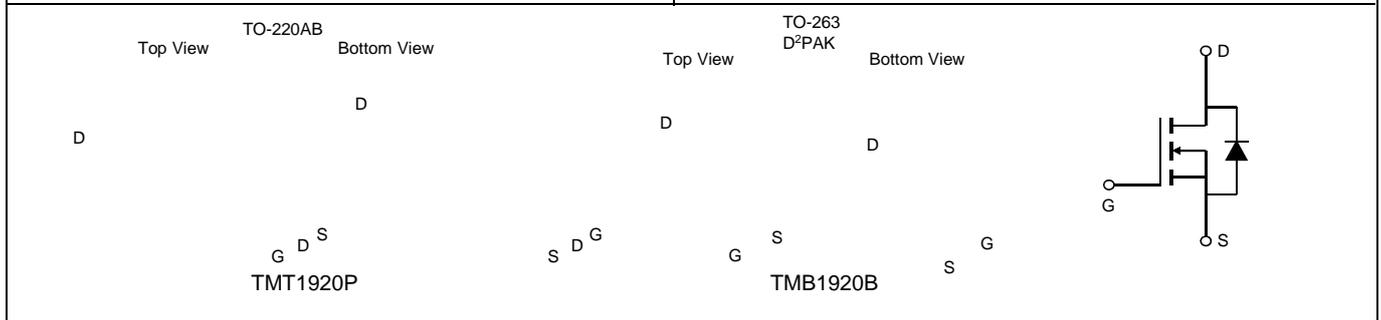


## TMT1920P / TMB1920B N-CHANNEL POWER MOSFET

<p><b>General Description</b></p> <ul style="list-style-type: none"> <li>● Power Management for Inverter Systems</li> </ul>	<p><b>Product Summary</b></p> <ul style="list-style-type: none"> <li>● 200V/90A</li> <li style="padding-left: 20px;"><math>R_{DS(ON)} = 22m\Omega(\text{typ.}) @ V_{GS} = 10V</math></li> <li>● Reliable and Rugged</li> <li>● Lead Free and Green Devices Available (RoHS Compliant)</li> </ul> <p>100% UIS Tested 100% <math>R_g</math> Tested</p>
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### Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
<b>Common Ratings</b> (Tc=25°C Unless Otherwise Noted)			
V <sub>DSS</sub>	Drain-Source Voltage	200	V
V <sub>GSS</sub>	Gate-Source Voltage	±20	V
T <sub>J</sub>	Maximum Junction Temperature	175	°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 175	°C
I <sub>S</sub>	Source Current-Continuous(Body Diode)	Tc=25°C	90
<b>Mounted on Large Heat Sink</b>			
I <sub>DM</sub>	Pulsed Drain Current *	Tc=25°C	360
I <sub>D</sub>	Continuous Drain Current	Tc=25°C	90
		Tc=100°C	70
P <sub>D</sub>	Maximum Power Dissipation	Tc=25°C	375
		Tc=100°C	187.5
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case	0.4	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient **	62.5	°C/W
E <sub>AS</sub>	Single Pulsed-Avalanche Energy ***	L=0.5mH	784
			mJ

Note: \* Repetitive rating; pulse width limited by max. junction temperature.  
 \*\* Surface mounted on FR-4 board.  
 \*\*\* Limited by T<sub>Jmax</sub>, starting T<sub>J</sub>=25°C, L = 0.5mH, R<sub>G</sub>= 25Ω, V<sub>GS</sub> =10V.

## Electrical Characteristics (T<sub>c</sub> =25°C Unless Otherwise Noted)

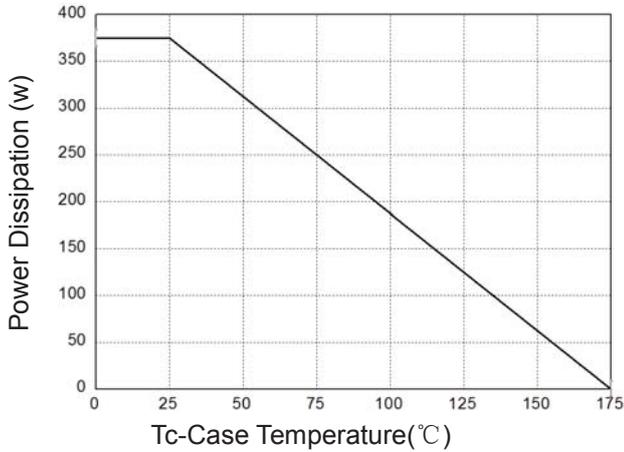
Symbol	Parameter	Test Conditions	1920			Unit
			Min	Typ.	Max	
<b>Static Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA	200	-		V
I <sub>DSS</sub>	Drain-to-Source Leakage Current	V <sub>DS</sub> =200V, V <sub>GS</sub> =0V	-	-	1	μA
		T <sub>J</sub> =55°C	-	-	5	μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA	2.0	3.0	4.0	V
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
R <sub>DS(ON)*</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>DS</sub> =45A		22.0	24.0	mΩ
<b>Diode Characteristics</b>						
V <sub>SD*</sub>	Diode Forward Voltage	I <sub>SD</sub> =45A, V <sub>GS</sub> =0V	-	0.82	1.1	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =45A, dI <sub>SD</sub> /dt=100A/μs	-	80	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	160	-	nC

Symbol	Parameter	Test Conditions	1920			Unit
			Min	Typ.	Max	
<b>Dynamic Characteristics</b>						
R <sub>G</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	-	3.4	-	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, Frequency=1.0MHz	-	5871	-	pF
C <sub>oss</sub>	Output Capacitance		-	392	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	165	-	
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =100V, R <sub>G</sub> =4Ω, I <sub>DS</sub> =45A, V <sub>GS</sub> =10V	-	29	-	ns
T <sub>r</sub>	Turn-on Rise Time		-	45	-	
t <sub>d(OFF)</sub>	Turn-off Delay Time		-	22	-	
T <sub>f</sub>	Turn-off Fall Time		-	41	-	
<b>Gate Charge Characteristics</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =160V, V <sub>GS</sub> =10V, I <sub>D</sub> =45A	-	130.4	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	22.1	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	38.2	-	

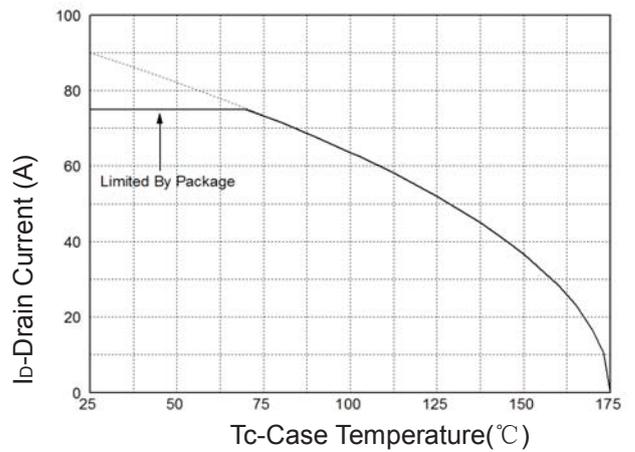
Note: \*Pulse test, pulse width ≤ 300us, duty cycle ≤ 2%

# Typical Operating Characteristics

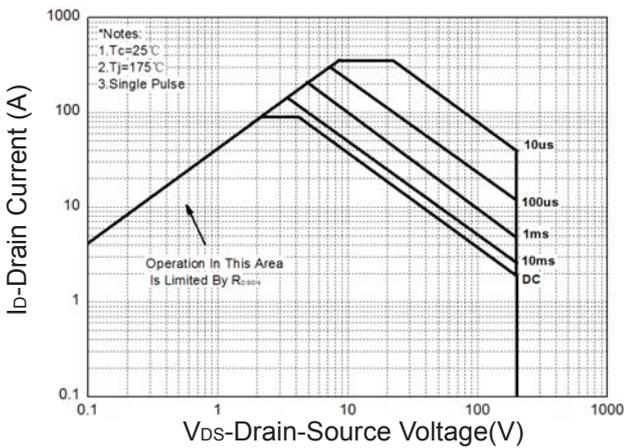
**Figure 1: Power Dissipation**



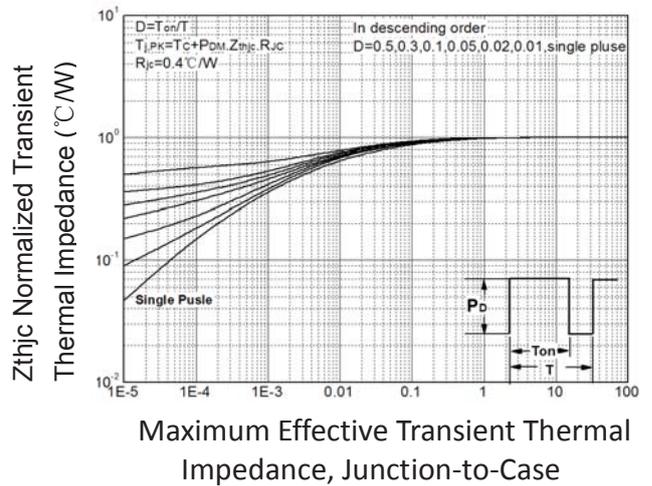
**Figure 2: Drain Current**



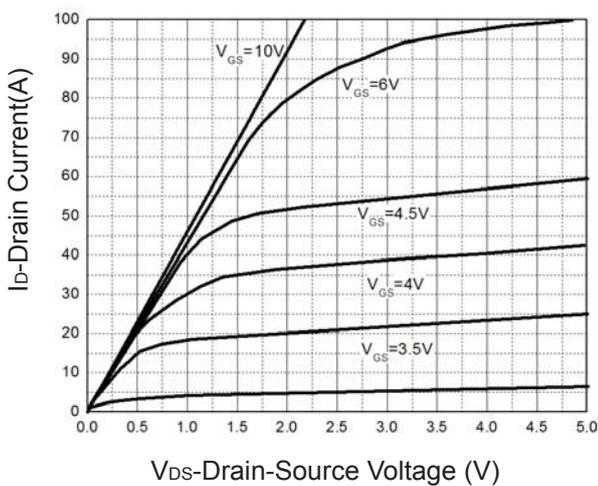
**Figure 3: Safe Operation Area**



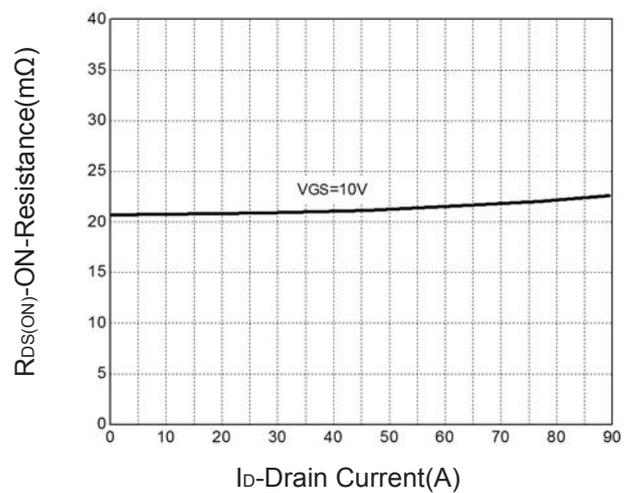
**Figure 4: Thermal Transient Impedance**



**Figure 5: Output Characteristics**



**Figure 6: Drain-Source On Resistance**



## Typical Operating Characteristics(Cont.)

Figure 7: Gate-Source Vs. On-Resistance

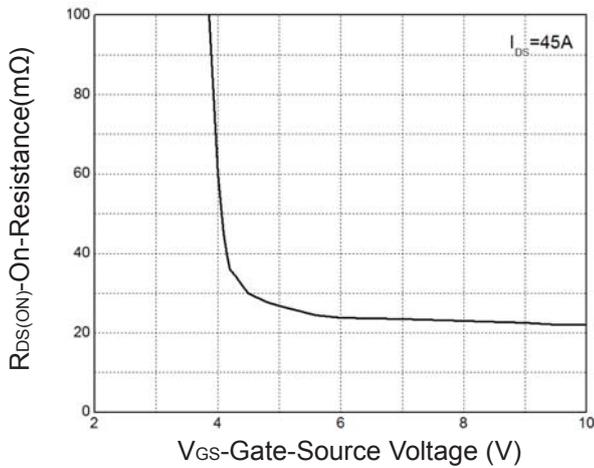


Figure 8: Gate-Source Forward

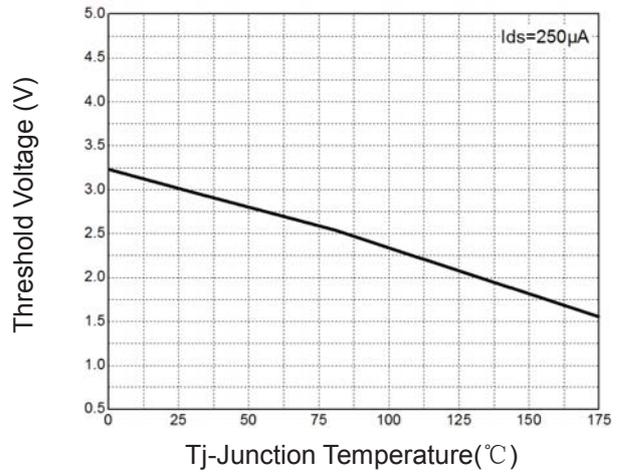


Figure 9: On-Resistance vs. Temperature

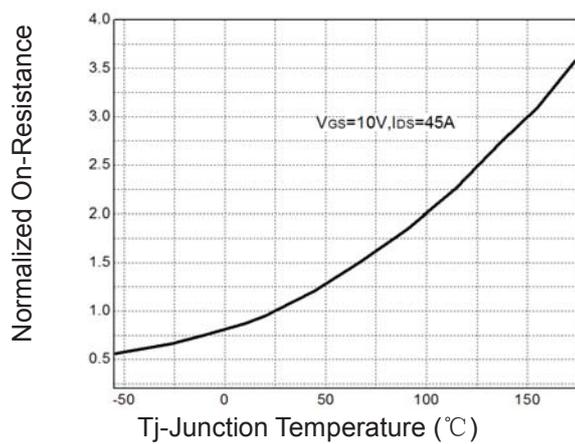


Figure 10: Source-Drain Diode Forward

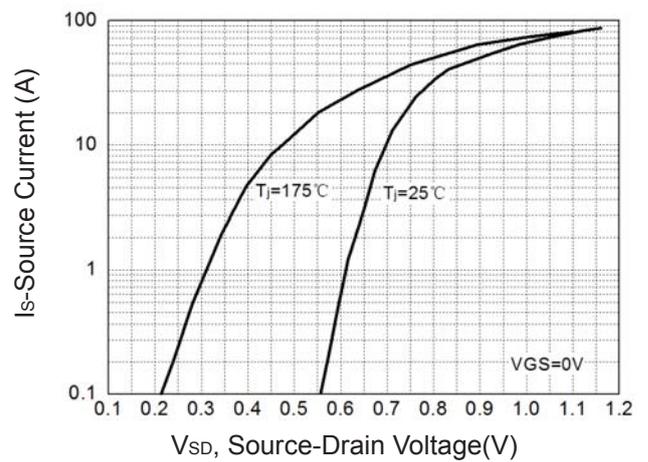


Figure 11: Capacitance Characteristics

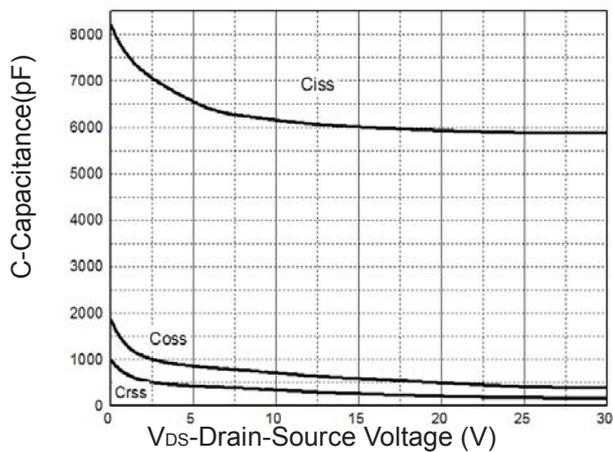
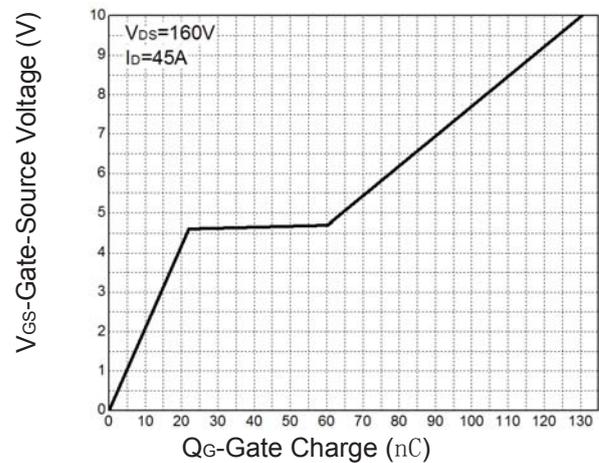
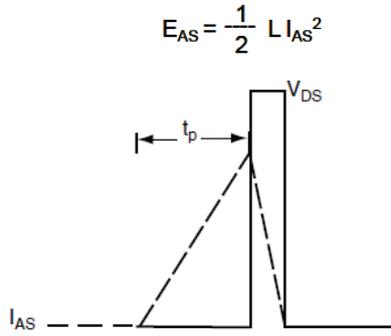
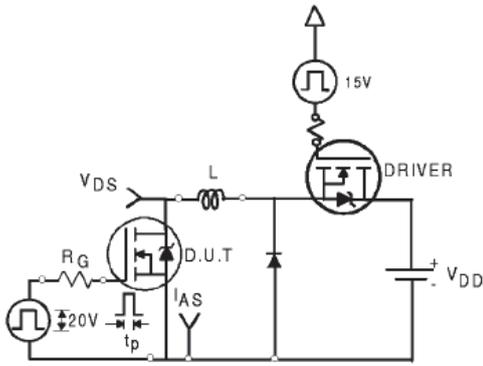


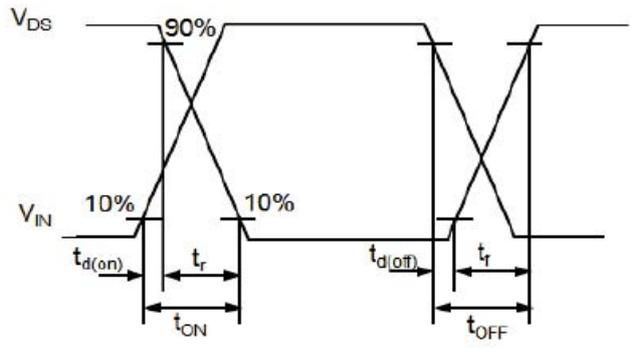
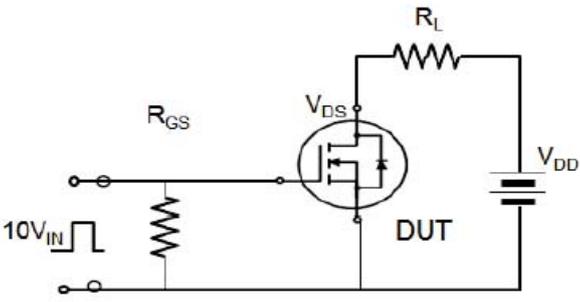
Figure 12: Gate Charge Characteristics



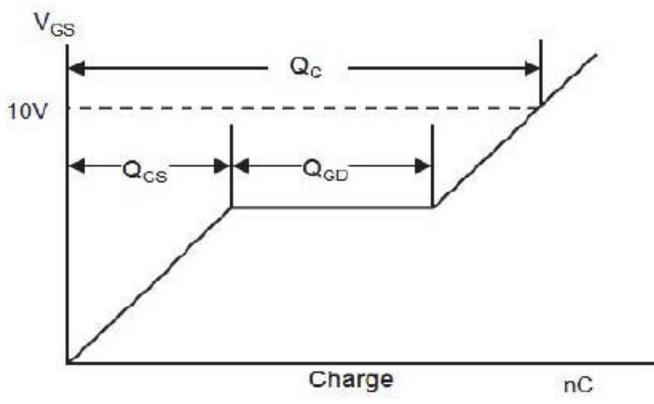
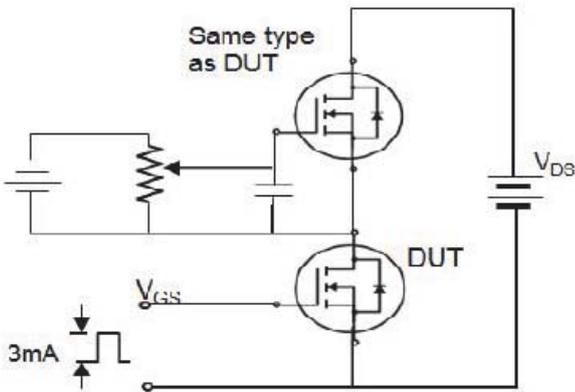
# Avalanche Test Circuit



# Switching Time Test Circuit



# Gate Charge Test Circuit



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