



TSM3461CX5

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20V N-Channel MOSFET w/ESD Protected

SOT-25



Pin assignment:

- | | |
|----------|-----------|
| 1. Drain | 5. Drain |
| 2. Drain | |
| 3. Gate | 4. Source |

$V_{DS} = 20V$

$R_{DS(on)}, V_{GS} @ 4.5V, I_{DS} @ 6A = 22m\Omega$ (typ.)

$R_{DS(on)}, V_{GS} @ 2.5V, I_{DS} @ 5A = 35m\Omega$ (typ.)

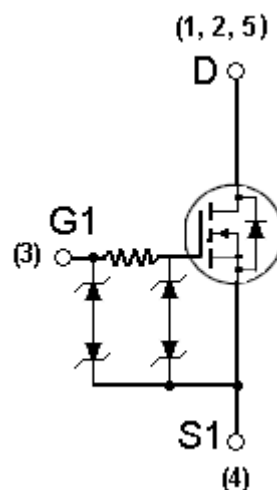
Features

- 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

Ordering Information

Part No.	Packing	Package
TSM3461CX5 RF	Tape & Reel 3,000/per reel	SOT-25

Block Diagram



Absolute Maximum Rating ($T_a = 25^\circ C$ 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		I _S	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	$R_{\theta JF}$	35	$^\circ C/W$
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta JA}$	120	$^\circ C/W$

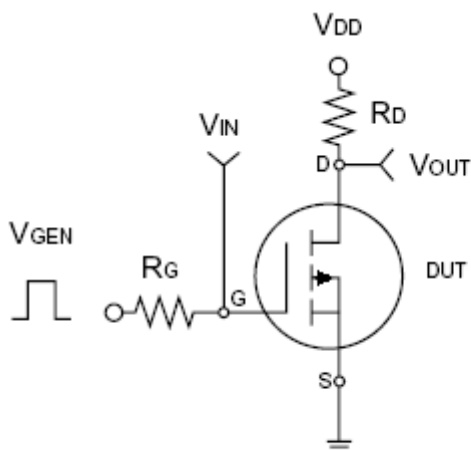
Note: Surface mounted on FR4 board $t \leq 300\mu s$, Duty < 2%.

Electrical Characteristics

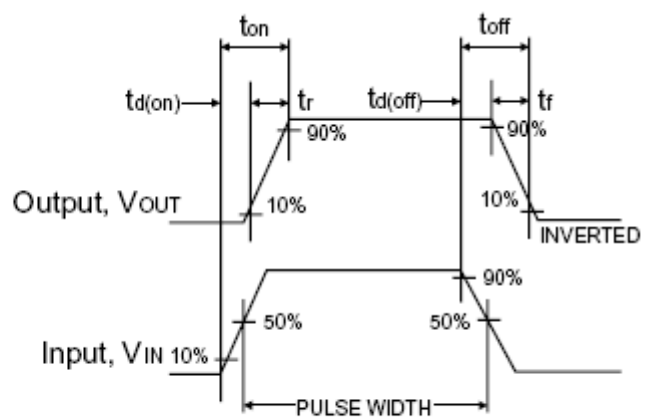
$T_j = 25^\circ\text{C}$ unless otherwise noted

Parameter	Conditions		Symbol	Min	Typ	Max	Unit
Static							
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$		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	$V_{DS} = V_{GS}, I_D = 250\mu A$		$V_{GS(TH)}$	0.5	0.85	--	V
Zero Gate Voltage Drain Current	$V_{DS} = 12V, V_{GS} = 0V$		I_{DSS}	--	--	1.0	uA
	$V_{DS} = 12V, V_{GS} = 0V, T_j = 60\text{ }^{\circ}\text{C}$			--	--	25	
Gate Body Leakage	$V_{GS} = \pm 12V, V_{DS} = 0V$		I_{GSS}	--	--	± 100	nA
On-State Drain Current	$V_{GS} = 4.5V, V_{DS} \geq 5V$		$I_{D(ON)}$	30	--	--	A
Forward Transconductance	$V_{DS} = 10V, I_D = 6A$		g_{fs}	--	30	--	S
Dynamic *							
Total Gate Charge	$V_{DS} = 10V, I_D = 6A,$ $V_{GS} = 4.5V$		Q_g	--	15.5	30	nC
Gate-Source Charge			Q_{gs}	--	2	--	
Gate-Drain Charge			Q_{gd}	--	3.5	--	
Turn-On Delay Time	$V_{DD} = 10V, R_L = 10\Omega,$ $I_D = 1A, V_{GEN} = 4.5V,$ $R_G = 6\Omega$		$t_{d(on)}$	--	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 : * for design only, not subject to production tested.
pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$

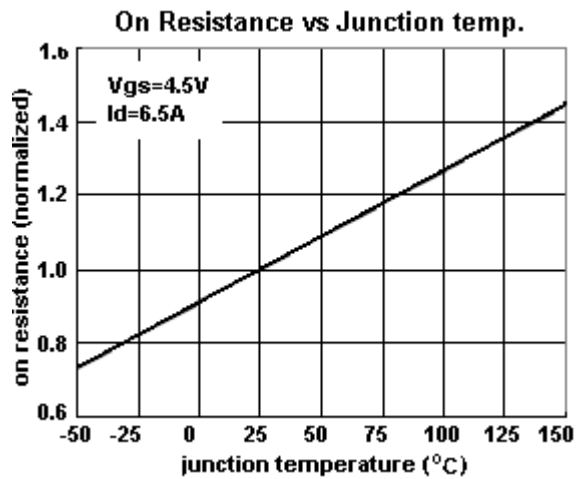
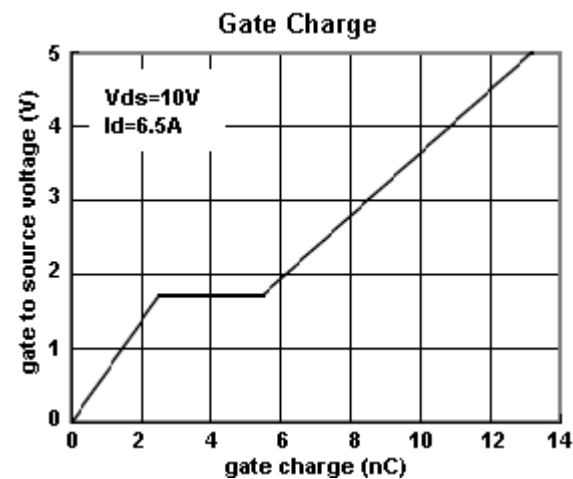
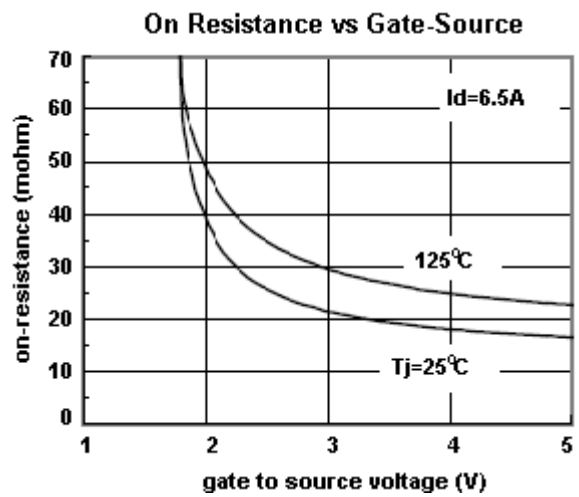
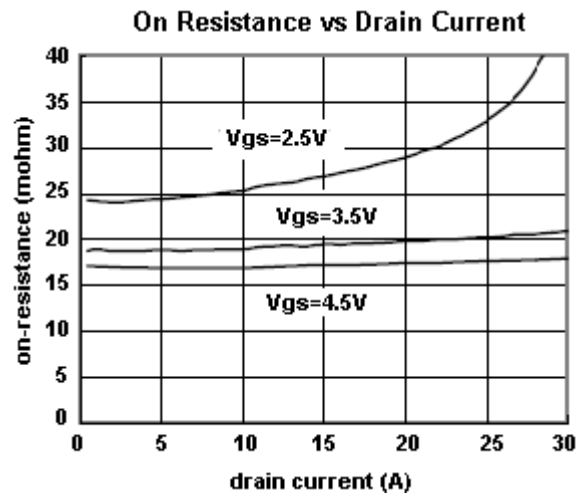
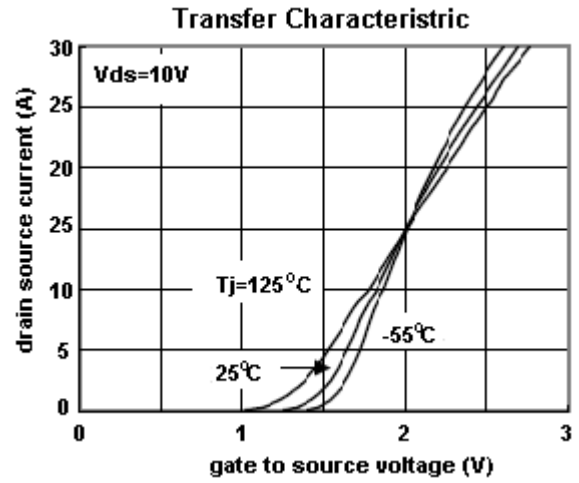
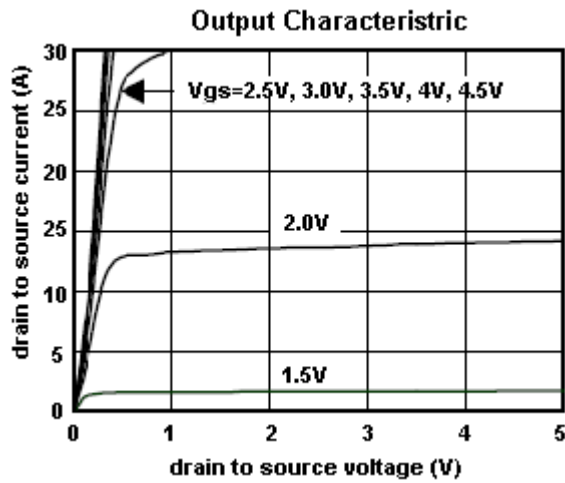


Switching Test Circuit

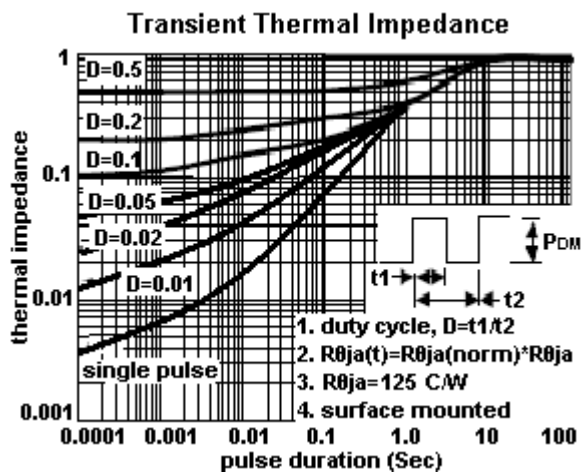
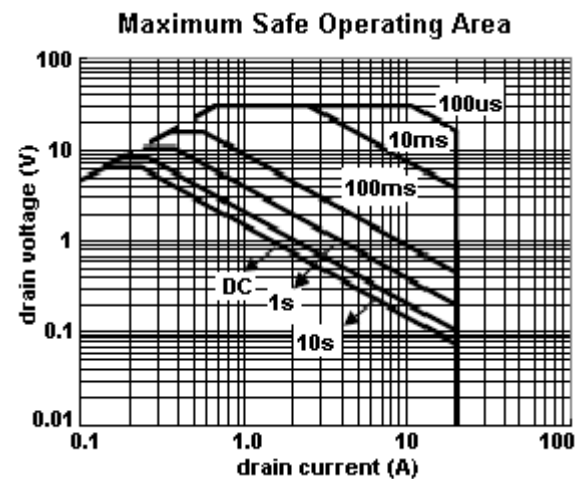
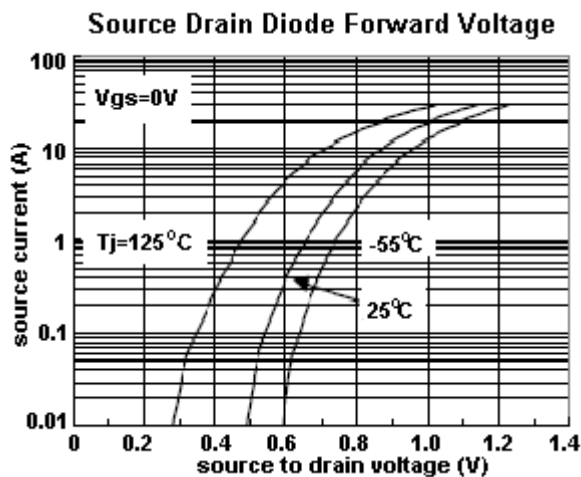
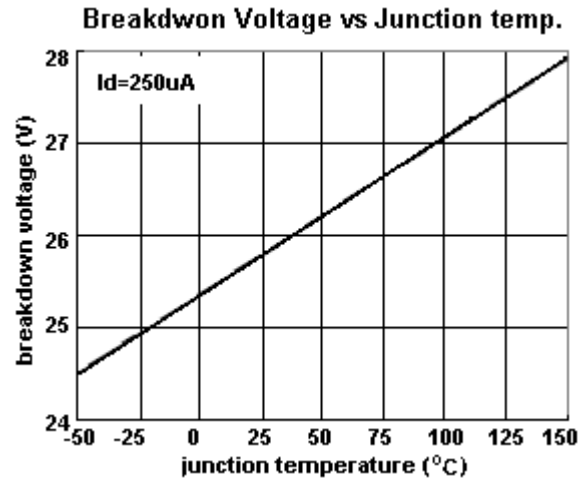
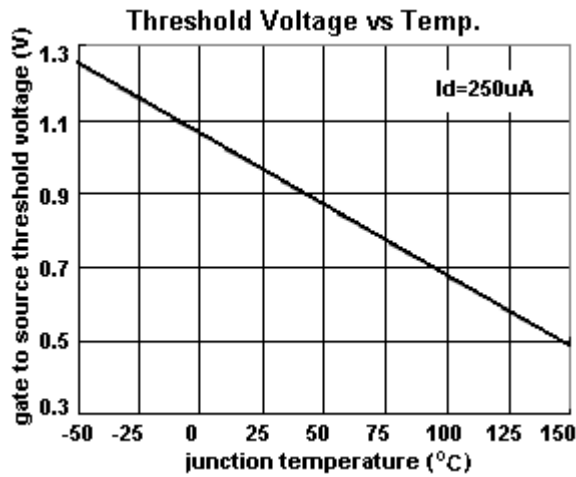


Switchin Waveforms

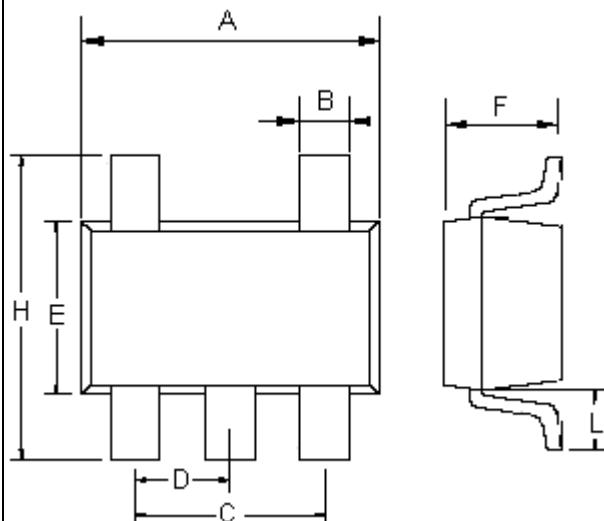
Typical Characteristics Curve ($T_a = 25^\circ\text{C}$ unless otherwise noted)



Electrical Characteristics Curve (continued)



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)	