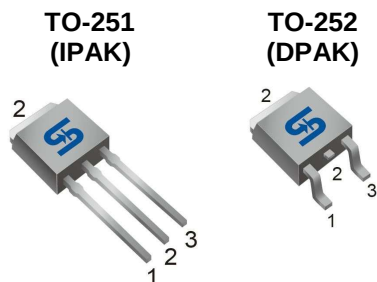


TSM600N25E

250V N-Channel Power MOSFET



Pin Definition:

1. Gate
2. Drain
3. Source

Key Parameter Performance

Parameter	Value	Unit
V_{DS}	250	V
$R_{DS(on)}(max)$	0.6	Ω
Q_g	8.4	nC

Features

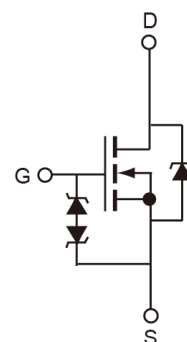
- 100% avalanche tested
- Improved ESD performance

Ordering Information

Part No.	Package	Packing
TSM600N25ECH C5G	TO-251	75pcs / Tube
TSM600N25ECP ROG	TO-252	2.5kpcs / 13" Reel

Note: "G" denotes for Halogen- and Antimony-free as those which contain
 <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl)
 and <1000ppm antimony compounds

Block Diagram



N-Channel MOSFET

Absolute Maximum Ratings

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V _{DS}	250	V
Gate-Source Voltage		V _{GS}	±30	V
Continuous Drain Current	T _C = 25°C	I _D	8	A
	T _C = 100°C		3.6	A
Pulsed Drain Current ^(Note 1)		I _{DM}	32	A
Single Pulse Avalanche Energy ^(Note 2)		E _{AS}	147	mJ
Repetitive Avalanche Current ^(Note 1)		I _{AR}	8	A
Repetitive Avalanche Energy ^(Note 1)		E _{AR}	5.2	mJ
Power Dissipation @ T _C = 25°C		P _D	52	W
Peak Diode Recovery ^(Note 3)		dv/dt	4.5	V/ns
Operating Junction Temperature		T _J	150	°C
Storage Temperature Range		T _{STG}	-55 to +150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Case	$R_{\theta JC}$	2.4	$^\circ C/W$
Thermal Resistance - Junction to Ambient	$R_{\theta JA}$	110	

Electrical Specifications ($T_c=25^{\circ}\text{C}$ unless otherwise noted)

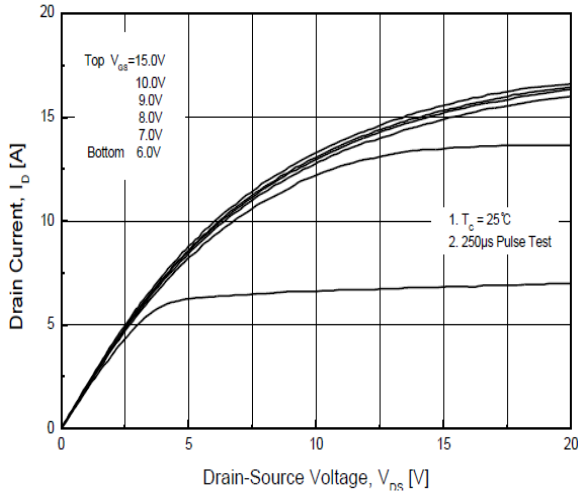
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	250	--	--	V
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 4A$	$R_{DS(ON)}$	--	0.5	0.6	Ω
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	3	--	5	V
Zero Gate Voltage Drain Current	$V_{DS} = 250V, V_{GS} = 0V$	I_{DSS}	--	--	1	μA
	$V_{DS} = 200V, T_C = 125^{\circ}C$		--	--	10	
Gate Body Leakage	$V_{GS} = \pm 30V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	μA
Forward Transconductance ^(Note 4)	$V_{DS} = 30V, I_D = 4A$	g_{fs}	--	7.5	--	S
Dynamic						
Total Gate Charge ^(Note 4,5)	$V_{DS} = 200V, I_D = 8A,$ $V_{GS} = 10V$	Q_g	--	8.4	--	nC
Gate-Source Charge ^(Note 4,5)		Q_{gs}	--	1.9	--	
Gate-Drain Charge ^(Note 4,5)		Q_{gd}	--	4	--	
Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$	C_{iss}	--	423	--	pF
Output Capacitance		C_{oss}	--	74	--	
Reverse Transfer Capacitance		C_{rss}	--	12	--	
Switching						
Turn-On Delay Time ^(Note 4,5)	$V_{DD} = 125V, I_D = 8A,$ $R_{GEN} = 25\Omega$	$t_{d(on)}$	--	14	--	ns
Turn-On Rise Time ^(Note 4,5)		t_r	--	25	--	
Turn-Off Delay Time ^(Note 4,5)		$t_{d(off)}$	--	30	--	
Turn-Off Fall Time ^(Note 4,5)		t_f	--	14	--	
Source-Drain Diode Ratings and Characteristic						
Maximum Continuous Drain-Source Diode Forward Current		I_S	--	--	8	A
Maximum Pulse Drain-Source Diode Forward Current		I_{SM}	--	--	32	A
Diode-Source Forward Voltage	$V_{GS} = 0V, I_S = 8A$	V_{SD}	--	--	1.5	V
Reverse Recovery Time ^(Note 4)	$V_{GS} = 0V, I_S = 8A$ $dI_F/dt = 100A/\mu s$	t_{rr}	--	157	--	ns
Reverse Recovery Charge ^(Note 4)		Q_{rr}	--	0.6	--	μC

Note:

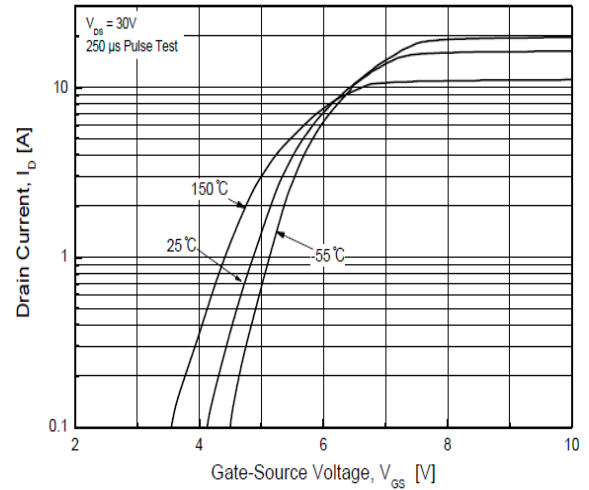
- Pulse width limited by safe operating area
- $L=3.68\text{mH}, I_{AS}=8A, V_{DD}=50V, R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
- $I_{SD} \leq 8A, di/dt \leq 200A/\mu s, V_{DD} \leq BV_{DS}$, Starting $T_J=25^{\circ}\text{C}$
- Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- Switching time is essentially independent of operating temperature.

Electrical Characteristics Curves

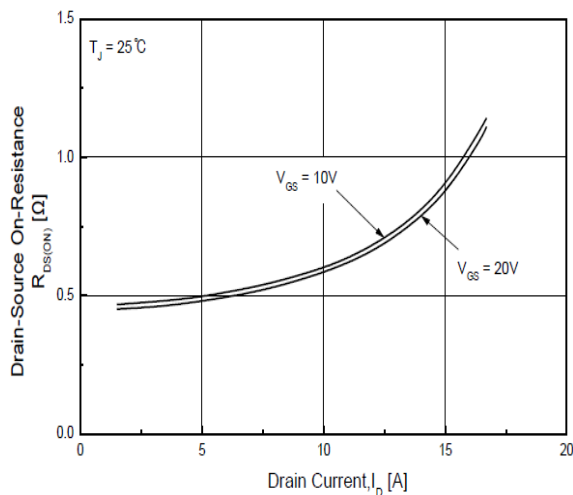
Output Characteristics



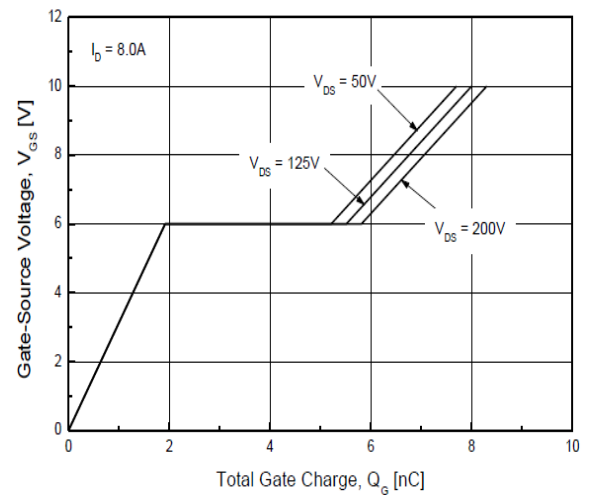
Transfer Characteristics



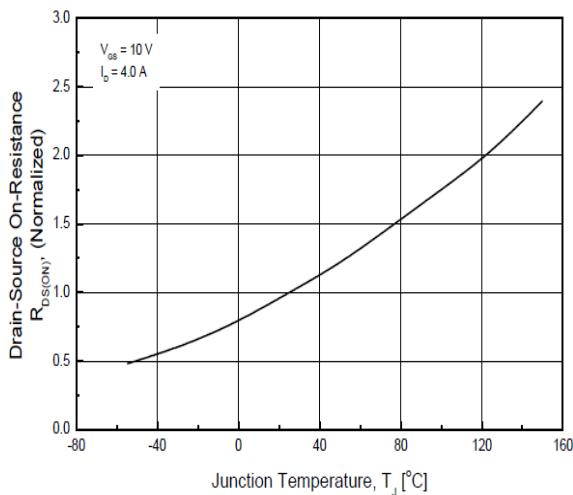
On-Resistance vs. Drain Current



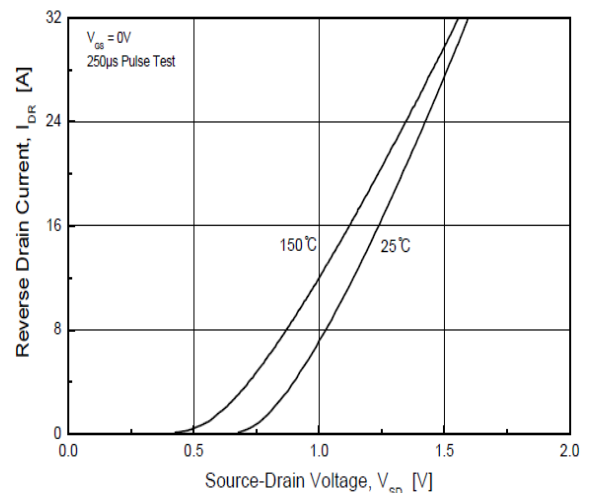
Gate Charge



On-Resistance vs. Junction Temperature

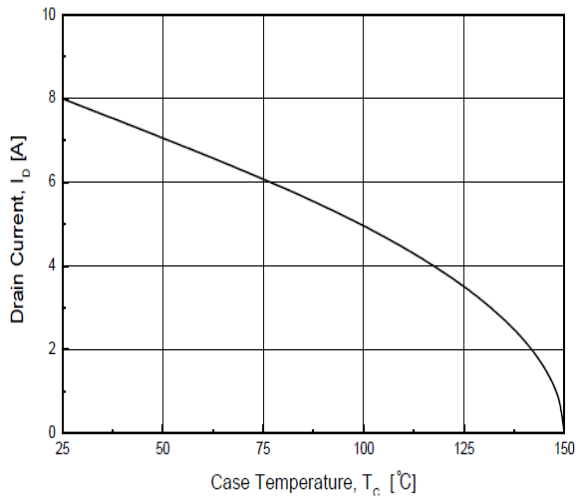


Source-Drain Diode Forward Voltage

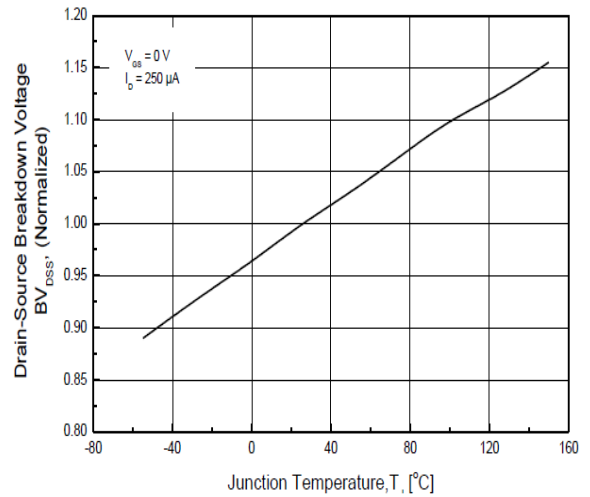


Electrical Characteristics Curves

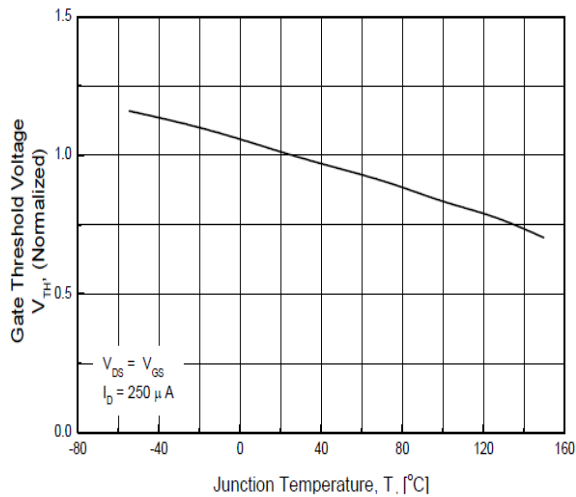
Drain Current vs. Case Temperature



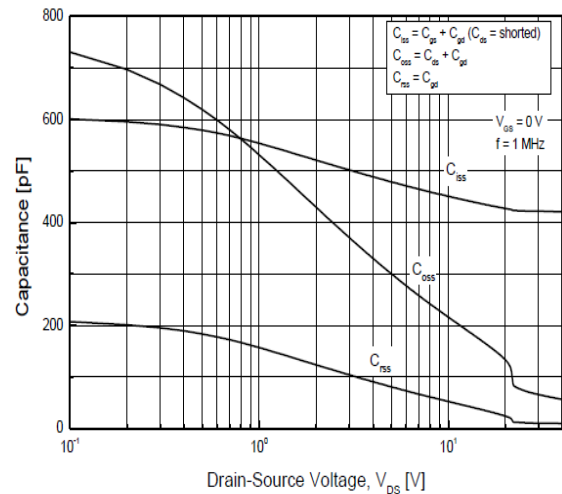
BV_{DSS} vs. Junction Temperature



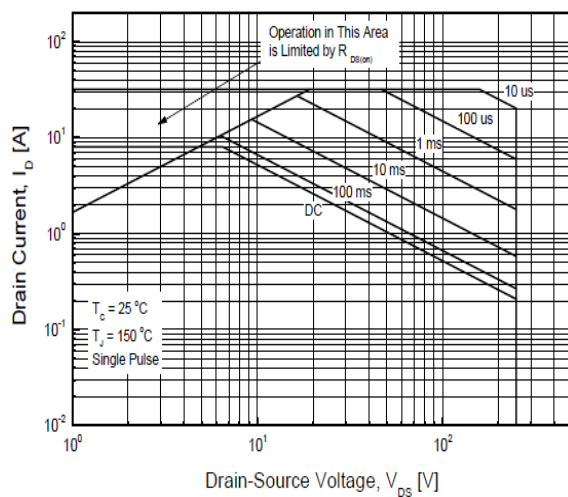
V_{TH} vs. Junction Temperature



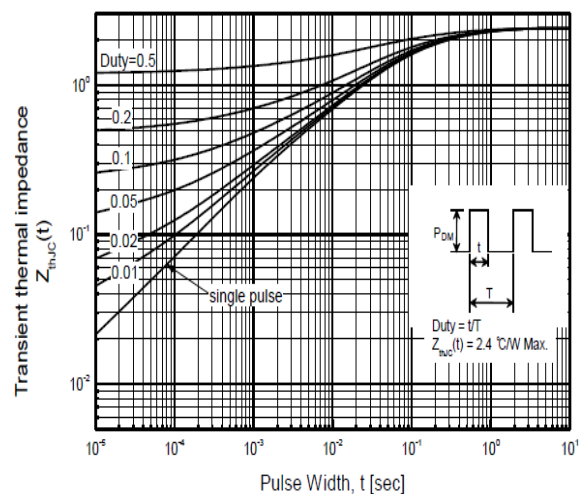
Capacitance vs. Drain-Source Voltage



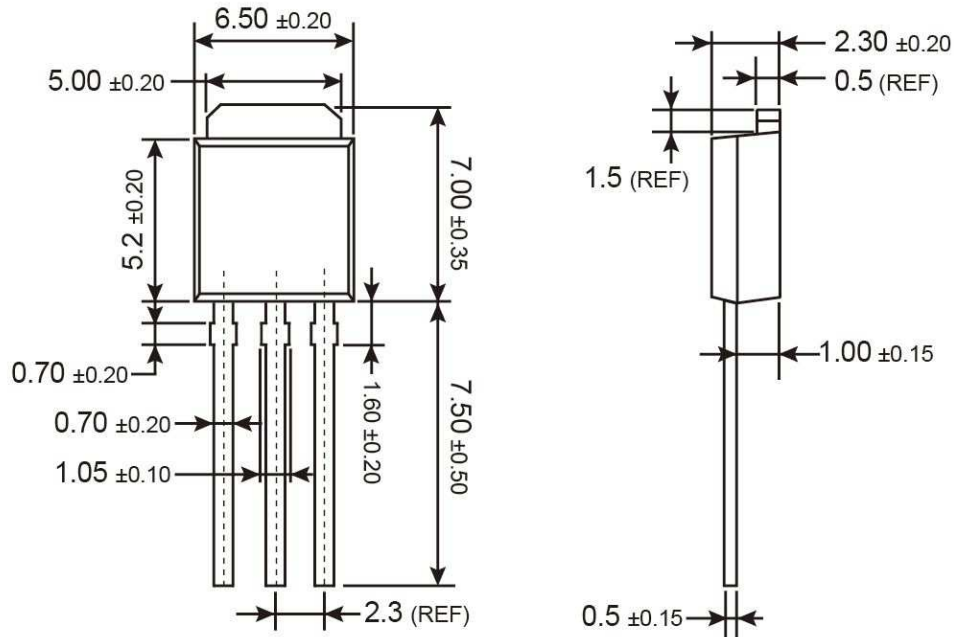
Maximum Safe Operating Area



Transient Thermal Impedance

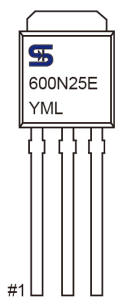


TO-251 Mechanical Drawing



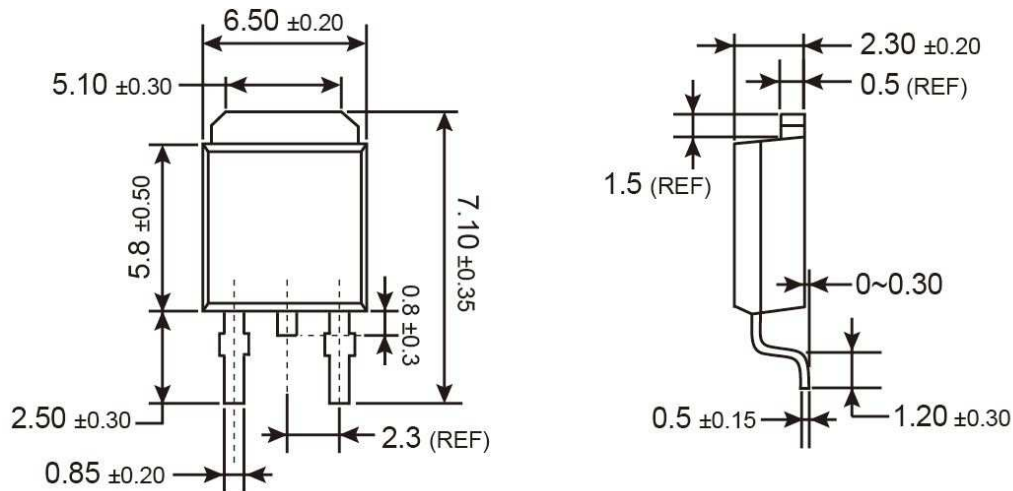
Unit: Millimeters

Marking Diagram



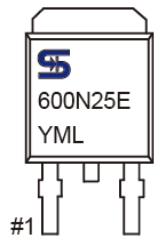
- Y** = Year Code
- M** = Month Code for Halogen Free Product
(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apr, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)
- L** = Lot Code

TO-252 Mechanical Drawing



Unit: Millimeters

Marking Diagram



- Y** = Year Code
- M** = Month Code for Halogen Free Product
(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apr, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)
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TSM600N25E

250V N-Channel Power MOSFET

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