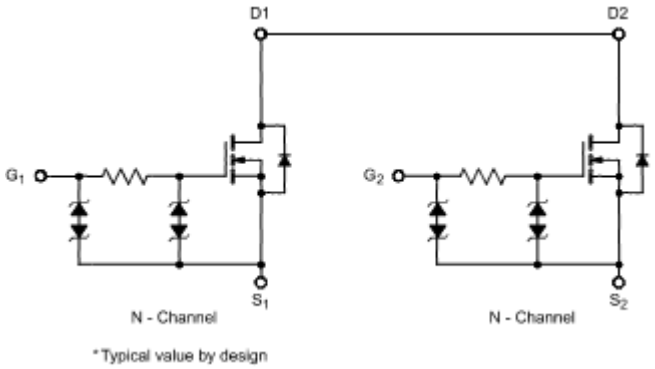
- Power Management in Note book
- Portable Equipment
- Battery Powered System
- Load Switch
- DSC

PIN CONFIGURATION

(TSSOP-8)

Top View





Ordering Information: ME6978ED (Pb-free)

ME6978ED-G (Green product-Halogen free)

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

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±12	V
Continuous Drain Current(tJ=150℃)	T_A=25℃	I_D	6.4	A
	T_A=70℃		5.1	
Pulsed Drain Current		I_{DM}	26	A
Maximum Power Dissipation	T_A=25℃	P_D	1.3	W
	T_A=70℃		0.8	
Operating Junction Temperature		T_J	-55 to 150	℃
Thermal Resistance-Junction to Ambient*		$R_{\theta JA}$	100	℃/W

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

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Electrical Characteristics (T_A=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	0.5		1.5	V
I_{GSS}	Gate Leakage Current	V_{DS}=0V, V_{GS}=±10V			±10	uA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V			1	μA
$R_{DS(ON)}$	Drain-Source On-State Resistance [a]	V_{GS}=10V, I_D=5A		15	20	mΩ
		V_{GS}=4.5V, I_D=5A		16.5	22	
		V_{GS}=4V, I_D=3A		19	23	
		V_{GS}=2.5V, I_D=3A		25	33	
V_{SD}	Diode Forward Voltage	I_S=5A, V_{GS}=0V		0.8	1.2	V
DYNAMIC						
Qg	Total Gate Charge	V_{DS}=10V, V_{GS}=10V, I_D=7A		25		nC
Qg	Total Gate Charge	V_{DS}=10V, V_{GS}=4.5V, I_D=7A		12		
Qgs	Gate-Source Charge			4.2		
Qgd	Gate-Drain Charge			3.8		
Ciss	Input Capacitance	V_{DS}=15V, V_{GS}=0V,f=1MHz		981		pF
Coss	Output Capacitance			103		
Crss	Reverse Transfer Capacitance			33		
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=10V, R_L=10Ω I_D=1A, V_{GEN}=4.5V R_G=10Ω		49		μs
t_r	Turn-On Rise Time			86		
$t_{d(off)}$	Turn-Off Delay Time			335		
t_f	Turn-Off Fall Time			132		

Notes: a. pulse test: pulse width≦ 300us, duty cycle≦ 2%,Guaranteed by design, not subject to production testing.

b. Matsuki reserves the right to improve product design, functions and reliability without notice.

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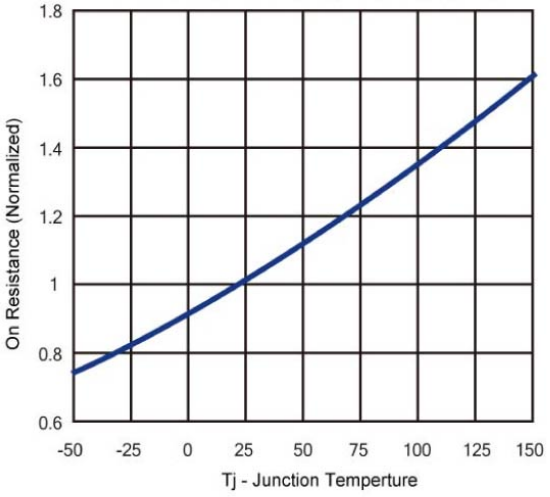
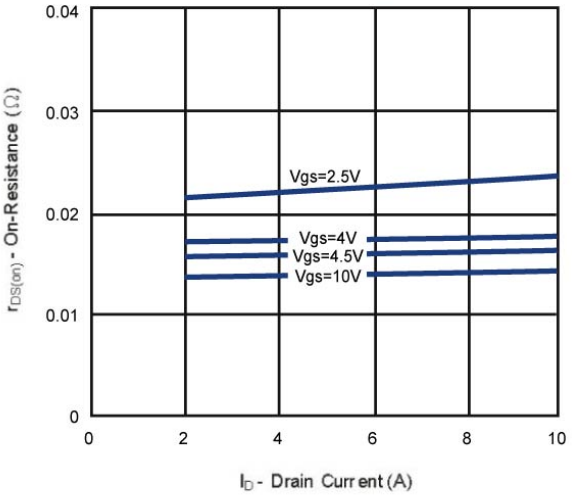
Typical Characteristics (T_J =25℃ Noted)

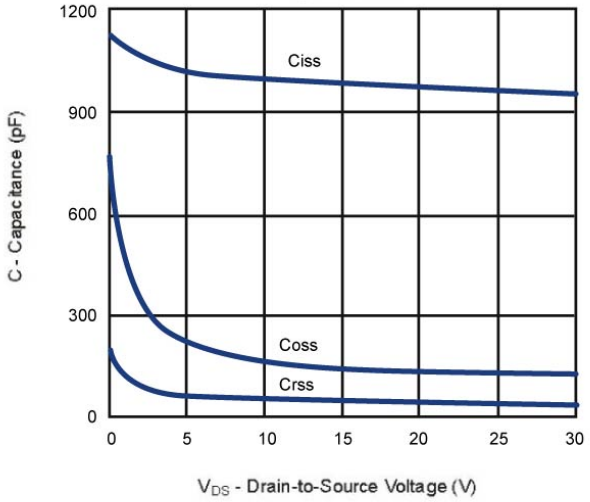
On Resistance vs. Junction Temperture



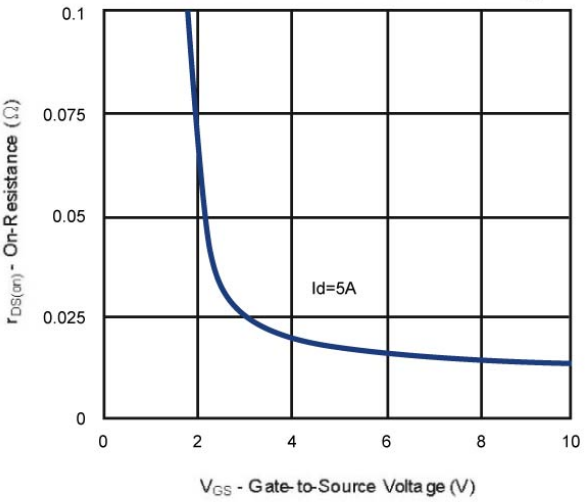
On-Resistance vs. Drain Current



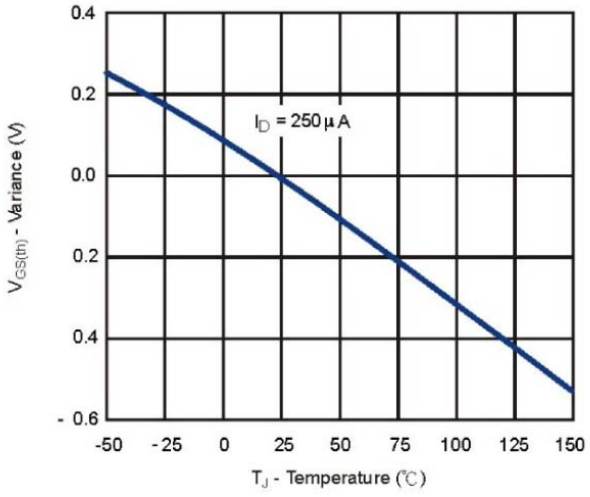
Capacitance



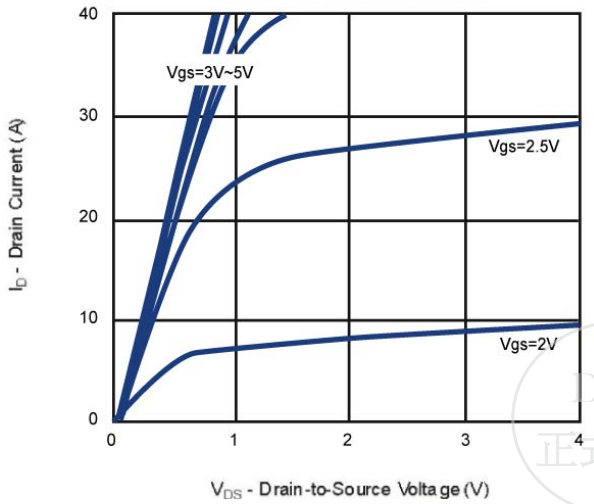
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



On-Region Characteristics



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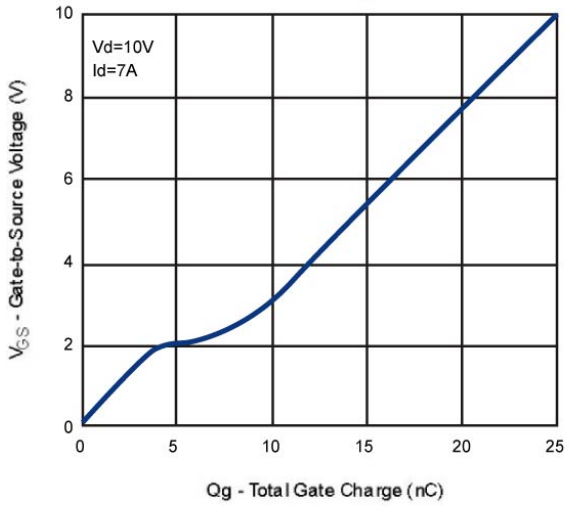
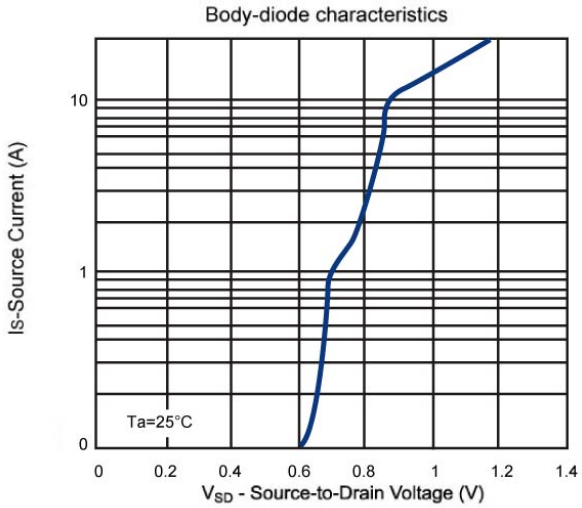
Typical Characteristics (T_J =25℃ Noted)

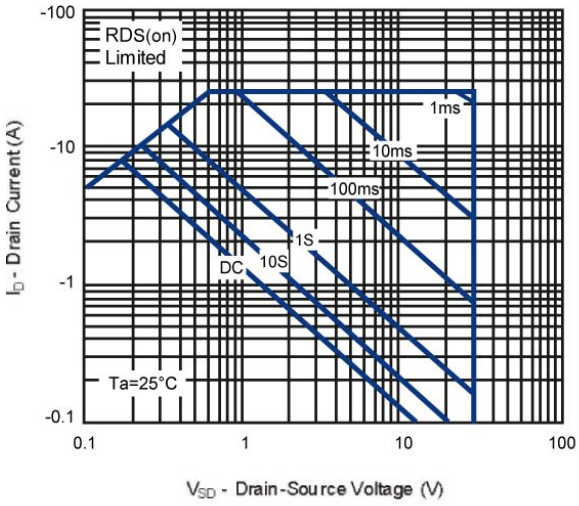
Gate Charge



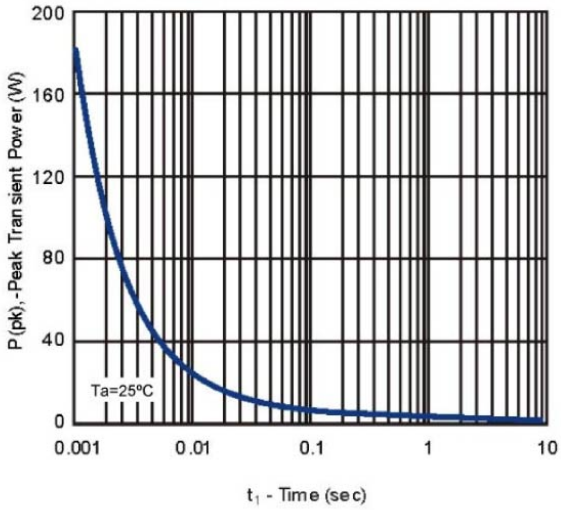
Body-diode characteristics



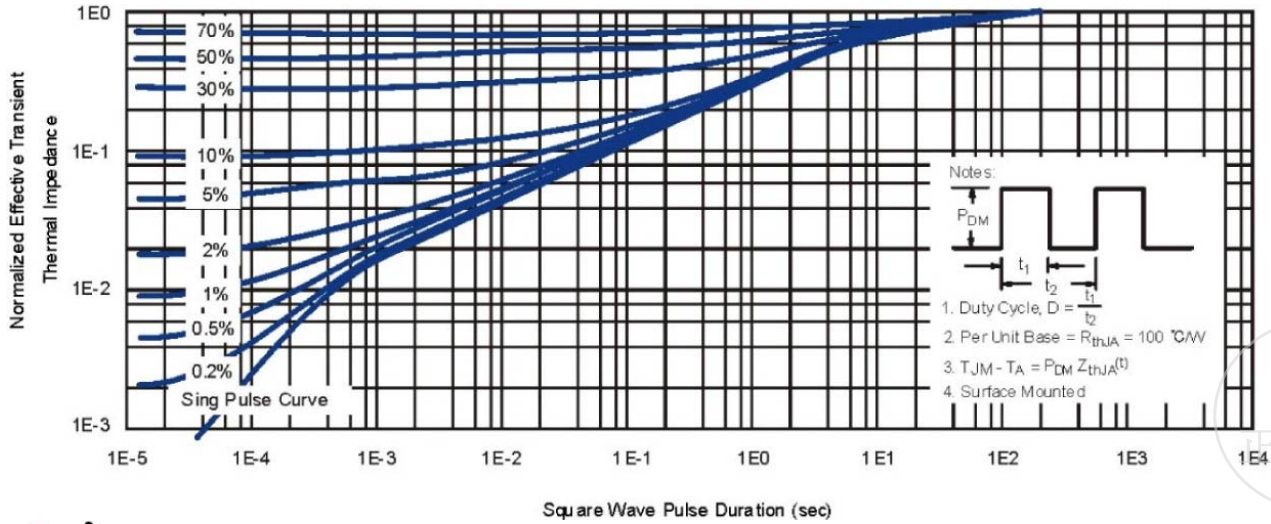
Maximum Forward Biased Safe Operating Area



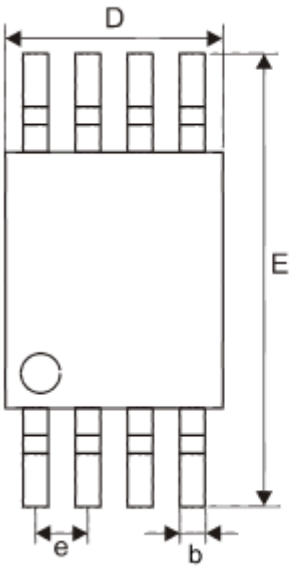
Single Pulse Maximum Power Dissipation

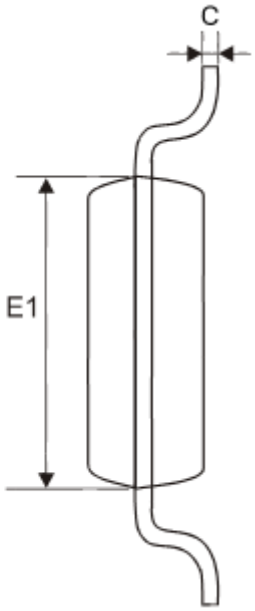


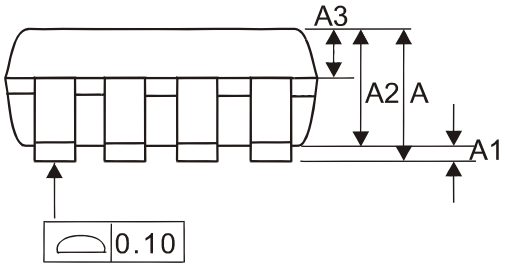
Normalized Thermal Transient Impedance, Junction-to-Ambient

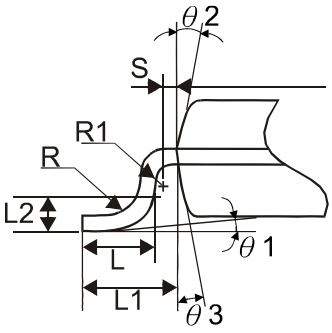


TSSOP-8 Package









SYMBOL	MILLIMETERS (mm)	
	MIN	MAX
A	-	1.20
A1	0.05	0.15
A2	0.90	1.05
A3	0.34	0.54
b	0.19	0.30
c	0.09	0.20
D	2.90	3.10
E	6.20	6.60
E1	4.30	4.50
e	0.65BSC	
L	0.45	0.75
L1	1.00REF	
L2	0.25BSC	
R	0.09	-