

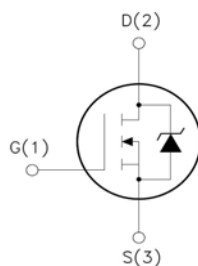
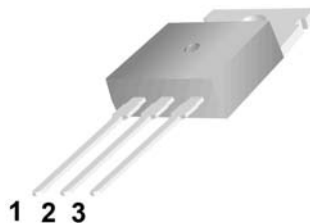


HGS50N06C 60V N-Channel MOSFET

Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg= 50nC (Typ.).
- ☐ BVDSS=60V, I_D=50A
- ☐ R_{DS(on)} : 0.02Ω (Max) @V_G=10V
- ☐ 100% Avalanche Tested

TO-220C



- 1.Gate (G)
- 2.Drain (D)
- 3.Source (S)

Absolute Maximum Ratings* (T_C=25°C Unless otherwise noted)

Symbol	PARAMETER		Value	Unit
V _{DSS}	Drain-Source Voltage		60	V
I _D	Drain Current	T _C =25°C	50	A
		T _C =100°C	35.4	
V _{GS(TH)}	Gate Threshold Voltage		±20	V
E _{AS}	Single Pulse Avalanche Energy (note1)		300	mJ
I _{AR}	Avalanche Current (note2)		50	A
P _D	Power Dissipation (T _C =25°C)		85	W
T _j	Junction Temperature(MAX)		175	°C
T _{stg}	Storage Temperature		-55~+175	°C
TL	Maximum lead temperature for soldering purpose,1/8" from case for 5 seconds		300	°C

Thermal Characteristics

Symbol	PARAMETER	Typ.	MAX.	Unit
R _{θJC}	Thermal Resistance,Junction to Case	-	1.8	°C/W
R _{θJA}	Thermal Resistance,Junction to Ambient	-	-	°C/W
R _{θCS}	Thermal Resistance,Case to Sink	-	110	°C/W



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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 =250μA	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} =±20V,V _{DS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	1.4	1.9	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	14	20	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V,I _D =20A	18	-	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{iss}	V _{DS} =30V,V _{GS} =0V, F=1.0MHz	-	2050	-	PF
Output Capacitance	C _{oss}		-	158	-	PF
Reverse Transfer Capacitance	C _{rss}		-	120	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V, R _L =6.7Ω V _{GS} =10V,R _G =3Ω	-	7.4	-	nS
Turn-on Rise Time	t _r		-	5.1	-	nS
Turn-Off Delay Time	t _{d(off)}		-	28.2	-	nS
Turn-Off Fall Time	t _f		-	5.5	-	nS
Total Gate Charge	Q _g	V _{DS} =30V,I _D =20A, V _{GS} =10V	-	50		nC
Gate-Source Charge	Q _{gs}		-	6		nC
Gate-Drain Charge	Q _{gd}		-	15		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V,I _S =20A	-		1.2	V
Diode Forward Current ^(Note 2)	I _S		-	-	50	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F =20A di/dt = 100A/μs ^(Note3)	-	28	-	nS
Reverse Recovery Charge	Q _{rr}		-	40	-	nC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega$



Typical Characteristics

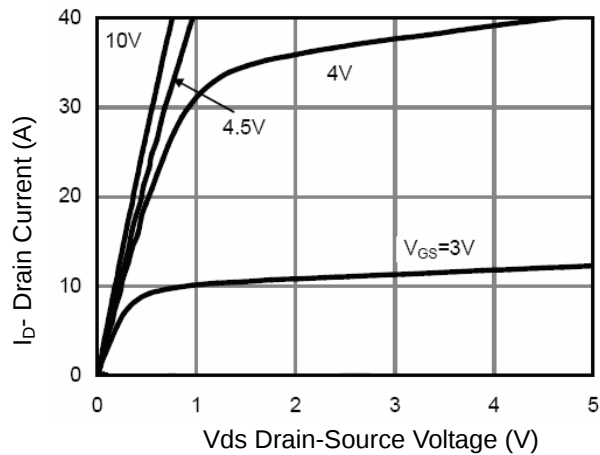


Figure 1 Output Characteristics

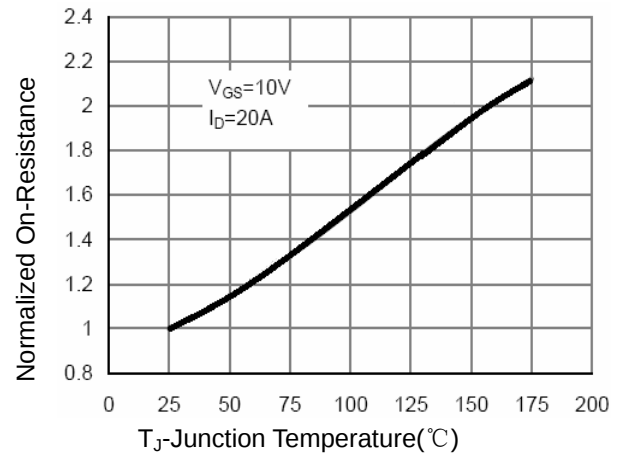


Figure 4 Rdson-Junction Temperature

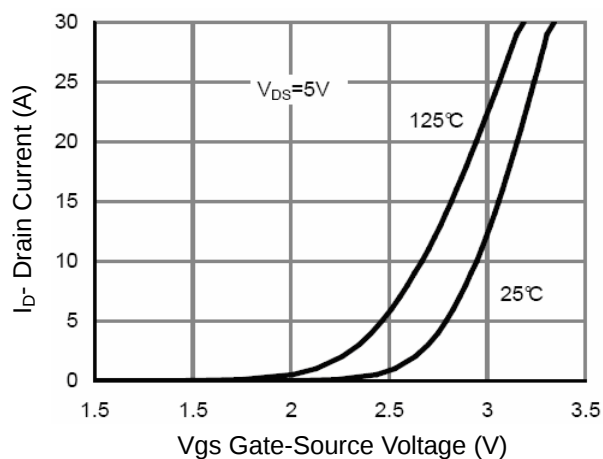


Figure 2 Transfer Characteristics

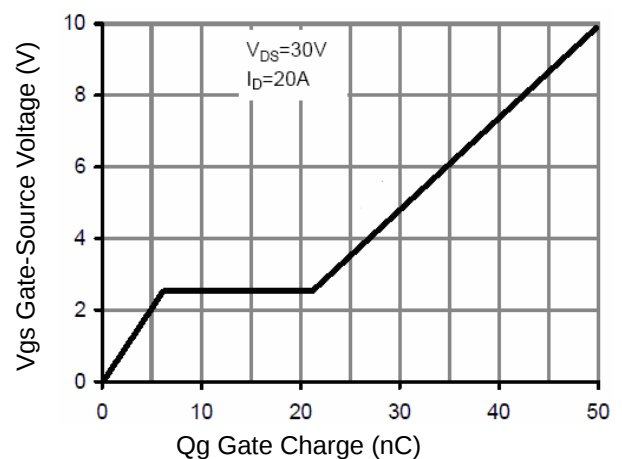


Figure 5 Gate Charge

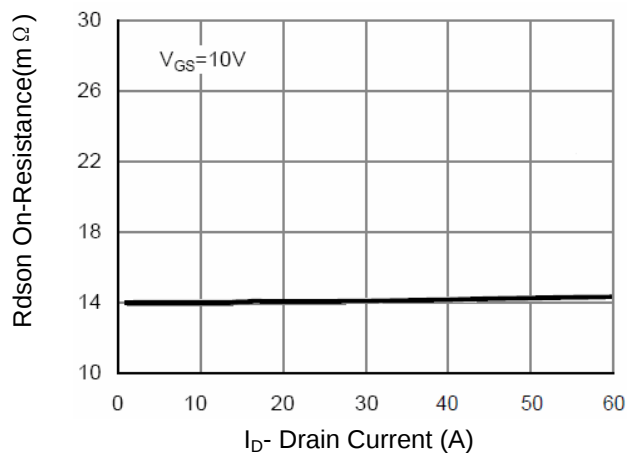


Figure 3 Rdson- Drain Current

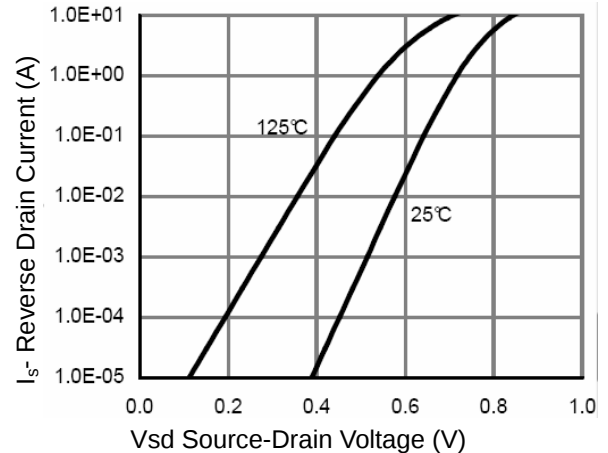


Figure 6 Source- Drain Diode Forward



Typical Characteristics (Continued)

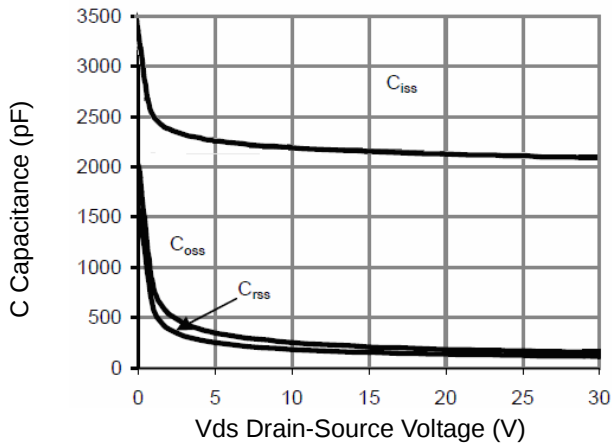


Figure 7 Capacitance vs Vds

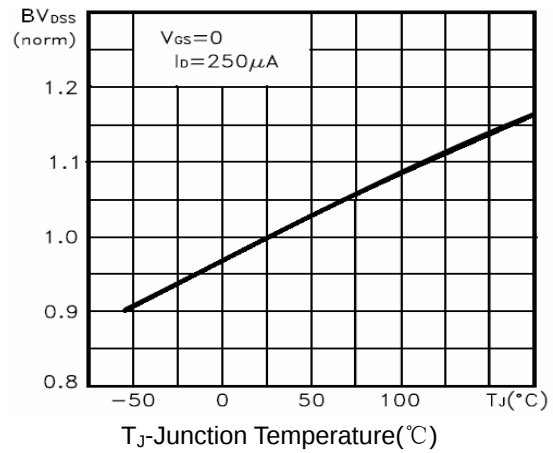


Figure 9 BV_{DSS} vs Junction Temperature

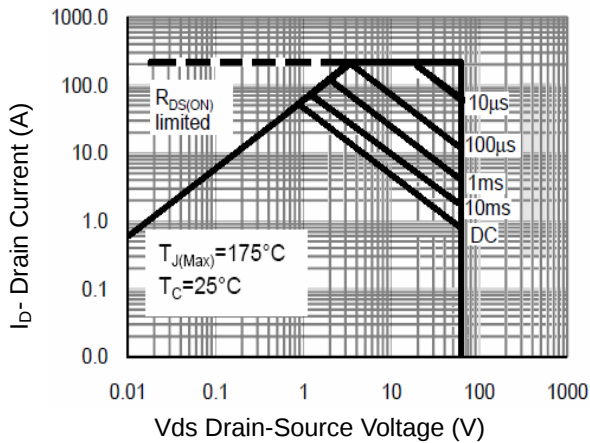


Figure 8 Safe Operation Area

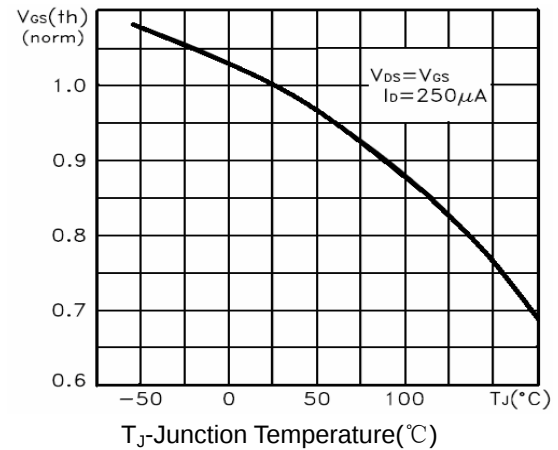


Figure 10 $V_{GS(th)}$ vs Junction Temperature

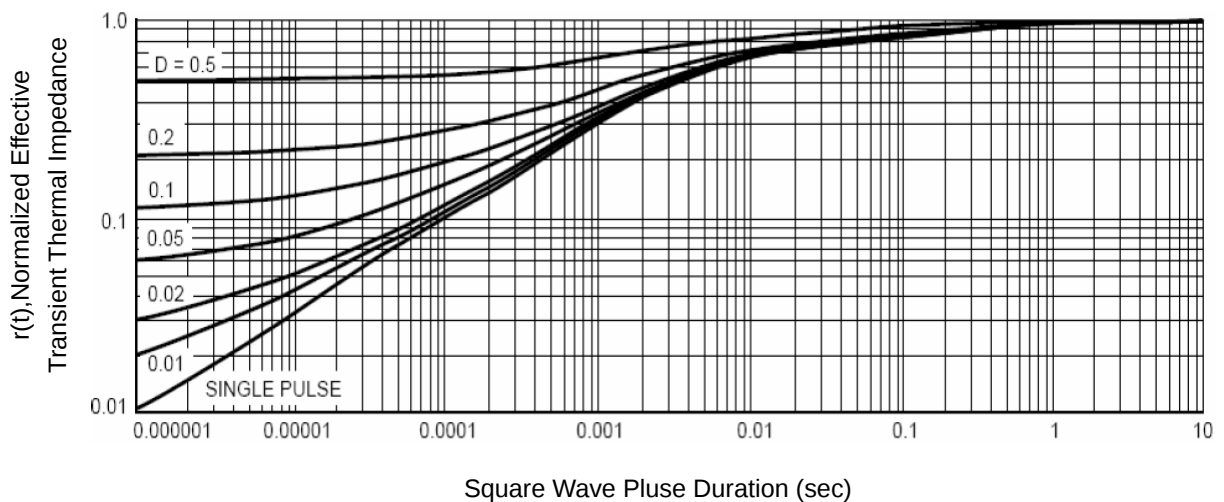
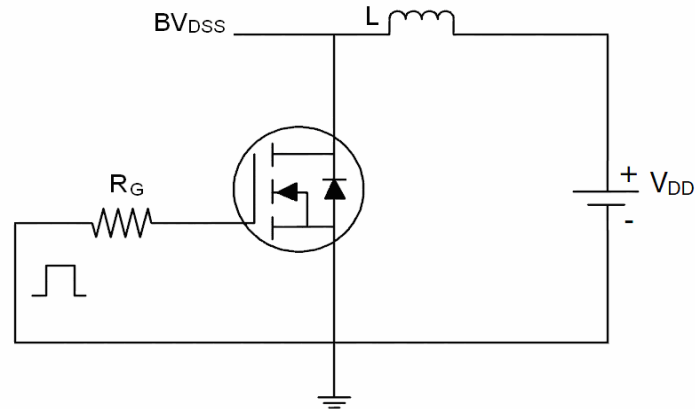


Figure 11 Normalized Maximum Transient Thermal Impedance

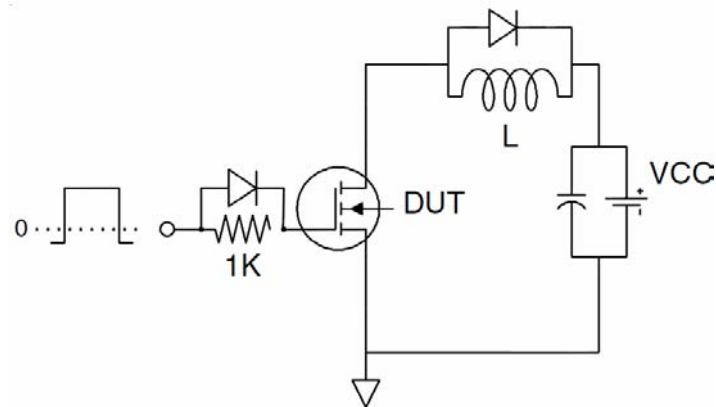


Test Circuit

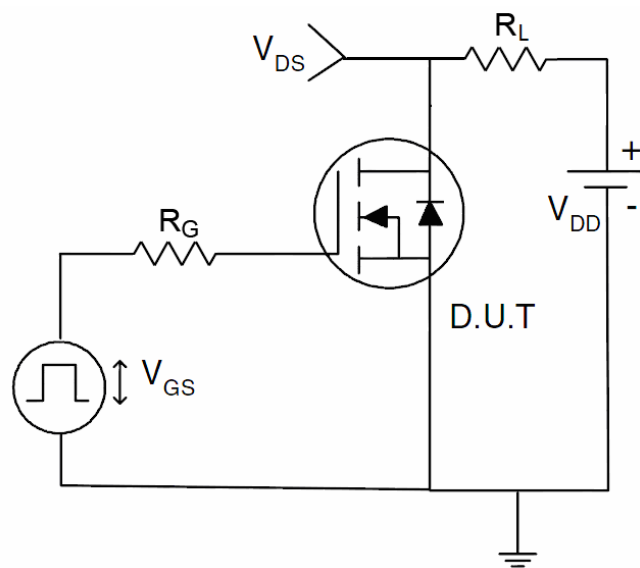
1) A_S test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit

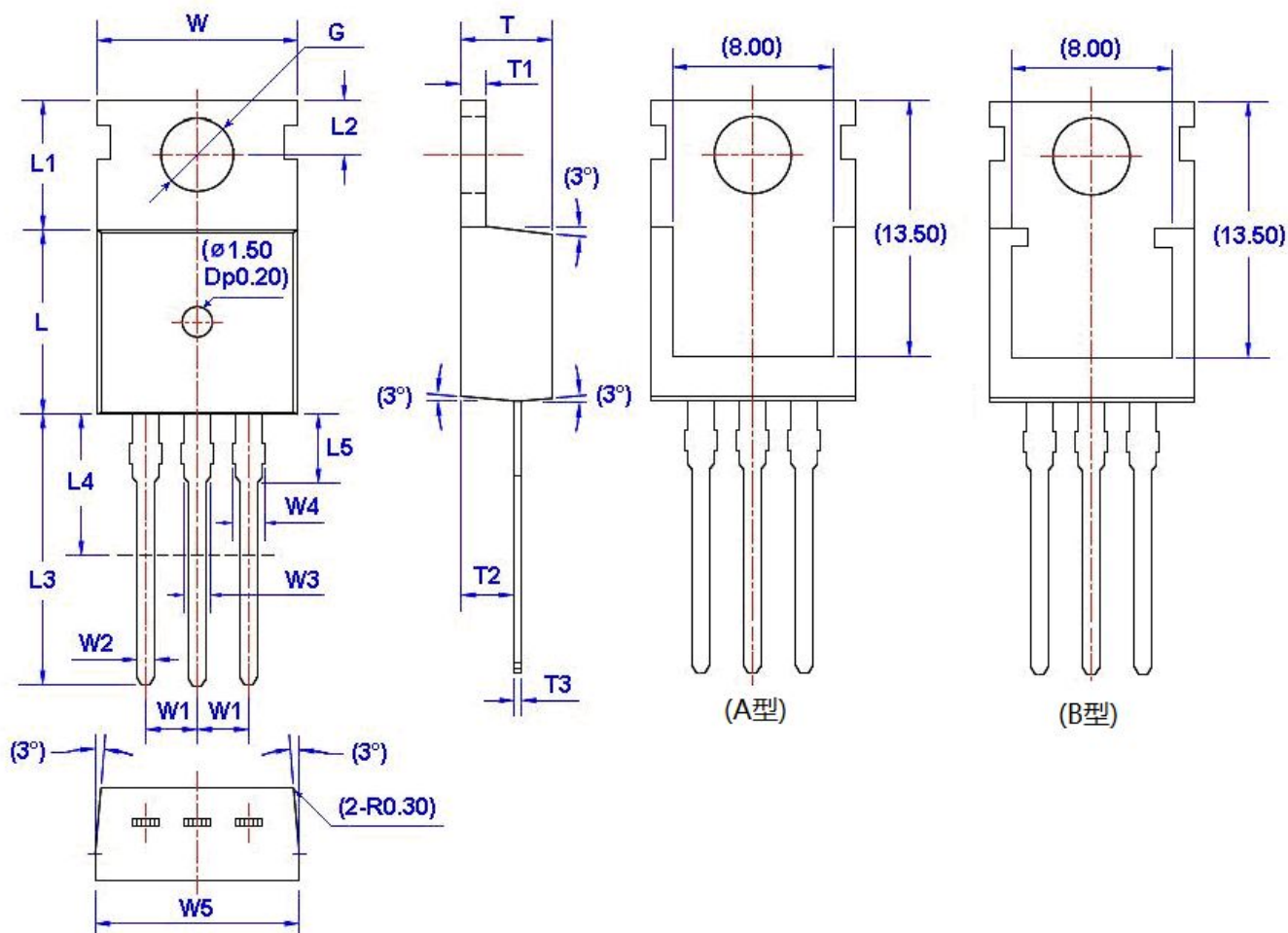




Package Dimension

TO-220

Unit:mm



Symbol	Size		Symbol	Size		Symbol	Size		Symbol	Size	
	Min	Max		Min	Max		Min	Max		Min	Max
W	9.66	10.28	W5	9.80	10.20	L4**	6.20	6.60	T3	0.45	0.60
W1	2.54 (TYP)		L	9.00	9.40	L5	2.79	3.30	G(Φ)	3.50	3.70
W2	0.70	0.95	L1	6.40	6.80	T	4.30	4.70			
W3	1.17	1.37	L2	2.70	2.90	T1	1.15	1.40			
W4*	1.32	1.72	L3	12.70	14.27	T2	2.20	2.60			