

TMG190N06P

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

General Features

$V_{DS} = 60V$ $I_D = 190A$

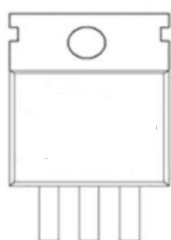
$R_{DS(ON)} = 2.6m\Omega (typ.) @ V_{GS} = 10V$

100% UIS Tested

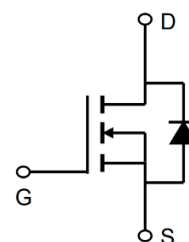
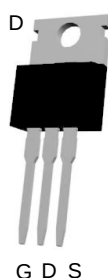
100% R_g Tested



P:TO-220AB



Marking: G190N06



Absolute Maximum Ratings: ($T_C = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	190	A
Drain Current-Pulsed ^(Note 1)	I_{DM}	680	A
Maximum Power Dissipation ($T_C = 25^\circ C$)	P_D	210	W
Single pulse avalanche energy ^(Note 2)	E_{AS}	1000	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ C$

Thermal Characteristics:

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.7	$^\circ C/W$
--------------------------------------	-----------------	-----	--------------

TMG190N06P
N-Channel Enhancement Mosfet

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V
Drain-Source On-State Resistance ^(Note 3)	$R_{DS(ON)}$	$V_{GS}=10V, I_D=50A$	-	2.6	3.1	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=50V, I_D=75A$	-	180	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=25V,$ $V_{GS}=0V,$ $f=1.0MHz$	-	7280	-	pF
Output Capacitance	C_{oss}		-	760	-	pF
Reverse Transfer Capacitance	C_{rss}		-	680	-	pF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	td(on)	$V_{DD}=30V, I_D=40A,$ $V_{GS}=10V, R_{GEN}=3\Omega$	-	27	-	nS
Turn-on Rise Time	tr		-	25	-	nS
Turn-Off Delay Time	td(off)		-	90	-	nS
Turn-Off Fall Time	tf			40	-	nS
Total Gate Charge	Qg	$V_{DS}=60V, I_D=40A, V_{GS}=10V$	-	186	-	nC
Gate-Source Charge	Qgs		-	46	-	nC
Gate-Drain Charge	Qgd		-	70	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=190A$	-	-	1.2	V

Notes:

- 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2.EAS condition : $T_j=25^{\circ}\text{C}, V_{DD}=50V, V_G=10V, L=0.5mH, R_g=25\Omega$
- 3.Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
- 4.Guaranteed by design, not subject to production.

TMG190N06P

N-Channel Enhancement Mosfet

Characteristics Curves

Figure 1 Output Characteristics

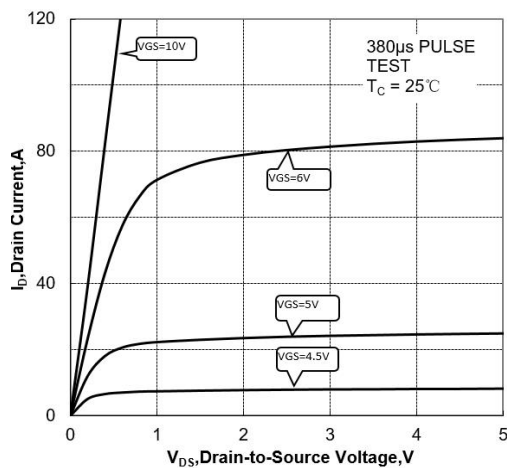


Figure 2 Transfer Characteristics

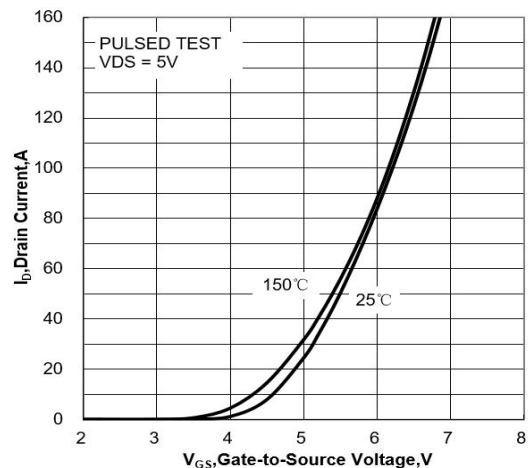


Figure 3 On-Resistance vs. I_D and V_{GS}

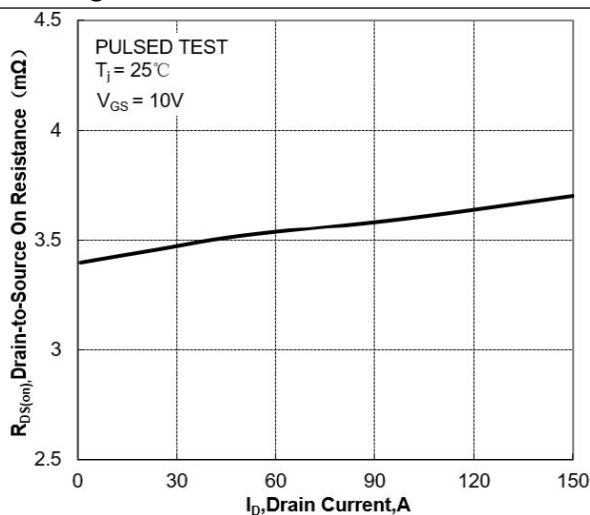


Figure 4 On-Resistance vs. Junction Temperature

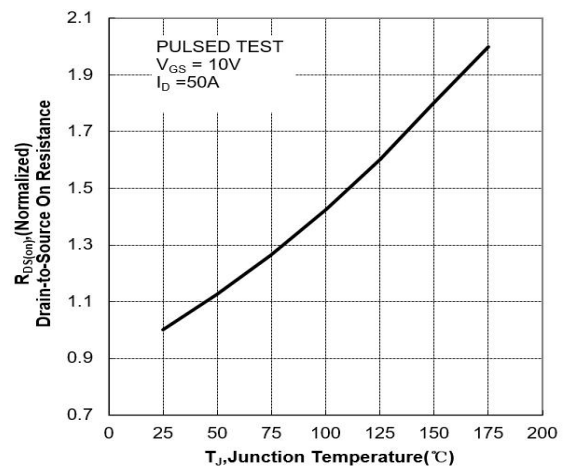


Figure 5 On-Resistance vs. V_{GS}

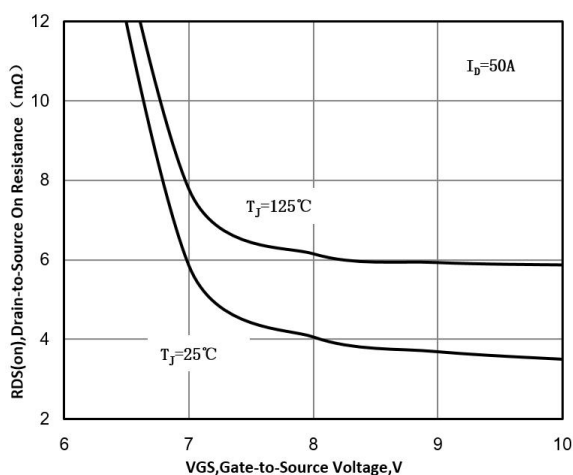
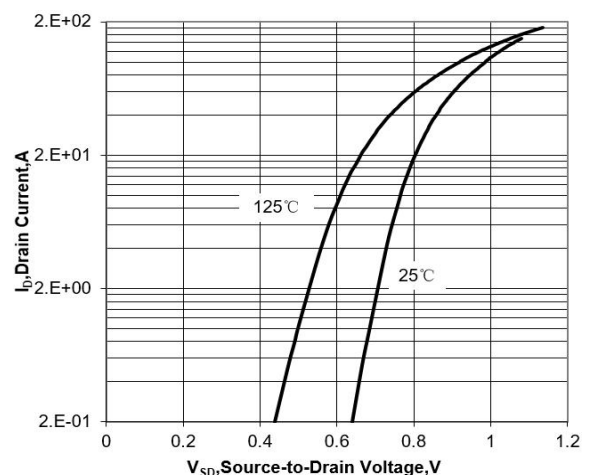


Figure 6 Body Diode Forward Voltage





TMG190N06P

N-Channel Enhancement Mosfet

Figure 7 Gate-Charge Characteristics

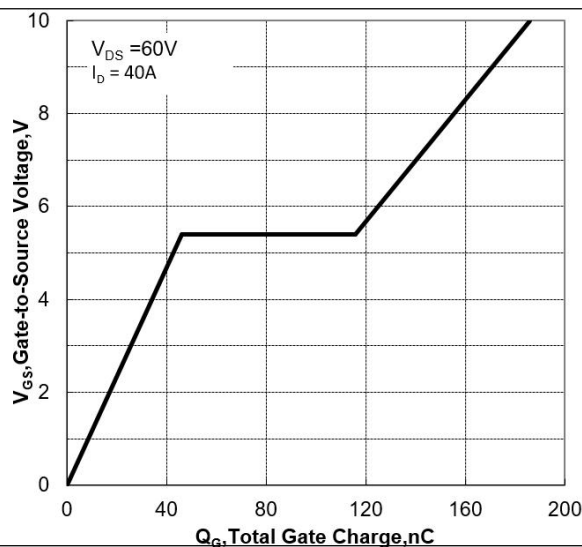


Figure 8 Capacitance Characteristics

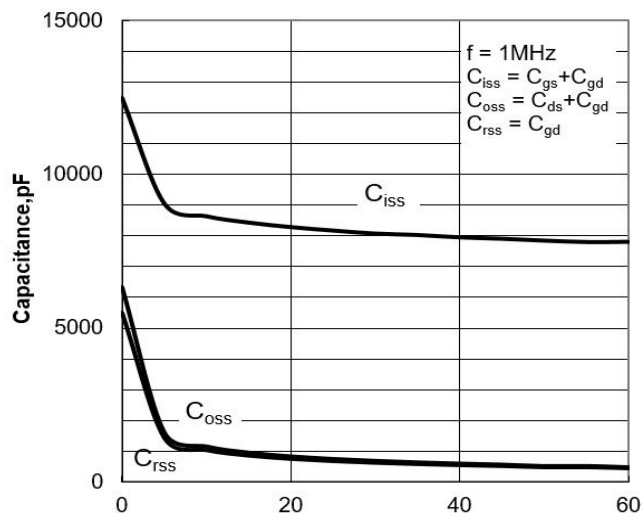


Figure 9 Maximum Forward Biased Safe Operation Area

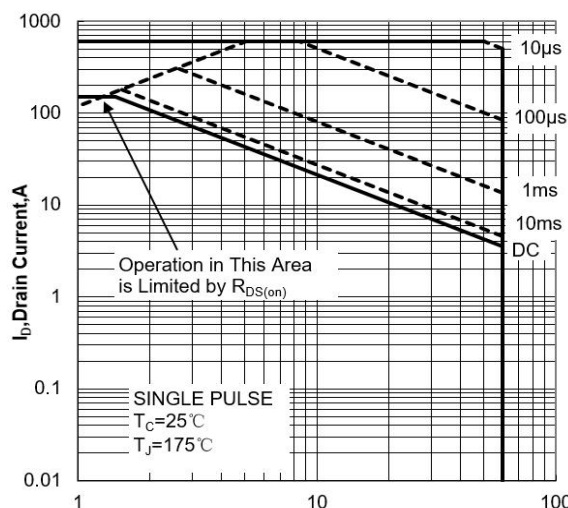


Figure 10 Single Pulse Power Rating Junction-to-Ambient

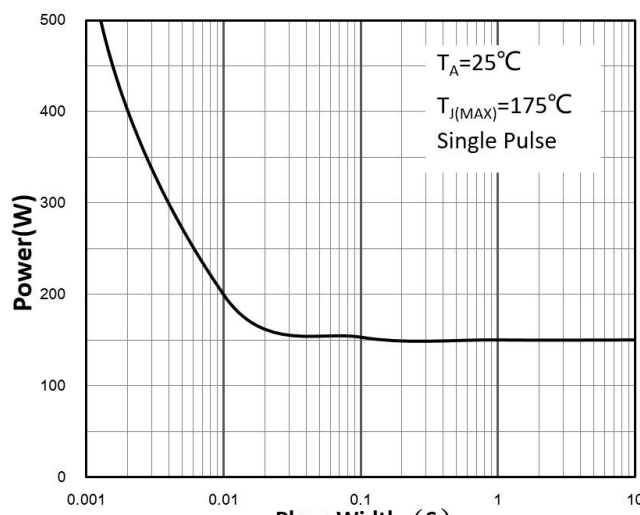
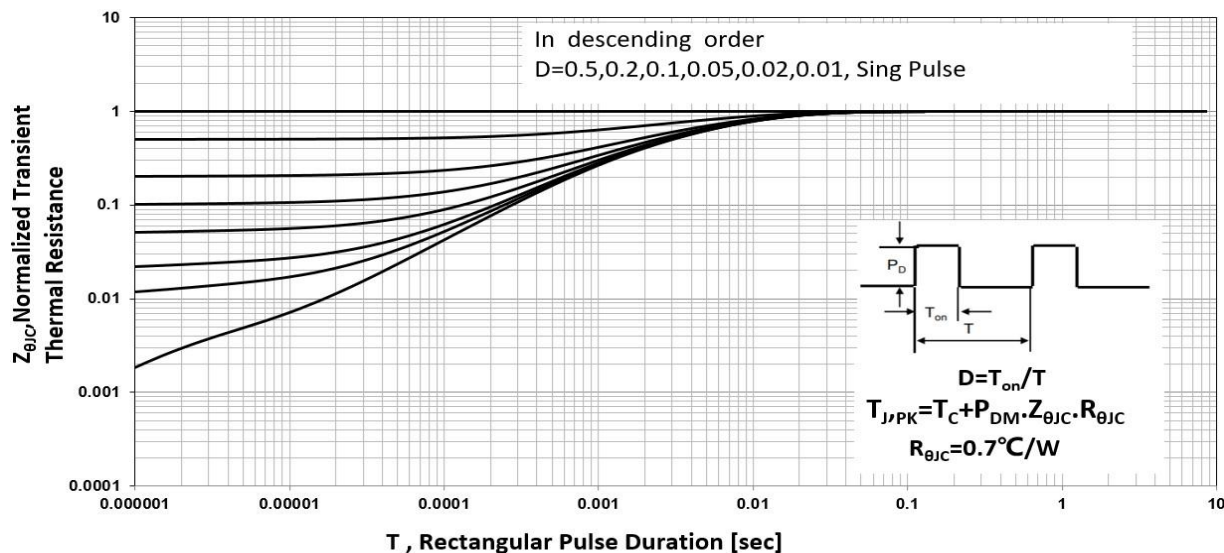


Figure 11 Normalized Maximum Transient Thermal Impedance



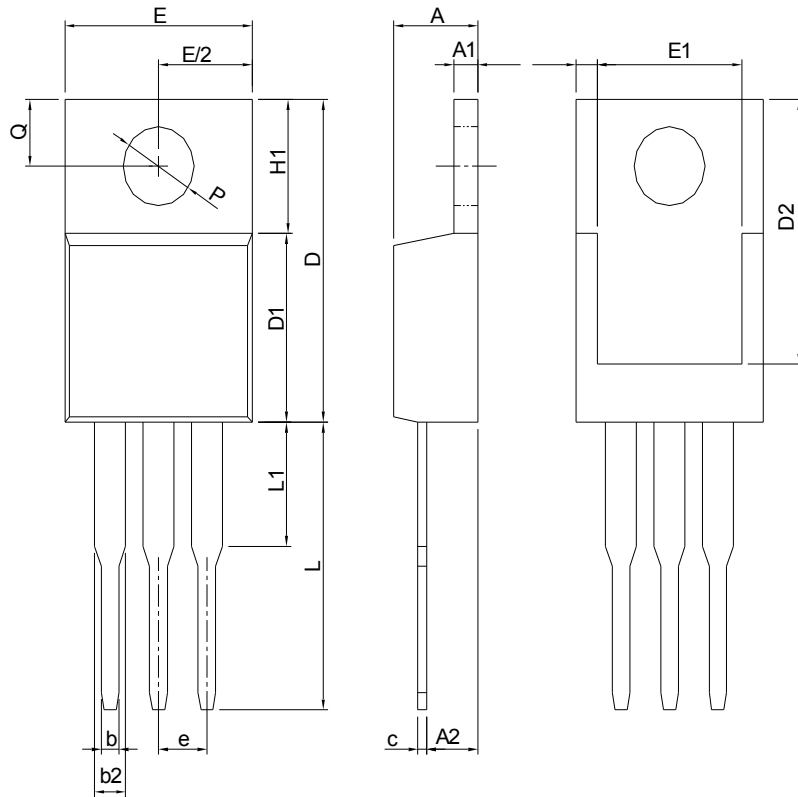
TMG190N06P

N-Channel Enhancement Mosfet

Test Circuit and Waveform

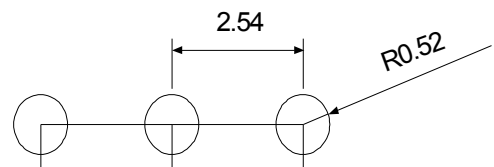
Gate Charge Test Circuit	Gate Charge Test Waveform
Resistive Switching Test Circuit	Resistive Switching Test Waveforms
Unclamped Inductive Switching (UIS) Test Circuit	Unclamped Inductive Switching (UIS) Test Waveforms
Diode Recovery Test Circuit	Diode Recovery Test Waveforms

Package Information:TO-220AB



SYMBOL	TO-220			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	3.56	4.83	0.140	0.190
A1	0.51	1.40	0.020	0.055
A2	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b2	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.22	16.51	0.560	0.650
D1	8.38	9.02	0.330	0.355
D2	12.19	13.65	0.480	0.537
E	9.65	10.67	0.380	0.420
E1	6.86	8.89	0.270	0.350
e	2.54 BSC		0.100 BSC	
H1	5.84	6.86	0.230	0.270
L	12.70	14.73	0.500	0.580
L1	-	6.35	-	0.250
P	3.53	4.09	0.139	0.161
Q	2.54	3.43	0.100	0.135

RECOMMENDED LAND PATTERN



UNIT: mm

Note: Follow JEDEC TO-220 AB.