

# MT6968

## N-Channel Enhancement Mode Field Effect Transistor

### Product Summary

PRODUCT SUMMARY		
V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(ON)</sub> (mΩ) Typ
20V	6.5A	18@ V <sub>GS</sub> =4.5V
		23 @ V <sub>GS</sub> =2.5V
ESD Protected: 3000 V		

### Features

- Super high dense cell design for low  $R_{DS(ON)}$
- Rugged and reliable
- Simple drive requirement
- TSSOP-8 package

### Applications

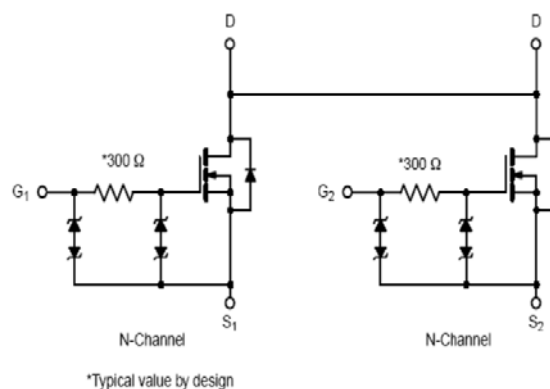
- Portable battery packs



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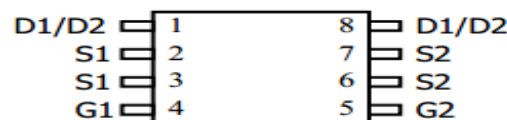
<http://www.mtsemi.com>

### Simplified Schematic



### MARKING DIAGRAM & PIN ASSIGNMENT

#### Top View



TSSOP-8

### Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	MOSFET	Units
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current <sup>A</sup>	$I_D$	6.5	A
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	30	A
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	1.5	A
Power Dissipation	$P_D$	1.5	W
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to Ambient <sup>a</sup>	$R_{th JA}$	70	$^\circ\text{C/W}$
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ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V,I <sub>D</sub> =-250μA	20			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-16V,V <sub>GS</sub> =0V			1	μA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> =±8V,V <sub>DS</sub> =0V			±200	nA
ON CHARACTERITICS						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =-250μA	0.8	1.0	1.2	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V,I <sub>D</sub> =6.5A		18	23	mΩ
		V <sub>GS</sub> =2.5V,I <sub>D</sub> =5.5A		23	28	
Forward Transconductance	g <sub>FS</sub>	V <sub>GS</sub> =5V,I <sub>D</sub> =6.5A		30		S
DAYNAMIC CHARACTERISTICS						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =-10V,V <sub>GS</sub> =0V f=1.0MHz		540		pF
Output Capacitance	C <sub>OSS</sub>			72		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			49		pF
SWITCHING CHARACTERISISTICS						
Turn-On Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =10V I <sub>D</sub> =1A, V <sub>GEN</sub> =4.5V R <sub>L</sub> =10ohm R <sub>GEN</sub> =6ohm		245		ns
Rise Time	t <sub>r</sub>			330		ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>			860		ns
Fall Time	t <sub>f</sub>			510		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =10V,I <sub>D</sub> =6.5A V <sub>GS</sub> =4.5V		12	18	nC
Gate-Source Charge	Q <sub>gs</sub>			2.2		nC
Gate-Drain Charge	Q <sub>gd</sub>			3.6		nC

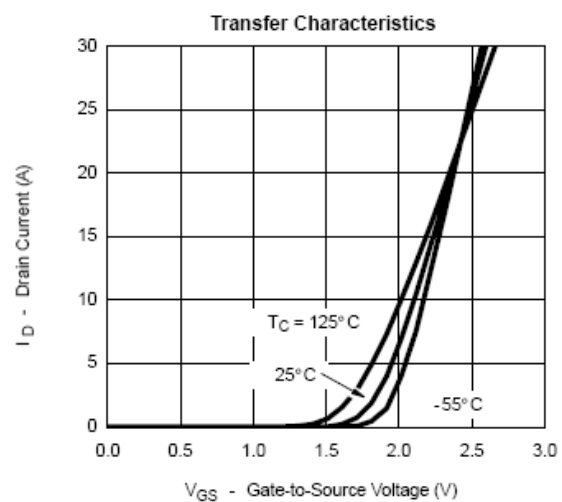
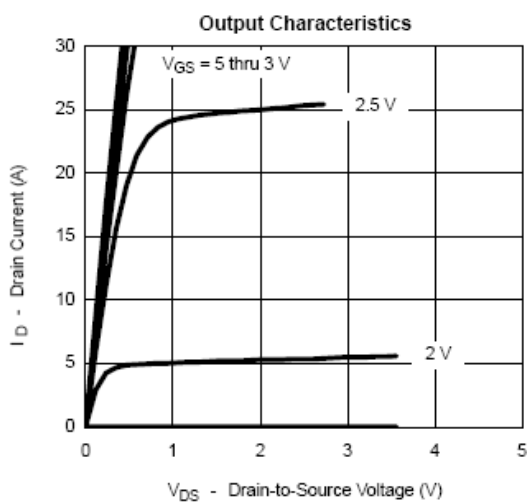
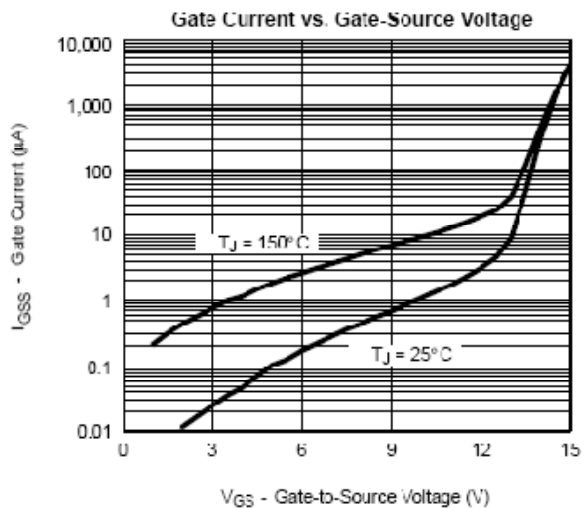
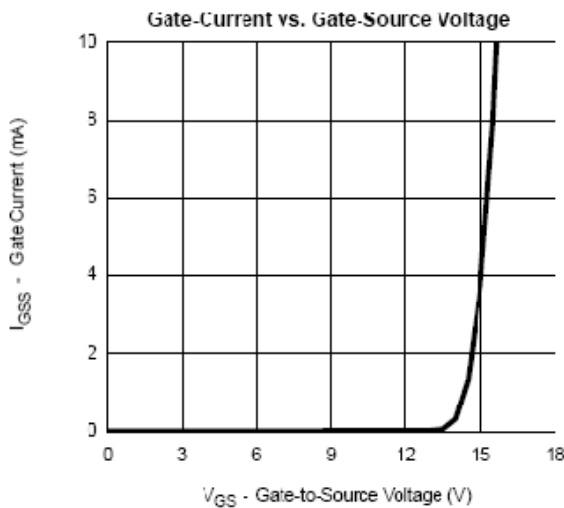
## ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

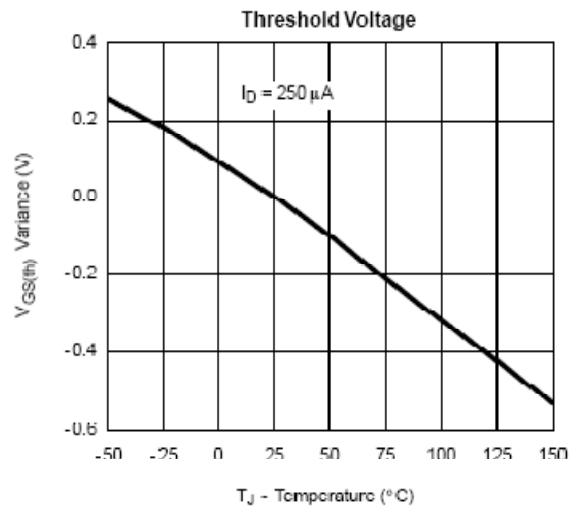
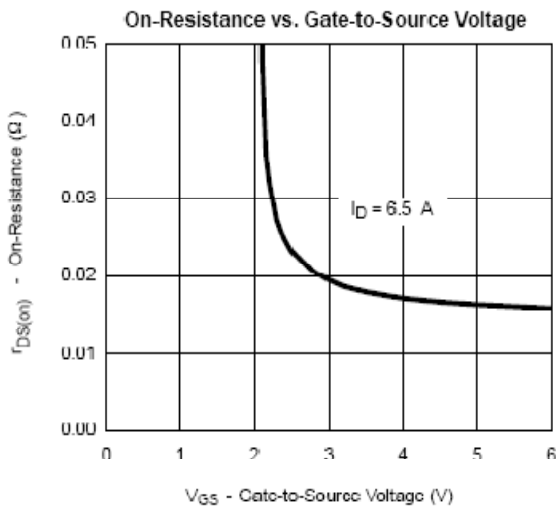
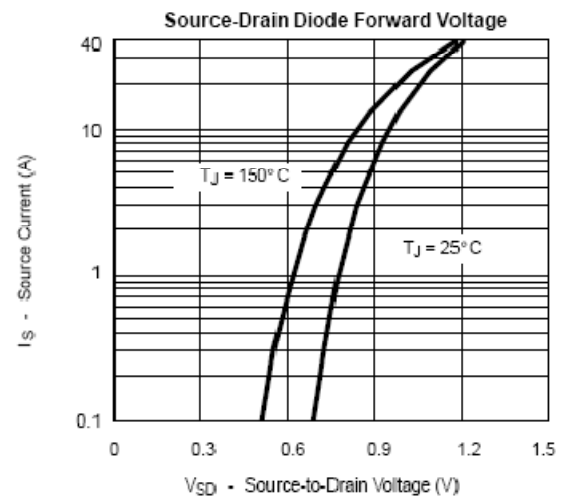
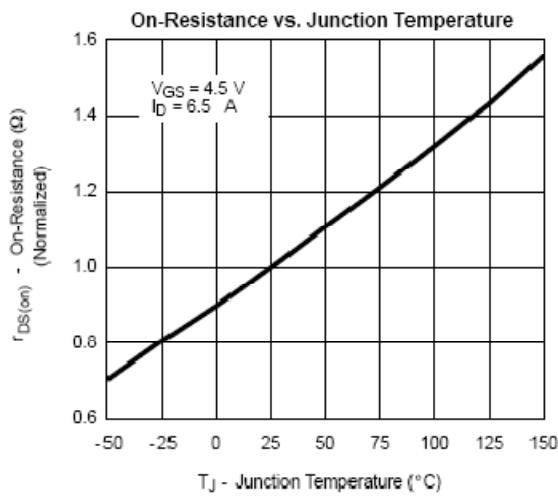
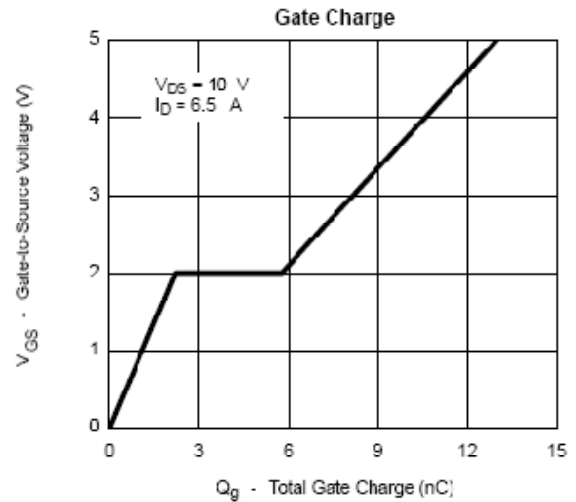
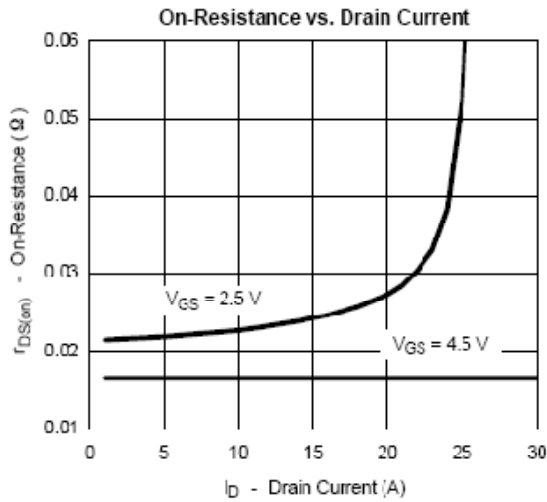
Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1.5A$		0.71	1.2	V

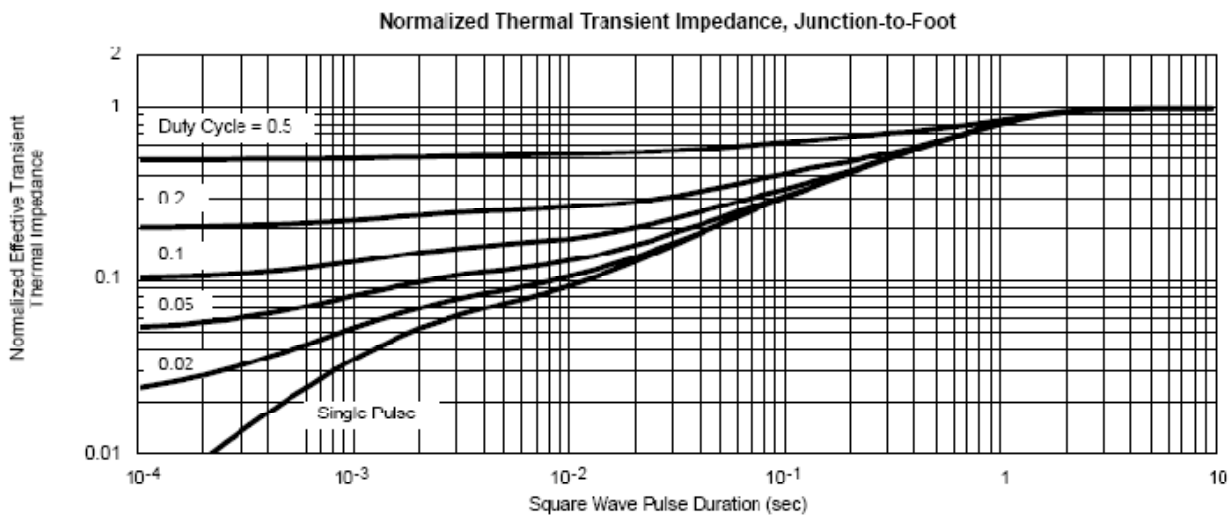
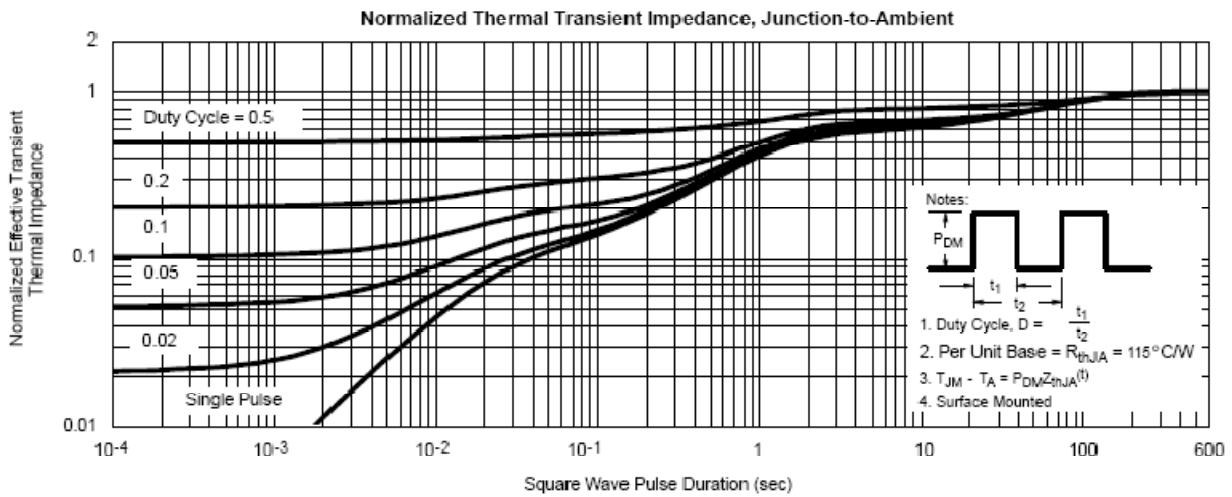
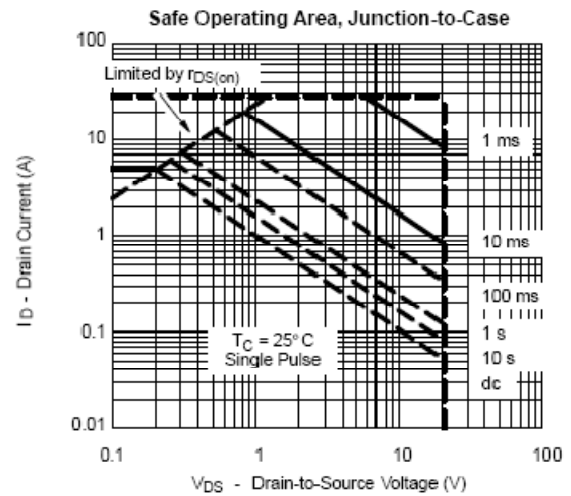
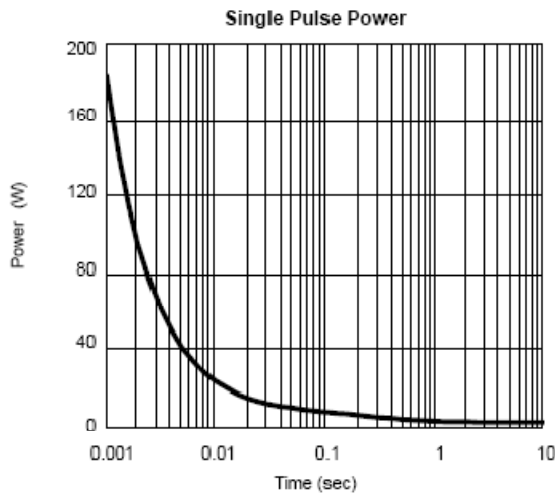
## Notes

- Surface Mounted on FR4 Board,  $t \leq 10\text{sec}$
- Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$
- Guaranteed by design, not subject to production testing.

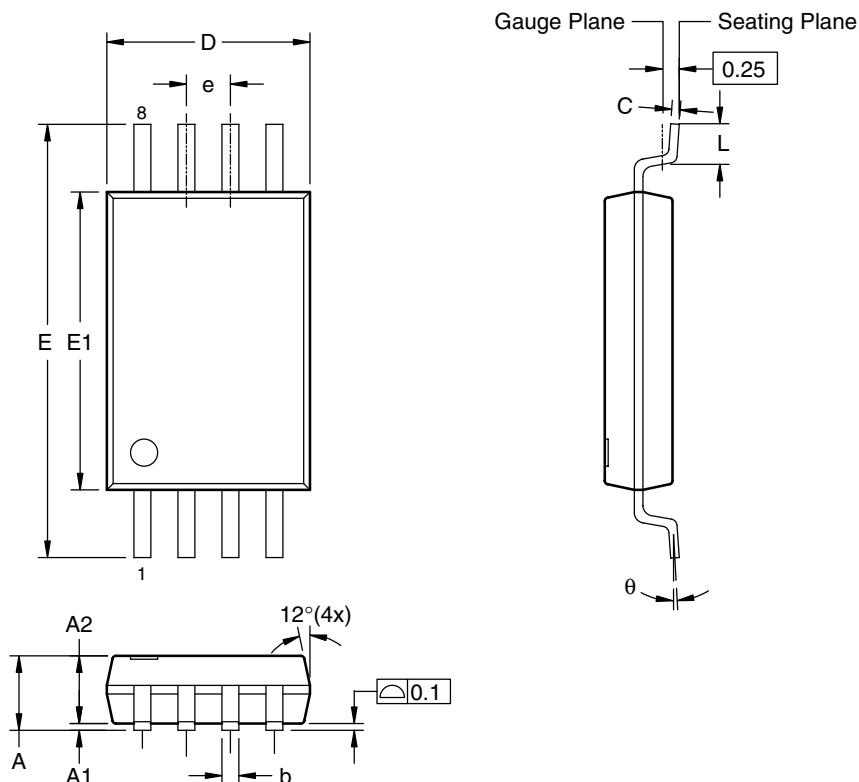
## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



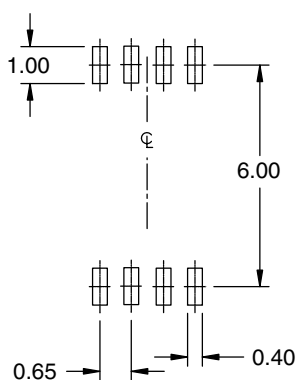




## TSSOP-8 Package Dimensions



### RECOMMENDED LAND PATTERN



UNIT: mm

### Dimensions in millimeters

Symbols	Min.	Nom.	Max.
A	—	—	1.20
A1	0.05	—	0.15
A2	0.80	1.00	1.05
b	0.19	—	0.30
C	0.09	—	0.20
D	2.90	3.00	3.10
E	6.40 BSC		
E1	4.30	4.40	4.50
e	0.65 BSC		
L	0.45	0.60	0.75
$\theta$	0°	—	8°

### Dimensions in inches

Symbols	Min.	Nom.	Max.
A	—	—	0.047
A1	0.002	—	0.006
A2	0.031	0.039	0.041
b	0.007	—	0.012
C	0.004	—	0.008
D	0.114	0.118	0.122
E	0.252 BSC		
E1	0.169	0.173	0.177
e	0.026 BSC		
L	0.018	0.024	0.030
$\theta$	0°	—	8°

### Notes:

1. All dimensions are in millimeters.
2. Dimensions are inclusive of plating
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 6 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.
6. Refer to JEDEC MO-153(AA).

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