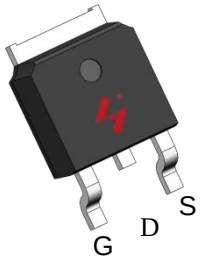
Single N-Channel Enhancement Mode MOSFET

Feature

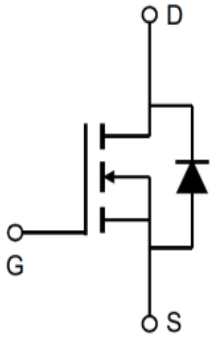
- 30V/120A
  $R_{DS(ON)}$= 1.7 mΩ(typ.) @V_{GS} = 10V
  $R_{DS(ON)}$= 2.6 mΩ(typ.) @V_{GS} = 4.5V
- 100% Avalanche Tested
- Reliable and Rugged
- Halogen- Free Devices Available

Pin Description



Applications

- Battery Protection
- DC-DC Converters



Single N-Channel MOSFET

Ordering and Marking Information

D G018N03 XYMXXXXXX	Package Code D: TO-252-2L Date Code XYMXXXXXX

Note: HUAYI lead-free products contain molding compounds/die attach materials and 100% matte tin plate Termi-Nation finish;which are fully compliant with RoHS. HUAYI lead-free products meet or exceed the lead-Free require-ments of IPC/JEDEC J-STD-020 for MSL classification at lead-free peak reflow temperature. HUAYI defines “Green” to mean lead-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 pr-oduct and/or to this document at any time without notice.

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25 Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		30	V
V_{GSS}	Gate-Source Voltage		20	V
T_J	Junction Temperature Range		-55 to 175	
T_{STG}	Storage Temperature Range		-55 to 175	
I_S	Source Current-Continuous(Body Diode)	Tc=25	120	A
Mounted on Large Heat Sink				
I_{DM}	Pulsed Drain Current *	Tc=25	480	A
I_D	Continuous Drain Current	Tc=25	120	A
		Tc=100	85	A
P_D	Maximum Power Dissipation	Tc=25	58	W
		Tc=100	29	W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		2.6	/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient **		110	/W
E_{AS}	SinglePulsed-Avalanche Energy ***	L=0.3mH	287	mJ

Note: * Repetitive rating pulse width limited by max.junction temperature.
** Surface mounted on FR-4 board.
*** Limited by $T_J$max , starting T_J=25 , L = 0.3mH, R_G =25Ω., V_{GS} =10V.

Electrical Characteristics(Tc =25 Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HYG018N03LS1			Unit
			Min	Typ.	Max	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_{DS}=250μA	30	-	-	V
I_{DSS}	Drain-to-Source Leakage Current	V_{DS}=30V,V_{GS}=0V	-	-	1	μA
		T_J=125	-	-	50	μA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1	1.9	3	V
I_{GSS}	Gate-Source Leakage Current	V_{GS}=+20V/-20V,V_{DS}=0V	-	-	100	nA
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V,I_{DS}=20A	-	1.7	2.0	mΩ
		V_{GS}=4.5V,I_{DS}=20A	-	2.6	3.1	mΩ
Diode Characteristics						
V_{SD}*	Diode Forward Voltage	I_{SD}=20A,V_{GS}=0V	-	0.78	1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=20A,dI_{SD}/dt=100A/μs	-	31.2	-	ns
Q_{rr}	Reverse Recovery Charge		-	24.0	-	nC

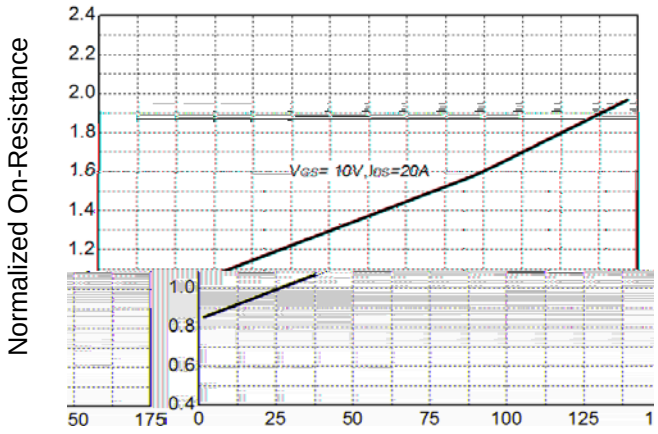
Electrical Characteristics (Cont.) (Tc =25 Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HYG018N03LS1			Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	4.0	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V,	-	3392	-	pF
C_{oss}	Output Capacitance	V_{DS}=25V,	-	742	-	
C_{rss}	Reverse Transfer Capacitance	Frequency=1.0MHz	-	26	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V,R_G=2.5Ω, I_{DS}=20A,V_{GS}=10V	-	13.3	-	ns
T_r	Turn-on Rise Time		-	56.0	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	32.2	-	
T_f	Turn-off Fall Time		-	8.7	-	
Gate Charge Characteristics						
Q_g	Total Gate Charge V_{GS}=10V	V_{DS} =24V, I_D=20A	-	50.7	-	nC
Q_g	Total Gate Charge V_{GS}=4.5V)		-	23.7	-	
Q_{gs}	Gate-Source Charge		-	13.0	-	
Q_{gd}	Gate-Drain Charge		-	8.0	-	

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

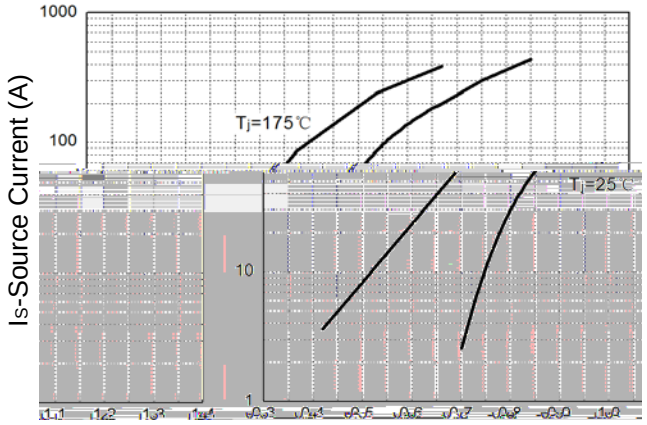
Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature



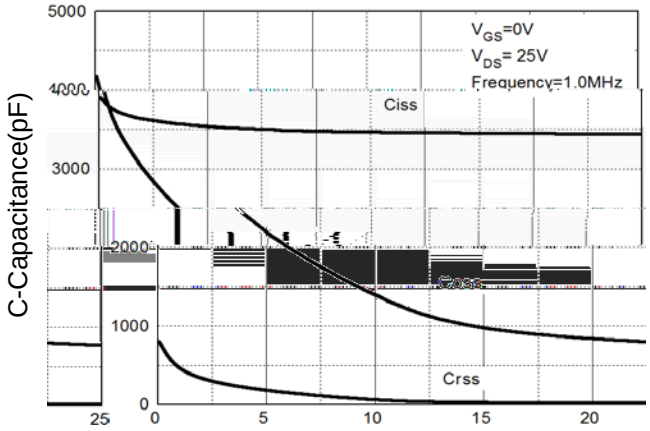
Tj-Junction Temperature ( )

Figure 8: Source-Drain Diode Forward



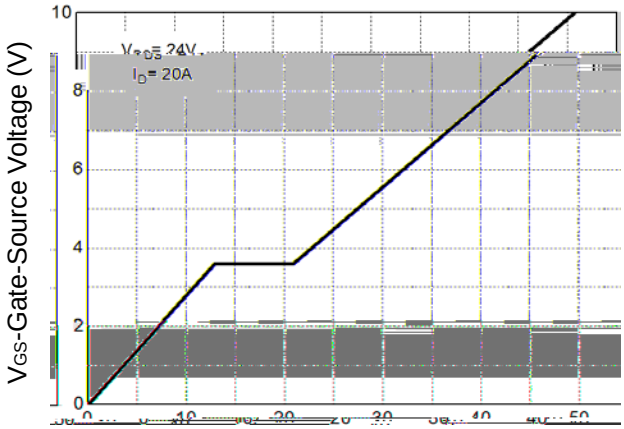
VSD-Source-Drain Voltage(V)

Figure 9: Capacitance Characteristics



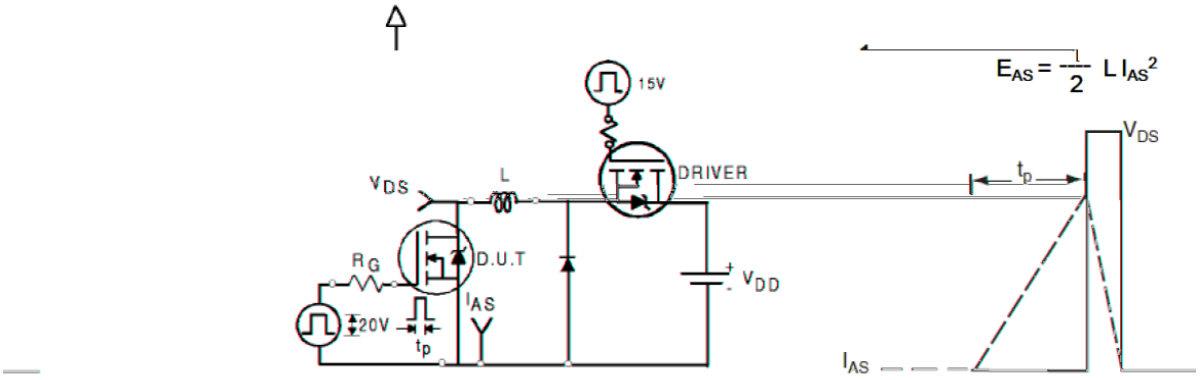
VDS-Drain-Source Voltage (V)

Figure 10: Gate Charge Characteristics

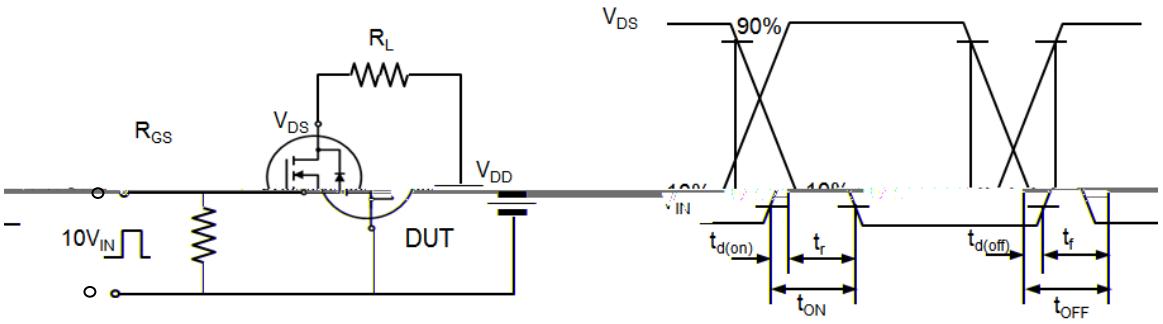


QG-Gate Charge ( )

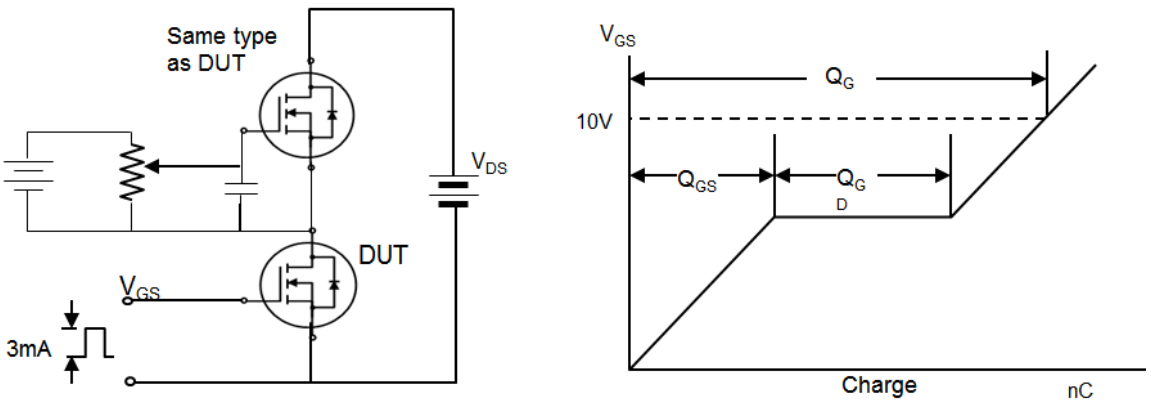
Avalanche Test Circuit



Switching Time Test Circuit



Gate Charge Test Circuit

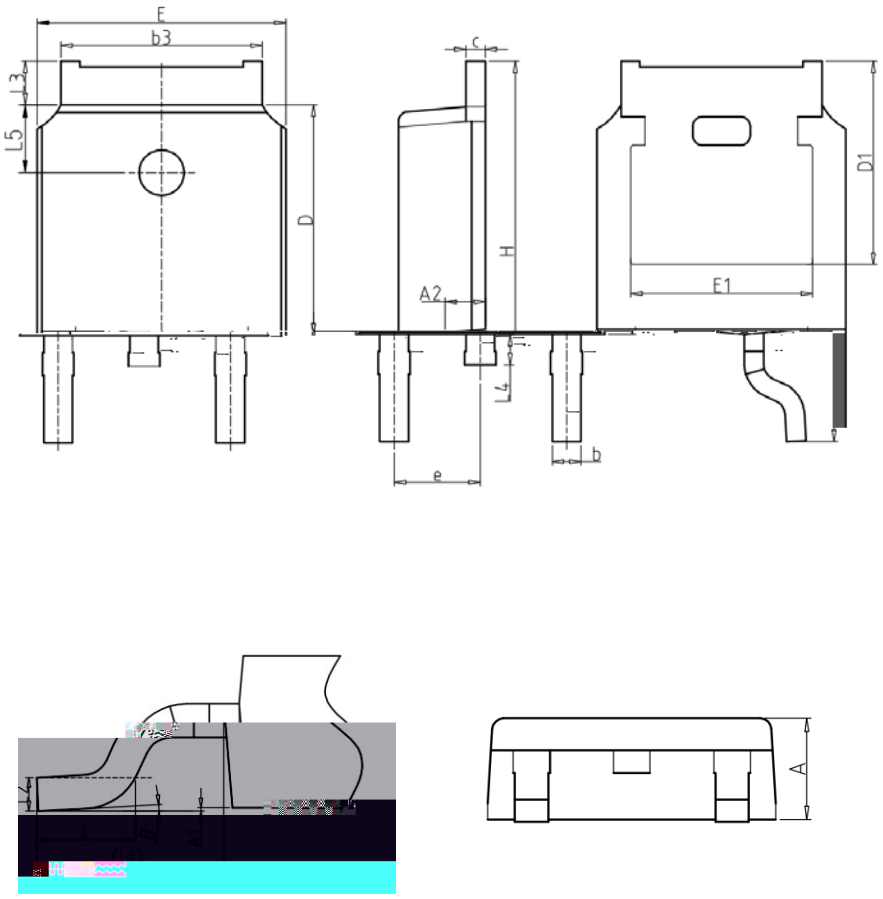


Device Per Unit

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

PackageInformation

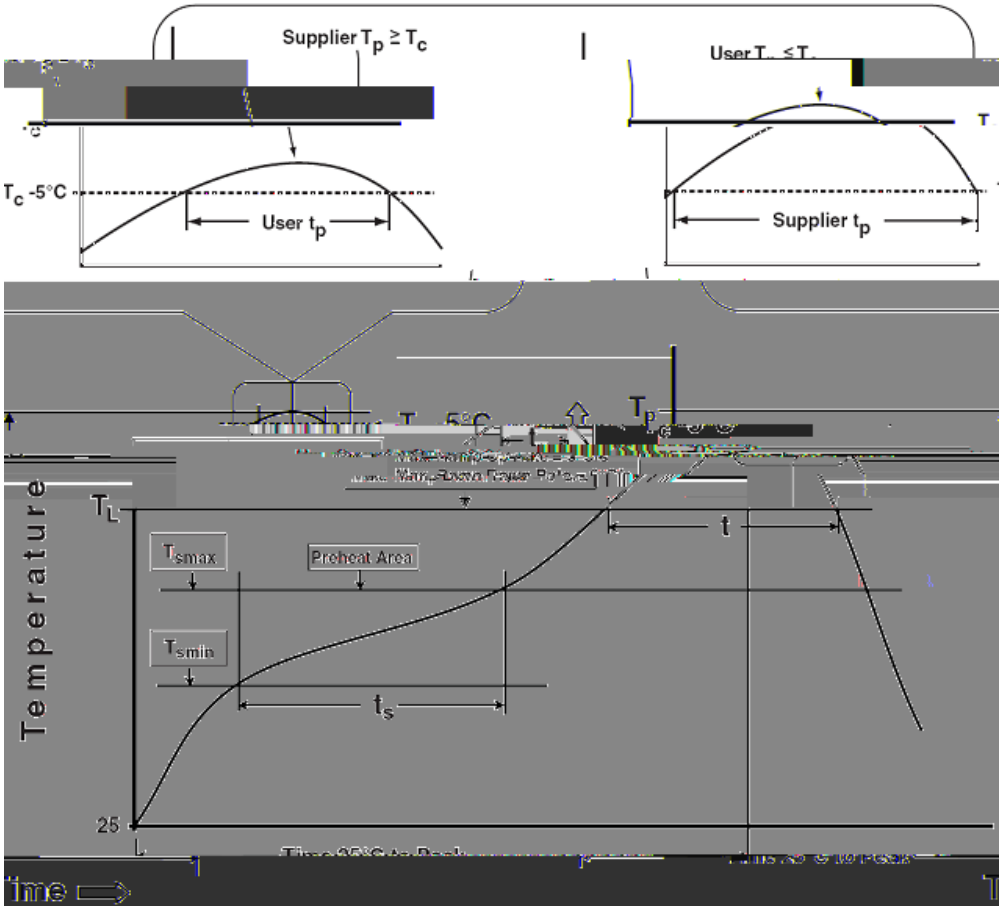
TO-252-2L



COMMONDIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.00	-	0.20
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.50
c	0.43	0.53	0.63
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	-	-
e	2.286BSC		
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1	2.90REF		
L2	0.51BSC		
L3	0.88	-	1.28
L4	-	-	1.00
L5	1.65	1.80	1.95
θ	0°	-	8°

Classification Profile



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak Temperature min (T_{smin}) Temperature max (T_{smax}) Time (Tsmin to Tsmax) (t_s)	 100 150 60-120 seconds	 150 200 60-120 seconds
Average ramp-up rate ($T_{smax}$to T_P)	3 /second max.	3 /second max.
Liquidous temperature (T_L) Time at liquidous (t_L)	183 60-150 seconds	217 60-150 seconds
Peak package body Temperature (T_p)*	See Classification Temp in table 1	SeeClassification Tempin table 2
Time (t_P)** within 5 of the specified classification temperature (T_c)	20** seconds	30** seconds
Average ramp-down rate ($T_p$to T_{smax})	6 /second max.	6 /second max.
Time 25 to peak temperature	6 minutes max.	8 minutes max.
*Tolerance for peak profile Temperature (T_p) is defined as a supplier minimum and a user maximum. ** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.		

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

Package Thickness	Volume mm <350	Volume mm 350
2.5 mm	235	220
≥2.5 mm	220	220

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

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

Reliability Test Program

Test item	Method	Description
SOLDERABILITY	JESD-22, B102	5 Sec, 245
PRECON	JESD-22, A113	30°C/60%/192Hrs
HTRB	JESD-22, A108	168 /500 /1000 Hrs, Bias @ 150
HTGB	JESD-22, A108	168 /500/1000Hrs, V_{gs}100% @ 150°C
PCT	JESD-22, A102	96 Hrs, 100%RH, 2atm, 121
TCT	JESD-22, A104	500 Cycles, -55 ~150

Customer Service
Worldwide Sales and Service: sales@hymexa.com
Technical Support:Technology@hymexa.com
Huayi Microelectronics Co., Ltd.
No.8928,Shangji Road,Economic and Technological Development Zone,Xi'an,China
TEL: (86-029) 86685706
FAX: (86-029) 86685705
E-mail: sales@hymexa.com
Web net: www.hymexa.com