

MT3814

N-Channel Enhancement Mode Field Effect Transistor



MT Semiconductor®

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Product Summary

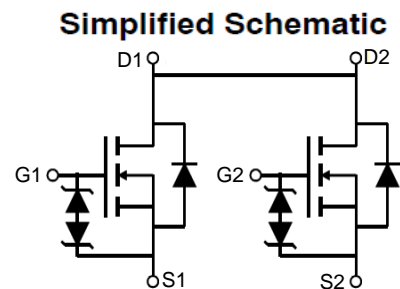
PRODUCT SUMMARY		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Typ
20V	8A	13@ V _{GS} =4.5V
		17@ V _{GS} =2.5V

Features

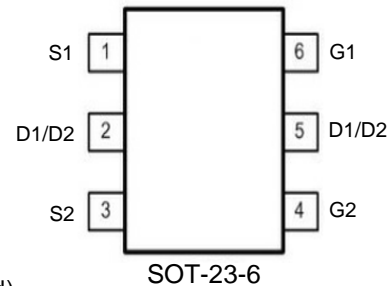
- Super high dense cell design for low R_{DS(ON)}
- Rugged and reliable
- Simple drive requirement
- Sot-23-6 package
- ESD Protected

Applications

- Portable battery packs



MARKING DIAGRAM & PIN ASSIGNMENT



Absolute Maximum Ratings (T_A = 25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	20	V
Gate-Source Voltage	V _{GS}	±12	V
Drain Current-Continuous ^a @T _j =125°C	I _D	8	A
	- Pulse ^b	DM	30
Drain-source Diode Forward Current ^a	I _S	1.5	A
Maximum Power Dissipation ^a	P _D	1.25	W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to Ambient ^a	R _{th JA}	80	°C/W
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ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

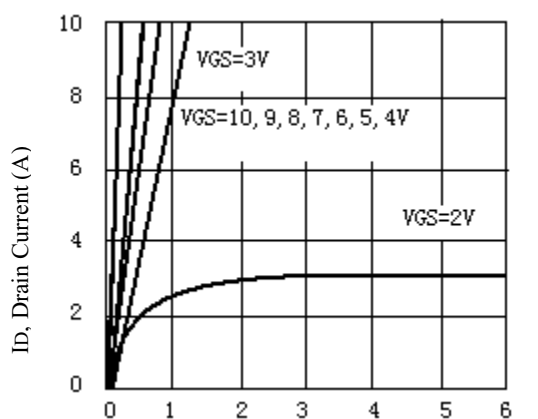
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=16V, V_{GS}=0V$			1	μA
Gate-Body Leakage	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$			± 9.7	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$		0.8		V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=3.6A$		13	14	$m\Omega$
		$V_{GS}=2.5V, I_D=2.5A$		17	19	
Forward Transconductance	g_{FS}	$V_{GS}=5V, I_D=5A$		1.7		S
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{DS}=10V, V_{GS}=0V$ $f=1.0MHz$		1100		pF
Output Capacitance	C_{OSS}			210		pF
Reverse Transfer Capacitance	C_{RSS}			195		pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=10V$ $I_D=6A,$ $V_{GEN}=4.5V$ $R_L=10\Omega$ $R_{GEN}=10\Omega$		7	14	ns
Rise Time	t_r			11	21	ns
Turn-Off Delay Time	$t_{D(off)}$			65	116	ns
Fall Time	t_f			32	116	ns
Total Gate Charge	Q_g	$V_{DS}=10V, I_D=1A$ $V_{GS}=4.5V$		16		nC
Gate-Source Charge	Q_{gs}			1.7		nC
Gate-Drain Charge	Q_{gd}			6		nC

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

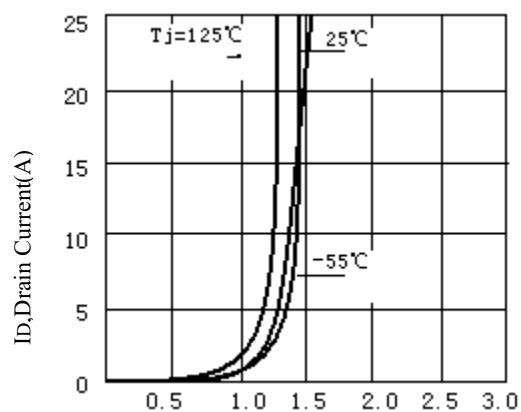
Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage	VSD	VGS=0V, I =1.7A		0.8		V

Notes

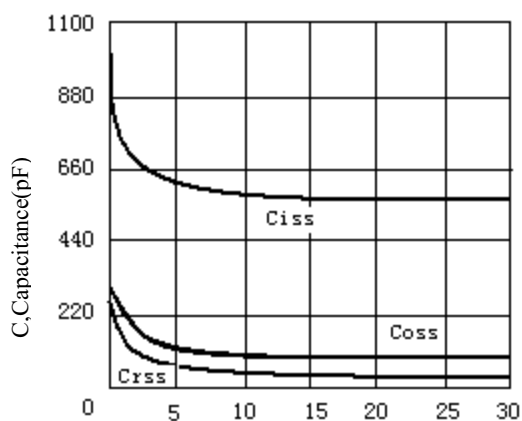
- a. Surface Mounted on FR4 Board, $t \cong 10\text{sec}$
- b. Pulse Test: Pulse Width $\cong 300\mu\text{s}$, Duty Cycle $\cong 2\%$
- c. Guaranteed by design, not subject to production testing.



VDS, Drain-to-Source Voltage (V)
Figure 1. Output Characteristics



VGS, Gate-to-source Voltage (V)
Figure 2. Transfer Characteristics



VGS, Drain-to Source Voltage
Figure3. Capacitance

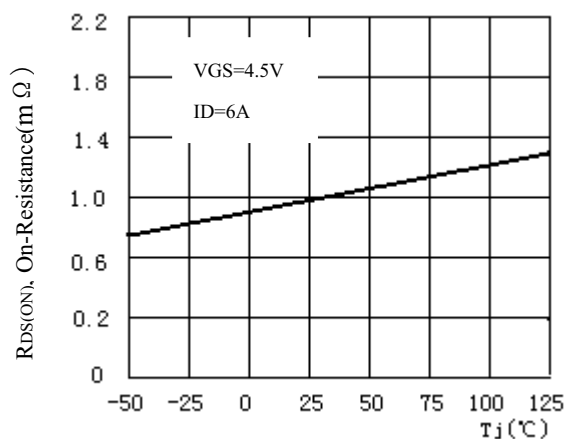
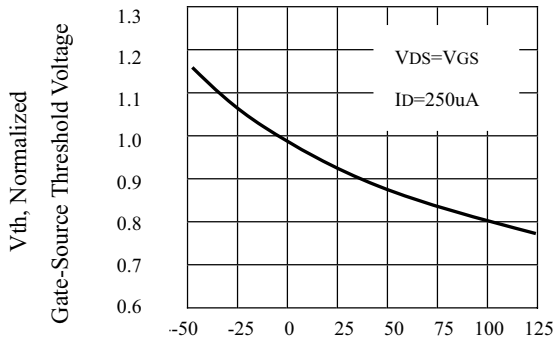
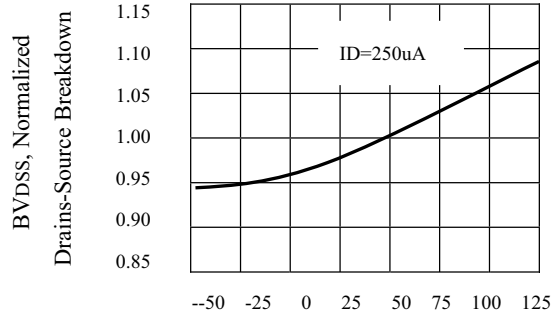


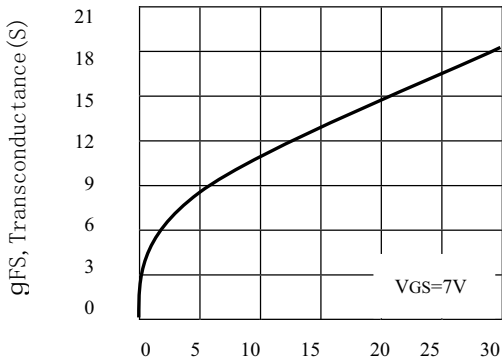
Figure4. On-Resistance Variation with Temperature



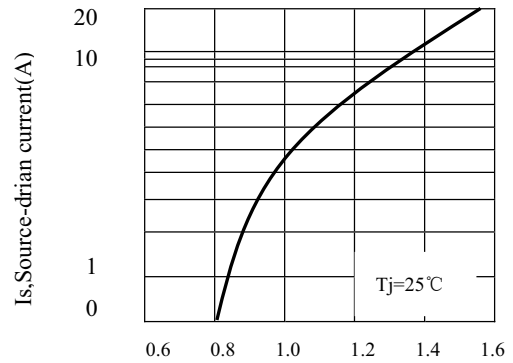
Tj, Junction Temperature(°C)
 Figure5.Gate Threshold Variation With Temperature



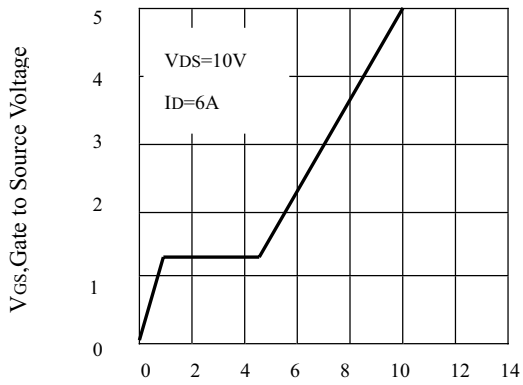
Tj, Junction Temperature (°C)
 Figure6.Breakdown Voltage Variation With Temperature



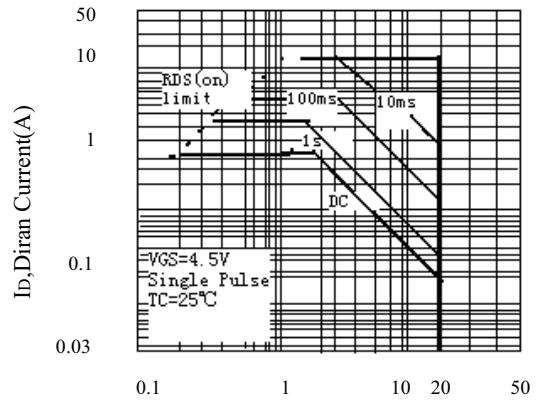
IDS, Drain-Source Current (A)
 Figure7.Transconductance Variation With Drain Current



VSD, Body Diode Forward Voltage
 Figure8.Body Diode Forward Voltage Variation with Source Current



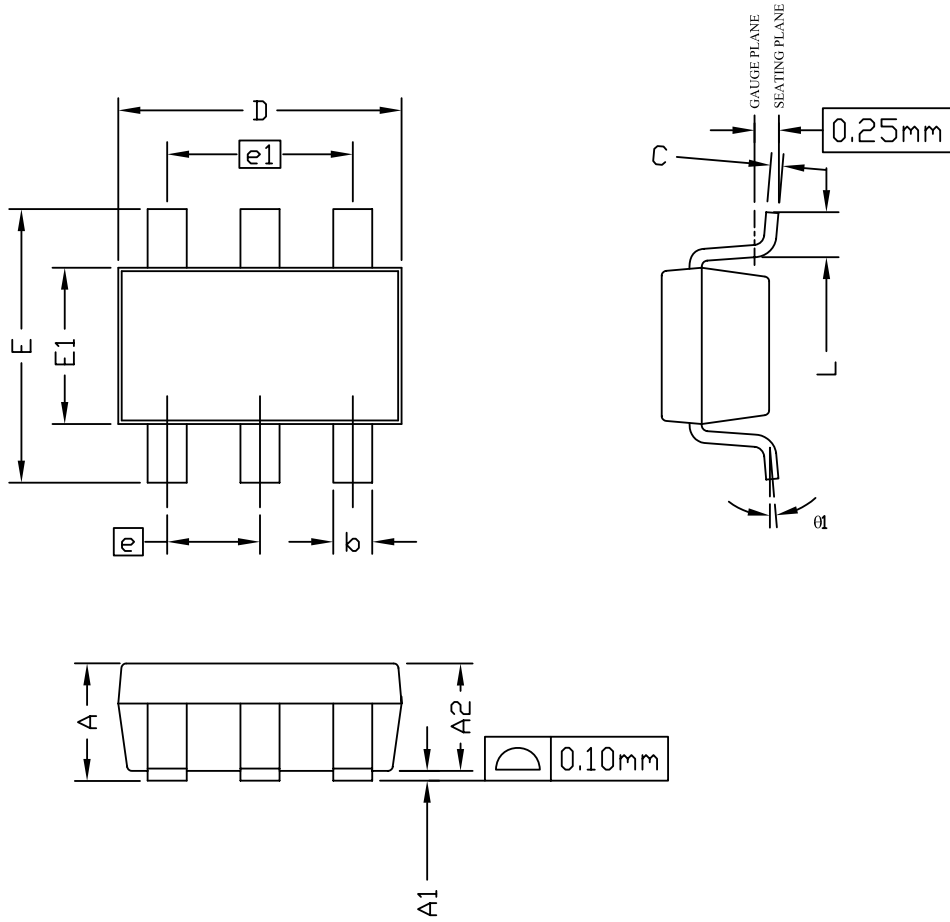
Qg, Total Gate Charge (nC)
 Figure9. Gate Charge



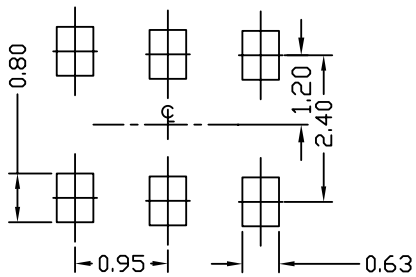
VDS, Drain-Source Voltage(V)
 Figure10.Maximum Safe Operating Area

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Version	rev B

SOT23_6 PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



UNIT: mm

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	---	1.25	0.035	---	0.049
A1	0.00	---	0.15	0.00	---	0.006
A2	0.70	1.10	1.20	0.028	0.043	0.047
b	0.30	0.40	0.50	0.012	0.016	0.020
C	0.08	0.13	0.20	0.003	0.005	0.008
D	2.70	2.90	3.10	0.106	0.114	0.122
E	2.50	2.80	3.10	0.098	0.110	0.122
E1	1.50	1.60	1.70	0.059	0.063	0.067
e	0.95 BSC.			0.037BSC.		
e1	1.90 BSC.			0.075 BSC.		
L	0.30	---	0.60	0.012	---	0.024
θ1	0°	---	8°	0°	---	8°

NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 5 MILS EACH.
2. DIMENSION "L" IS MEASURED IN GAGE PLANE.
3. TOLERANCE ±0.100 mm(4 mil) UNLESS OTHERWISE SPECIFIED.
4. FOLLOWED FROM JEDEC MO-178C & MO-193C.
5. CONTROLLING DIMENSIONS IS MILLIMETER.
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

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