

TM0036P03D

P -Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

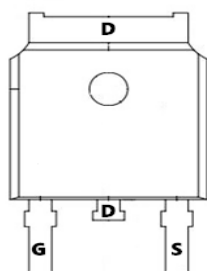
General Features

$V_{DS} = -30V$ $I_D = -100A$

$R_{DS(ON)} = 3.6 m\Omega$ (typ.) @ $V_{GS} = -10V$

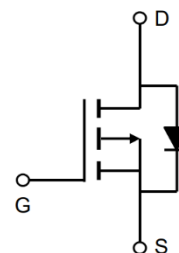
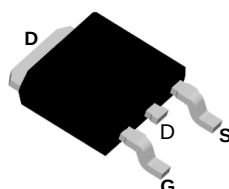
100% UIS Tested

100% R_g Tested



Marking: 100P03

D:TO-252-3L



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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	-100	A
	$T_C = 100^\circ C$		-67	
Pulsed Drain Current ¹		I_{DM}	-360	A
Single Pulse Avalanche Energy ²		EAS	125	mJ
Total Power Dissipation	$T_C = 25^\circ C$	P_D	60	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	$R_{\theta JA}$	50	°C/W
Thermal Resistance from Junction-to-Case	$R_{\theta JC}$	1.58	°C/W

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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		$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30	-	-	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}	$V_{DS} = -30V, V_{GS} = 0V$	-	-	-1	μA
	$T_J=100^{\circ}C$			-	-	-100	
Gate-Threshold Voltage		$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0	-1.5	-2.5	V
Drain-Source On-Resistance ⁴		$R_{DS(on)}$	$V_{GS} = -10V, I_D = -30A$	-	3.6	5.6	mΩ
			$V_{GS} = -4.5V, I_D = -15A$	-	5.5	6.2	
Forward Transconductance ⁴		g_{fs}	$V_{DS} = -10V, I_D = -30A$	-	90	-	S
Dynamic Characteristics ⁵							
Input Capacitance		C_{iss}	$V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$	-	5070	-	pF
Output Capacitance		C_{oss}		-	695	-	
Reverse Transfer Capacitance		C_{rss}		-	580	-	
Gate resistance		R_g	$f = 1MHz$	-	4	-	Ω
Switching Characteristics ⁵							
Total Gate Charge		Q_g	$V_{GS} = -10V, V_{DS} = -15V, I_D = -30A$	-	146	-	nC
Gate-Source Charge		Q_{gs}		-	21.5	-	
Gate-Drain Charge		Q_{gd}		-	39	-	
Turn-On Delay Time		$t_{d(on)}$	$V_{GS} = -10V, V_{DD} = -15V, R_G = 3\Omega, I_D = -30A$	-	23	-	ns
Rise Time		t_r		-	15	-	
Turn-Off Delay Time		$t_{d(off)}$		-	129	-	
Fall Time		t_f		-	28	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴		V_{SD}	$I_S = -30A, V_{GS} = 0V$	-	-	-1.2	V
Continuous Source Current	$T_C=25^{\circ}C$	I_S	-	-	-	-100	A

Note :

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 $V_{DD} = -25V, V_{GS} = -10V, L = 0.1mH, I_{AS} = -50A$
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.

Typical Characteristics

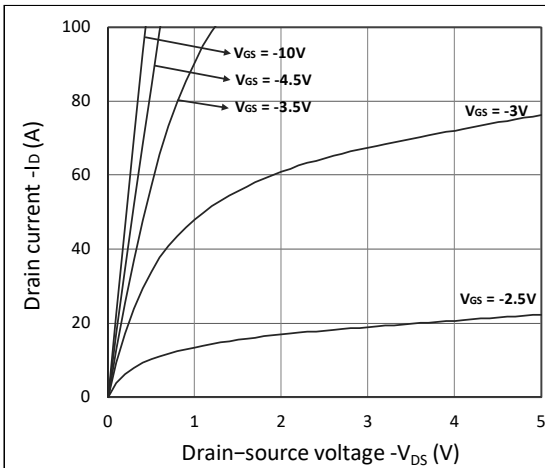


Figure 1. Output Characteristics

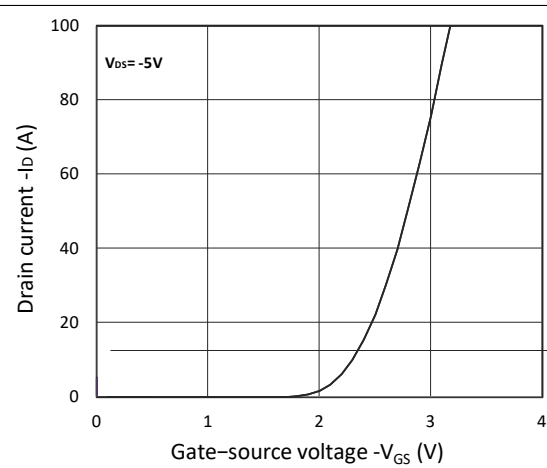


Figure 2. Transfer Characteristics

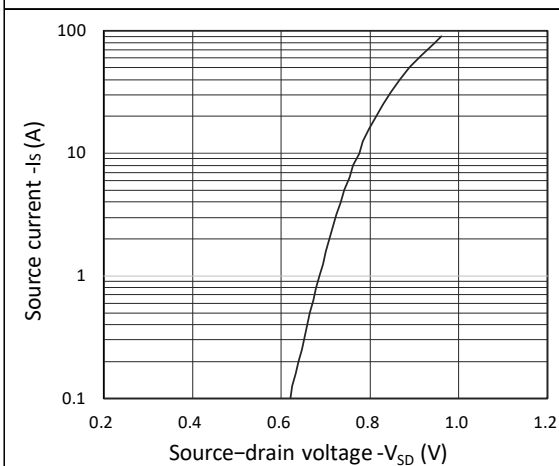


Figure 3. Forward Characteristics of Reverse

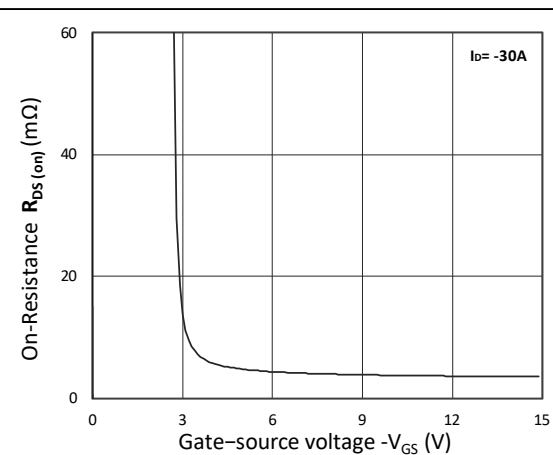


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

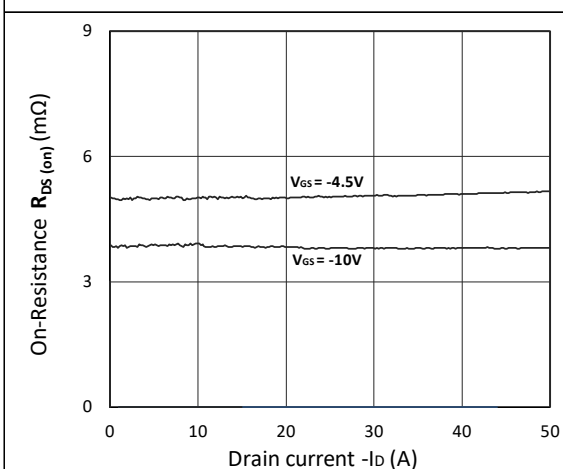


Figure 5. $R_{DS(ON)}$ vs. I_D

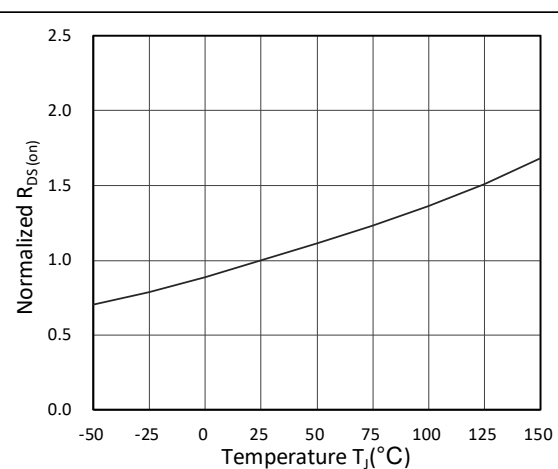


Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature

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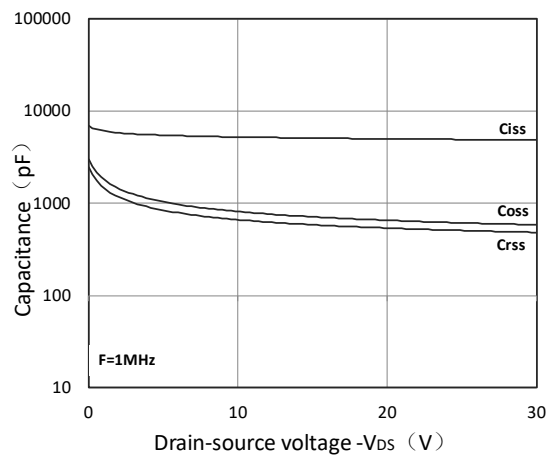


Figure 7. Capacitance Characteristics

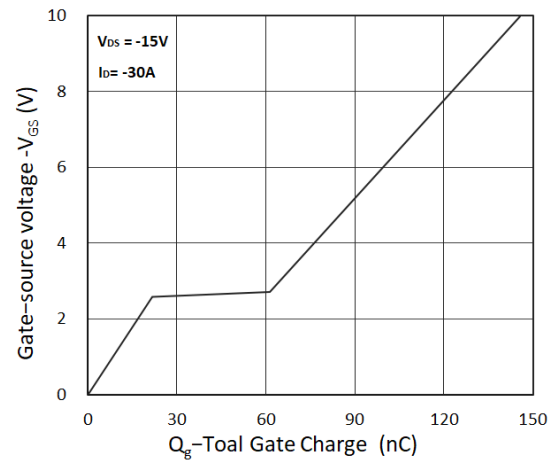


Figure 8. Gate Charge Characteristics

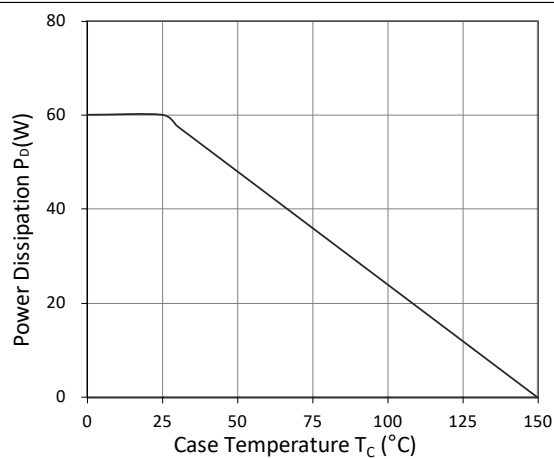


Figure 9. Power Dissipation

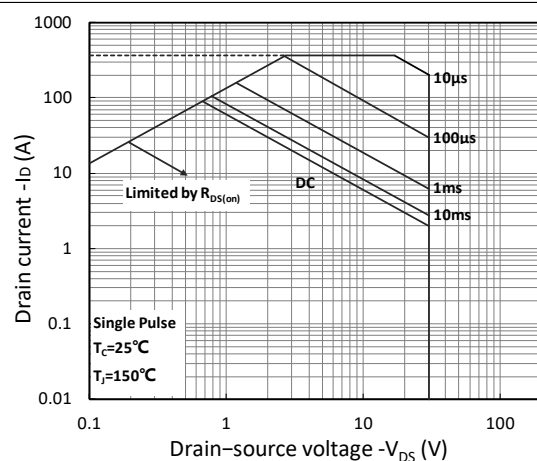


Figure 10. Safe Operating Area

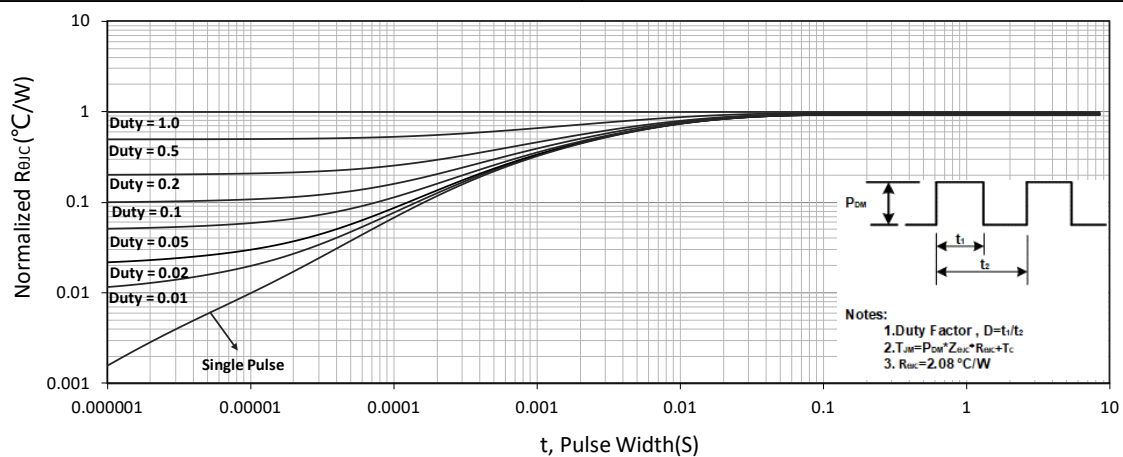


Figure 11. Normalized Maximum Transient Thermal Impedance

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Test Circuit

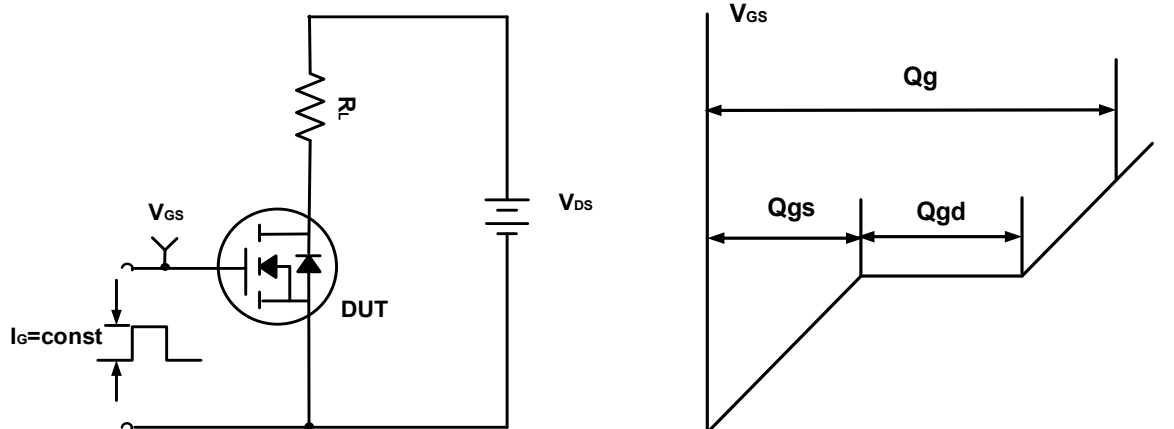


Figure A. Gate Charge Test Circuit & Waveforms

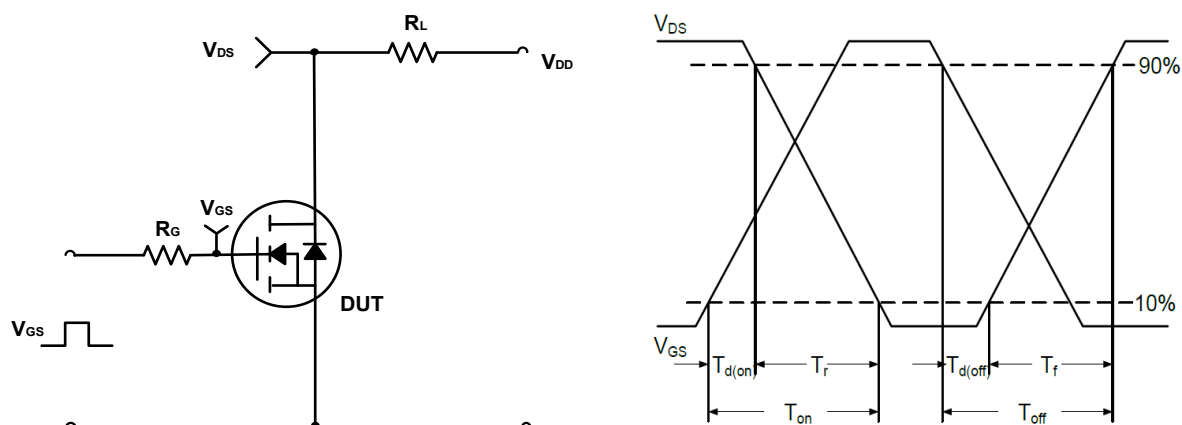


Figure B. Switching Test Circuit & Waveforms

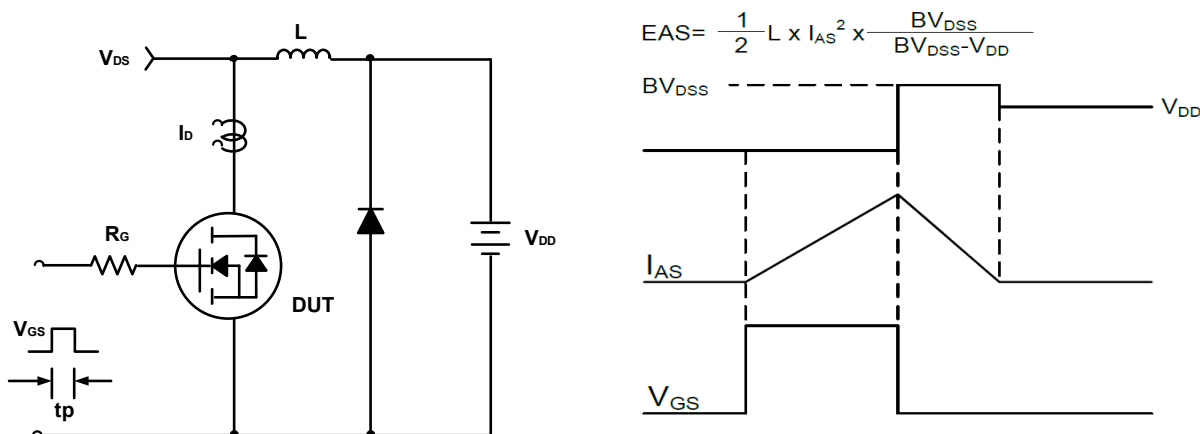
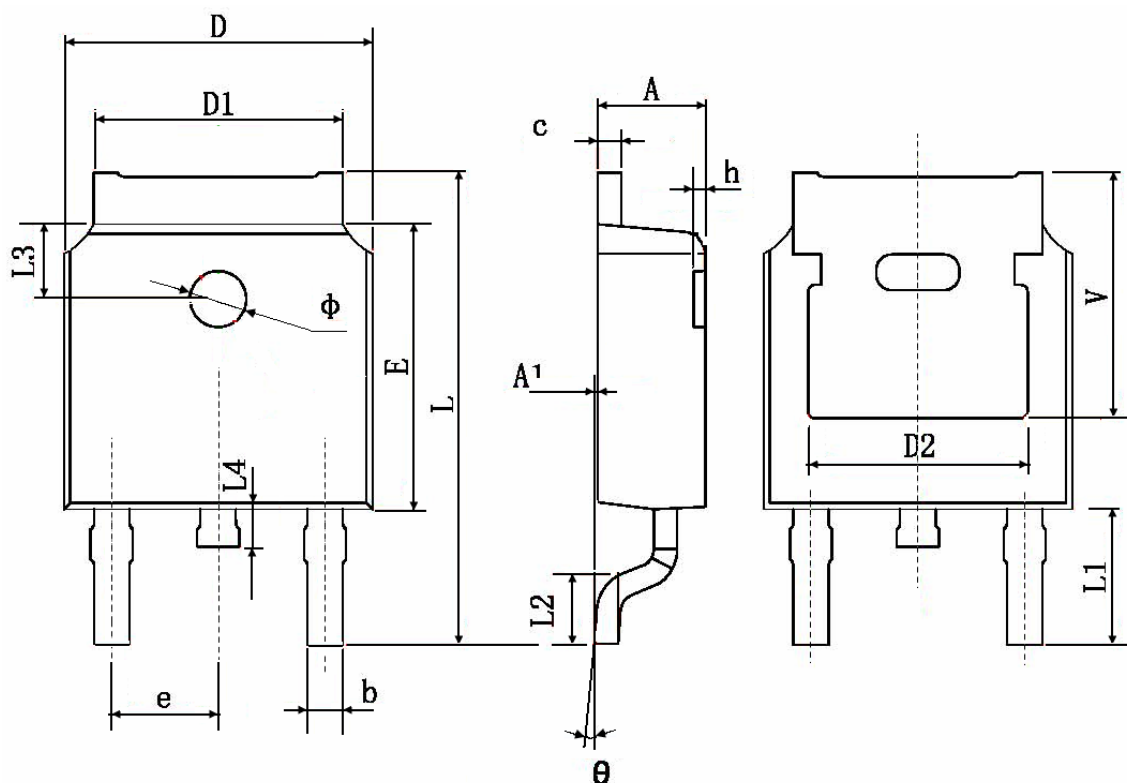


Figure C. Unclamped Inductive Switching Circuit & Waveforms

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.	