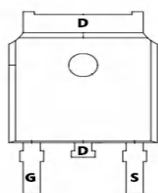


TM20P10D

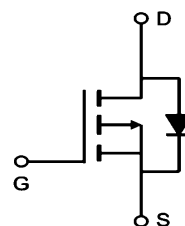
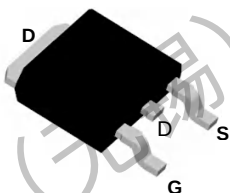
P-Channel Enhancement Mosfet

General Description • Low $R_{DS(ON)}$ • RoHS and Halogen-Free Compliant Applications • Load switch • PWM	General Features $V_{DS} = -100V$ $I_D = -20A$ $R_{DS(ON)} = 85m\Omega (typ.) @ V_{GS} = -10V$ 100% UIS Tested 100% R_g Tested 
--	--

D:TO-252-3L



Marking: 20P10



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, $V_{GS} @ -10V^1$	-20	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-13	A
I_{DM}	Pulsed Drain Current ²	-74	A
EAS	Single Pulse Avalanche Energy ³	132.25	mJ
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ³	70	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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P-Channel Enhancement Mosfet
Electrical Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-100	-	-	V
Gate-body Leakage current		I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
Zero Gate Voltage Drain Current	$T_J = 25^{\circ}C$	I_{DSS}	$V_{DS} = -100V, V_{GS} = 0V$	-	-	-1	μA
	$T_J = 100^{\circ}C$			-	-	-100	
Gate-Threshold Voltage		$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1	-2	-3	V
Drain-Source On-Resistance ⁴		$R_{DS(on)}$	$V_{GS} = -10V, I_D = -10A$	-	85	90	mΩ
			$V_{GS} = -4.5V, I_D = -6A$		---	---	
Forward Transconductance ⁴		g_{fs}	$V_{DS} = -10V, I_D = -10A$	-	30	-	S
Dynamic Characteristics ⁵							
Input Capacitance		C_{iss}	$V_{DS} = -50V, V_{GS} = 0V, f = 1MHz$	-	1985	-	pF
Output Capacitance		C_{oss}		-	85	-	
Reverse Transfer Capacitance		C_{rss}		-	71	-	
Gate Resistance		R_g	$f = 1MHz$	-	4	-	Ω
Switching Characteristics ⁵							
Total Gate Charge		Q_g	$V_{GS} = -10V, V_{DS} = -50V, I_D = -10A$	-	65	-	nC
Gate-Source Charge		Q_{gs}		-	10.2	-	
Gate-Drain Charge		Q_{gd}		-	13	-	
Turn-On Delay Time		$t_{d(on)}$	$V_{GS} = -10V, V_{DD} = -50V, R_G = 3\Omega, I_D = -10A$	-	12.8	-	ns
Rise Time		t_r		-	30	-	
Turn-Off Delay Time		$t_{d(off)}$		-	82	-	
Fall Time		t_f		-	61	-	
Body Diode Reverse Recovery Time		t_{rr}	$I_F = -10A, dI/dt = 100A/\mu s$	-	62	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}		-	56	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴		V_{SD}	$I_S = -10A, V_{GS} = 0V$	-	-	-1.2	V
Continuous Source Current	$T_C = 25^{\circ}C$	I_S	-	-	-	-20	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$.
2. The EAS data shows Max. rating. The test condition is $V_{DD} = -35V, V_{GS} = -10V, L = 0.5\text{mH}, I_{AS} = -23A$
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 $\leq 300\mu s$, duty cycle $\leq 2\%$.
5. This value is guaranteed by design hence it is not included in the production test..

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Typical Characteristics

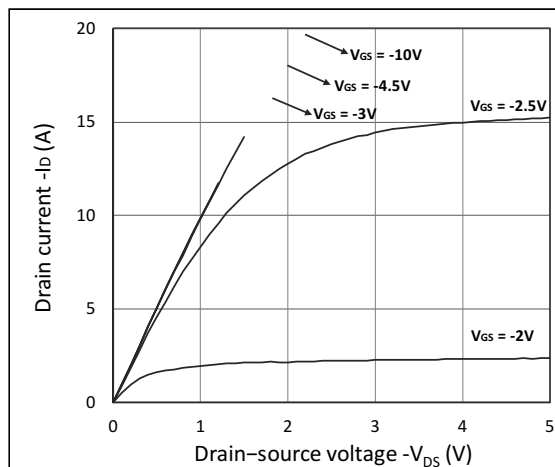


Figure 1. Output Characteristics

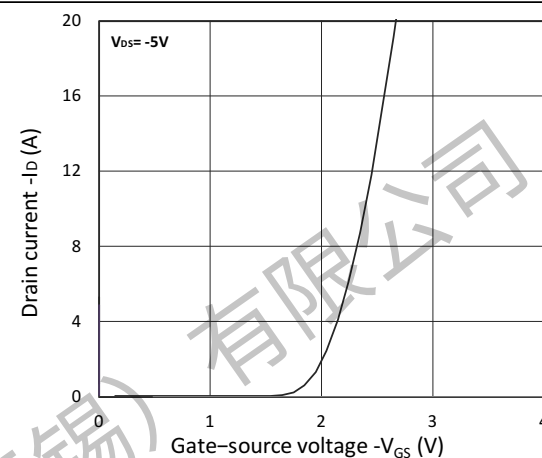


Figure 2. Transfer Characteristics

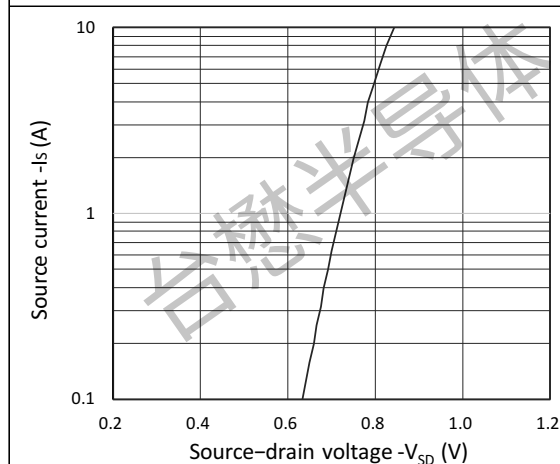


Figure 3. Forward Characteristics of Reverse

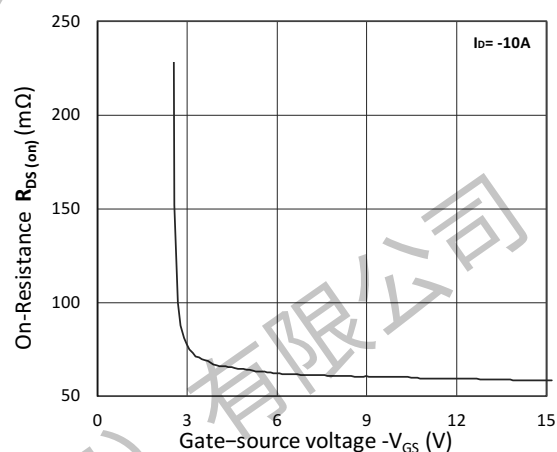


Figure 4. $R_{DS(on)}$ vs. V_{GS}

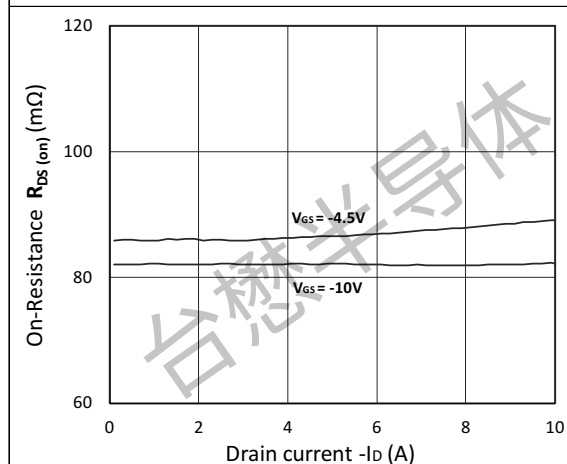


Figure 5. $R_{DS(on)}$ vs. I_D

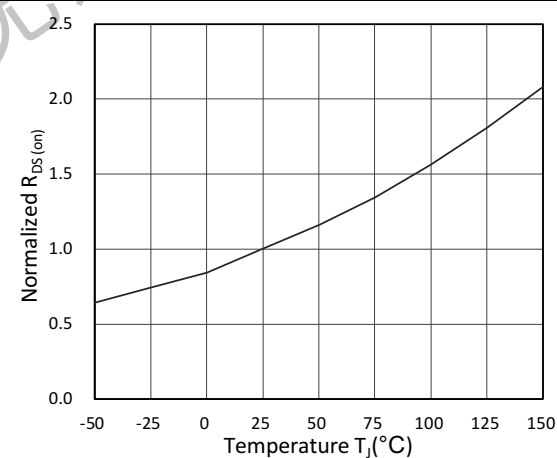


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

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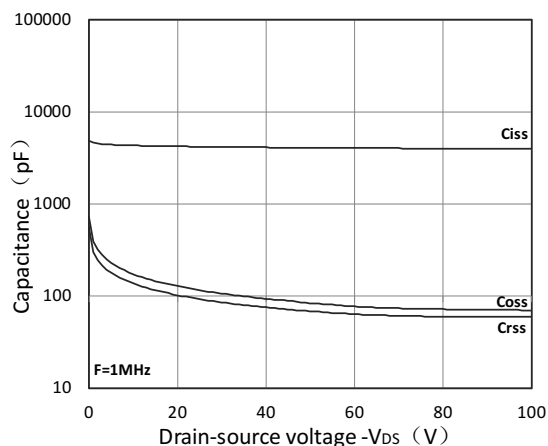


Figure 7. Capacitance Characteristics

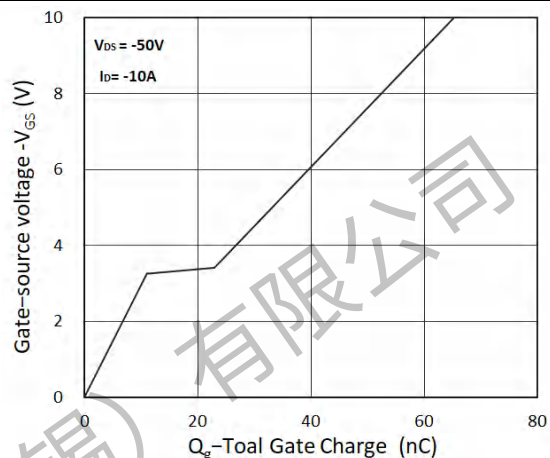


Figure 8. Gate Charge Characteristics

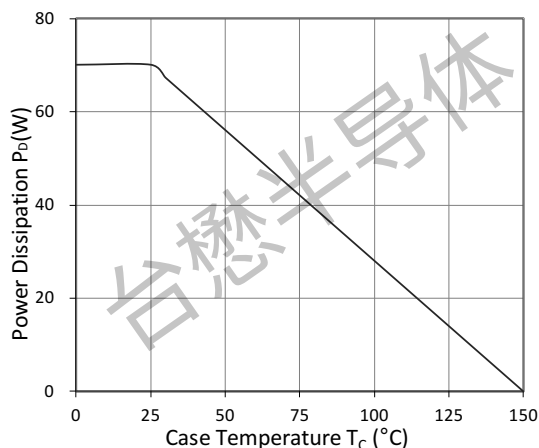


Figure 9. Power Dissipation

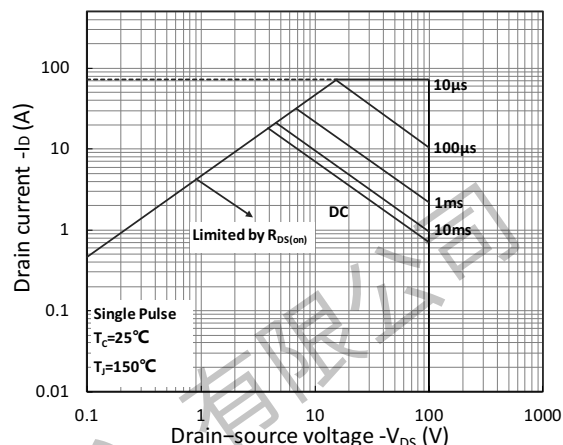


Figure 10. Safe Operating Area

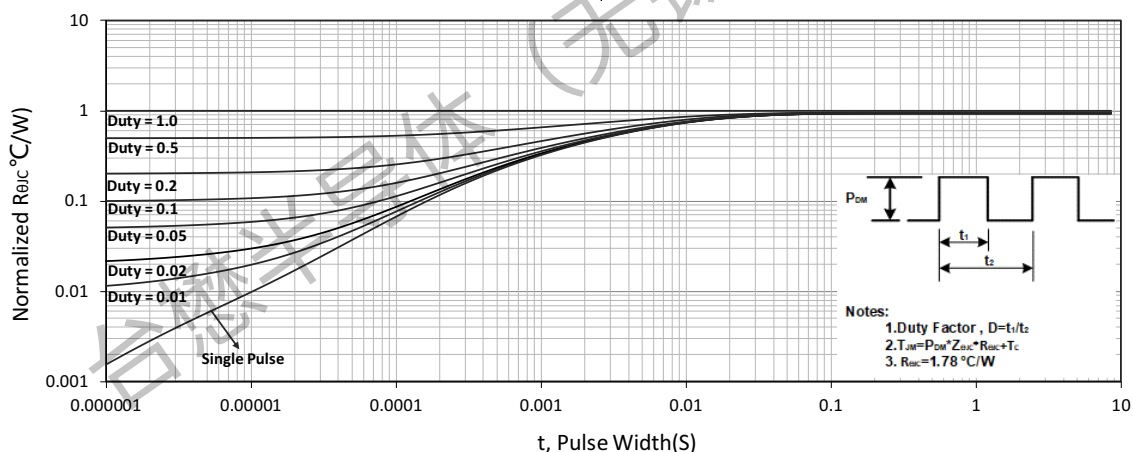
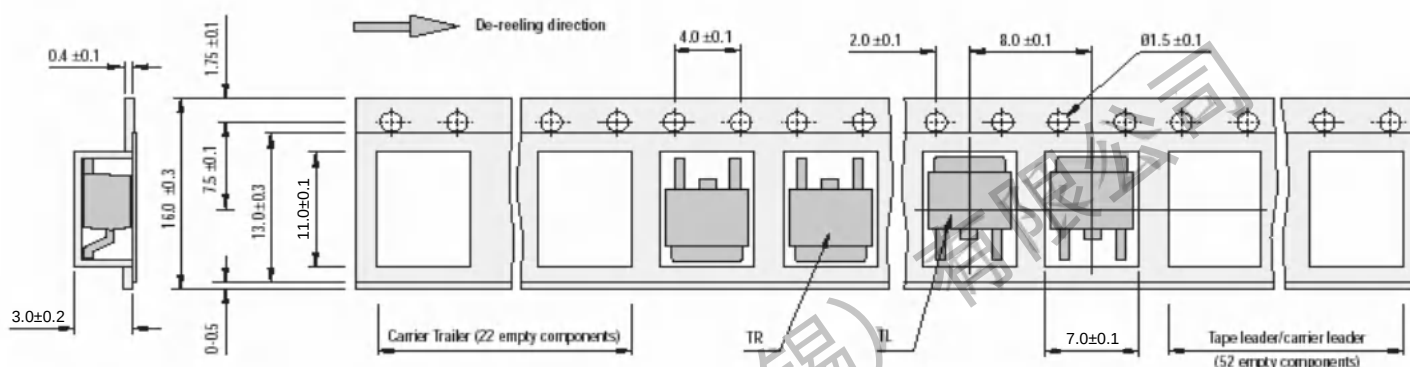


Figure 11. Normalized Maximum Transient Thermal Impedance

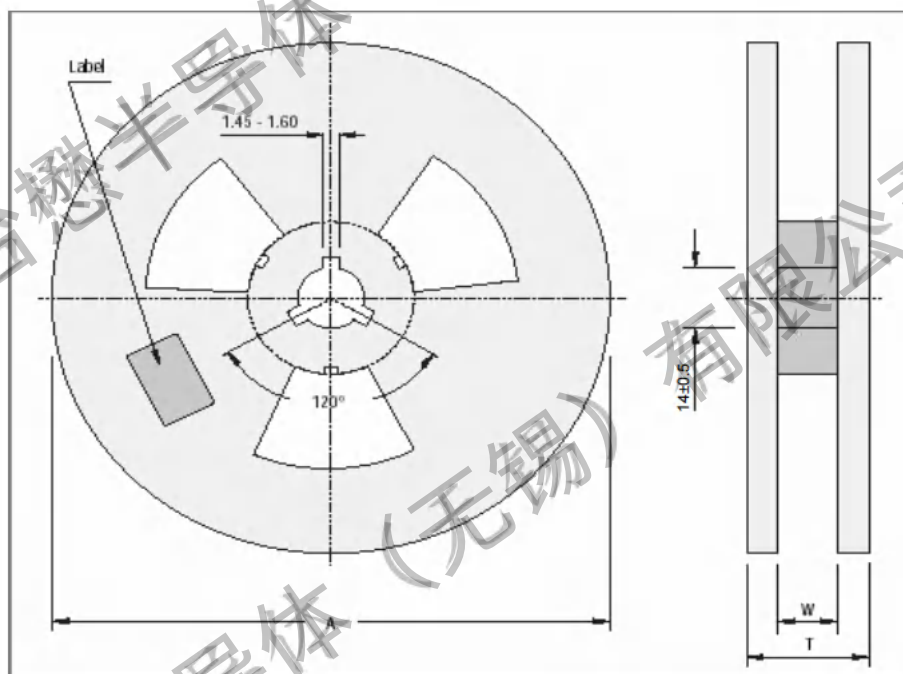
TM20P10D

P-Channel Enhancement Mosfet

TO-252-3L Embossed Carrier Tape



TO-252-3L Reel



All Dimensions are in mm.

Reel Specifications				
Package	Tape Width	Reel Dia. A - Max	Inside Thickness W	Reel Thickness T - max
TO-252-3L	16	330	18.0 ±1.5	20

Packaging Information

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
2,500 pcs	13 inch	5,000 pcs	355×370×50	25,000 pcs	380×275×380	

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Revision history:

Date	Rev	Description	Page
2023.04.21	23.04	Original	