

TMP6040D

P-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

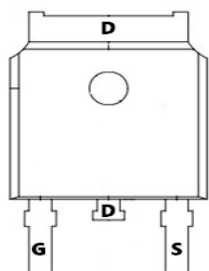
General Features

$V_{DS} = -60V$ $I_D = -30A$

$R_{DS(ON)} = 23m\Omega$ (typ.) @ $V_{GS} = -10V$

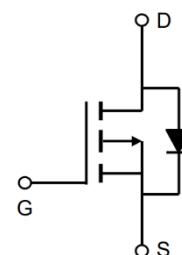
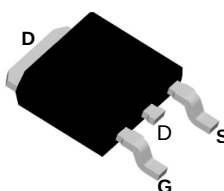
100% UIS Tested

100% R_g Tested



Marking: 40P06

D:TO-252-3L



Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage ($V_{GS} = 0V$)	-60	V
V_{GS}	Gate-Source Voltage ($V_{DS} = 0V$)	± 20	V
I_D	Drain Current-Continuous ($T_C = 25^\circ C$)	-30	A
	Drain Current-Continuous ($T_C = 100^\circ C$)	-25.5	A
I_{DM} (pulse)	Drain Current-Continuous@ Current-Pulsed (Note 1)	-144	A
P_D	Maximum Power Dissipation ($T_C = 25^\circ C$)	79	W
	Maximum Power Dissipation ($T_C = 100^\circ C$)	39.5	W
E_{AS}	Avalanche energy (Note 2)	196	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 175	$^\circ C$

Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		1.9	$^\circ C/W$

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

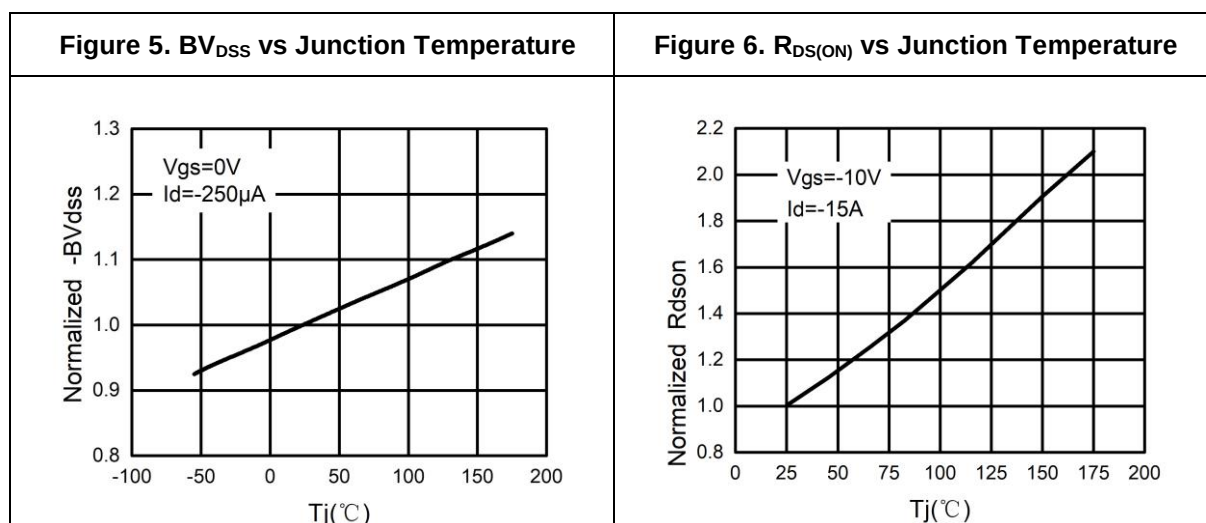
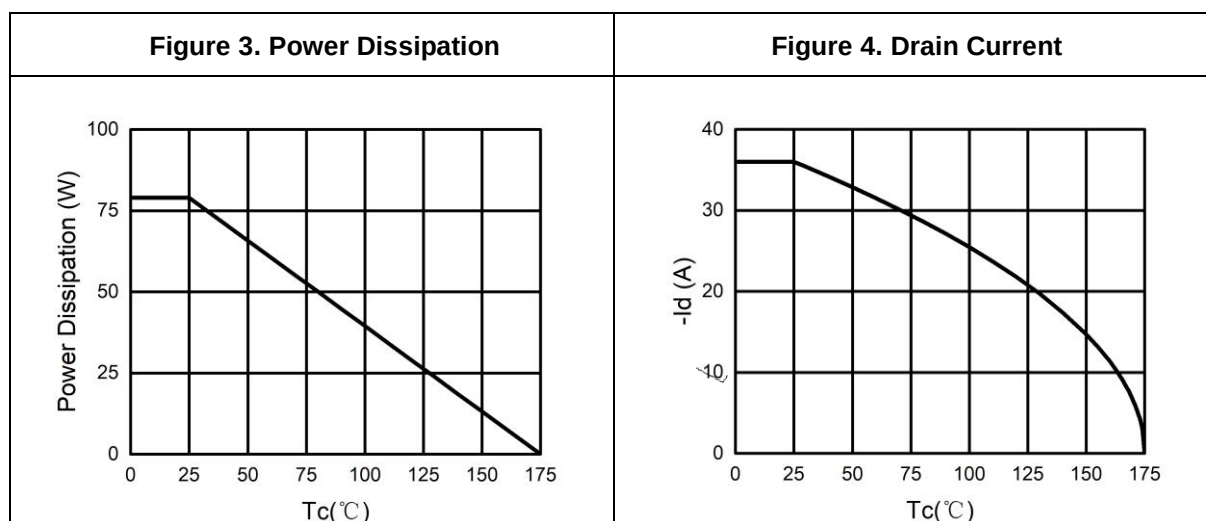
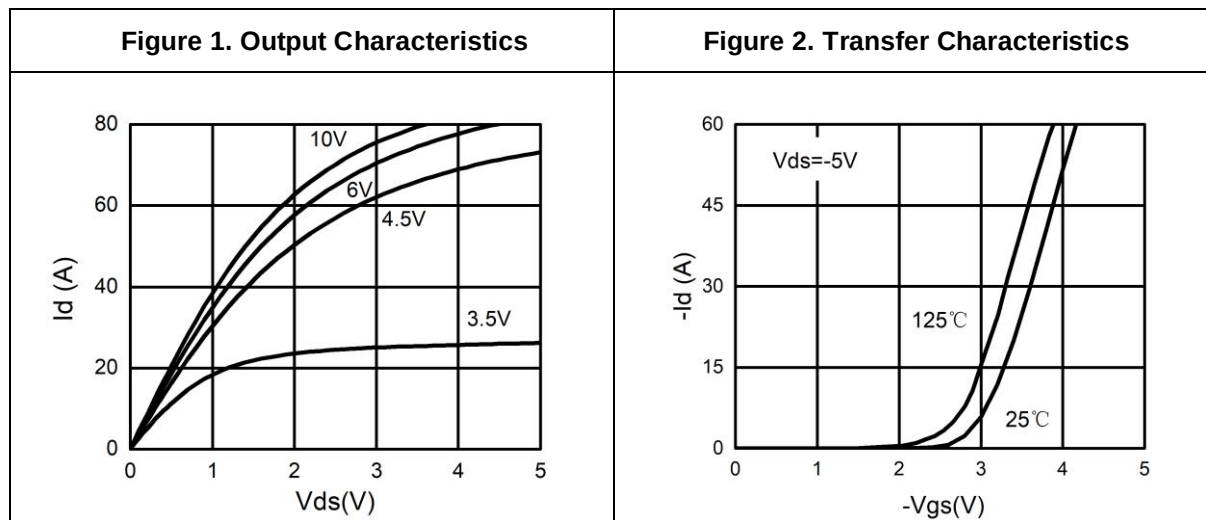
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =-250μA	-60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-60V, V _{GS} =0V			-1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1	-1.6	-2.5	V
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-15A		35		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-15A		23	28	mΩ
		V _{GS} =-4.5V, I _D =-10A		29	38	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-25V, V _{GS} =0V, f=1.0MHz		4026		pF
C _{oss}	Output Capacitance			134		pF
C _{rss}	Reverse Transfer Capacitance			98		pF
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =-10V, V _{DS} =-30V, R _L =1.5Ω, R _{GEN} =3Ω		12.2		nS
t _r	Turn-on Rise Time			10		nS
t _{d(off)}	Turn-Off Delay Time			64		nS
t _f	Turn-Off Fall Time			14		nS
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-30V, I _D =-20A		68		nC
Q _{gs}	Gate-Source Charge			10.5		nC
Q _{gd}	Gate-Drain Charge			13		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				-30	A
V _{SD}	Forward on Voltage ^(Note 3)	V _{GS} =0V, I _S =-15A			-1.2	V
t _{rr}	Reverse Recovery Time	I _F =-20A, di/dt=100A/μs		26		ns
Q _{rr}	Reverse Recovery Charge	I _F =-20A, di/dt=100A/μs		29		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

Notes 2.E_{AS} Condition: T_J=25°C, V_{DS}=40V, V_G=-10V, R_g=25Ω, L=0.5mH.

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Electrical And Thermal Characteristics (Curves)





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Figure 7. Gate Charge Waveforms

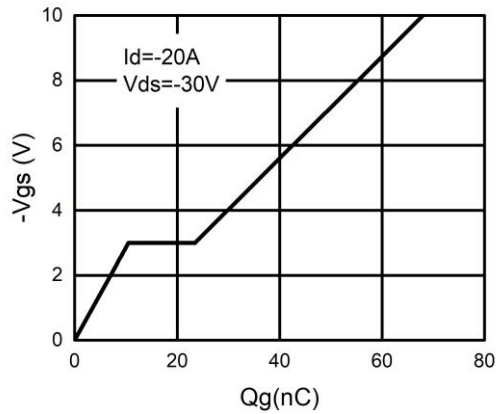


Figure 8. Capacitance

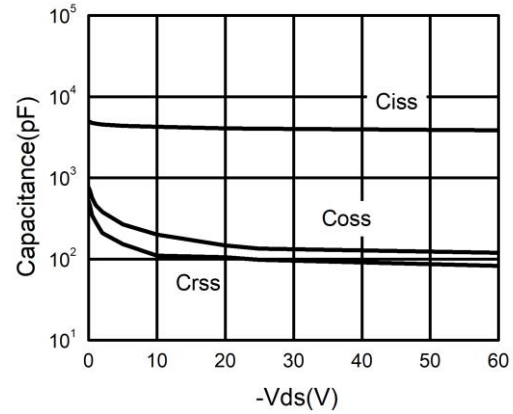


Figure 9. Body-Diode Characteristics

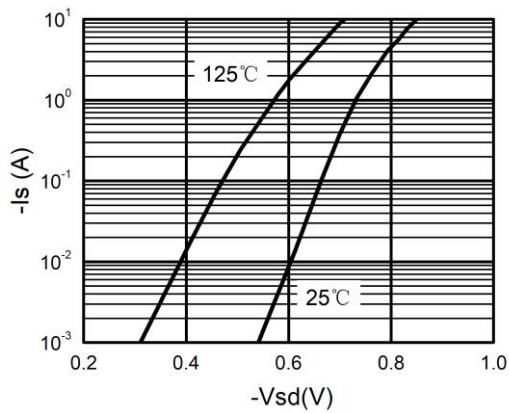
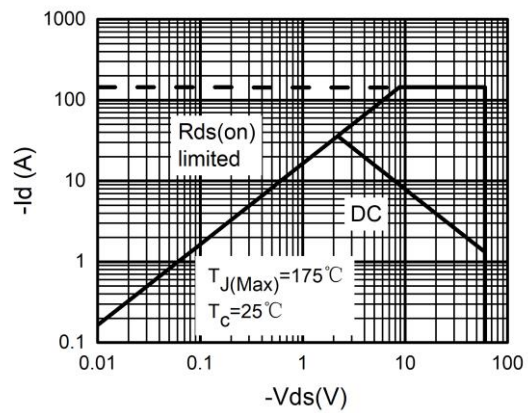
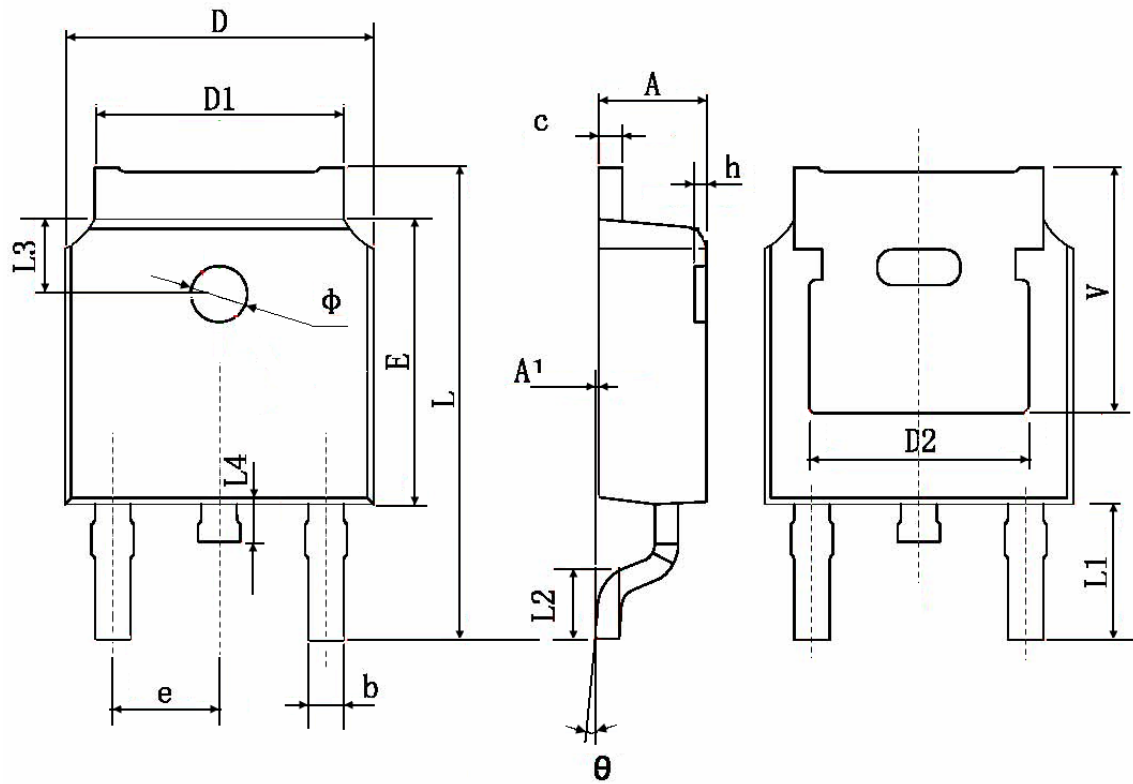


Figure 10. Maximum Safe Operating Area



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.	