

# P-CHANNEL ENHANCEMENT MODE POWER MOSFET

## MTDP4953BDYQ8

### Description

The MTDP4953BDYQ8 is a P-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The SOP-8 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

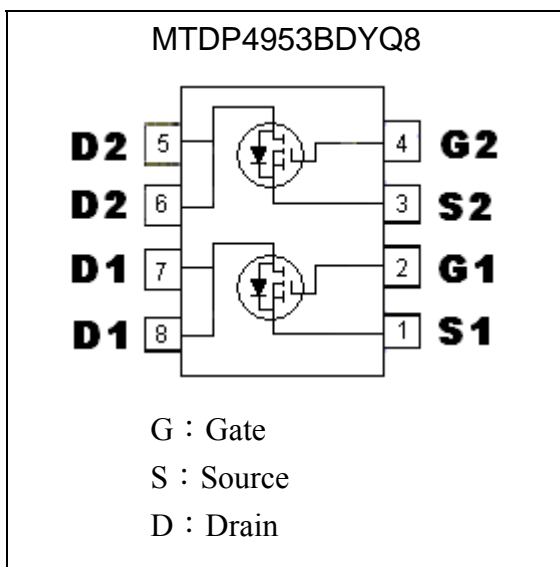
### Features

- $R_{DS(ON)}=42m\Omega @V_{GS}=-10V, I_D=-5A$   
 $R_{DS(ON)}=70m\Omega @V_{GS}=-4.5V, I_D=-4A$
- Simple drive requirement
- Low on-resistance
- Fast switching speed
- Pb-free package

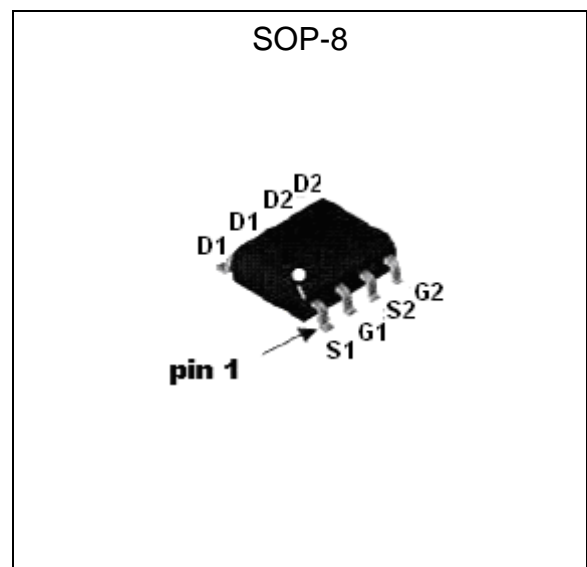
### Applications

- Power management in notebook computer, portable equipment and battery powered systems.

### Equivalent Circuit



### Outline





**Absolute Maximum Ratings** (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current @T <sub>A</sub> =25 °C (Note 1)	I <sub>D</sub>	-5	A
Continuous Drain Current @T <sub>A</sub> =70 °C (Note 1)	I <sub>D</sub>	-4	A
Pulsed Drain Current (Note 2)	I <sub>DM</sub>	-20	A
Total Power Dissipation (Note 1)	P <sub>d</sub>	2	W
Linear Derating Factor		0.02	W / °C
Operating Junction Temperature	T <sub>j</sub>	-55~+150	°C
Storage Temperature	T <sub>stg</sub>	-55~+150	°C
Thermal Resistance, Junction-to-Ambient (Note 1)	R <sub>th,ja</sub>	62.5	°C/W

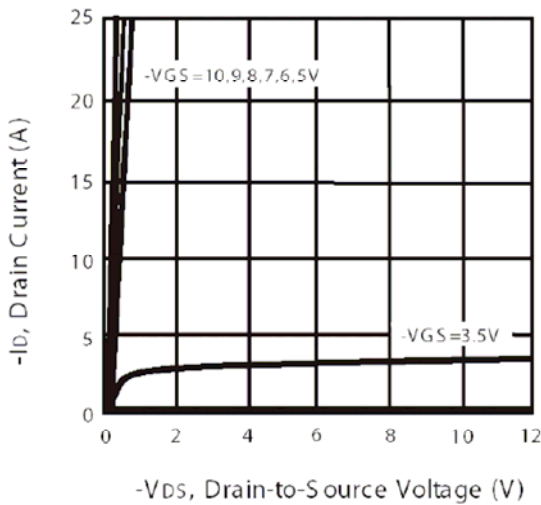
Note : 1.Surface mounted on 1 in<sup>2</sup> copper pad of FR-4 board, t≤10s.  
 2.Pulse width ≤300μs, duty cycle≤2%

**Electrical Characteristics** (T<sub>j</sub>=25°C, unless otherwise specified)

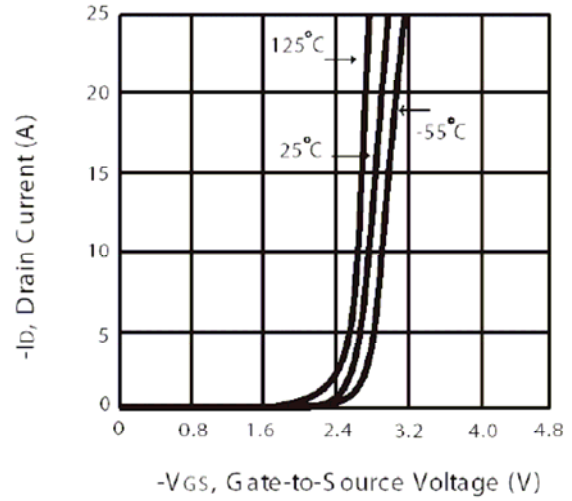
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>					
BV <sub>DSS</sub>	-30	-	-	V	V <sub>GS</sub> =0, I <sub>D</sub> =-250μA
V <sub>GS(th)</sub>	-1	-	-2.5	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA
I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0
I <sub>DSS</sub>	-	-	-1	μA	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0
*R <sub>DS(ON)</sub>	-	-	42	mΩ	I <sub>D</sub> =-5A, V <sub>GS</sub> =-10V
	-	-	70		I <sub>D</sub> =-4A, V <sub>GS</sub> =-4.5V
*G <sub>FS</sub>	-	5	-	S	V <sub>DS</sub> =-5V, I <sub>D</sub> =-5A
<b>Dynamic</b>					
C <sub>iSS</sub>	-	582	-	pF	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0, f=1MHz
C <sub>oSS</sub>	-	125	-		
C <sub>rSS</sub>	-	86	-		
*t <sub>d(ON)</sub>	-	9	-	ns	V <sub>DS</sub> =-15V, I <sub>D</sub> =-1A, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω, R <sub>D</sub> =15Ω
*t <sub>r</sub>	-	10	-		
*t <sub>d(OFF)</sub>	-	37	-		
*t <sub>f</sub>	-	23	-		
*Q <sub>g</sub>	-	11.7	-	nC	V <sub>DS</sub> =-15V, I <sub>D</sub> =-5A, V <sub>GS</sub> =-10V,
*Q <sub>gs</sub>	-	2.1	-		
*Q <sub>gd</sub>	-	2.9	-		
<b>Source-Drain Diode</b>					
*V <sub>SD</sub>	-	-0.84	-1.2	V	V <sub>GS</sub> =0V, I <sub>S</sub> =-1.7A

\*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

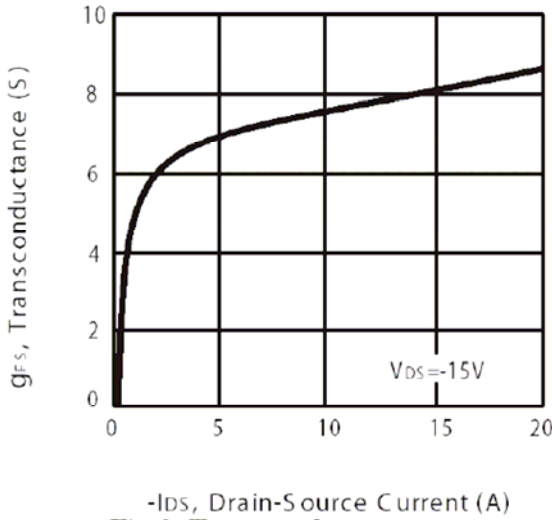
**Characteristic Curves**



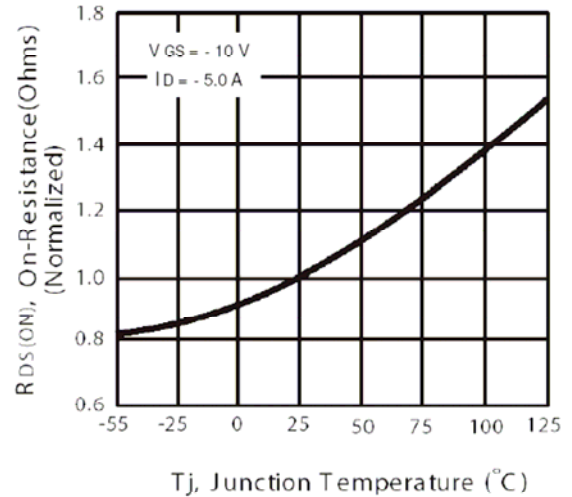
**Fig 1. Typical Output Characteristics**



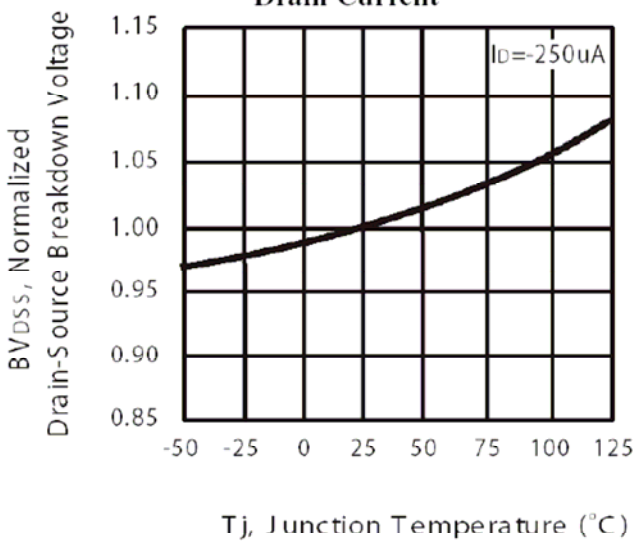
**Fig 2. Transfer Characteristics**



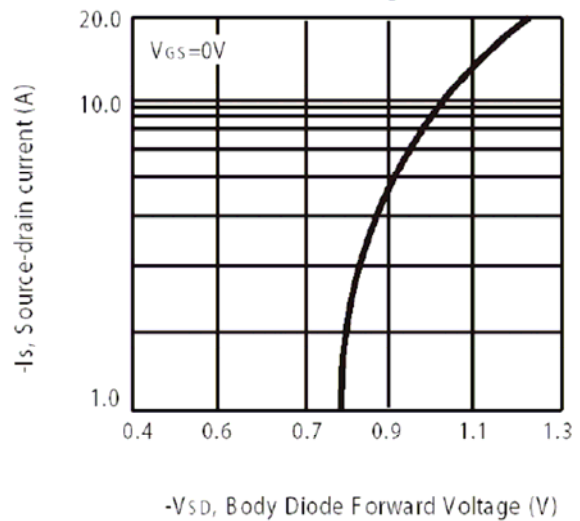
**Fig 3. Transconductance v.s. Drain Current**



**Fig 4. On-Resistance v.s. Junction Temperature**

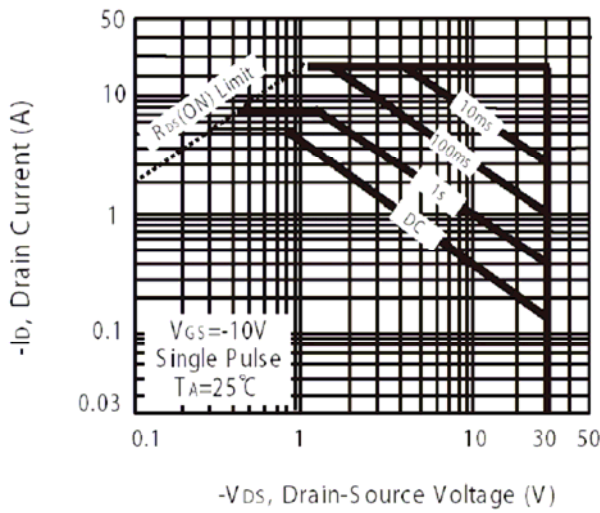


**Fig 5. Breakdown Voltage v.s. Junction Temperature**

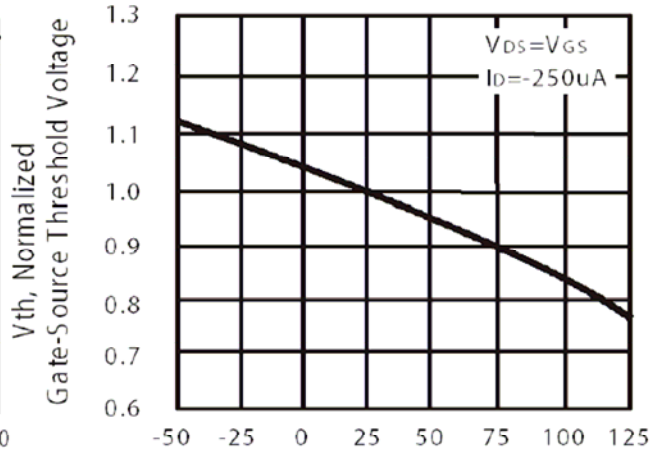


**Fig 6. Body Diode Forward Voltage v.s. Source Current**

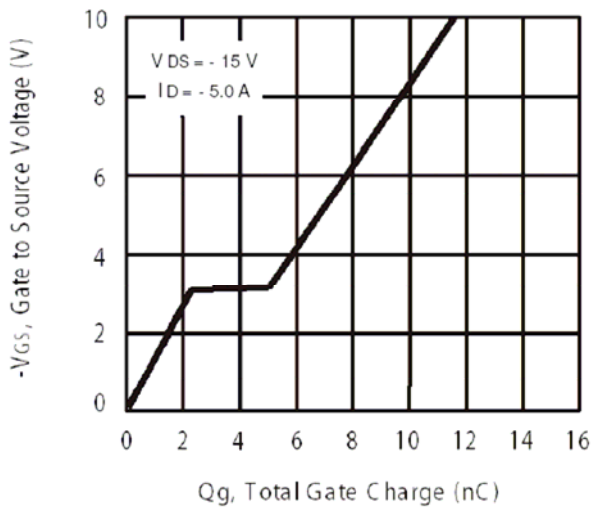
**Characteristic Curves(Cont.)**



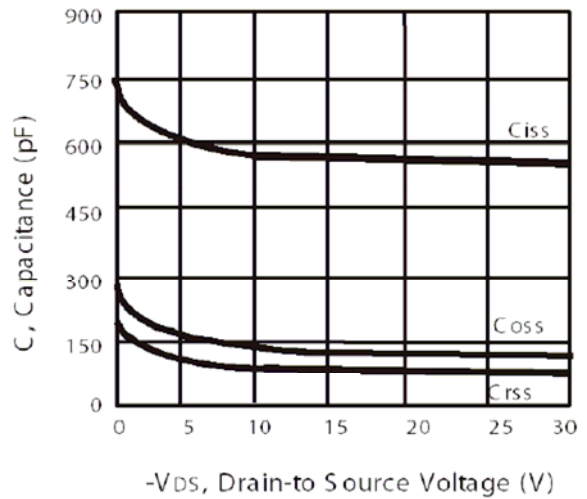
**Fig 7. Maximum Safe Operating Area**



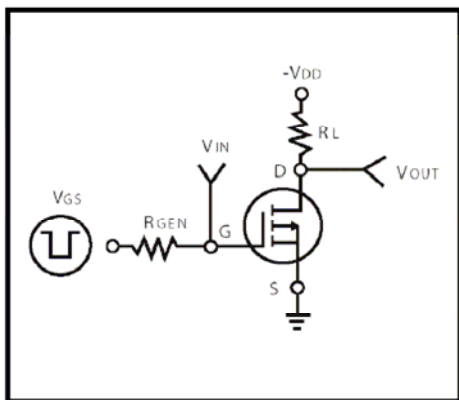
**Fig 8. Gate Threshold Voltage v.s. Junction Temperature**



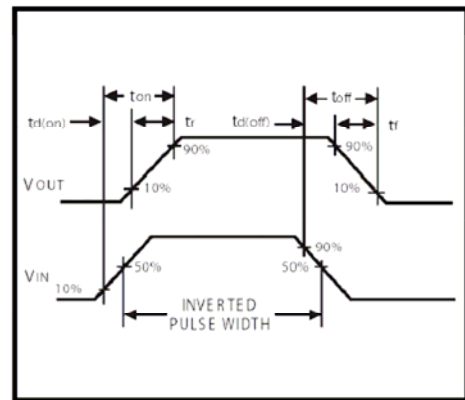
**Fig 9. Gate Charge Characteristics**



**Fig 10. Typical Capacitance Characteristics**

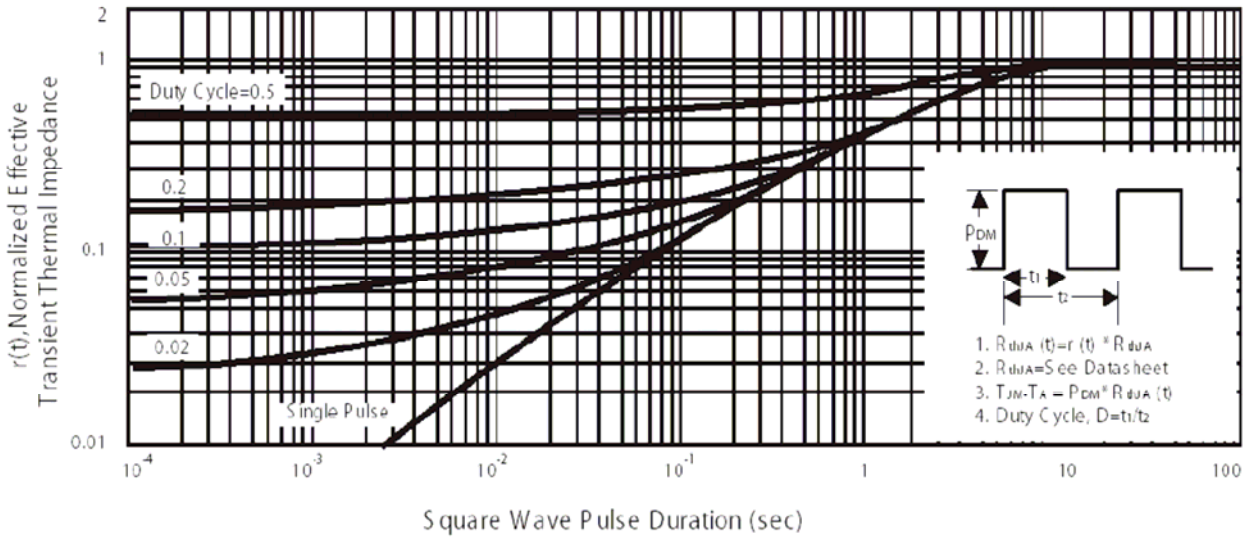


**Fig 11. Switching Time Circuit**



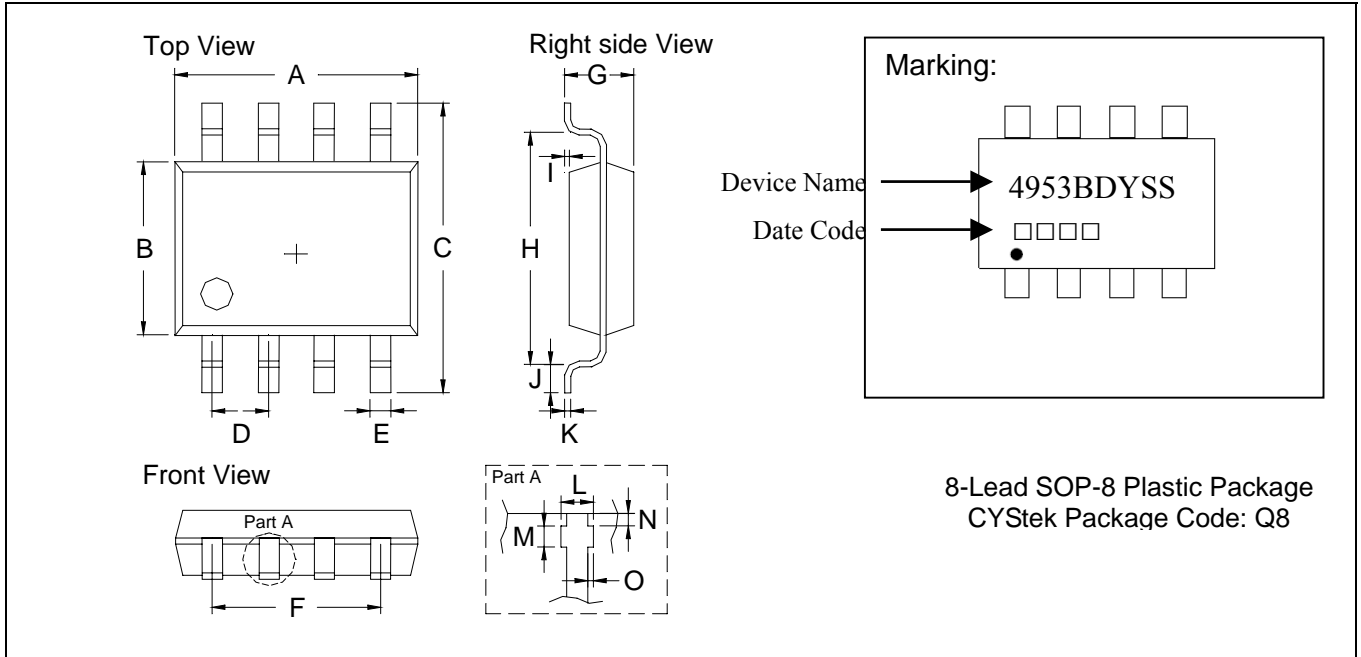
**Fig 12. Switching Time Waveform**

**Characteristic Curves(Cont.)**



**Fig 13. Normalized Thermal Transient Impedance Curve**

**SOP-8 Dimension**



\*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1909	0.2007	4.85	5.10	I	0.0019	0.0078	0.05	0.20
B	0.1515	0.1555	3.85	3.95	J	0.0118	0.0275	0.30	0.70
C	0.2283	0.2441	5.80	6.20	K	0.0074	0.0098	0.19	0.25
D	0.0480	0.0519	1.22	1.32	L	0.0145	0.0204	0.37	0.52
E	0.0145	0.0185	0.37	0.47	M	0.0118	0.0197	0.30	0.50
F	0.1472	0.1527	3.74	3.88	N	0.0031	0.0051	0.08	0.13
G	0.0570	0.0649	1.45	1.65	O	0.0000	0.0059	0.00	0.15
H	0.1889	0.2007	4.80	5.10					

- Notes: 1. Controlling dimension: millimeters.  
 2. Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.  
 3. If there is any question with packing specification or packing method, please contact your local CYStek sales office.

**Material:**

- Lead: 42 Alloy; solder plating
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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