TM20P10D

P -Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

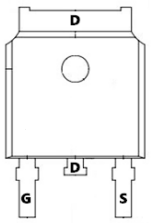
V_{DS} =-100V I_D=-20A

$R_{DS(ON)}$ = 85mΩ(typ.) @ V_{GS} =-10V

100% UIS Tested

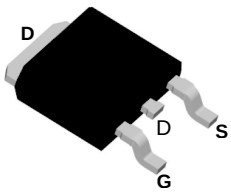
100% R_g Tested

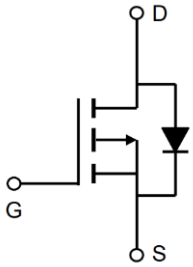
Green Product



Marking: 20P10

D:TO-252-3L





Absolute Maximum Ratings (T_A = 25°C, unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C= 25°C	I_D	-20	A
	T_C= 100°C		-13	
Pulsed Drain Current[1]		I_{DM}	-74	A
Single Pulse Avalanche Energy[2]		EAS	132.25	mJ
Total Power Dissipation	T_C= 25°C	P_D	70	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient[3]	$R_{\theta JA}$	75	°C/W
Thermal Resistance from Junction-to-Case	$R_{\theta JC}$	1.78	°C/W

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	-100	-	-	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} = -100V, V_{GS} = 0V	-	-	-1	μA
	T_J= 100°C			-	-	-100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1	-1.6	-2.5	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		88	105	
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 = 3Ω, 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/μs	-	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°C	I_S	-	-	-	-20	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}= -35V, V_{GS}= -10V, L= 0.5mH, 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 ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test..

Typical Characteristics

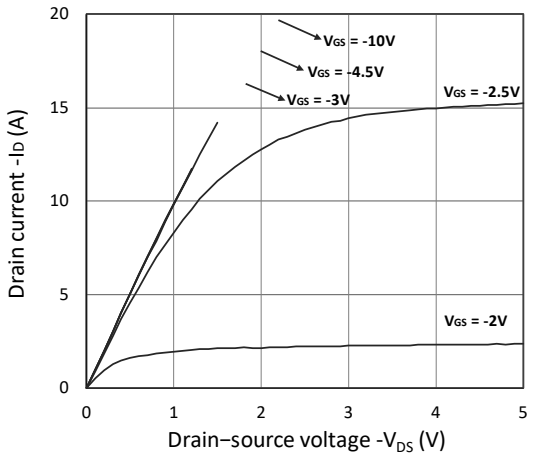


Figure 1. Output Characteristics

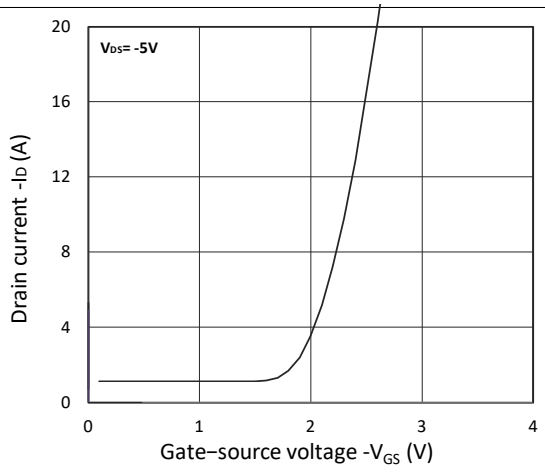


Figure 2. Transfer Characteristics

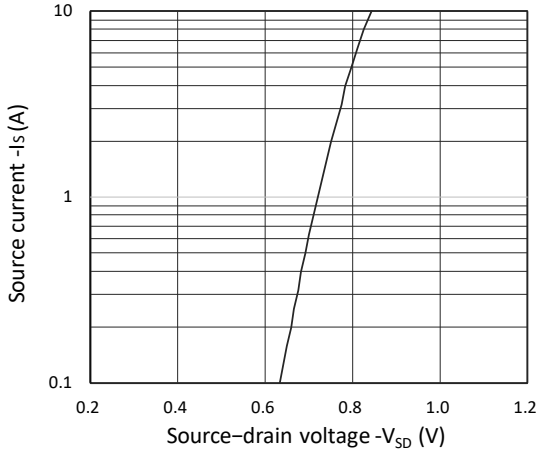


Figure 3. Forward Characteristics of Reverse

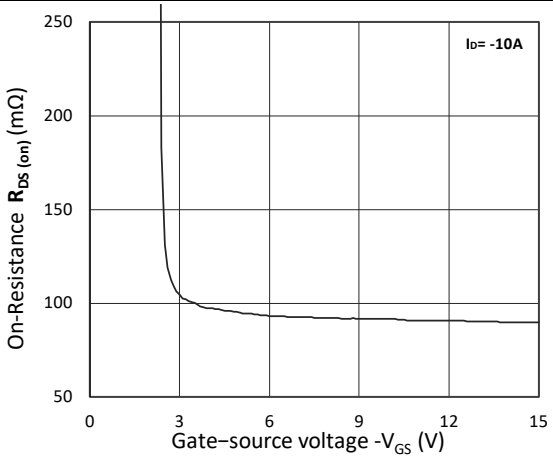


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

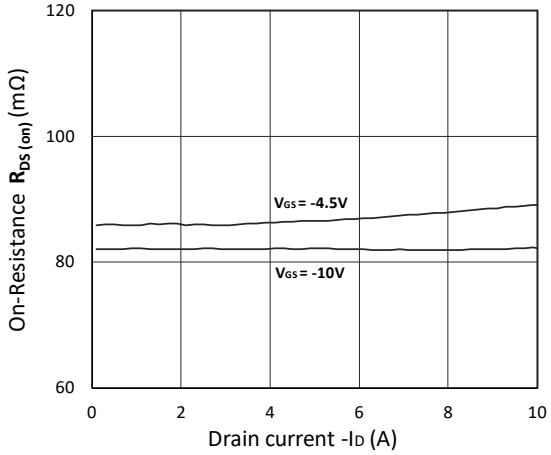


Figure 5. $R_{DS(ON)}$ vs. I_D

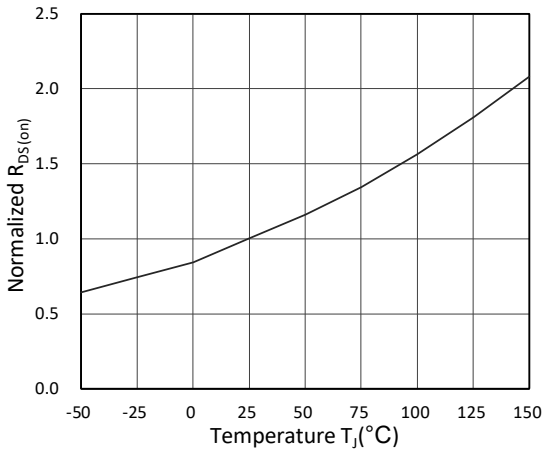


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

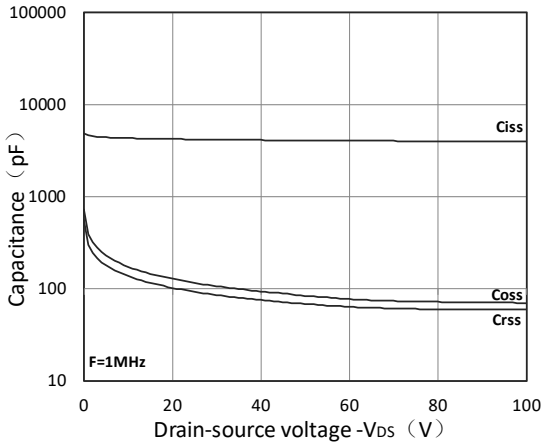


Figure 7. Capacitance Characteristics

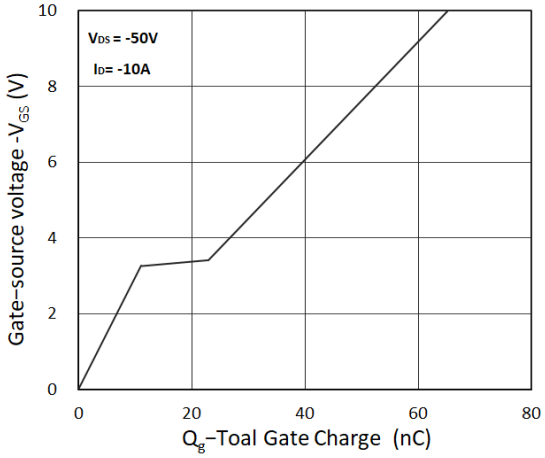


Figure 8. Gate Charge Characteristics

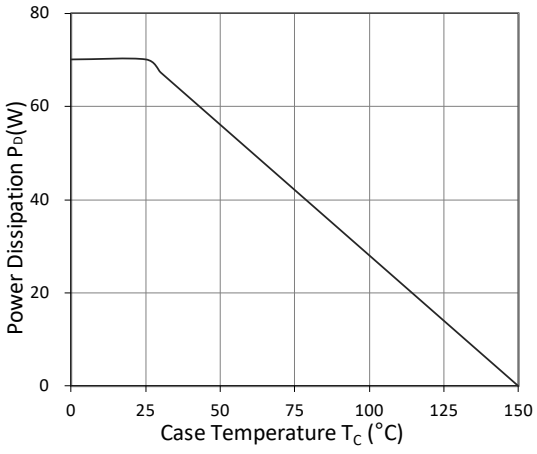


Figure 9. Power Dissipation

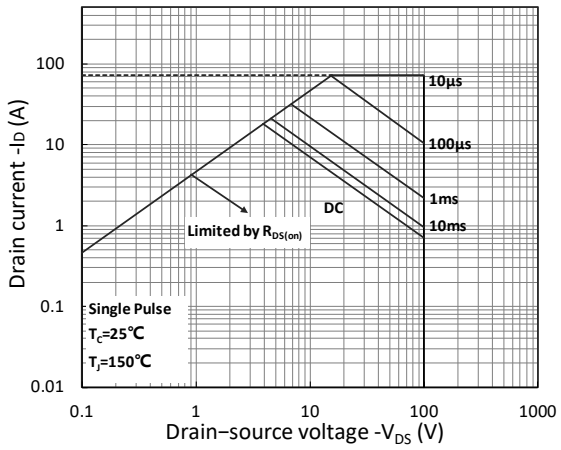


Figure10. Safe Operating Area

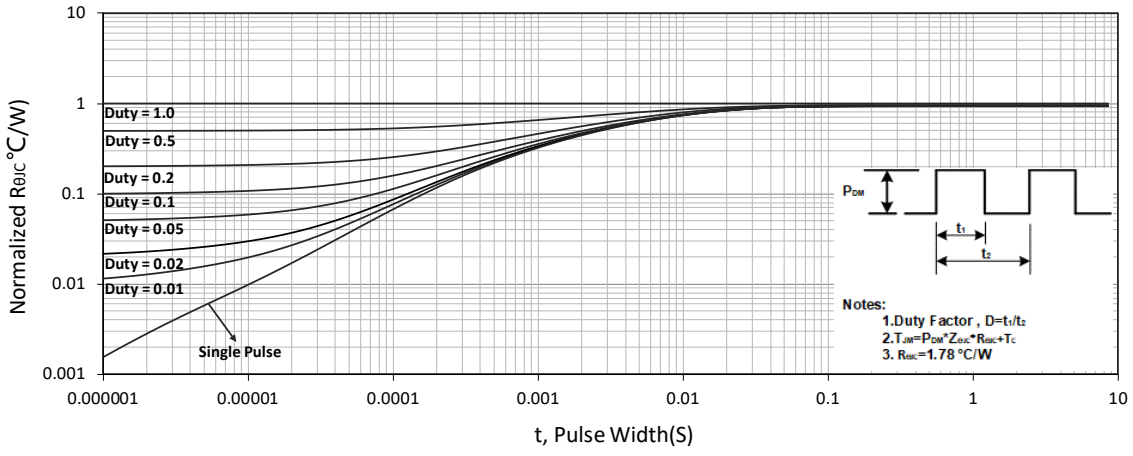
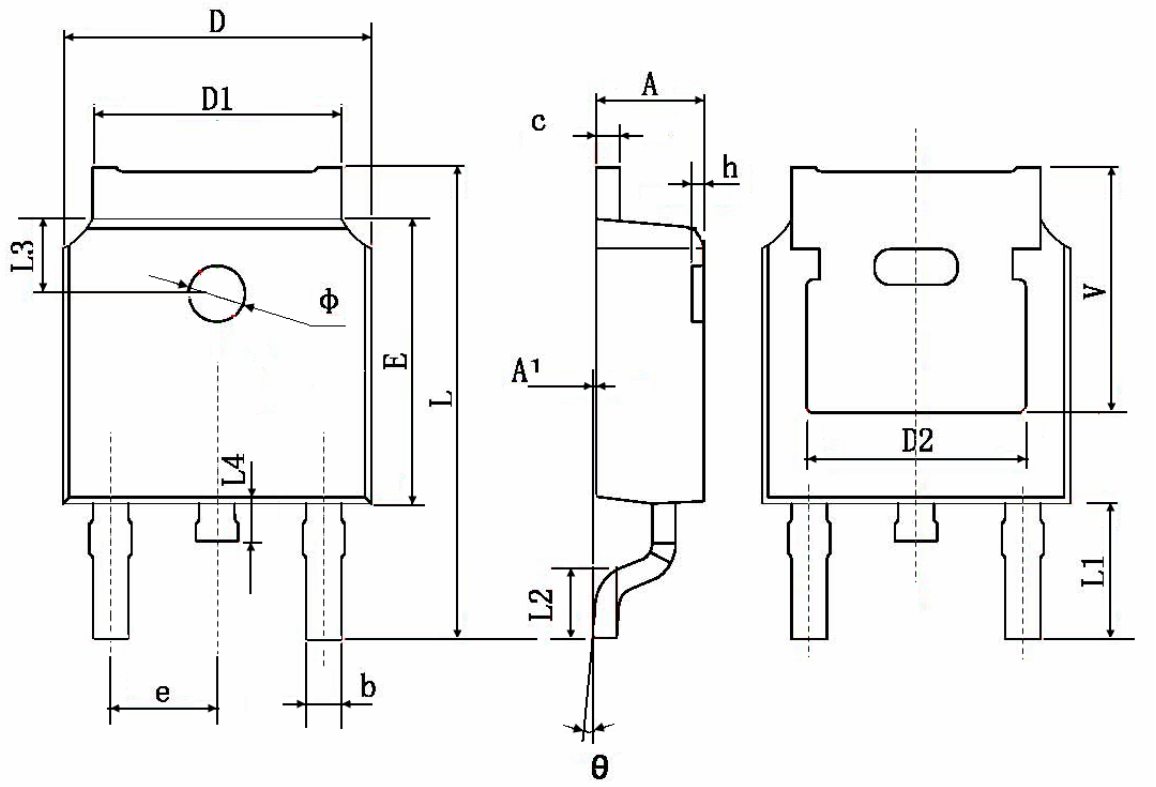


Figure 11. Normalized Maximum Transient Thermal Impedance

Package Information: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
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	