



# TSM3460

## 20V N-Channel MOSFET w/ESD Protected

SOT-26



Pin assignment:

- |          |           |
|----------|-----------|
| 1. Drain | 6. Drain  |
| 2. Drain | 5. Drain  |
| 3. Gate  | 4. Source |

$V_{DS} = 20V$

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

$R_{DS(on)}, V_{GS} @ 2.5V, I_{DS} @ 5A = 30m\Omega$  (typ.)

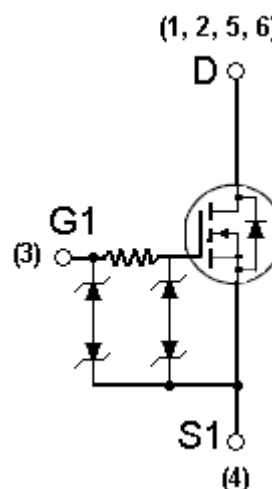
### Features

- ✧ 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
TSM3460CX6	Tape & Reel 3,000/per reel	SOT-26

### Block Diagram



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

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{DS}$	20V	V	
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V	
Continuous Drain Current, $V_{GS} @ 4.5V$ .	$T_a = 25^\circ C$	$I_D$	6	A
	$T_a = 70^\circ C$	$I_D$	5	A
Pulsed Drain Current, $V_{GS} @ 4.5V$	$I_{DM}$	30	A	
Diode Forward Current	$I_S$	1.5	A	
Maximum Power Dissipation	$T_a = 25^\circ C$	$P_D$	1.3	W
	$T_a = 70^\circ C$		0.96	
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	- 55 to +150	$^\circ C$	

### Thermal Performance

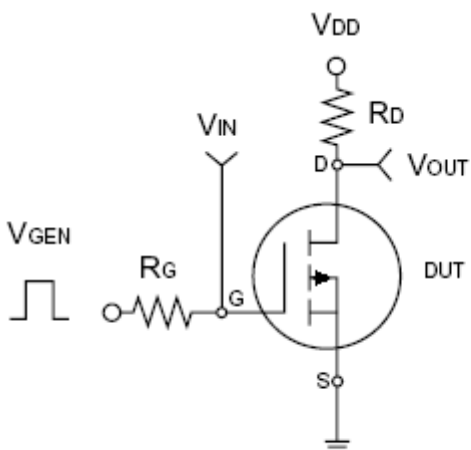
Parameter	Symbol	Limit	Unit
Junction to Foot (Drain) Thermal Resistance	$R_{\theta jf}$	35	$^\circ C/W$
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta ja}$	120	$^\circ C/W$

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

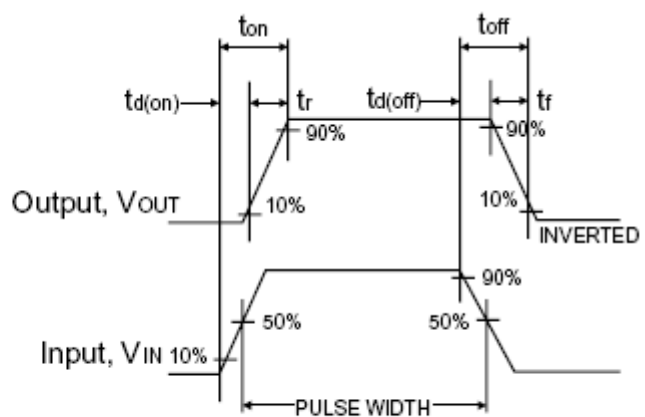


Electrical Characteristics						
T <sub>j</sub> = 25 °C unless otherwise noted						
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250uA	BV <sub>DSS</sub>	20	--	--	V
Drain-Source On-State Resistance	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6A	R <sub>DS(ON)</sub>	--	22	30	mΩ
	25 °C					
	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6A			40	50	
Drain-Source On-State Resistance	V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 5A	R <sub>DS(ON)</sub>	--	30	40	mΩ
Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250uA	V <sub>GS(TH)</sub>	0.5	0.85	--	V
Zero Gate Voltage Drain Current	V <sub>DS</sub> = 12V, V <sub>GS</sub> = 0V	I <sub>DSS</sub>	--	--	1.0	uA
	V <sub>DS</sub> = 12V, V <sub>GS</sub> = 0V, T <sub>j</sub> = 60 °C					
Gate Body Leakage	V <sub>GS</sub> = ± 12V, V <sub>DS</sub> = 0V	I <sub>GSS</sub>	--	--	± 100	nA
On-State Drain Current	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> >= 5V	I <sub>D(ON)</sub>	30	--	--	A
Forward Transconductance	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6A	g <sub>fs</sub>	--	30	--	S
<b>Dynamic *</b>						
Total Gate Charge	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6A, V <sub>GS</sub> = 4.5V	Q <sub>g</sub>	--	15.5	30	nC
Gate-Source Charge		Q <sub>gs</sub>	--	2	--	
Gate-Drain Charge		Q <sub>gd</sub>	--	3.5	--	
Turn-On Delay Time	V <sub>DD</sub> = 10V, R <sub>L</sub> = 10Ω, I <sub>D</sub> = 1A, V <sub>GEN</sub> = 4.5V, R <sub>G</sub> = 6Ω	t <sub>d(on)</sub>	--	75	100	nS
Turn-On Rise Time		t <sub>r</sub>	--	125	150	
Turn-Off Delay Time		t <sub>d(off)</sub>	--	600	720	
Turn-Off Fall Time		t <sub>f</sub>	--	300	360	
Input Capacitance	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1.0MHz	C <sub>iss</sub>	--	1336	--	pF
Output Capacitance		C <sub>oss</sub>	--	220	--	
Reverse Transfer Capacitance		C <sub>rss</sub>	--	130	--	
<b>Source-Drain Diode</b>						
Max. Diode Forward Current		I <sub>S</sub>	--	--	1.5	A
Diode Forward Voltage	I <sub>S</sub> = 1.5A, V <sub>GS</sub> = 0V	V <sub>SD</sub>	--	0.6	1.2	V

Note : \* for design only, not subject to production tested.  
pulse test: pulse width <=300uS, duty cycle <=2%

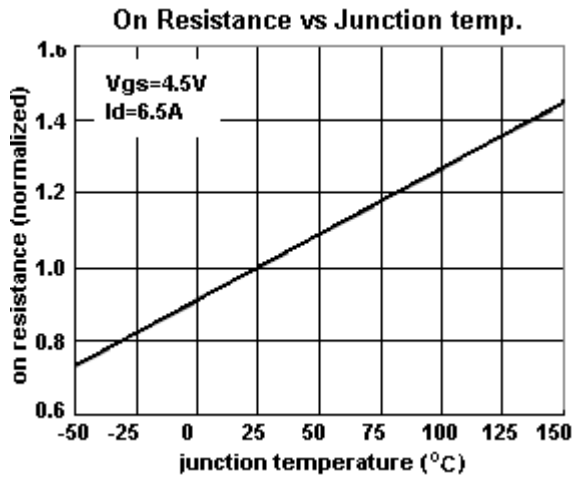
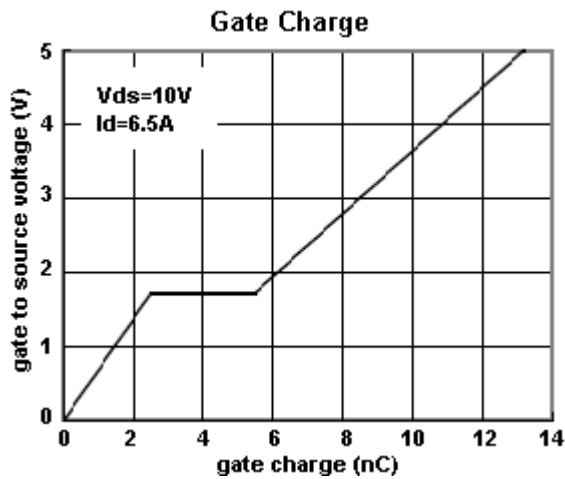
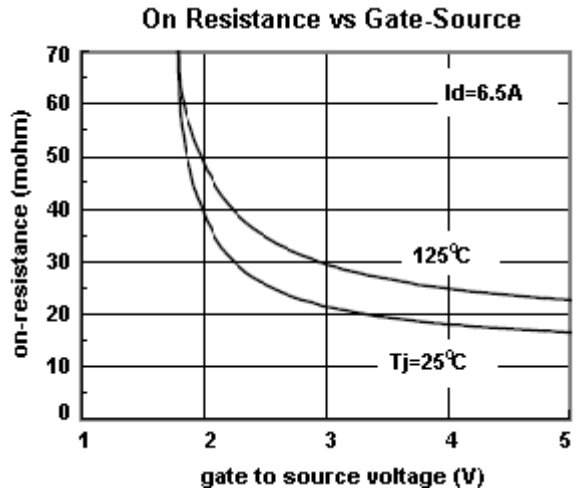
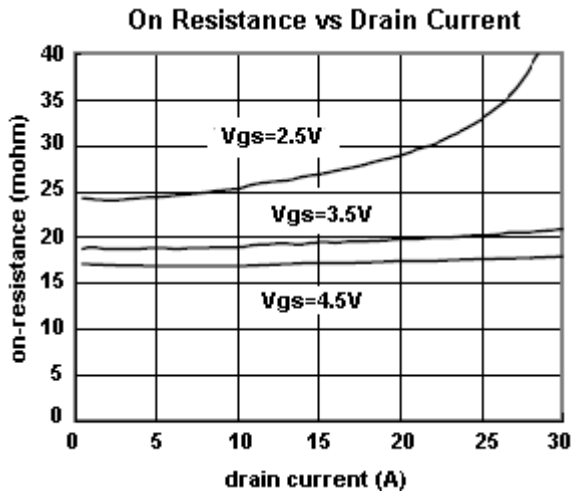
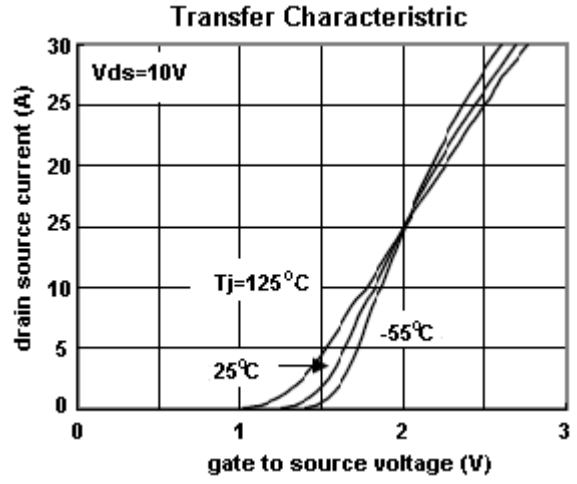
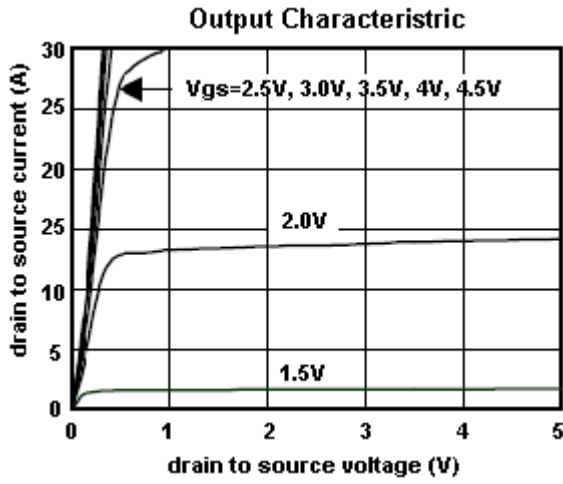


Switching Test Circuit

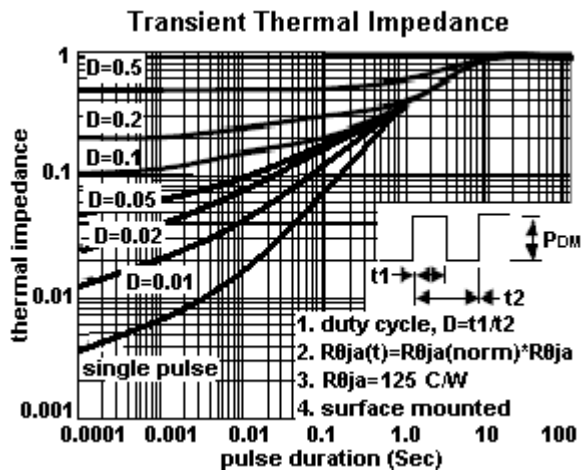
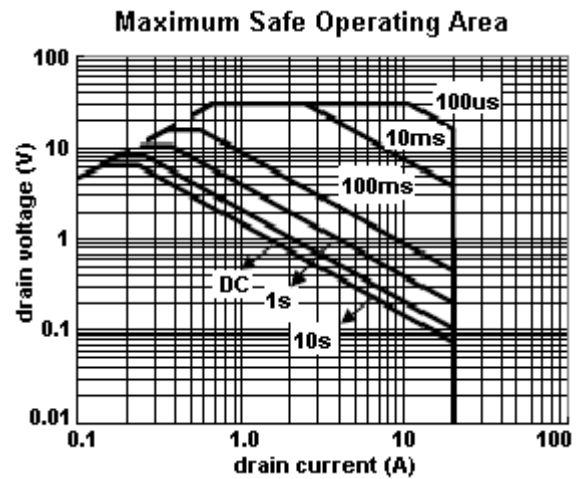
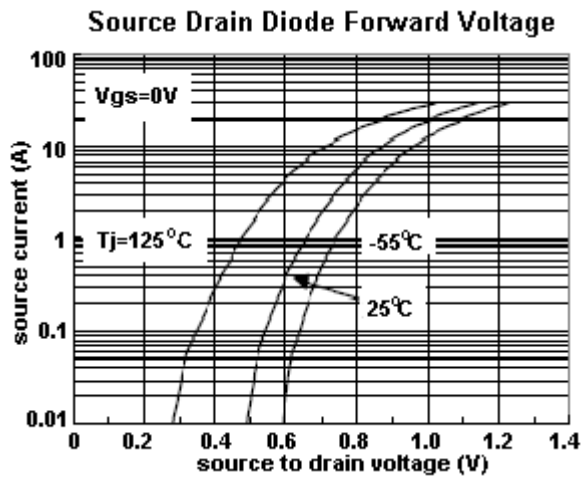
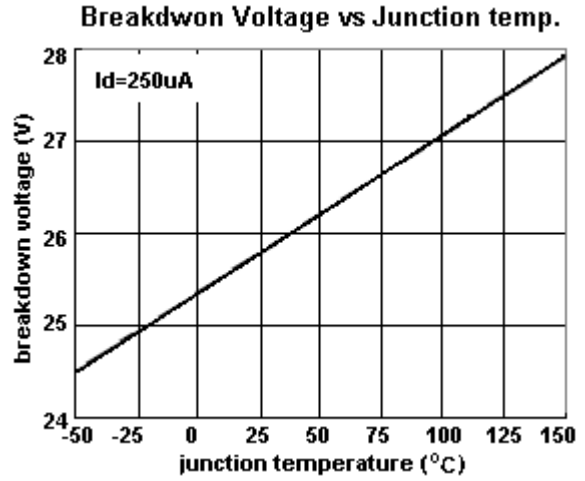
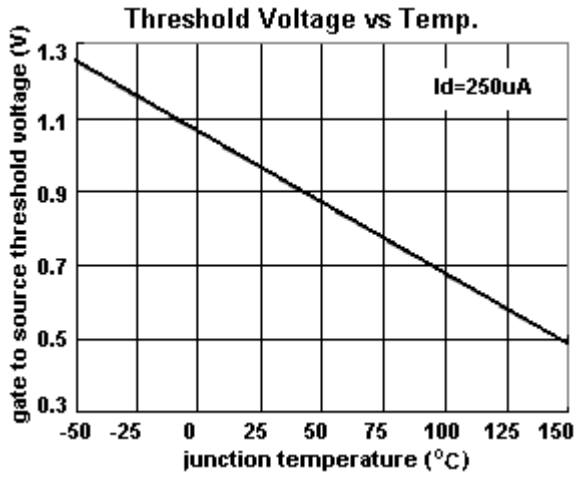


Switchin Waveforms

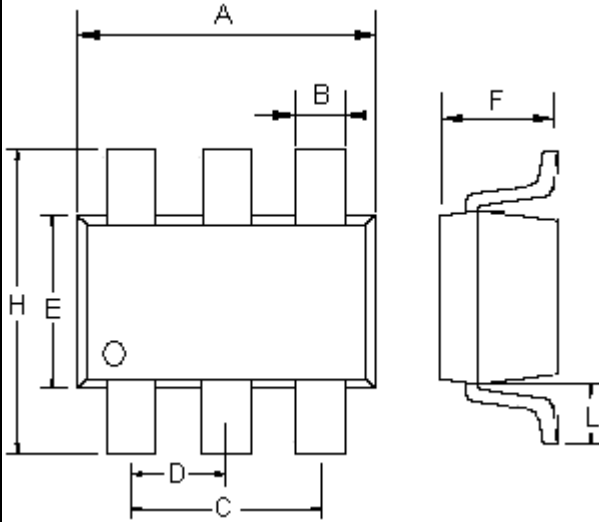
### Typical Characteristics Curve (Ta = 25 °C unless otherwise noted)



### Electrical Characteristics Curve (continued)



## SOT-26 Mechanical Drawing



SOT-26 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	1.05	1.35	0.041	0.053
H	2.60	3.00	0.102	0.118
L	0.60(typ)		0.024(typ)	