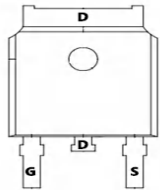
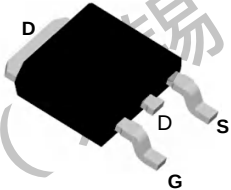
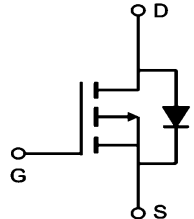


TM20P03D

P-Channel Enhancement Mosfet

General Description • Low R_{DS(ON)} • RoHS and Halogen-Free Compliant Applications • Load switch • PWM General Features V_{DS} =-30V I_D =-20A R_{DS(ON)}=33 mΩ (typ.)@V_{GS}=-10V 100% UIS Tested 100% R_g Tested 	D:TO-252-3L    Marking: 20P03																																																							
Absolute Maximum Ratings (T_C = 25°C Unless Otherwise Noted) <table><tr><th>Symbol</th><th>Parameter</th><th>Rating</th><th>Units</th></tr><tr><td>V_{DS}</td><td>Drain-Source Voltage</td><td>-30</td><td>V</td></tr><tr><td>V_{GS}</td><td>Gate-Source Voltage</td><td>± 20</td><td>V</td></tr><tr><td>I_D@T_C=25°C</td><td>Continuous Drain Current, V_{GS} @ - 10V¹</td><td>-20</td><td>A</td></tr><tr><td>I_D@T_C=100°C</td><td>Continuous Drain Current, V_{GS} @ - 10V¹</td><td>-13</td><td>A</td></tr><tr><td>I_{DM}</td><td>Pulsed Drain Current²</td><td>-74</td><td>A</td></tr><tr><td>E_{AS}</td><td>Single Pulsed Avalanche Energy</td><td>15</td><td>mJ</td></tr><tr><td>P_D@T_C=25°C</td><td>Total Power Dissipation³</td><td>19</td><td>W</td></tr><tr><td>T_{STG}</td><td>Storage Temperature Range</td><td>-55 to 175</td><td>°C</td></tr><tr><td>T_J</td><td>Operating Junction Temperature Range</td><td>-55 to 175</td><td>°C</td></tr></table> Thermal Data <table><tr><th>Symbol</th><th>Parameter</th><th>Typ.</th><th>Max.</th><th>Unit</th></tr><tr><td>R_{θJA}</td><td>Thermal Resistance Junction-ambient ¹</td><td>---</td><td>62</td><td>°C/W</td></tr><tr><td>R_{θJC}</td><td>Thermal Resistance Junction-Case¹</td><td>---</td><td>6.6</td><td>°C/W</td></tr></table>		Symbol	Parameter	Rating	Units	V _{DS}	Drain-Source Voltage	-30	V	V _{GS}	Gate-Source Voltage	± 20	V	I _D @T _C =25°C	Continuous Drain Current, V _{GS} @ - 10V ¹	-20	A	I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ - 10V ¹	-13	A	I _{DM}	Pulsed Drain Current ²	-74	A	E _{AS}	Single Pulsed Avalanche Energy	15	mJ	P _D @T _C =25°C	Total Power Dissipation ³	19	W	T _{STG}	Storage Temperature Range	-55 to 175	°C	T _J	Operating Junction Temperature Range	-55 to 175	°C	Symbol	Parameter	Typ.	Max.	Unit	R _{θJA}	Thermal Resistance Junction-ambient ¹	---	62	°C/W	R _{θJC}	Thermal Resistance Junction-Case ¹	---	6.6	°C/W
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TM20P03D
P-Channel Enhancement Mosfet
Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V$	-	-	-1	μA
Gate-Source Leakage	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
Gate-Source Threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.5	-2.0	V
Drain-Source on-State Resistance ³	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-4.1A$	-	33	46	mΩ
		$V_{GS}=-4.5V, I_D=-3A$	-	45	75	
Dynamic Characteristics ⁴						
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=-15V,$ $f=1.0MHz$	-	530	-	pF
Output Capacitance	C_{oss}		-	70	-	
Reverse Transfer Capacitance	C_{rss}		-	56	-	
Switching Characteristics ⁴						
Total Gate Charge	Q_g	$V_{GS}=-10V, V_{DS}=-15V,$ $I_D=-4.1A$	-	6.8	-	nC
Gate-Source Charge	Q_{gs}		-	1.0	-	
Gate-Drain Charge	Q_{gd}		-	1.4	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}=-10V, V_{DS}=-15V,$ $R_L=15\Omega, R_{GEN}=2.5\Omega$	-	14	-	ns
Rise Time	t_r		-	61	-	
Turn-off Delay time	$t_{d(off)}$		-	19	-	
Fall Time	t_f		-	10	-	
Source-Drain Body Diode Characteristics						
Diode Forward Voltage ³	V_{SD}	$I_S=-4.1A, V_{GS}=0V$	-	-	-1.2	V
Continuous Source Current	I_S		-	-	-20	A

Notes:

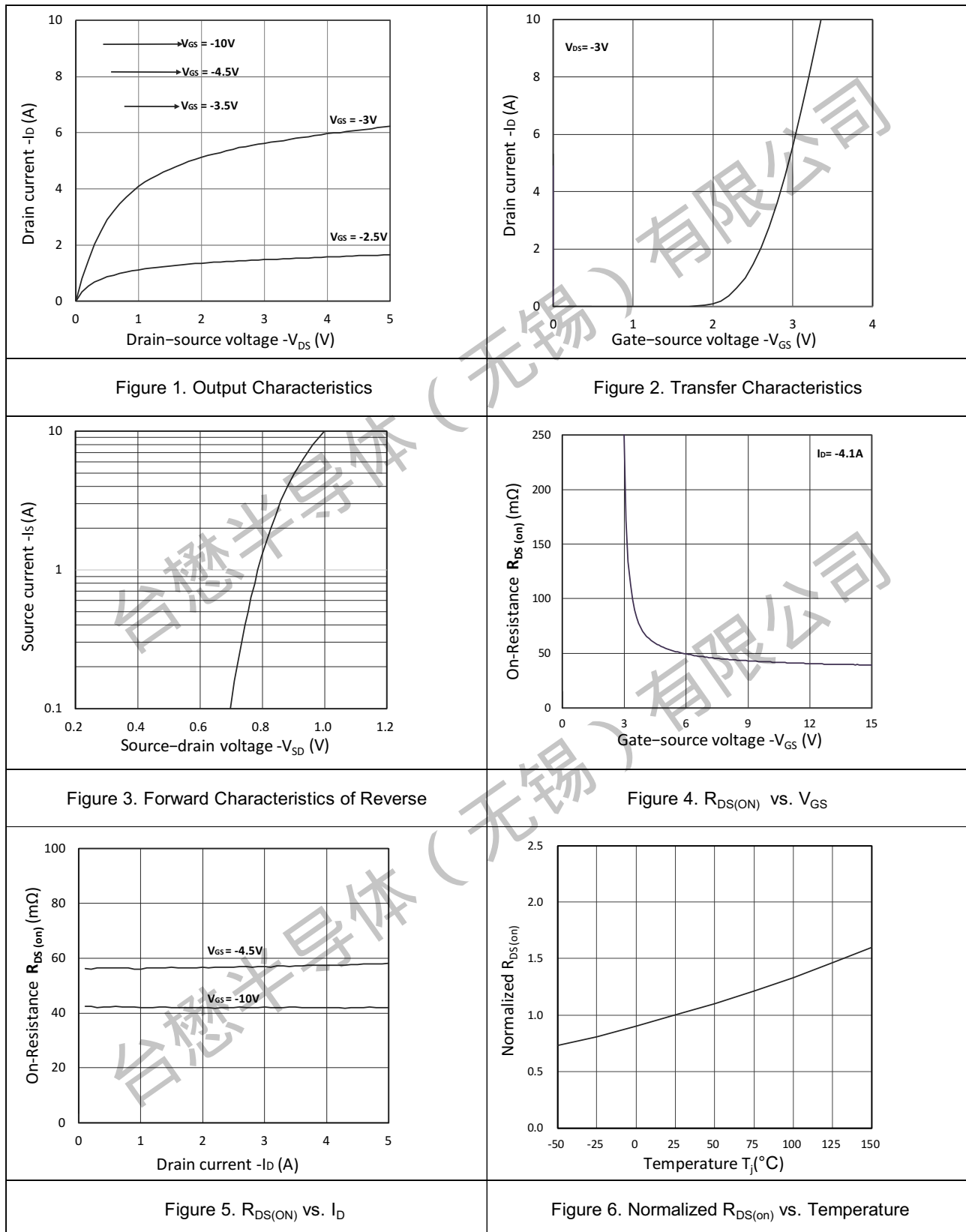
1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$.
2. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. This value is guaranteed by design hence it is not included in the production test.



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P-Channel Enhancement Mosfet

Typical Characteristics





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P-Channel Enhancement Mosfet

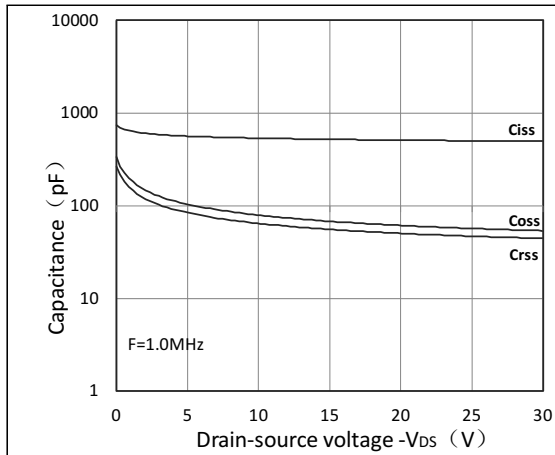


Figure 7. Capacitance Characteristics

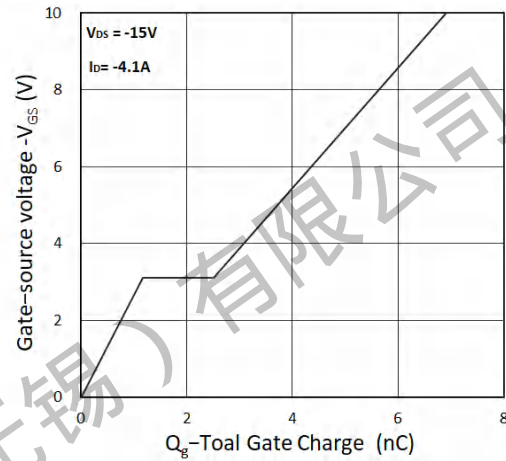
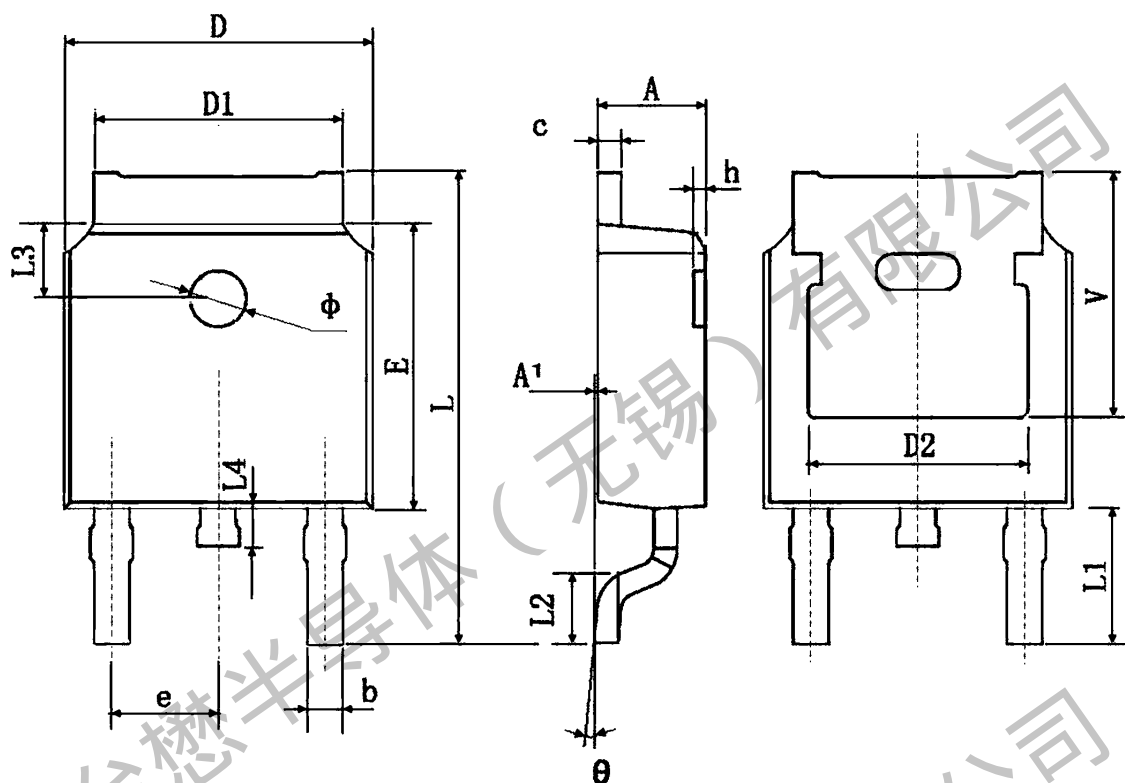


Figure 8. Gate Charge Characteristics

TM20P03D

P-Channel Enhancement Mosfet

Package Mechanical Data: TO-252-3L



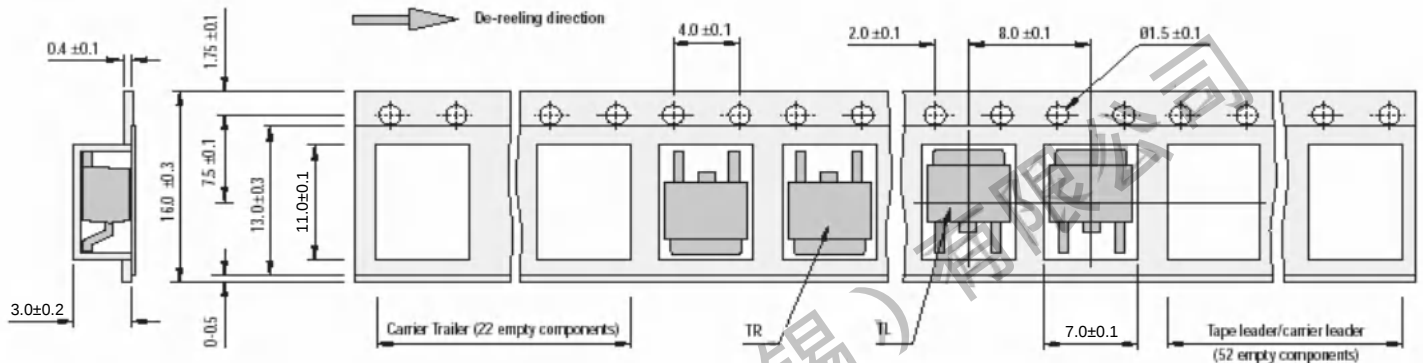
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
phi	1.100	1.300	0.043	0.051
theta	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	



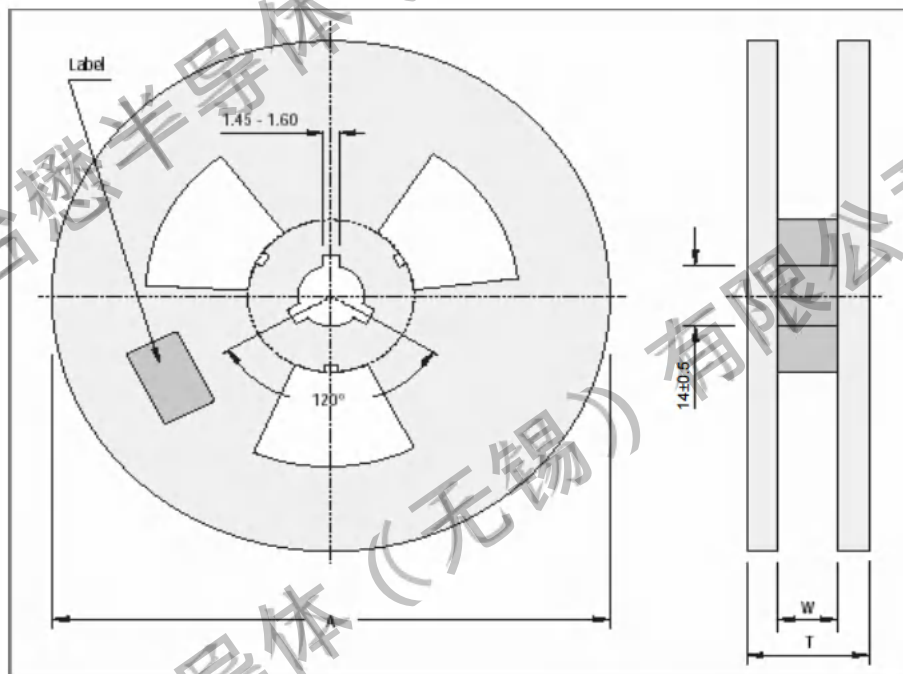
TM20P03D

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
2023.05.09	23.05	Original	