

TMG160N10HT

N-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

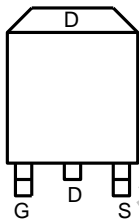
$V_{DS} = 100V$ $I_D = 160A$

$R_{DS(ON)} = 3.3m\Omega$ (typ.) @ $V_{GS} = 10V$

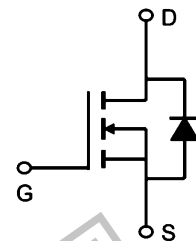
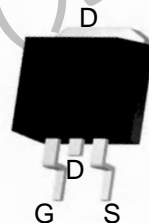
100% UIS Tested
100% R_g Tested



T:TO-263-3L



Marking: G160N10



Absolute Maximum Ratings ($T_C = 25^\circ C$ Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	160	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	96	A
I_{DM}	Pulsed Drain Current ²	619	A
EAS	Single Pulse Avalanche Energy ³	726	mJ
I_{AS}	Avalanche Current	150	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ³	312	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	6.6	$^\circ C/W$

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Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	100	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA	---	---	---	V/°C
R _{DS(on)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =20A	---	3.3	3.8	mΩ
		V _{GS} =4.5V, I _D =10A	---	---	---	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	2.0	3.0	4.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	---	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =80V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =80V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =20A	---	50	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	1.9	---	Ω
Q _g	Total Gate Charge	V _{DS} =50V, V _{GS} =10V, I _D =20A	---	84	---	nC
Q _{gs}	Gate-Source Charge		---	24	---	
Q _{gd}	Gate-Drain Charge		---	27	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =50V, V _{GS} =10V, R _G =2.5Ω, I _D =10A	---	21	---	ns
T _r	Rise Time		---	35	---	
T _{d(off)}	Turn-Off Delay Time		---	49	---	
T _f	Fall Time		---	30	---	
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V, f=1MHz	---	4797	---	pF
C _{oss}	Output Capacitance		---	900	---	
C _{rss}	Reverse Transfer Capacitance		---	19.1	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	160	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1.2	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is T_J = 25°C, L = 3mH, I_{AS} = 22A, V_{GS} = 10V, V_{DD} = 50V; 100% test at L = 0.3mH, I_{AS} = 45A.
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.



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Typical Electrical & Thermal Characteristics

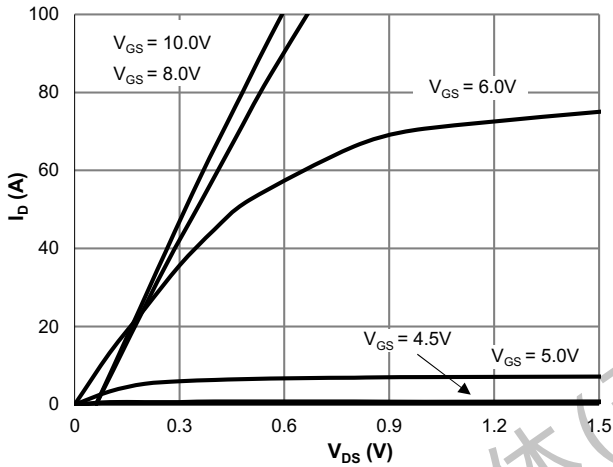


Figure 1: Saturation Characteristics

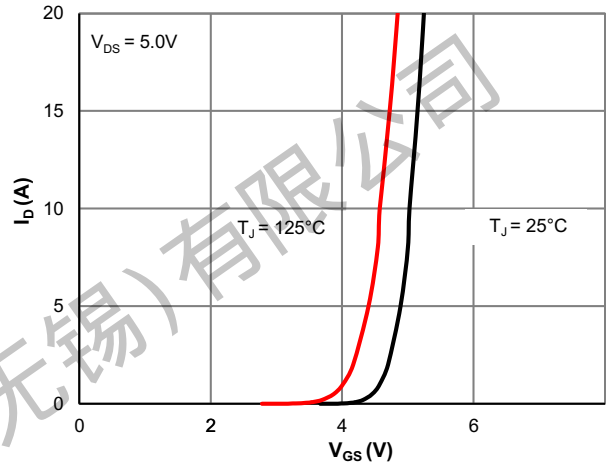


Figure 2: Transfer Characteristics

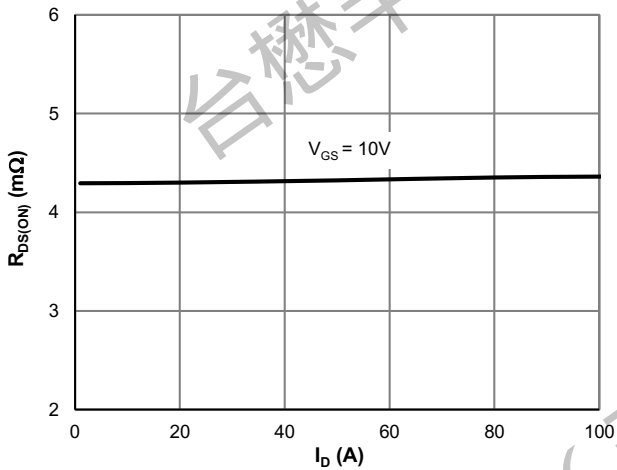


Figure 3: $R_{DS(ON)}$ vs. Drain Current

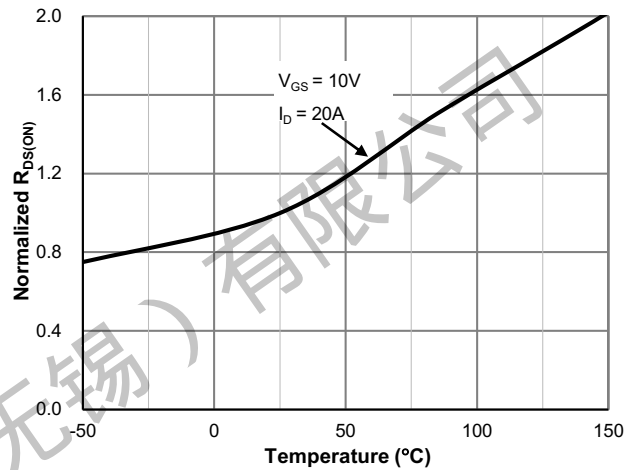


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

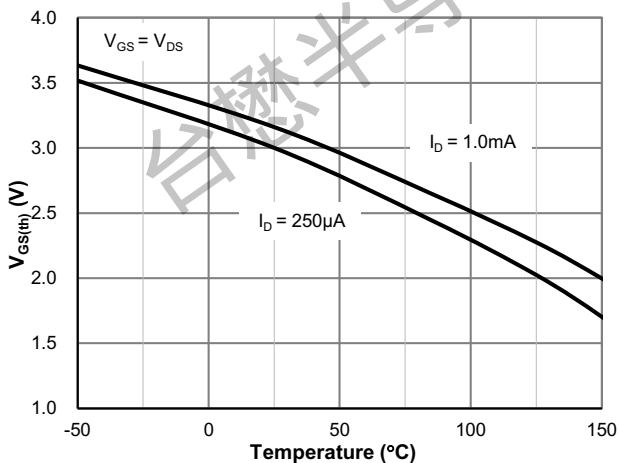


Figure 5: $V_{GS(th)}$ vs. Junction Temperature

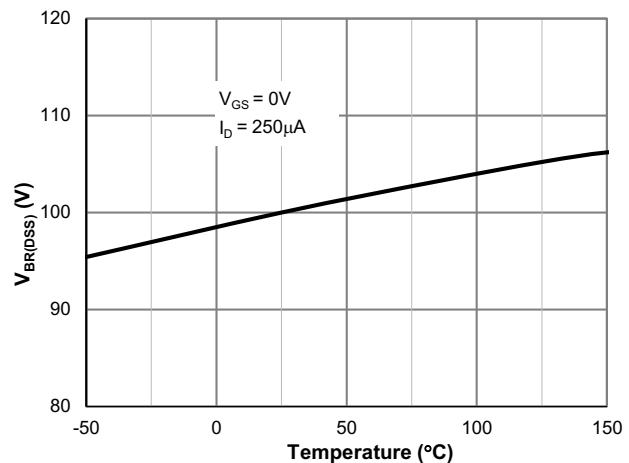


Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature



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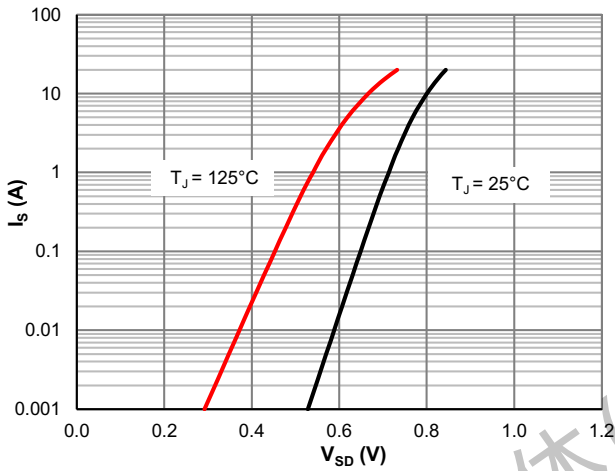


Figure 7: Body-Diode Characteristics

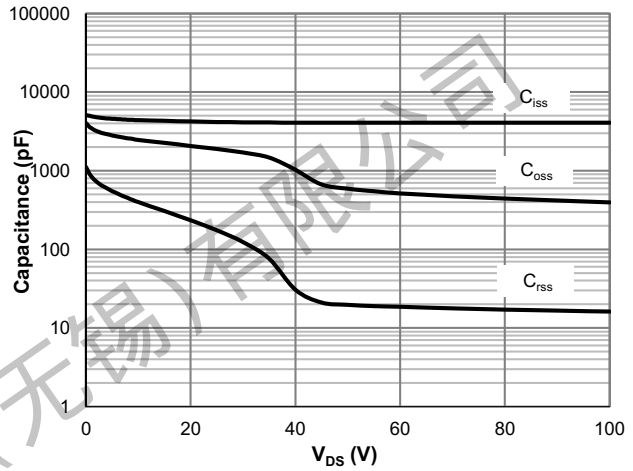


Figure 8: Capacitance Characteristics

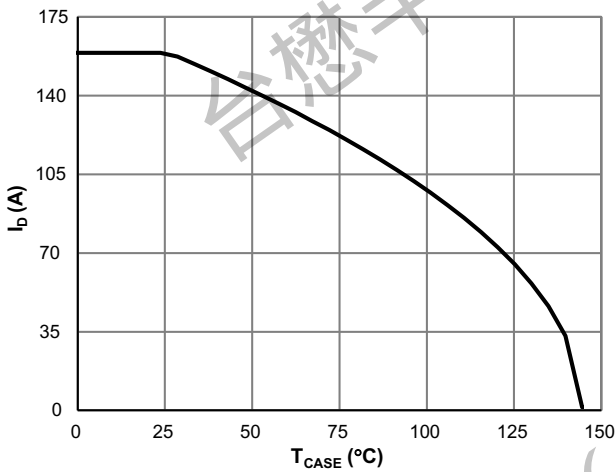


Figure 9: Current De-rating

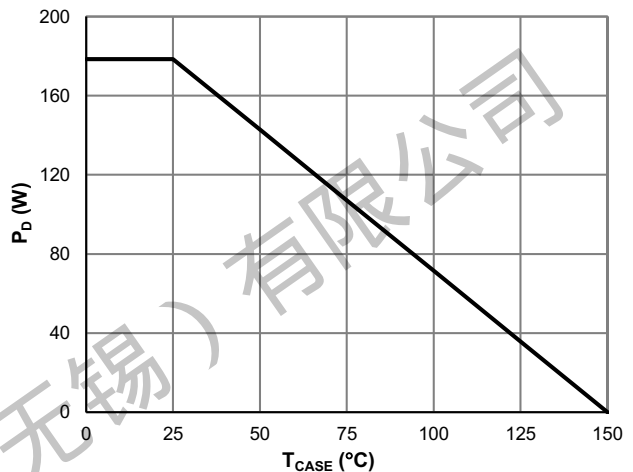


Figure 10: Power De-rating

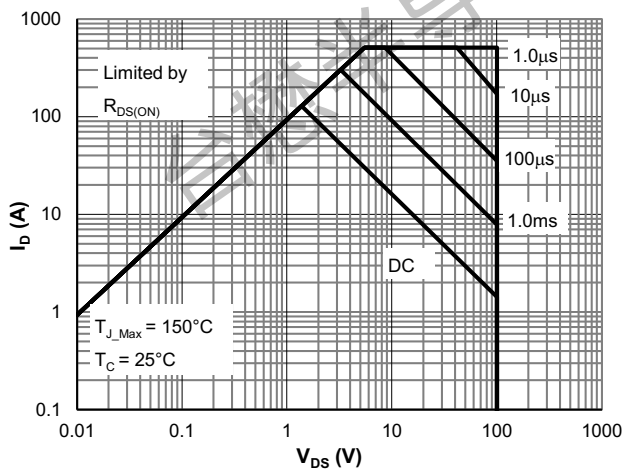


Figure 11: Maximum Safe Operating Area

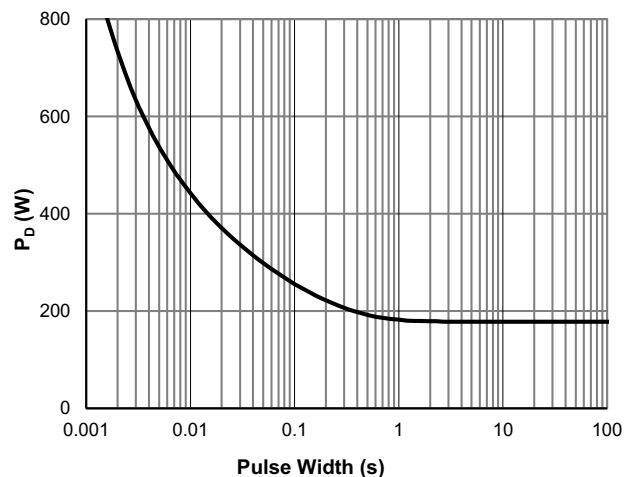


Figure 12: Single Pulse Power Rating, Junction-to-Case

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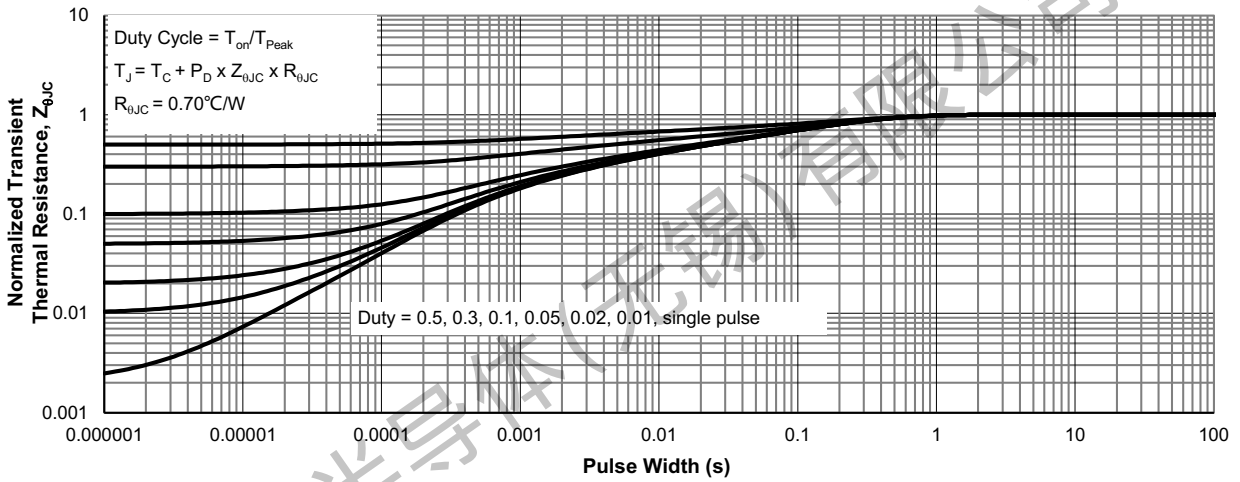
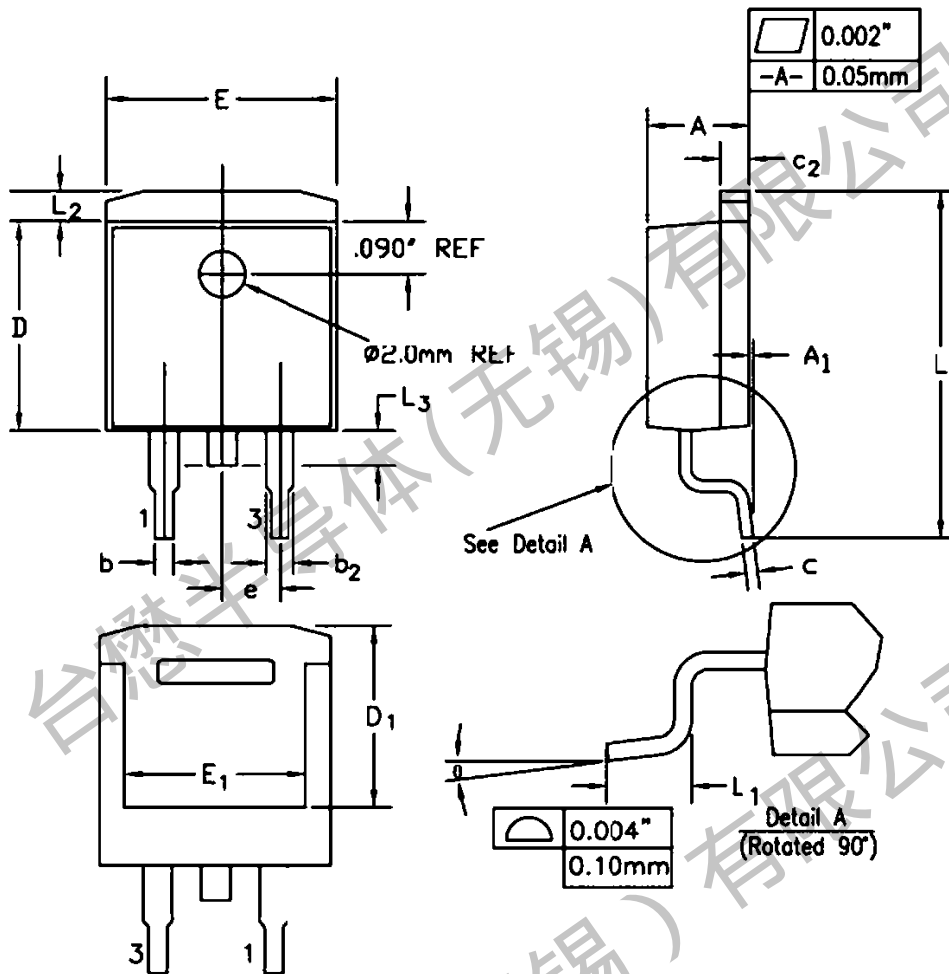


Figure 13: Normalized Maximum Transient Thermal Impedance

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Package Mechanical Data: TO-263-3L



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.170	0.180	4.32	4.57	
A1	-	0.010	-	0.25	
b	0.028	0.037	0.71	0.94	
b2	0.045	0.055	1.15	1.40	
c	0.018	0.024	0.46	0.61	
c2	0.048	0.055	1.22	1.40	
D	0.350	0.370	8.89	9.40	
D1	0.315	0.324	8.01	8.23	
E	0.395	0.405	10.04	10.28	
E1	0.310	0.318	7.88	8.08	
e	0.100 BSC.		2.54 BSC.		
L	0.580	0.620	14.73	15.75	
L1	0.090	0.110	2.29	2.79	
L2	0.045	0.055	1.15	1.39	
L3	0.050	0.070	1.27	1.77	
θ	0°	8°	0°	8°	



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Revision history:

Date	Rev	Description	Page
2023.05.31	23.05	Original	