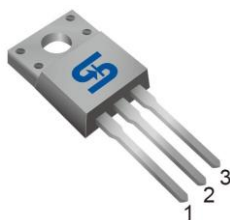
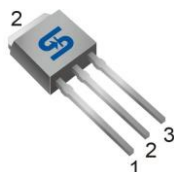


TSM60N900

600V, 4.5A, 0.9Ω
N-Channel Power MOSFET

ITO-220

**TO-251
(IPAK)**

Pin Definition:

1. Gate
2. Drain
3. Source

Key Parameter Performance

Parameter	Value	Unit
V_{DS}	600	V
$R_{DS(on)}$ (max)	0.9	Ω
Q_g	9.7	nC

**TO-252
(DPAK)**


Features

- Super-Junction technology
- High performance due to small figure-of-merit
- High ruggedness performance
- High commutation performance

Application

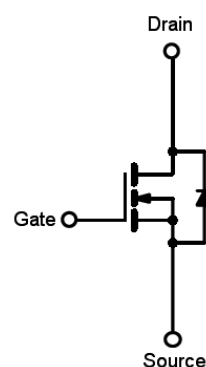
- Power Supply.
- Lighting

Ordering Information

Part No.	Package	Packing
TSM60N900CI C0G	ITO-220	50pcs / Tube
TSM60N900CH C5G	TO-251	75pcs / Tube
TSM60N900CP 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 ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit		Unit
		ITO-220	IPAK/DPAK	
Drain-Source Voltage	V_{DS}	600		V
Gate-Source Voltage	V_{GS}	± 30		V
Continuous Drain Current ^(Note 1)	I_D	4.5		A
Pulsed Drain Current ^(Note 2)	I_{DM}	13.5		A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	P_{DTOT}	20	50	W
Single Pulsed Avalanche Energy ^(Note 3)	E_{AS}	81		mJ
Single Pulsed Avalanche Current ^(Note 3)	I_{AS}	1.8		A
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150		$^\circ\text{C}$

Thermal Performance

Parameter	Symbol	Limit		Unit
		ITO-220	IPAK/DPAK	
Junction to Case Thermal Resistance	$R_{\theta JC}$	6.25	2.5	°C/W
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	62		°C/W

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

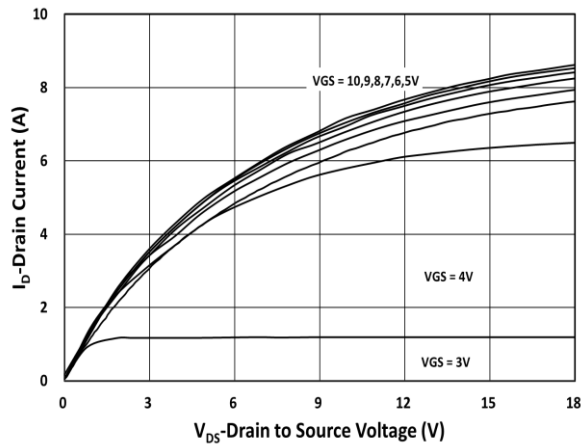
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static ^(Note 4)						
Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	BV _{DSS}	600	--	--	V
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	V _{GS(TH)}	2	3	4	V
Gate Body Leakage	V _{GS} = ±30V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V _{DS} = 600V, V _{GS} = 0V	I _{DSS}	--	--	1	μA
Drain-Source On-State Resistance	V _{GS} = 10V, I _D = 2.3A	R _{DS(ON)}	--	0.72	0.9	Ω
Dynamic ^(Note 5)						
Total Gate Charge	V _{DS} = 380V, I _D = 2.3A, V _{GS} = 10V	Q _g	--	9.7	--	nC
Gate-Source Charge		Q _{gs}	--	2.3	--	
Gate-Drain Charge		Q _{gd}	--	3.6	--	
Input Capacitance	V _{DS} = 100V, V _{GS} = 0V, f = 1.0MHz	C _{iss}	--	480	--	pF
Output Capacitance		C _{oss}	--	36	--	
Gate Resistance	f=1MHz, open drain	R _g	--	3.4	--	Ω
Switching ^(Note 6)						
Turn-On Delay Time	V _{DD} = 380V, R _{GEN} = 4.7Ω, I _D = 2.3A, V _{GS} = 10V,	t _{d(on)}	--	12	--	ns
Turn-On Rise Time		t _r	--	16	--	
Turn-Off Delay Time		t _{d(off)}	--	22	--	
Turn-Off Fall Time		t _f	--	12	--	
Source-Drain Diode ^(Note 4)						
Forward On Voltage	I _S =4.5A, V _{GS} =0V	V _{SD}	--	--	1.4	V
Reverse Recovery Time	V _R =200V, I _S =2.3A dI _F /dt=100A/μs	t _{rr}	--	179	--	ns
Reverse Recovery Charge		Q _{rr}	--	1.2	--	μC

Notes:

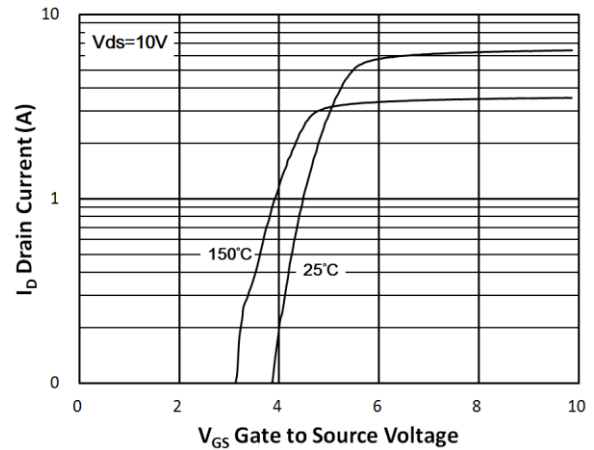
1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. $L = 50mH, I_{AS} = 1.8A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
4. Pulse test: $PW \leq 300\mu s$, duty cycle $\leq 2\%$
5. For DESIGN AID ONLY, not subject to production testing.
6. Switching time is essentially independent of operating temperature.

Electrical Characteristics Curves

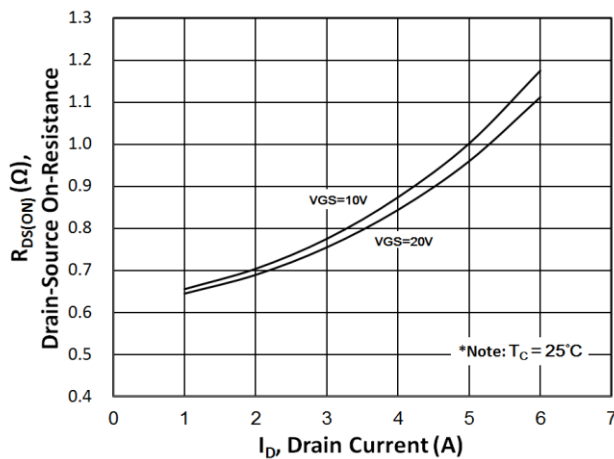
Output Characteristics



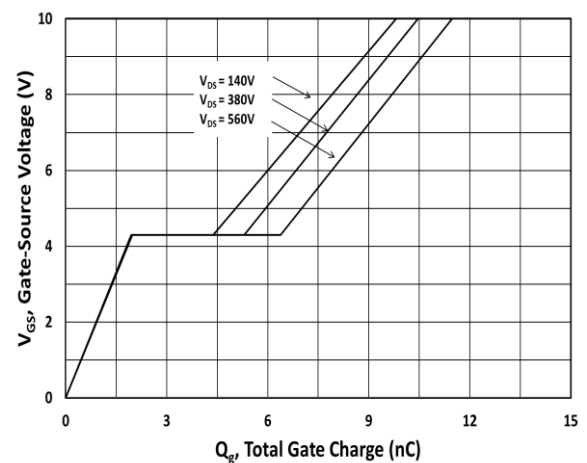
Transfer Characteristics



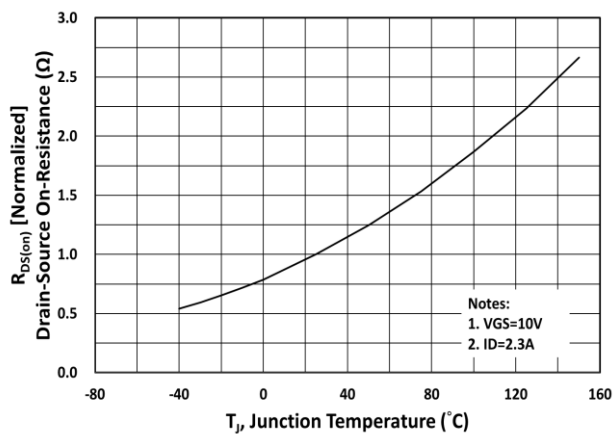
On-Resistance vs. Drain Current



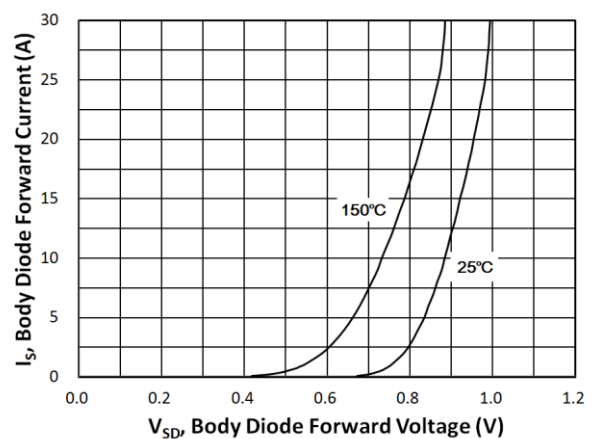
Gate Charge vs. Gate-Source Voltage



On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage vs. Current

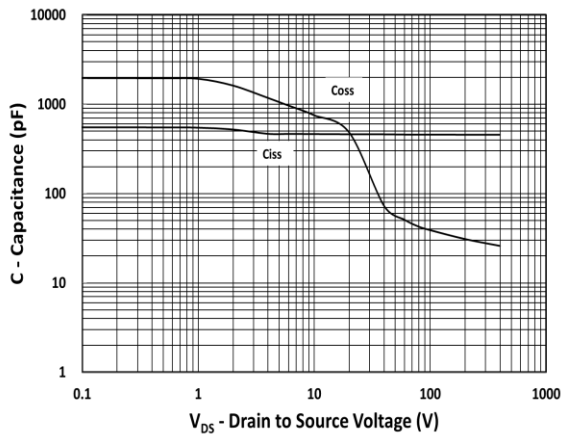


TSM60N900

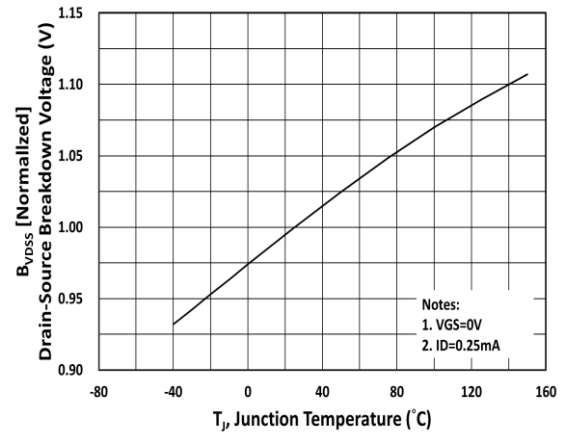
600V, 4.5A, 0.9Ω
N-Channel Power MOSFET

Electrical Characteristics Curves

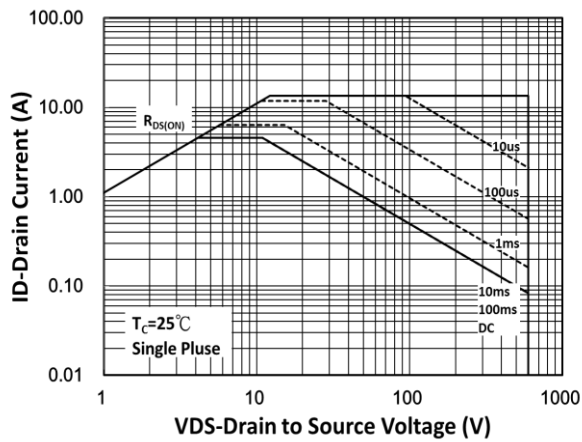
Capacitance vs. Drain-Source Voltage



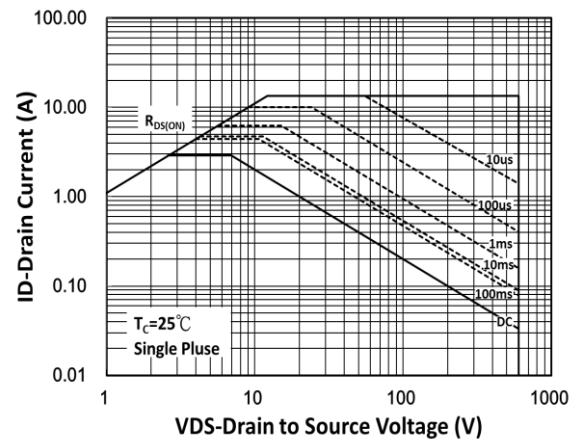
BV_{DSS} vs. Junction Temperature



Maximum Safe Operating Area (DPAK/IPAK)

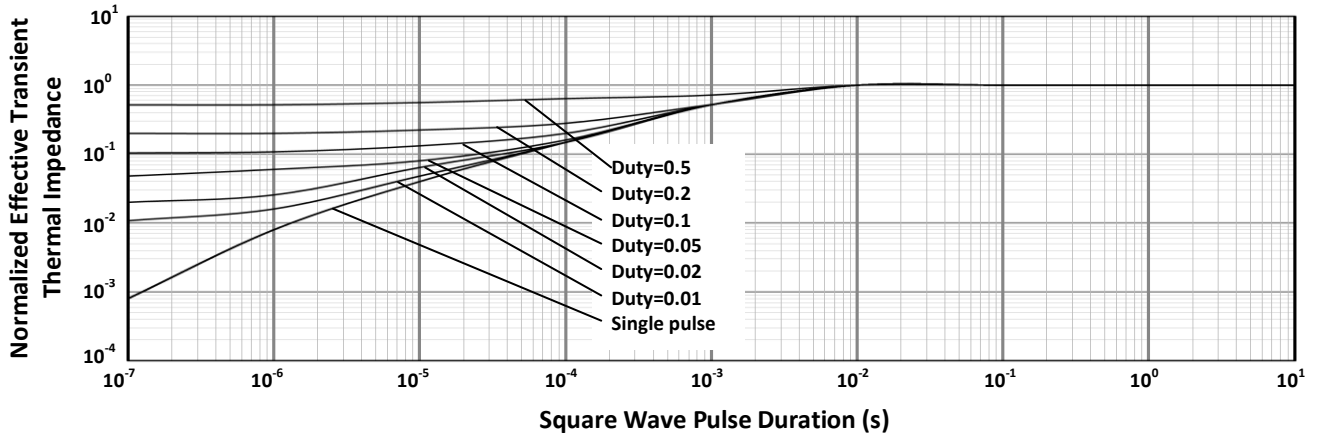


Maximum Safe Operating Area (ITO-220)

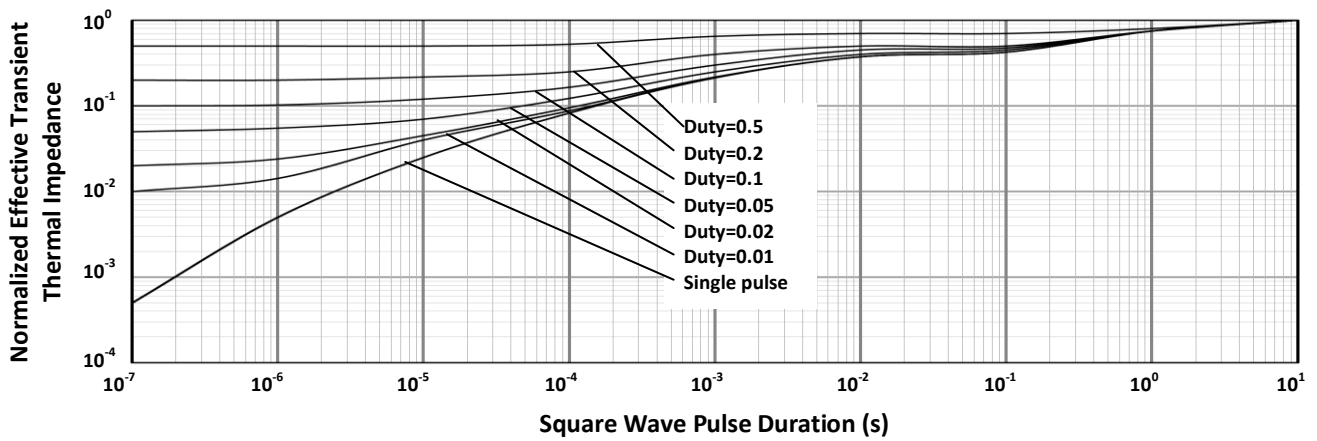


Electrical Characteristics Curves

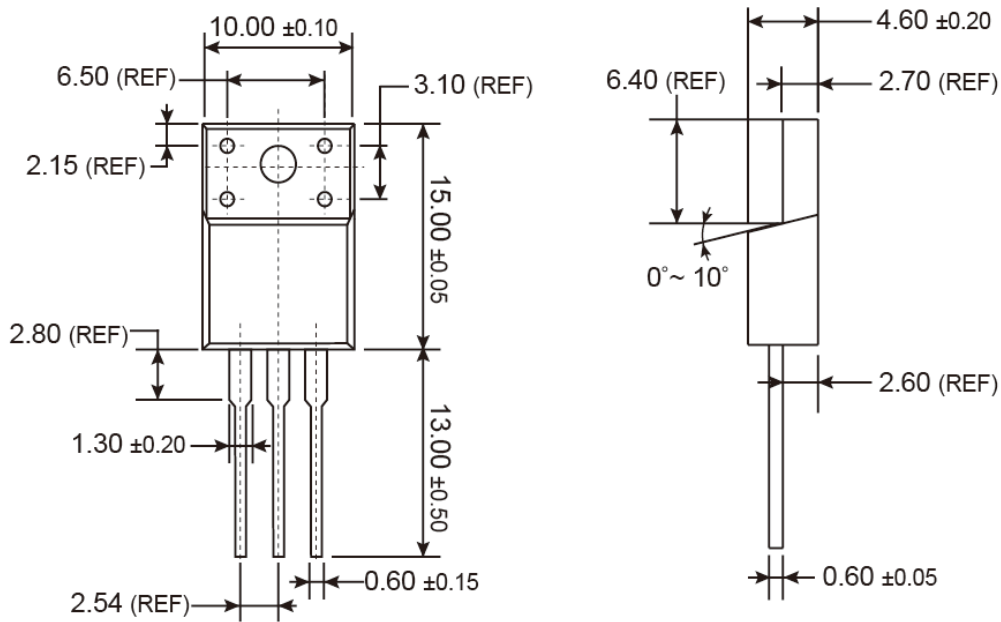
Normalized Thermal Transient Impedance, Junction-to-Case (DPAK/IPAK)



Normalized Thermal Transient Impedance, Junction-to-Case (ITO-220)

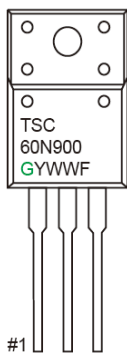


ITO-220 Mechanical Drawing



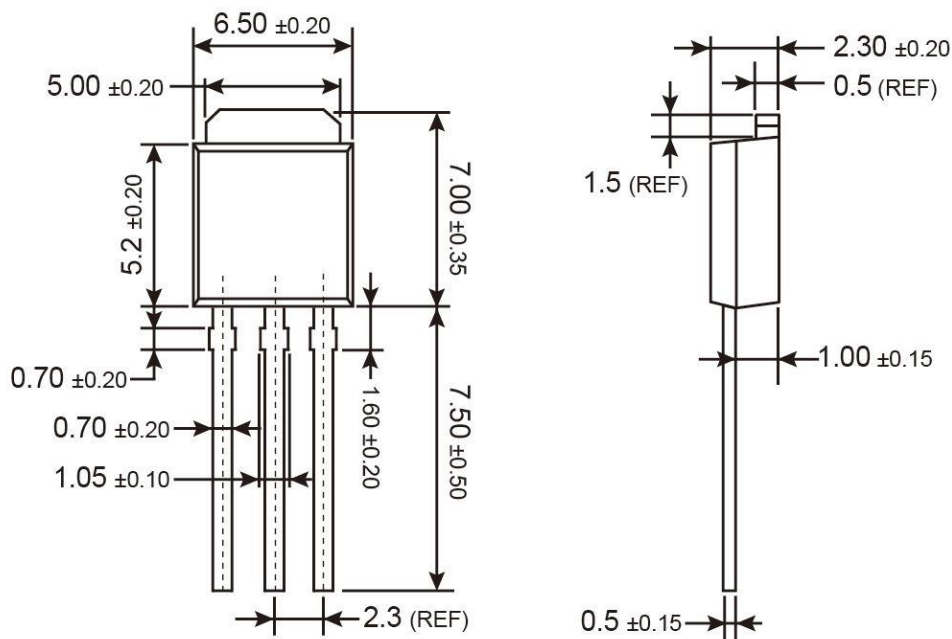
Unit: Millimeters

Marking Diagram



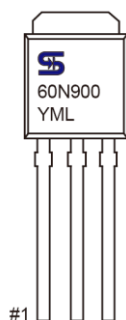
G = Halogen Free
Y = Year Code
WW = Week Code (01~52)
F = Factory Code

TO-251 (IPAK) Mechanical Drawing



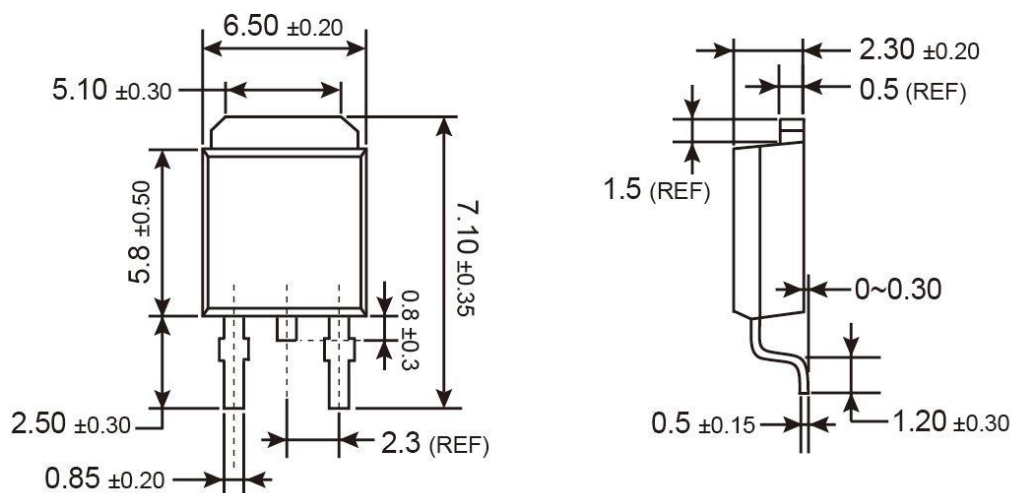
Unit: Millimeters

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 (DPAK) Mechanical Drawing



Unit: Millimeters

Marking Diagram



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

TSM60N900

600V, 4.5A, 0.9Ω
N-Channel Power MOSFET

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