TSM6968SD

20V Dual N-Channel MOSFET w/ESD Protected

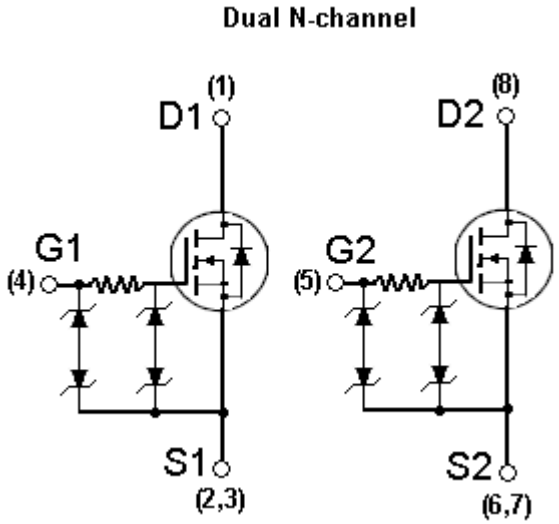
Pin assignment:
1. Drain 1
2. Source 1
3. Source 1
4. Gate 1
5, Gate 2
6. Source 2
7, Source 2
8. Drain 2

V_{DS} = 20V
$R_{DS\ (on)}$, Vgs @ 4.5V, Ids @ 6.5A =25mΩ
$R_{DS\ (on)}$, Vgs @ 2.5V, Ids @ 5.5A =35mΩ

Features

- ✧ Advanced trench process technology
- ✧ High density cell design for ultra low on-resistance
- ✧ Excellent thermal and electrical capabilities
- ✧ Specially designed for Li-ion battery packs.
- ✧ Battery switch application

Block Diagram



Ordering Information

Part No.	Packing	Package
TSM6968SDCA	Tape & Reel 3,000/per reel	TSSOP-8

Absolute Maximum Rating (Ta = 25 °C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	20V	V
Gate-Source Voltage		V_{GS}	± 12	V
Continuous Drain Current, V_{GS} @4.5V.		I_D	6.5	A
Pulsed Drain Current, V_{GS} @4.5V		I_{DM}	30	A
Maximum Power Dissipation	Ta = 25 °C	P_D	1.5	W
	Ta = 70 °C		0.96	
Operating Junction Temperature		T_J	+150	°C
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Junction to Foot (Drain) Thermal Resistance	Rθjf	35	°C/W
Junction to Ambient Thermal Resistance (PCB mounted)	Rθja	83	°C/W

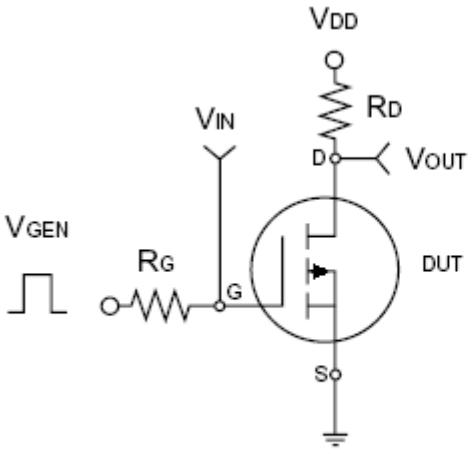
Note: Surface mounted on FR4 board t<=10sec.

Electrical Characteristics

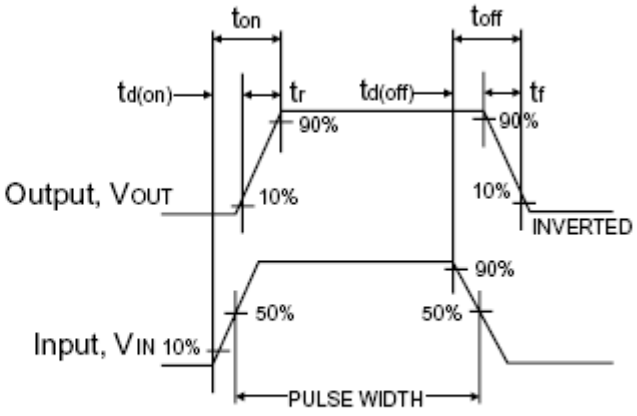
Rate I_D = 6.5A, (Ta = 25 °C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250uA	BV_{DSS}	20	--	--	V
Drain-Source On-State Resistance	V_{GS} = 4.5V, I_D = 6.5A	$R_{DS(ON)}$	--	18	25	mΩ
Drain-Source On-State Resistance	V_{GS} = 2.5V, I_D = 5.5A	$R_{DS(ON)}$	--	28	35	
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	$V_{GS(TH)}$	0.5	0.85	--	V
Zero Gate Voltage Drain Current	V_{DS} = 20V, V_{GS} = 0V	I_{DSS}	--	--	1.0	uA
Gate Body Leakage	V_{GS} = ± 12V, V_{DS} = 0V	I_{GSS}	--	--	± 10	uA
On-State Drain Current	V_{GS} = 4.5V, V_{DS} >= 5V	$I_{D(ON)}$	30	--	--	A
Forward Transconductance	V_{DS} = 10V, I_D = 6.5A	g_{fs}	--	30	--	S
Dynamic						
Total Gate Charge	V_{DS} = 10V, I_D = 6.5A, V_{GS} = 4.5V	Q_g	--	15.5	30	nC
Gate-Source Charge		Q_{gs}	--	2	--	
Gate-Drain Charge		Q_{gd}	--	3.5	--	
Turn-On Delay Time	V_{DD} = 10V, R_L = 10Ω, I_D = 1A, V_{GEN} = 4.5V, R_G = 6Ω	$t_{d(on)}$	--	75	100	nS
Turn-On Rise Time		t_r	--	125	150	
Turn-Off Delay Time		$t_{d(off)}$	--	600	720	
Turn-Off Fall Time		t_f	--	300	360	
Input Capacitance	V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	1336	--	pF
Output Capacitance		C_{oss}	--	220	--	
Reverse Transfer Capacitance		C_{rss}	--	130	--	
Source-Drain Diode						
Max. Diode Forward Current		I_S	--	--	1.5	A
Diode Forward Voltage	I_S = 1.5A, V_{GS} = 0V	V_{SD}	--	0.6	1.2	V

Note : pulse test: pulse width <=300uS, duty cycle <=2%



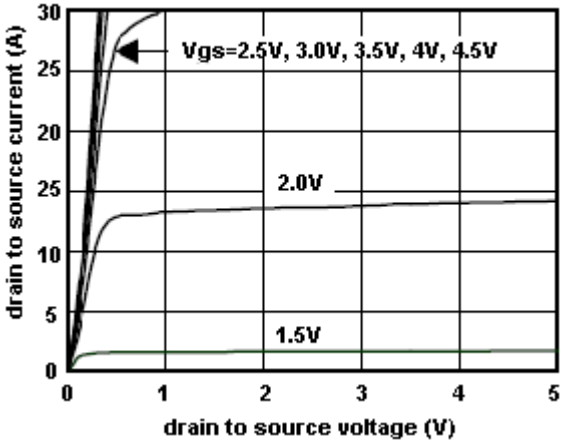
Switching Test Circuit



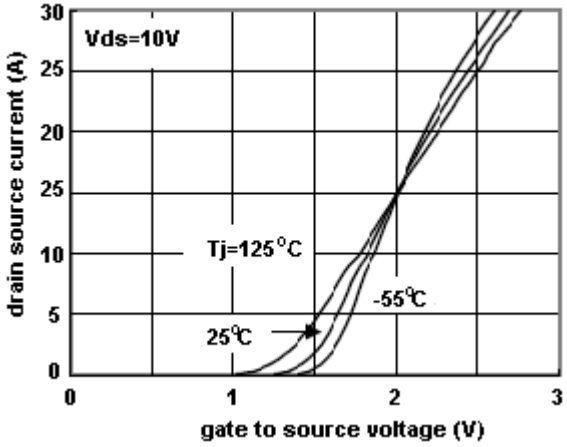
Switchin Waveforms

Typical Characteristics Curve (Ta = 25 °C unless otherwise noted)

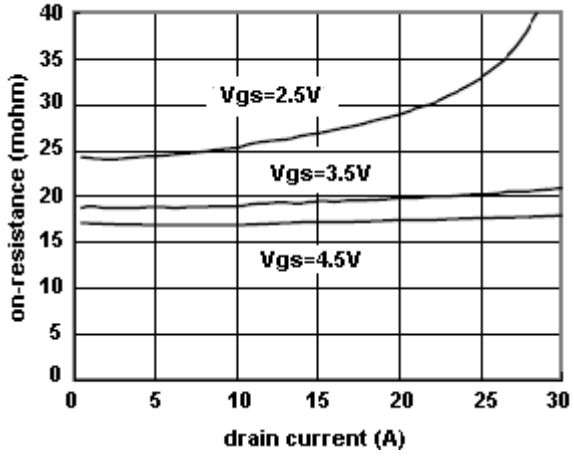
Output Characteristic



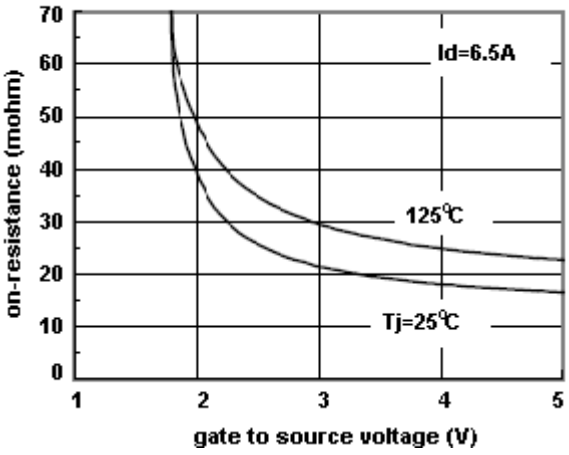
Transfer Characteristic



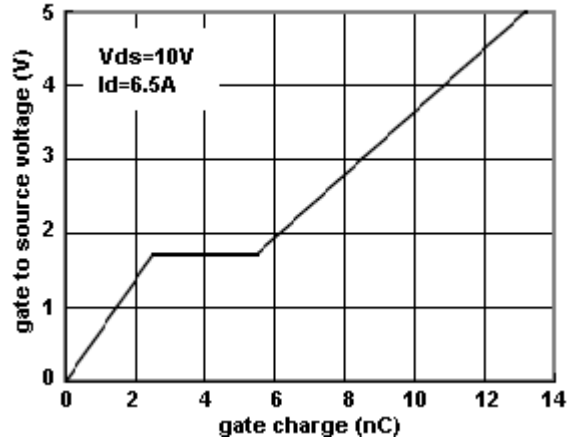
On Resistance vs Drain Current



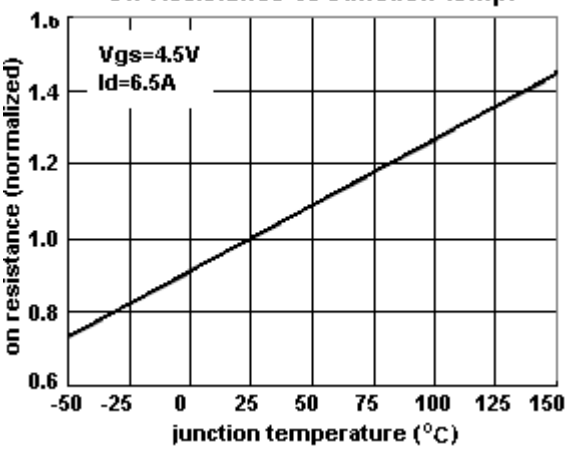
On Resistance vs Gate-Source



Gate Charge

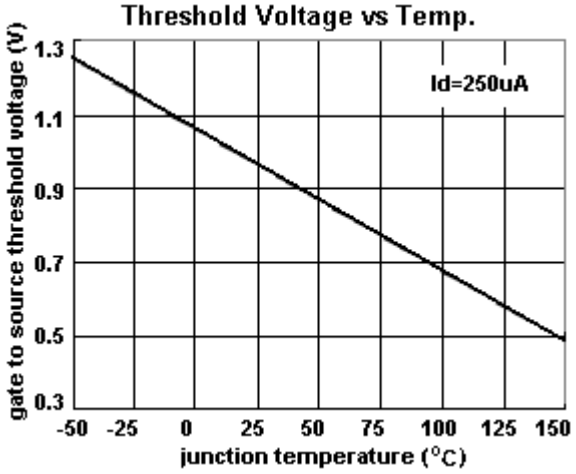


On Resistance vs Junction temp.

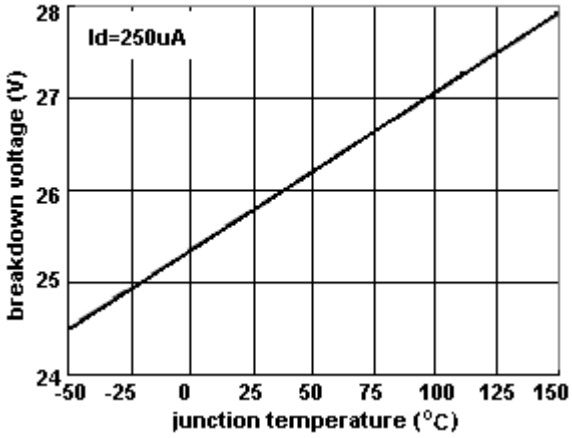


Electrical Characteristics Curve (continued)

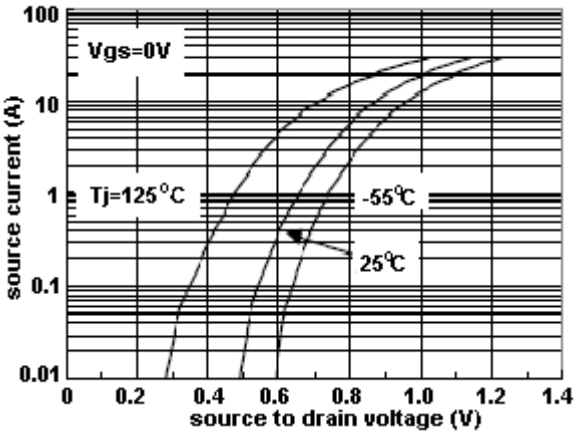
Threshold Voltage vs Temp.



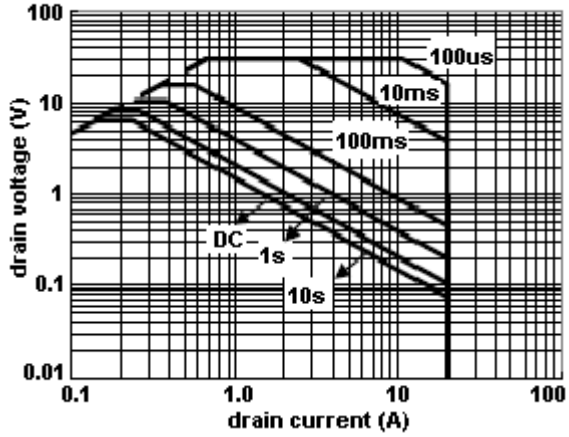
Breakdwon Voltage vs Junction temp.



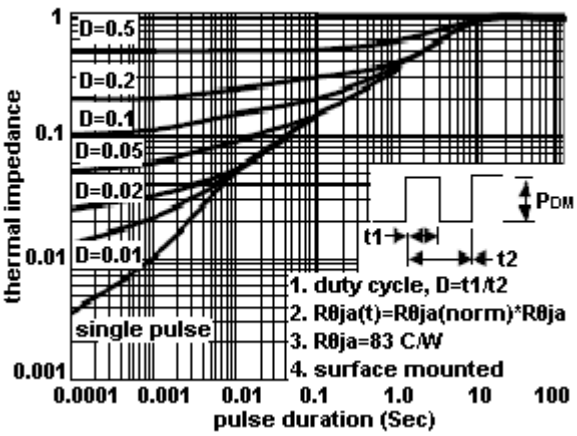
Source Drain Diode Forward Voltage



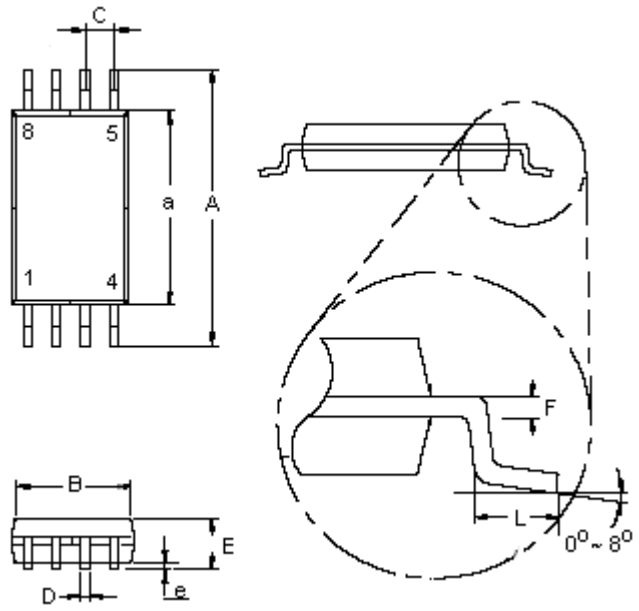
Maximum Safe Operating Area



Transient Thermal Impedance



TSSOP-8 Mechanical Drawing



TSSOP-8 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.20	6.60	0.244	0.260
a	4.30	4.50	0.170	0.177
B	2.90	3.10	0.114	0.122
C	0.65 (typ)		0.025 (typ)	
D	0.25	0.30	0.010	0.019
E	1.05	1.20	0.041	0.049
e	0.05	0.15	0.002	0.009
F	0.127		0.005	
L	0.50	0.70	0.020	0.028