TM80P04T

P-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

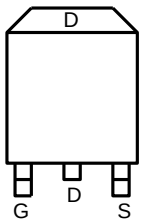
General Features

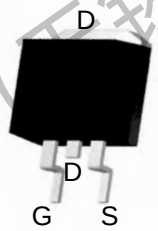
V_{DS} =-40V I_D =-80A

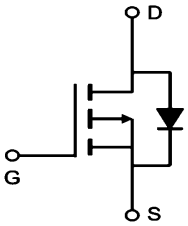
$R_{DS(ON)}$=5.8mΩ (typ.)@V_{GS}=-10V

100% UIS Tested
100% R_g Tested

T:TO-263-3L







Marking: 80P04

Absolute Maximum Ratings: (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Curren	-80	A
	Continuous Drain Current-T_C=100℃	-52	
I_{DM}	Pulsed Drain Current[1]	-296	
P_D	Power Dissipation	81.16	W
E_{AS}	Single pulse avalanche energy[2]	101.25	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55-+175	℃

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Case	2	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	62	℃/W

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

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-40	-	-	V
Gate-body Leakage current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25°C	I_{DSS}	V_{DS} = -40V, V_{GS} = 0V	-	-	-1	pA
	T_J=100°C			-	-	-100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = -250μA	-1.4	-1.75	-2.0	V
Drain-Source on-Resistance[4]		$R_{DS(on)}$	V_{GS} = -10V, I_D = -20A	-	5.8	6.6	mΩ
			V_{GS} = -4.5V, I_D = -15A	-	6.8	8.2	
Forward Transconductance[4]		g_{fs}	V_{DS}= -10V, I_D= -20A	-	104	-	S
Dynamic Characteristics[5]							
Input Capacitance		C_{iss}	V_{DS} = -20V, V_{GS} =0V, f =1MHz	-	5295	-	pF
Output Capacitance		C_{oss}		-	430	-	
Reverse Transfer Capacitance		C_{rss}		-	385	-	
Gate Resistance		R_g	f =1MHz	-	4.3	-	Q
Switching Characteristics[5]							
Total Gate Charge		Q_g	V_{GS} = -10V, V_{DS} = -20V, I_D= -20A	-	110	-	nC
Gate-Source Charge		Q_{gs}		-	12.5	-	
Gate-Drain Charge		Q_{gd}		-	23	-	
Turn-on Delay Time		$t_{d(on)}$	V_{GS} = -10V, V_{DD} = -20V, R_G = 3Ω , I_D= -20A	-	16.8	-	ns
Rise Time		t_r		-	10	-	
Turn-off Delay Time		$t_{d(off)}$		-	65	-	
Fall Time		t_f		-	17	-	
Body Diode Reverse Recovery Time		t_{rr}	I_F = -20A, dI/dt= 100A/μs	-	42	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}		-	29	-	nC
Drain- Source Body Diode Characteristics							
Diode Forward Voltage[4]		V_{SD}	I_S = -20A, V_{GS} = 0V	-	-	-1.2	V
Continuous Source Current	T_C=25°C	I_S	-	-	-	-80	A

Notes:
1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2. The EAS data shows Max. rating . The test condition is V_{DD}= -30V, V_{GS}= -10V, L= 0.1mH, I_{AS}= -45A.
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

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Typical Characteristics

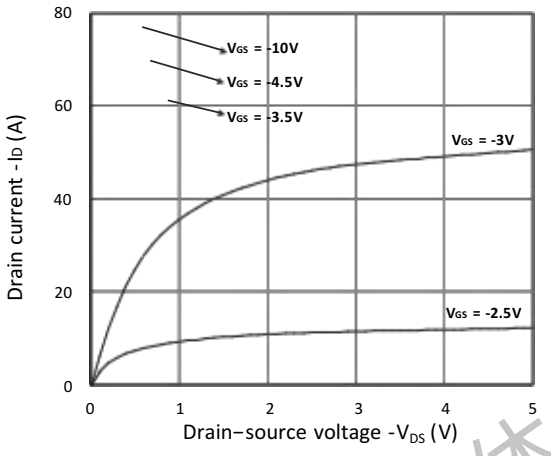

Figure 1. Output Characteristics

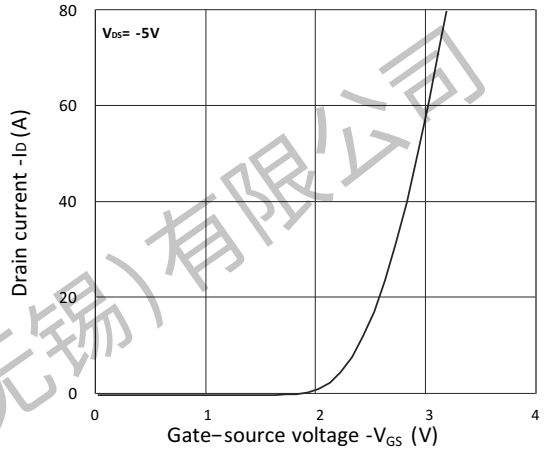

Figure 2. Transfer Characteristics

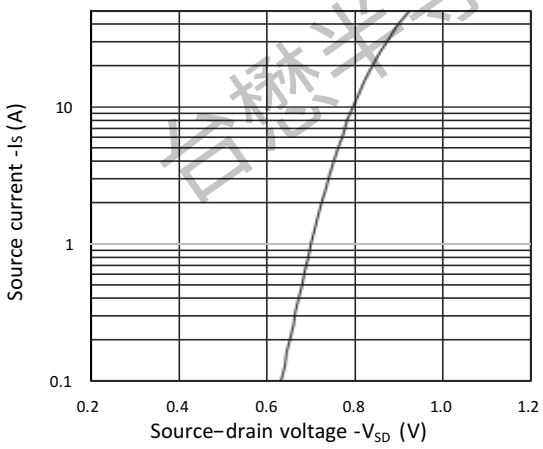

Figure 3. Forward Characteristics of Reverse

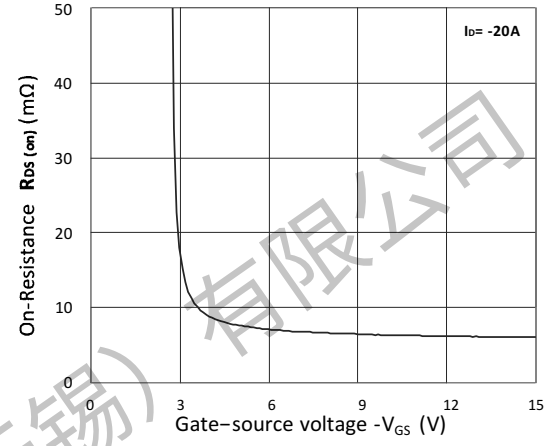

Figure 4. $R_{DS(ON)}$ vs . V_{GS}

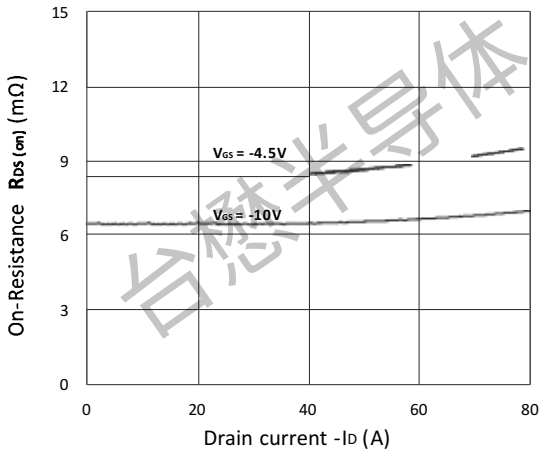

Figure 5. $R_{DS(ON)}$ vs . I_D

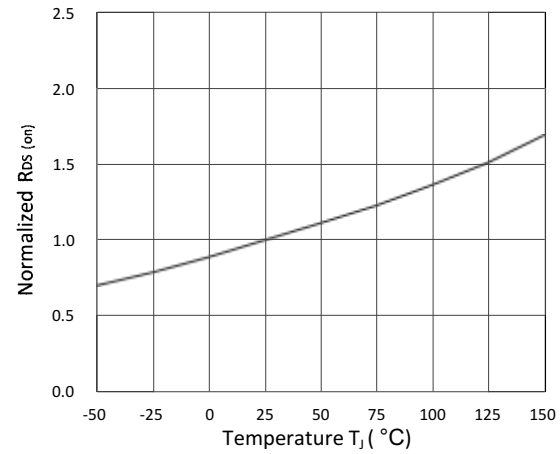

Figure 6. Normalized $R_{DS(on)}$ vs . Temperature

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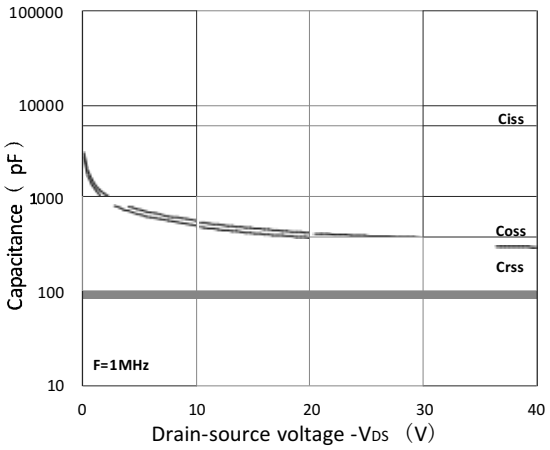

Figure 7. Capacitance Characteristics

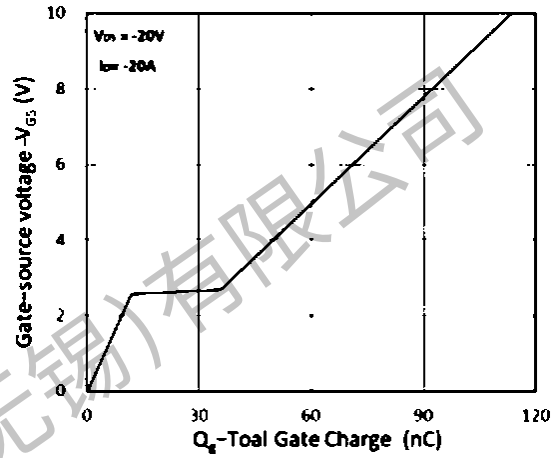

Figure 8. Gate Charge Characteristics

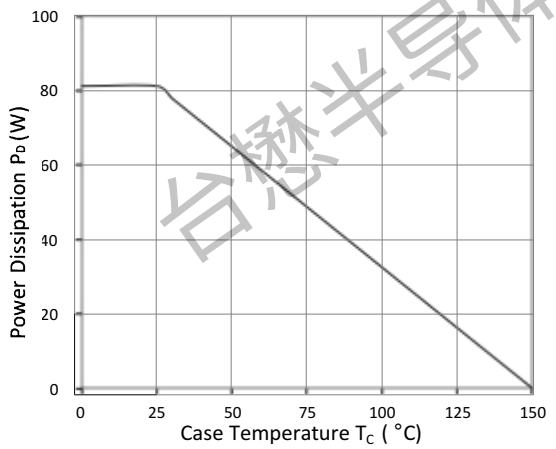

Figure 9. Power Dissipation

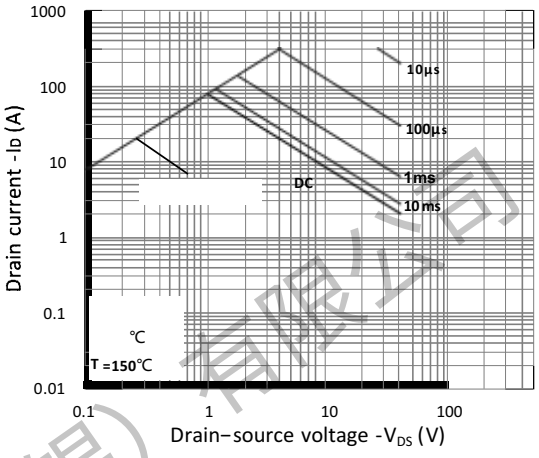

Figure10. Safe Operating Area

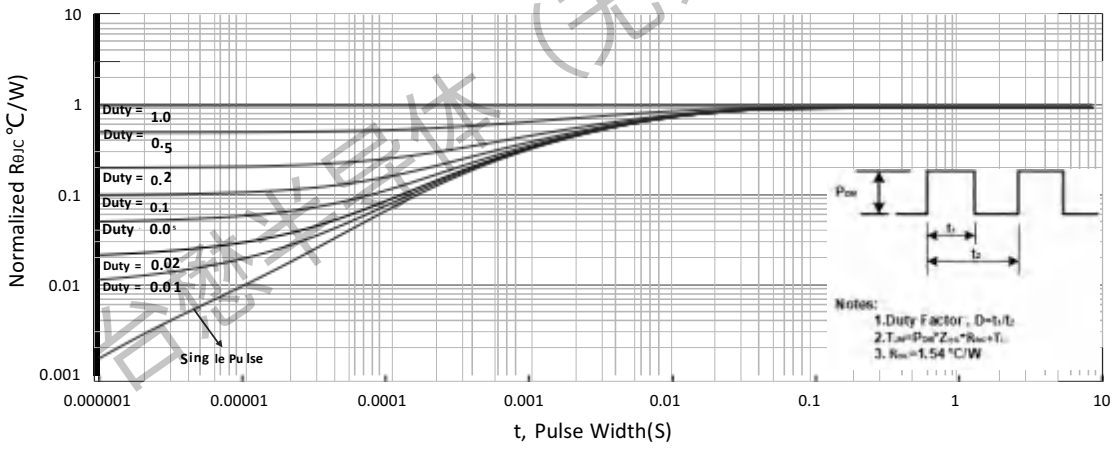

Figure 11. Normalized Maximum Transient Thermal Impedance

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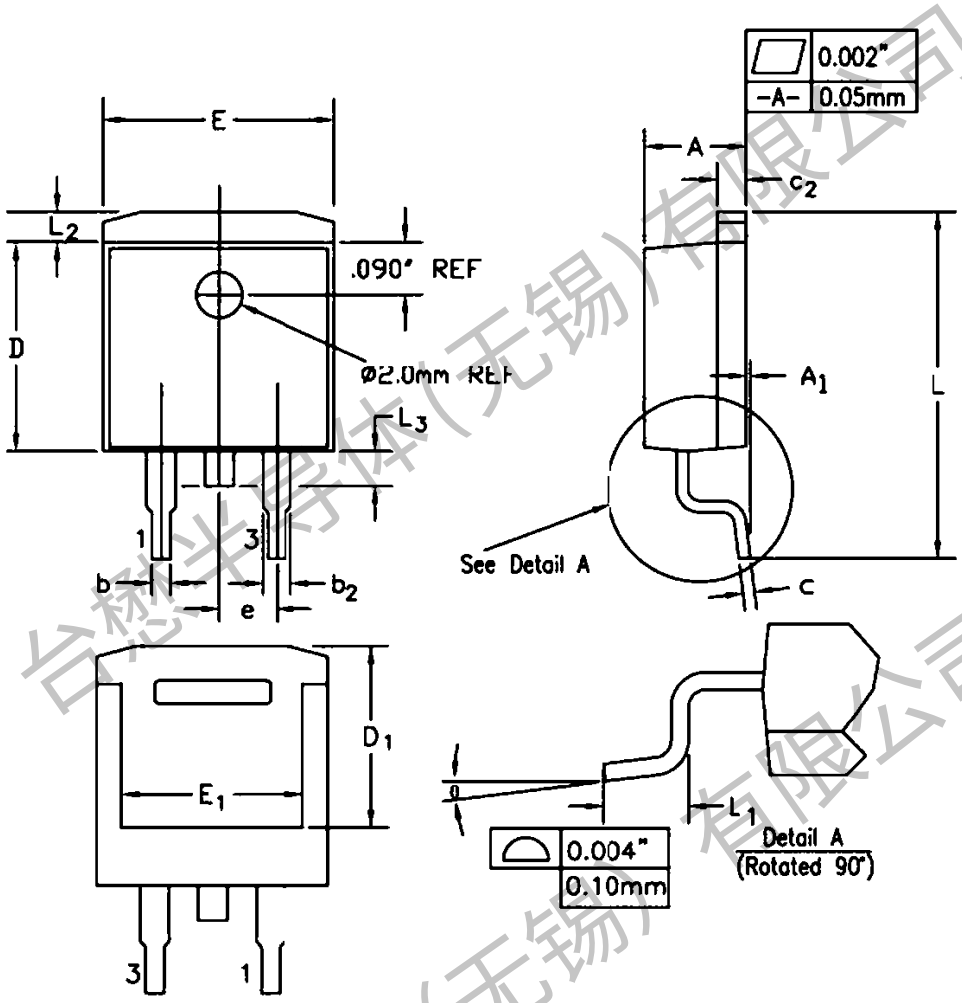
Package Mechanical Data: TO-263-3L



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
2023.08.17	23.08	Original	