TSM3461CX5

20V N-Channel MOSFET w/ESD Protected

SOT-25

Pin assignment:
1. Drain 5. Drain
2. Drain
3. Gate 4. Source

V_{DS} = 20V

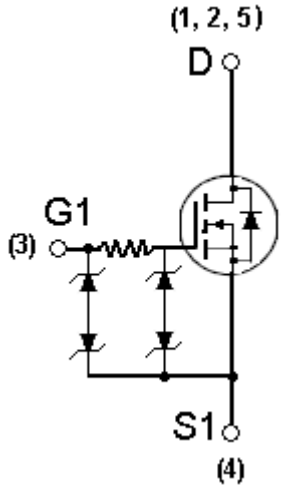
$R_{DS\ (on)}$, Vgs @ 4.5V, Ids @ 6A =22mΩ (typ.)

$R_{DS\ (on)}$, Vgs @ 2.5V, Ids @ 5A =35mΩ (typ.)

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
TSM3461CX5 RF	Tape & Reel 3,000/per reel	SOT-25

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.	Ta = 25 °C	I_D	6	A
	Ta = 70 °C	I_D	5	A
Pulsed Drain Current, V_{GS} @4.5V		I_{DM}	30	A
Diode Forward Current		Is	1.5	A
Maximum Power Dissipation	Ta = 25 °C	P_D	1.3	W
	Ta = 70 °C		0.96	
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	120	°C/W

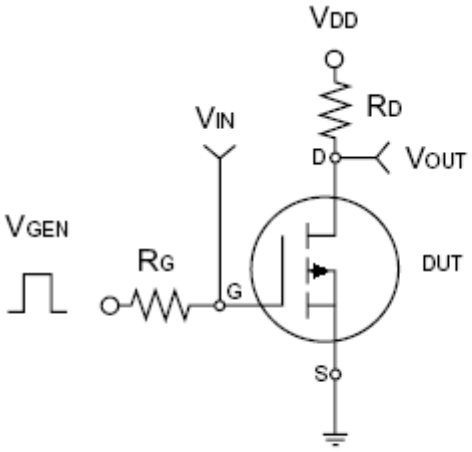
Note: Surface mounted on FR4 board t<=300uS, Duty < 2%.

Electrical Characteristics

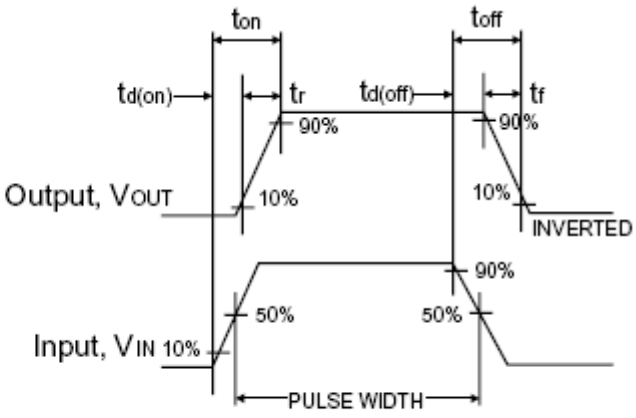
Tj = 25 °C unless otherwise noted

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 = 6A	25 °C	$R_{DS(ON)}$	--	25	30	mΩ
	V_{GS} = 4.5V, I_D = 6A	60 °C	$R_{DS(ON)}$	--	40	50	
Drain-Source On-State Resistance	V_{GS} = 2.5V, I_D = 5A		$R_{DS(ON)}$	--	35	45	mΩ
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} = 12V, V_{GS} = 0V		I_{DSS}	--	--	1.0	uA
	V_{DS} = 12V, V_{GS} = 0V, Tj = 60 °C			--	--	25	
Gate Body Leakage	V_{GS} = ± 12V, V_{DS} = 0V		I_{GSS}	--	--	± 100	nA
On-State Drain Current	V_{GS} = 4.5V, V_{DS} >= 5V		$I_{D(ON)}$	30	--	--	A
Forward Transconductance	V_{DS} = 10V, I_D = 6A		g_{fs}	--	30	--	S
Dynamic *							
Total Gate Charge	V_{DS} = 10V, I_D = 6A,		Q_g	--	15.5	30	nC
Gate-Source Charge	V_{GS} = 4.5V		Q_{gs}	--	2	--	
Gate-Drain Charge			Q_{gd}	--	3.5	--	
Turn-On Delay Time	V_{DD} = 10V, R_L = 10Ω,		$t_{d(on)}$	--	75	100	nS
Turn-On Rise Time	I_D = 1A, V_{GEN} = 4.5V,		t_r	--	125	150	
Turn-Off Delay Time	R_G = 6Ω		$t_{d(off)}$	--	600	720	
Turn-Off Fall Time			t_f	--	300	360	
Input Capacitance	V_{DS} = 10V, V_{GS} = 0V,		C_{iss}	--	1336	--	pF
Output Capacitance	f = 1.0MHz		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 : * for design only, not subject to production tested.
pulse test: pulse width <=300uS, duty cycle <=2%



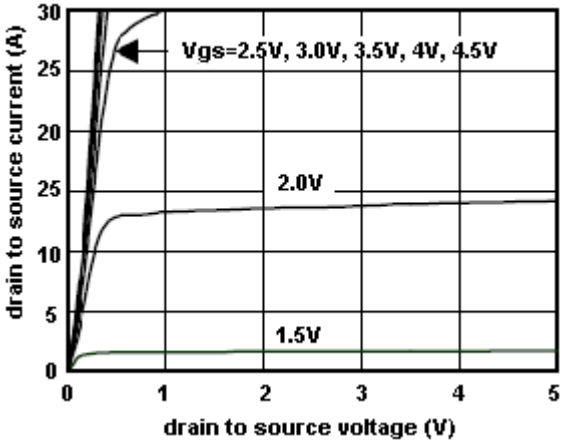
Switching Test Circuit



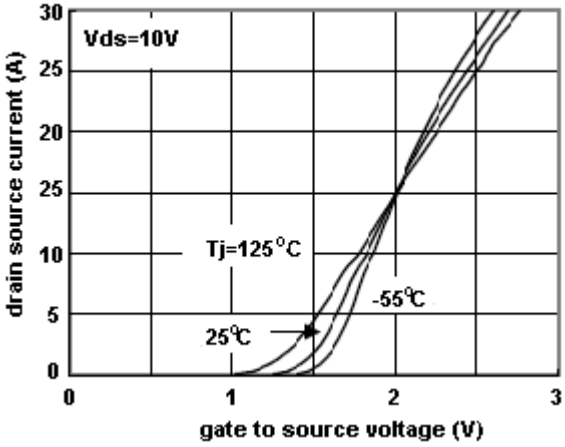
Switchin Waveforms

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

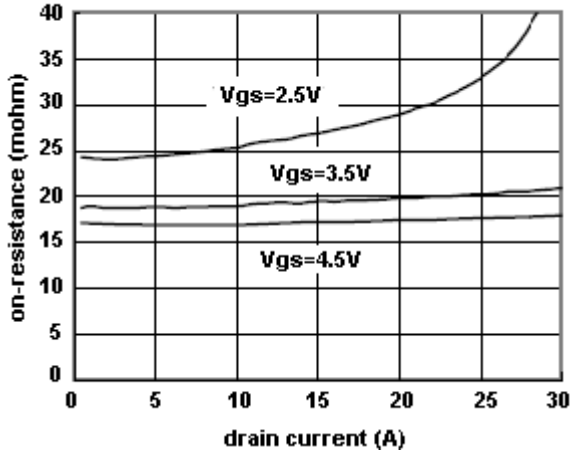
Output Characteristic



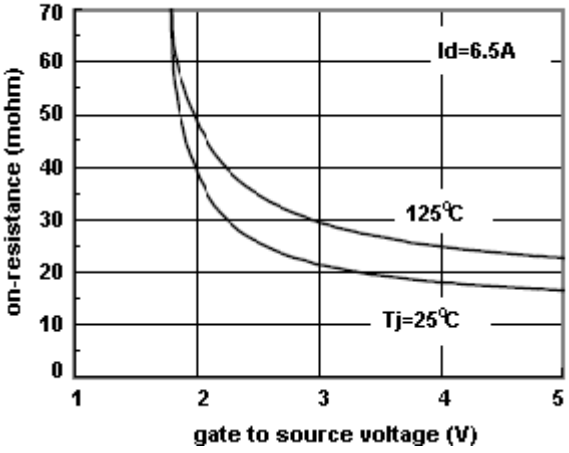
Transfer Characteristic



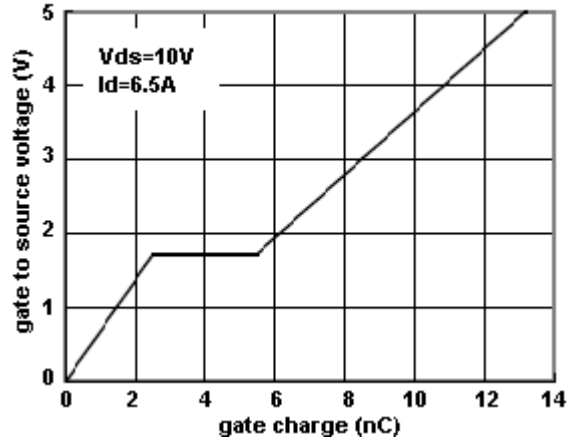
On Resistance vs Drain Current



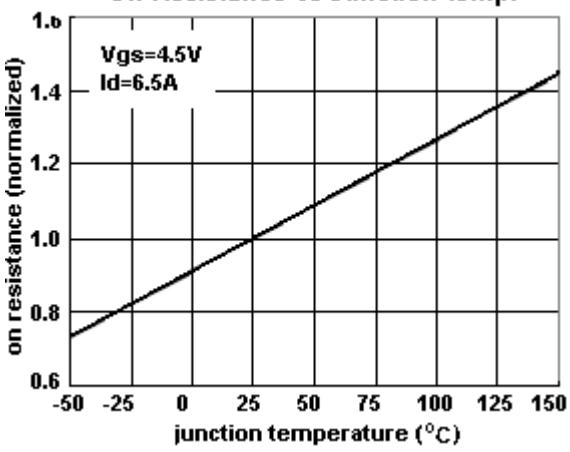
On Resistance vs Gate-Source



Gate Charge

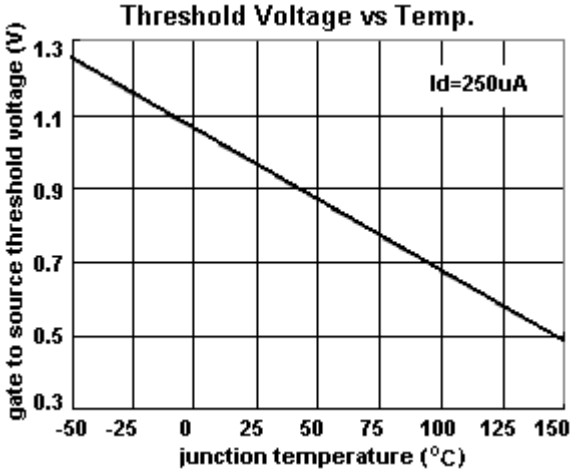


On Resistance vs Junction temp.

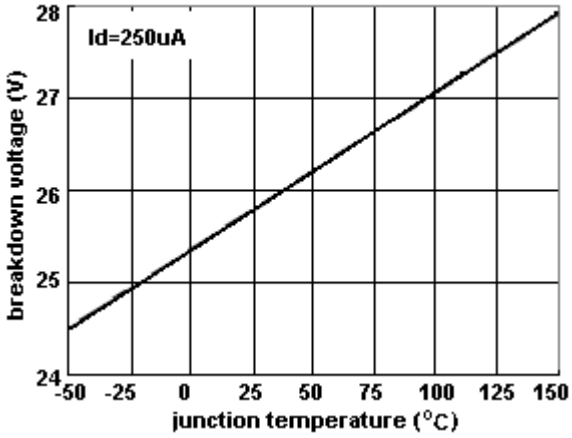


Electrical Characteristics Curve (continued)

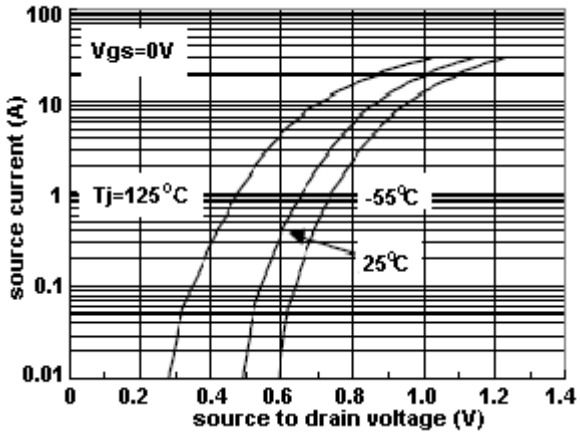
Threshold Voltage vs Temp.



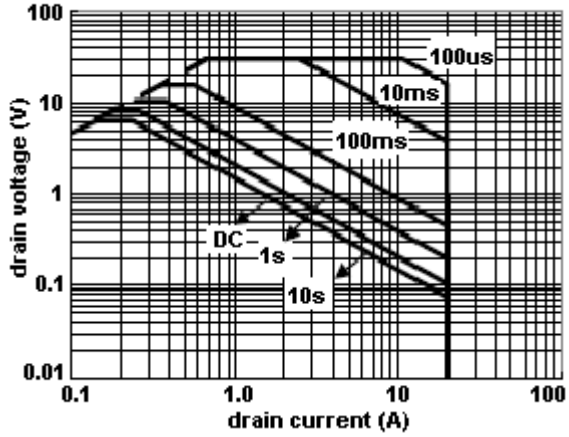
Breakdwon Voltage vs Junction temp.



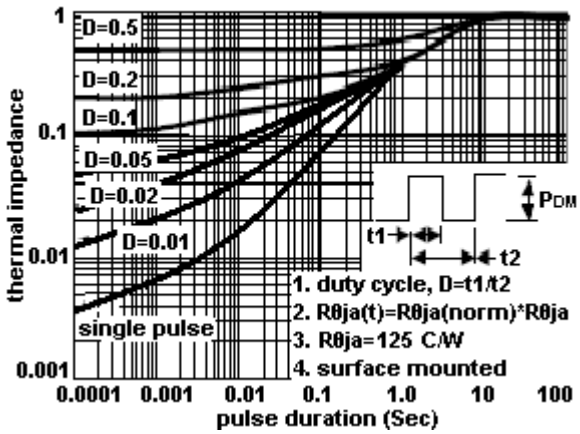
Source Drain Diode Forward Voltage



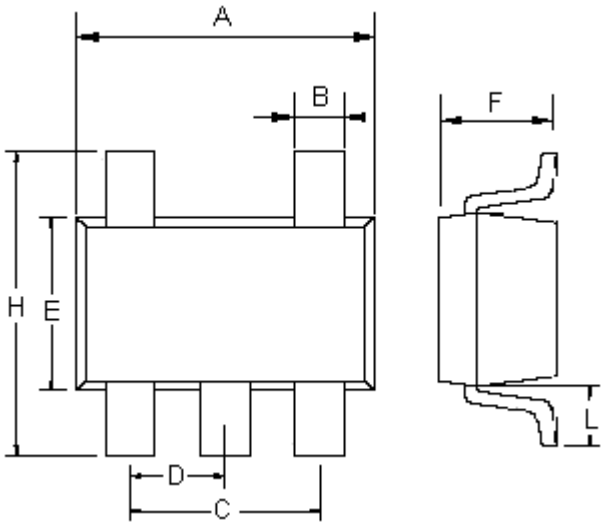
Maximum Safe Operating Area



Transient Thermal Impedance



SOT-25 Mechanical Drawing



SOT-25 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.70	3.00	0.106	0.118
B	0.25	0.50	0.010	0.020
C	1.90(typ)		0.075(typ)	
D	0.95(typ)		0.037(typ)	
E	1.50	1.70	0.059	0.067
F	1.00	1.2	0.040	0.047
H	2.60	3.00	0.102	0.118
L	0.60(typ)		0.024(typ)	