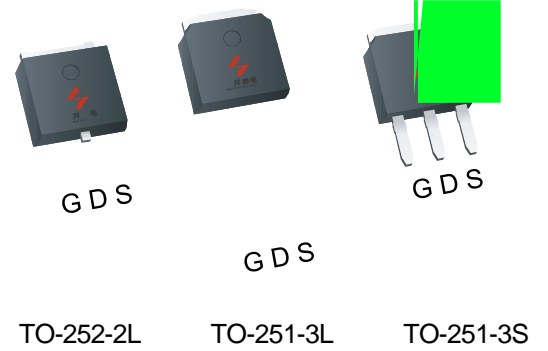


N-Channel Enhancement Mode MOSFET

Feature

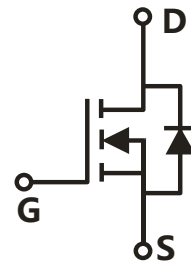
- 100V/120A
 $R_{DS(ON)} = 4.8\ m\ (\text{typ.}) @ V_{GS} = 10V$
- 100% Avalanche Tested
- 100% DVDS
- Reliable and Rugged
- Halogen Free and Green Devices Available
 (RoHS Compliant)

Pin Description






Applications

- Switching application
- Li-battery protection
- Motor control



Single N-Channel MOSFET

Ordering and Marking Information

 D  U  V HYG053N10 HYG053N10 HYG053N10 XYMXXXXXX XYMXXXXXX XYMXXXXXX	Package Code D: TO-252-2L U: TO-251-3L V: TO-251-3S Date Code XYMXXXXXX
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Note: HUAYI halogen free products contain molding compounds/die attach materials and 100% matte tin plate Termination finish; which are fully compliant with RoHS. HUAYI halogen free products meet or exceed the halogen free requirements of IPC/JEDEC J-STD-020 for MSL classification at halogen free peak reflow temperature. HUAYI defines "Green" to mean halogen free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight).

HUAYI reserves the right to make changes, corrections, enhancements, modifications, and improvements to this product and/or to this document at any time without notice.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
Common Ratings (Tc=25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage	100	V	
V _{GSS}	Gate-Source Voltage	20	V	
T _J	Junction Temperature Range	-55 to 175	°C	
T _{STG}	Storage Temperature Range		°C	
I _S	Source Current-Continuous(Body Diode)	Tc=25°C	120	A
Mounted on Large Heat Sink				
I _{DM}	Pulsed Drain Current *	Tc=25°C	360	A
I _D	Continuous Drain Current	Tc=25°C	120	A
		Tc=100°C	81.3	A

P_D Maximum Power Dissipation

Electrical Characteristics (Cont.) (Tc =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HYG053N10NS2			Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=500kHz	-	0.7	-	
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} = 25V, Frequency=500kHz	-	6512	-	pF
C _{oss}	Output Capacitance					
C _{rss}	Reverse Transfer Capacitance					
t _{d(ON)}	Turn-on Delay Time	V _{DD} =50V, R _G =2.5 Ω, I _{DS} =20A, V _{GS} =10V	-	27	-	ns
T _r	Turn-on Rise Time					
t _{d(OFF)}	Turn-off Delay Time					
T _f	Turn-off Fall Time					
Gate Charge Characteristics						
Q _g	Total Gate Charge(V _{GS} =10V)	V _{DS} =80V, I _{DS} =20A	-	92	-	nC
Q _{gs}	Gate-Source Charge					
Q _{gd}	Gate-Drain Charge					
V _{plateau}	Gate plateau voltage		-	5.3	-	V

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

Typical Operating Characteristics

Figure 1: Power Dissipation



Figure 2: Drain Current

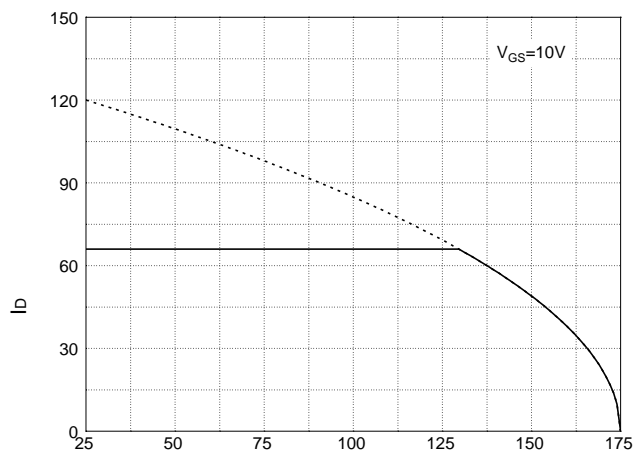


Figure 3: Safe Operation Area

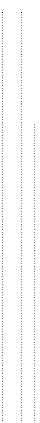


Figure 4: Thermal Transient Impedance



Figure 5: Output Characteristics

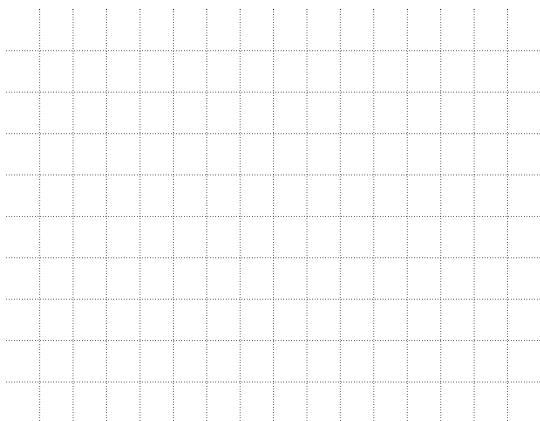
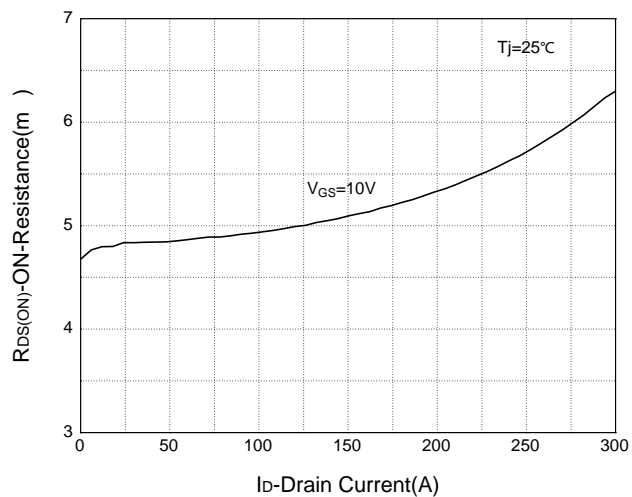


Figure 6: Drain-Source On Resistance



Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

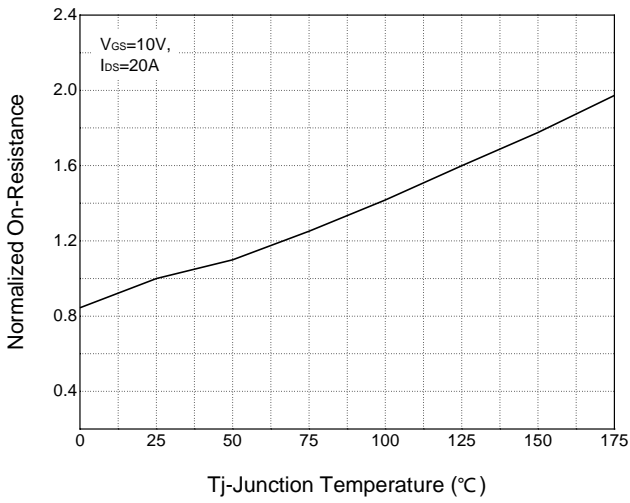


Figure 8: Source-Drain Diode Forward

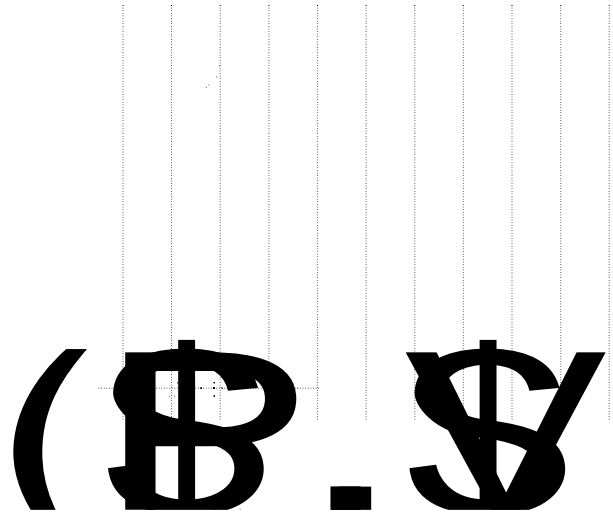


Figure 9: Capacitance Characteristics

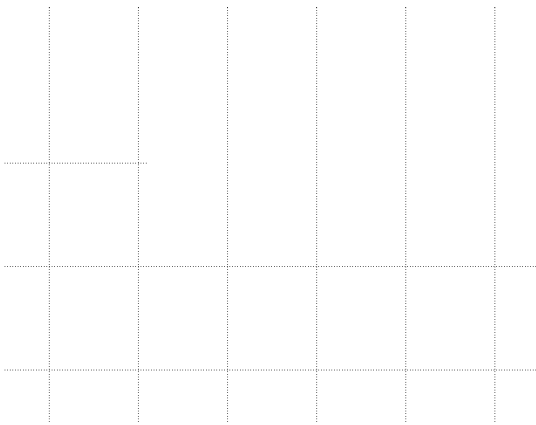
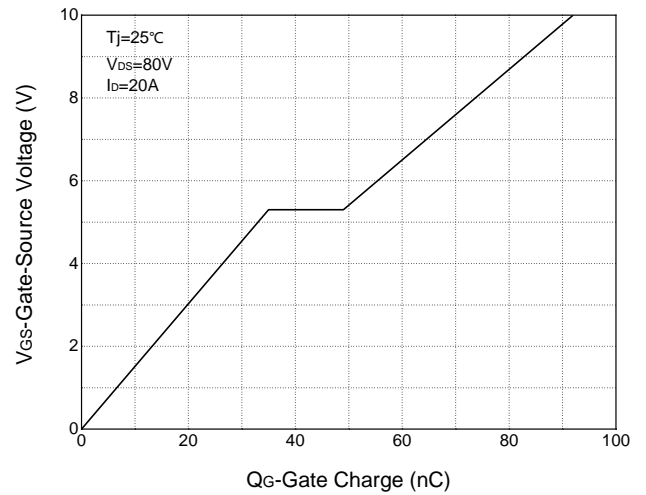
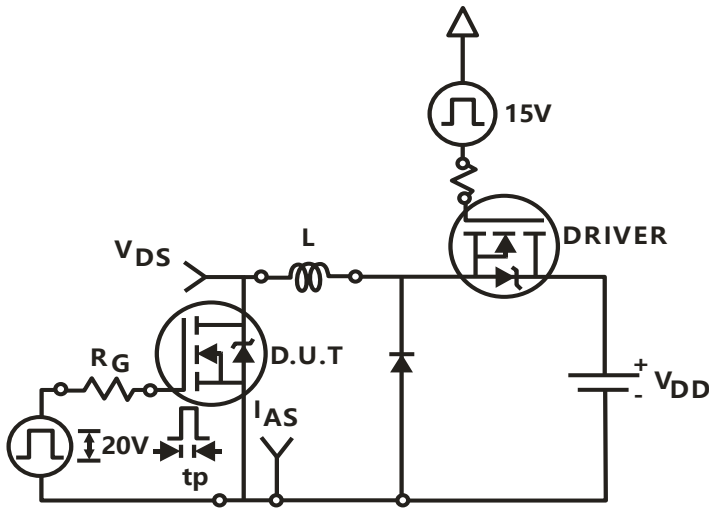


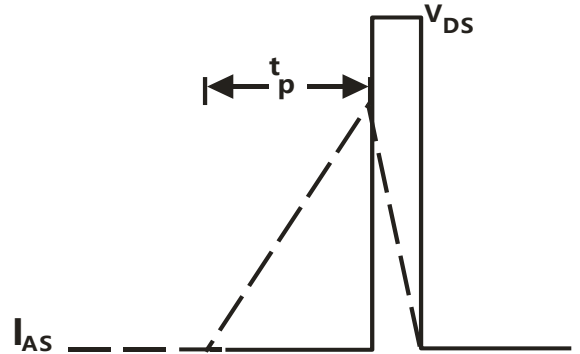
Figure 10: Gate Charge Characteristics



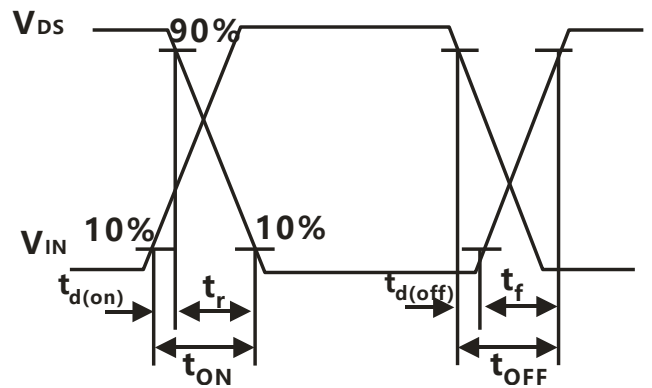
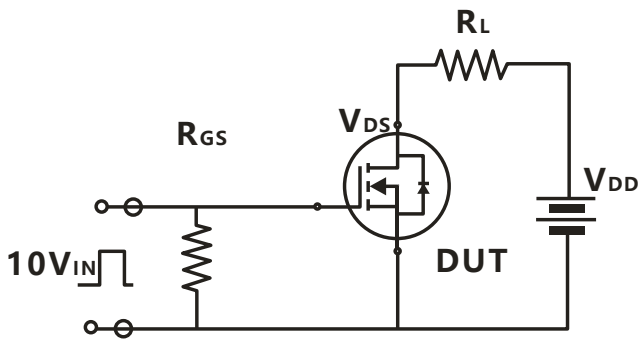
Avalanche Test Circuit



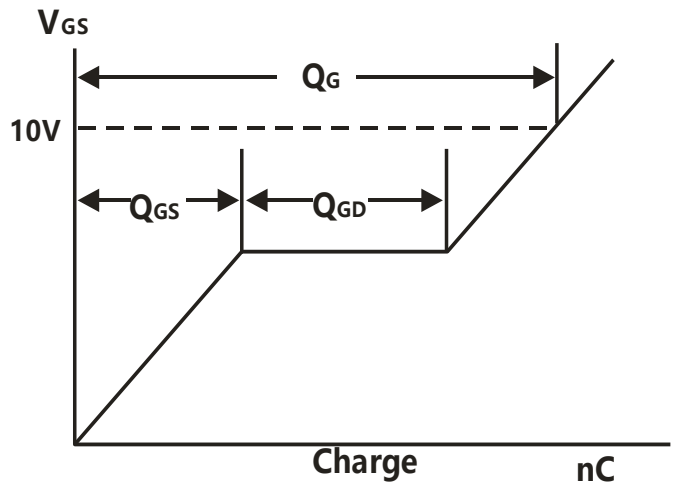
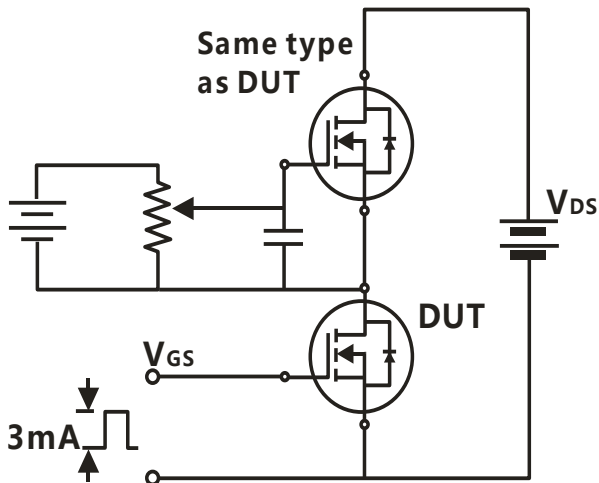
$$E_{AS} = \frac{1}{2} L I_{AS}^2$$



Switching Time Test Circuit



Gate Charge Test Circuit



Device Per Unit

Package Type	Unit	Quantity
TO-252-2L	Tube	75
TO-252-2L	Reel	2500
TO-251-3L	Tube	75
TO-251-3S	Tube	75

Package Information

TO-252-2L

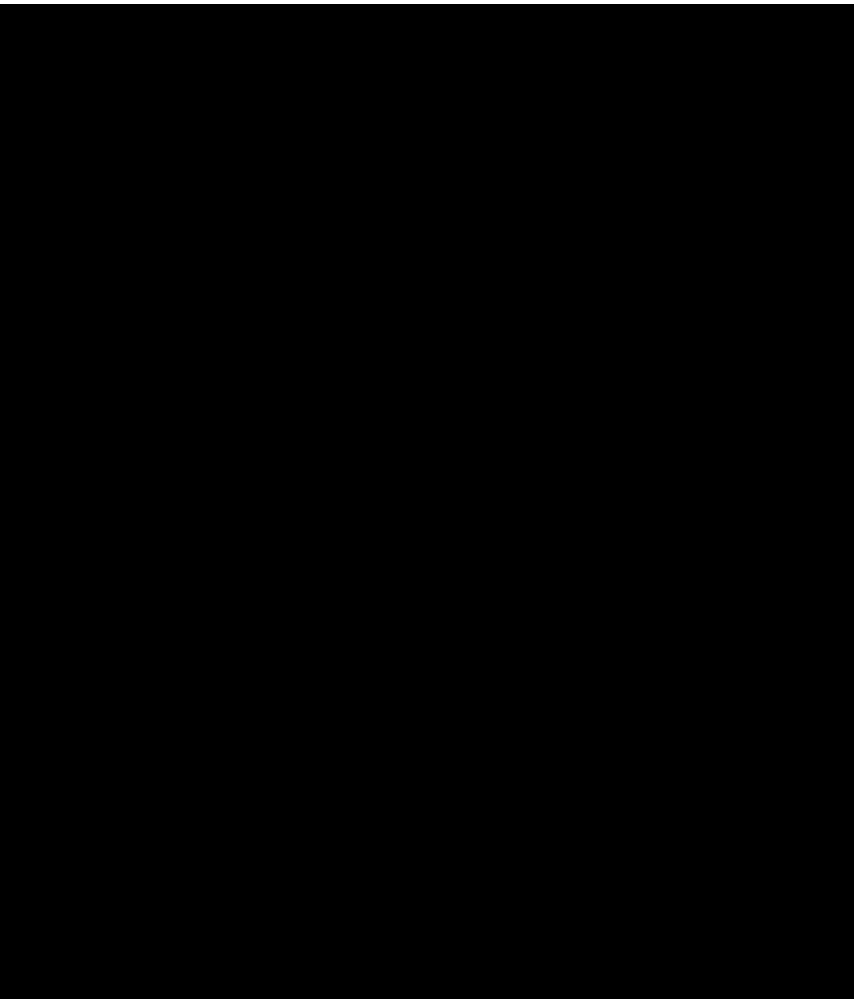
COMMON DIMENSIONS			
SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.00	-	0.12
A2	0.97	1.07	1.17
b	0.68	0.78	0.90

TO-251-3L

COMMON DIMENSIONS			
SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b2	0.00	0.04	0.10
b2'	0.00	0.04	0.10
b3	5.20	5.33	5.46

c37 Td()

TO-251-3S



5308.93 Td() TETQQ2.412189873 0.4.2 15

mm	
NOM	MAX
2.30	2.38
1.07	1.17
0.78	0.90
5.33	5.46

Classification Profile

Classification Reflow Profiles

Profile Feature	Sn-
-----------------	-----

Table 1.SnPb Eutectic Process – Classification Temperatures (Tc)

Package Thickness	Volume mm <350	Volume mm 350
2.5 mm	235 °C	220 °C
2.5 mm	220 °C	220 °C

Table 2.Pb-free Process – Classification Temperatures (Tc)

Package Thickness	Volume mm <350	Volume mm 350-2000	Volume mm 2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm – 2.5 mm	260 °C	250 °C	245 °C
2.5 mm	250 °C	245 °C	245 °C

Reliability Test Program

Test item	Method	Description
SOLDERABILITY	JESD-22, B102	5 Sec, 245°C
HTRB	JESD-22, A108	168/500 Hrs, Bias @ 150°C
HTGB	JESD-22, A108	168 /500 Hrs, V _{gs} 100% @ 150°C
PCT	JESD-22, A102	96 Hrs, 100%RH, 2atm, 121°C
TCT	JESD-22, A104	250/500 Cycles, -55°C~150°C

Customer Service

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Technical Support: Technology@hymexa.com

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