

# N- AND P-CHANNEL ENHANCEMENT MODE POWER MOSFET

## MTC5806Q8

### Description

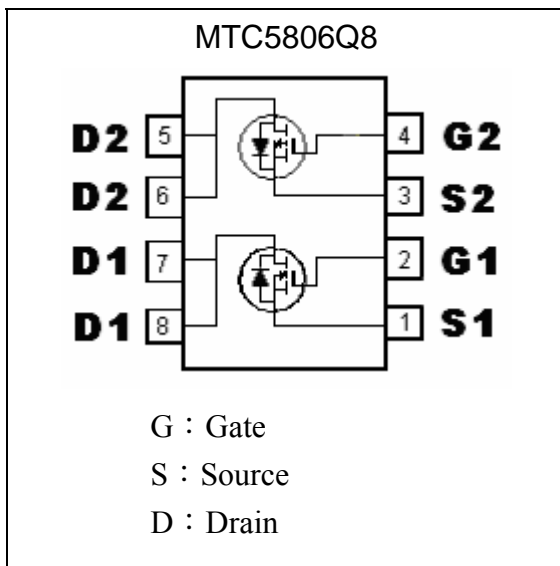
The MTC5806Q8 consists of a N-channel and a P-channel enhancement-mode MOSFET in a single SOP-8 package, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

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.

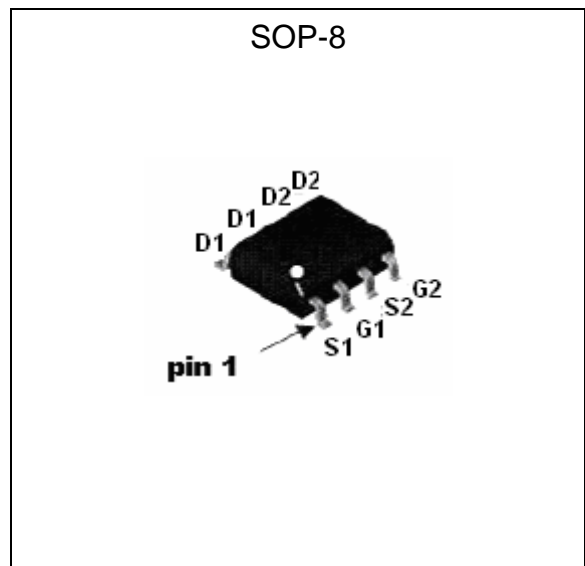
### Features

- Simple drive requirement
- Low on-resistance
- Fast switching speed
- Pb-free package

### Equivalent Circuit



### Outline





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

Parameter	Symbol	Limits		Unit
		N-channel	P-channel	
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	-55	V
Gate-Source Voltage	V <sub>GS</sub>	±20	±20	V
Continuous Drain Current @T <sub>A</sub> =25 °C (Note 1)	I <sub>D</sub>	4.5	-3.5	A
Continuous Drain Current @T <sub>A</sub> =70 °C (Note 1)	I <sub>D</sub>	4	-3	A
Pulsed Drain Current (Note 2)	I <sub>DM</sub>	20	-20	A
Total Power Dissipation (Note 1)	P <sub>d</sub>	2		W
Linear Derating Factor		0.016		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, 135°C/W when mounted on minimum copper pad  
 2.Pulse width limited by maximum junction temperature

**N-Channel Electrical Characteristics** (Tj=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>					
BV <sub>DSS</sub>	60	-	-	V	V <sub>GS</sub> =0, I <sub>D</sub> =250μA
V <sub>GS(th)</sub>	1.0	-	3.0	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> =48V, V <sub>GS</sub> =0
	-	-	10	μA	V <sub>DS</sub> =40V, V <sub>GS</sub> =0, T <sub>j</sub> =55°C
*R <sub>DS(ON)</sub>	-	55	85	mΩ	I <sub>D</sub> =4A, V <sub>GS</sub> =4.5V
	-	42	58		I <sub>D</sub> =4.5A, V <sub>GS</sub> =10V
*G <sub>FS</sub>	-	14	-	S	V <sub>DS</sub> =10V, I <sub>D</sub> =4.5A
<b>Dynamic</b>					
C <sub>iss</sub>	-	650	-	pF	V <sub>DS</sub> =25V, V <sub>GS</sub> =0, f=1MHz
C <sub>oss</sub>	-	80	-		
C <sub>rss</sub>	-	35	-		
*t <sub>d(ON)</sub>	-	11	20	ns	V <sub>DS</sub> =30V, I <sub>D</sub> =1A, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω
*t <sub>r</sub>	-	8	18		
*t <sub>d(OFF)</sub>	-	19	35		
*t <sub>f</sub>	-	6	15		
*Q <sub>g</sub>	-	12	16	nC	V <sub>DS</sub> =30V, I <sub>D</sub> =4.5A, V <sub>GS</sub> =10V
*Q <sub>gs</sub>	-	2.4	-		
*Q <sub>gd</sub>	-	2.6	-		
<b>Source-Drain Diode</b>					
*V <sub>SD</sub>	-	-	1.0	V	V <sub>GS</sub> =0V, I <sub>S</sub> =1.3A
*I <sub>S</sub>	-	-	1.3	A	
*I <sub>SM</sub>	-	-	2.6	A	

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



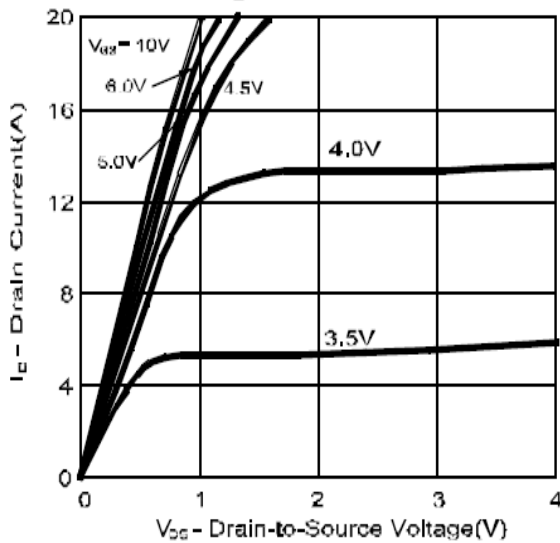
**P-Channel Electrical Characteristics** (Tj=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>					
BV <sub>DSS</sub>	-55	-	-	V	V <sub>GS</sub> =0, I <sub>D</sub> =-250μA
V <sub>GS(th)</sub>	-1.0	-	-3.0	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> =-48V, V <sub>GS</sub> =0
	-	-	-10	μA	V <sub>DS</sub> =-40V, V <sub>GS</sub> =0, Tj=55°C
*R <sub>DSON</sub>	-	70	90	mΩ	I <sub>D</sub> =-3.5A, V <sub>GS</sub> =-10V
	-	100	135		I <sub>D</sub> =-3A, V <sub>GS</sub> =-4.5V
*G <sub>FS</sub>	-	9	-	S	V <sub>DS</sub> =-5V, I <sub>D</sub> =-3.5A
<b>Dynamic</b>					
C <sub>iss</sub>	-	630	-	pF	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0, f=1MHz
C <sub>oss</sub>	-	81	-		
C <sub>rss</sub>	-	33	-		
*t <sub>d(ON)</sub>	-	6	13	ns	V <sub>DS</sub> =-30V, I <sub>D</sub> =-1A, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω
*t <sub>r</sub>	-	8	18	ns	
*t <sub>d(OFF)</sub>	-	17	31		
*t <sub>f</sub>	-	11	20		
*Q <sub>g</sub>	-	11	15	nC	V <sub>DS</sub> =-27V, I <sub>D</sub> =-3.5A, V <sub>GS</sub> =-10V
*Q <sub>gs</sub>	-	2.1	-		
*Q <sub>gd</sub>	-	2.5	-		
<b>Source-Drain Diode</b>					
*V <sub>SD</sub>	-	-	-1.0	V	V <sub>GS</sub> =0V, I <sub>S</sub> =-1.3A
*I <sub>S</sub>	-	-	-1.3	A	
*I <sub>SM</sub>	-	-	-2.6		

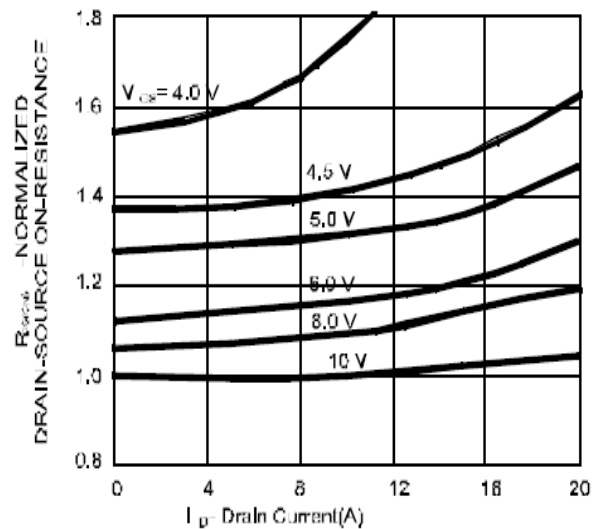
\*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

## N-channel Characteristic Curves

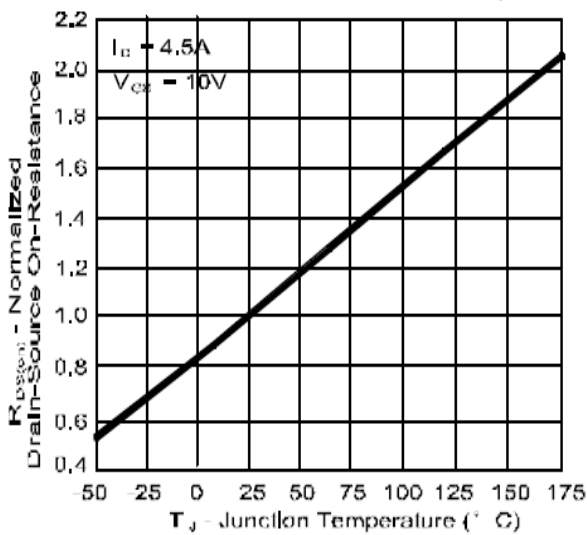
**On-Region Characteristics**



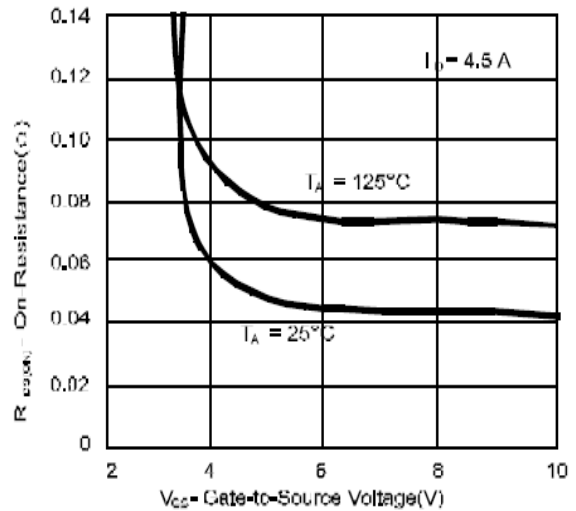
**On-Resistance Variation with Drain Current and Gate Voltage**



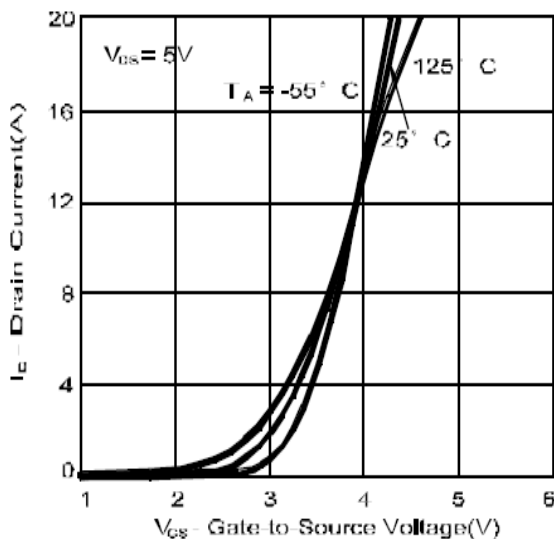
**On-Resistance Variation with Temperature**



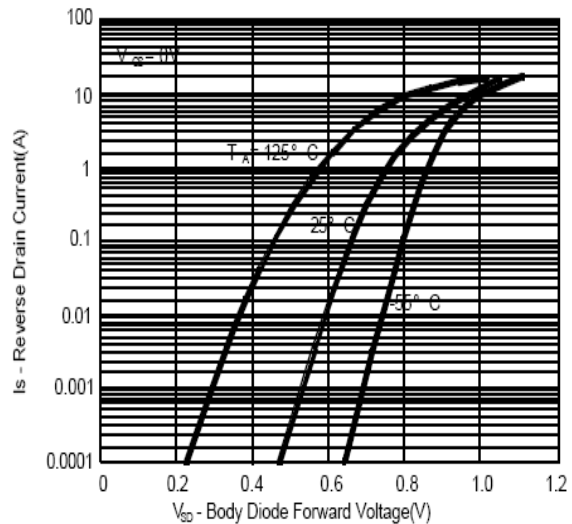
**On-Resistance Variation with Gate-to-Source Voltage**



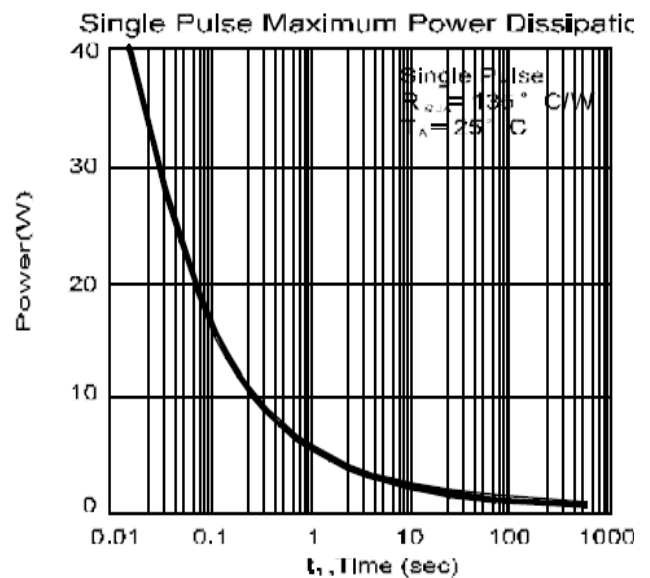
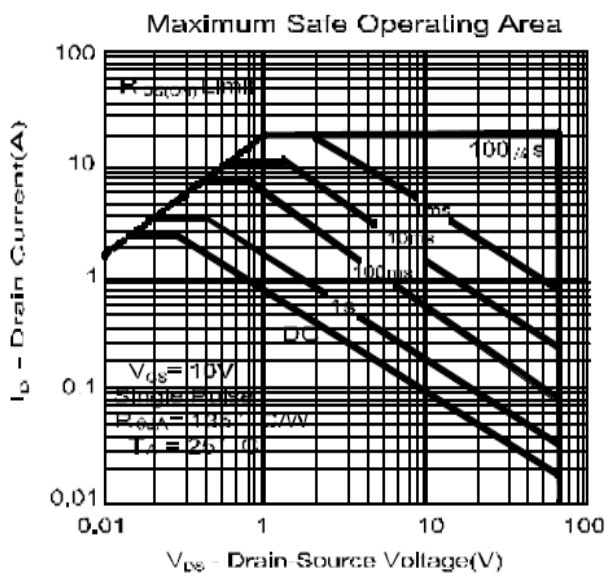
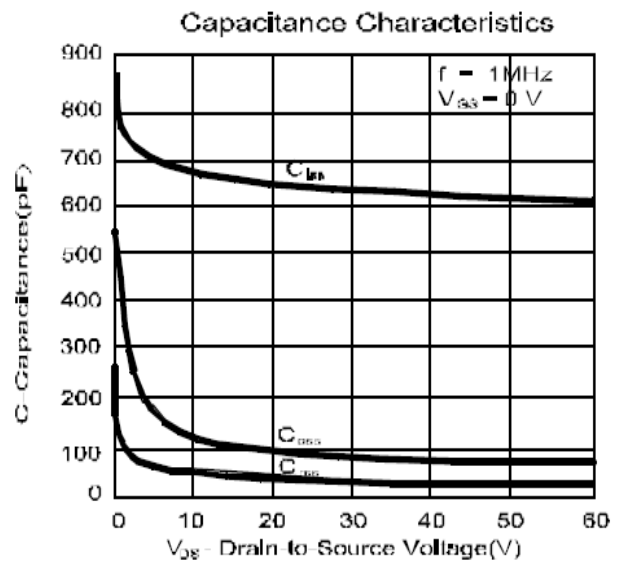
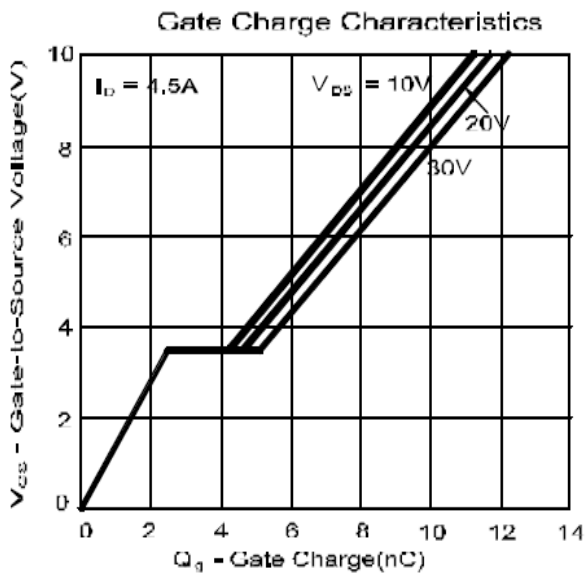
**Transfer Characteristics**



**Body Diode Forward Voltage Variation with Source Current and Temperature**

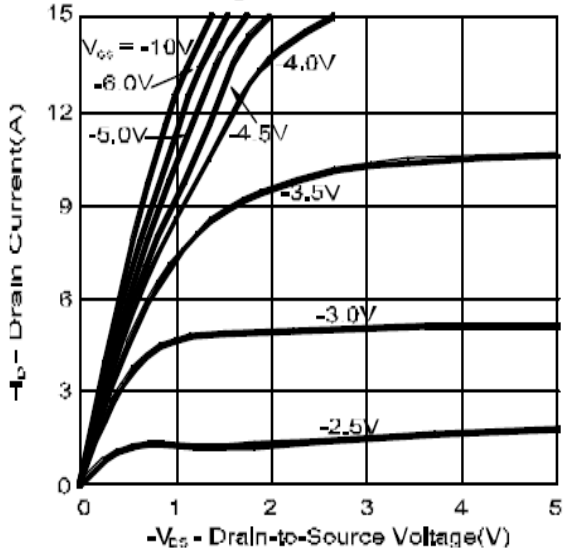


**N-channel Characteristic Curves(Cont.)**

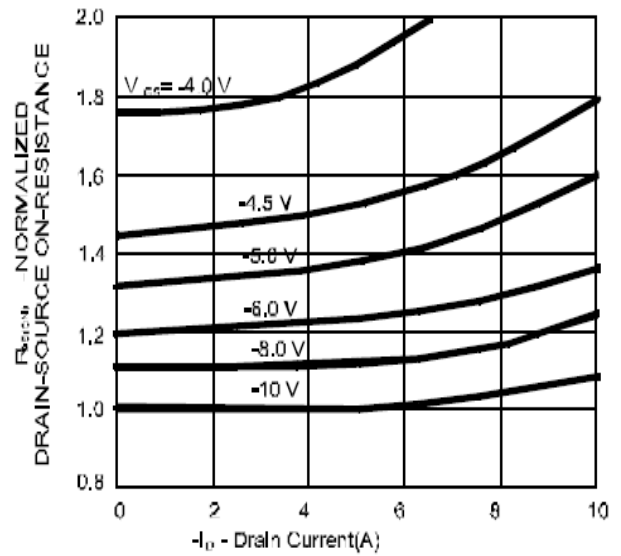


**P-channel Characteristic Curves**

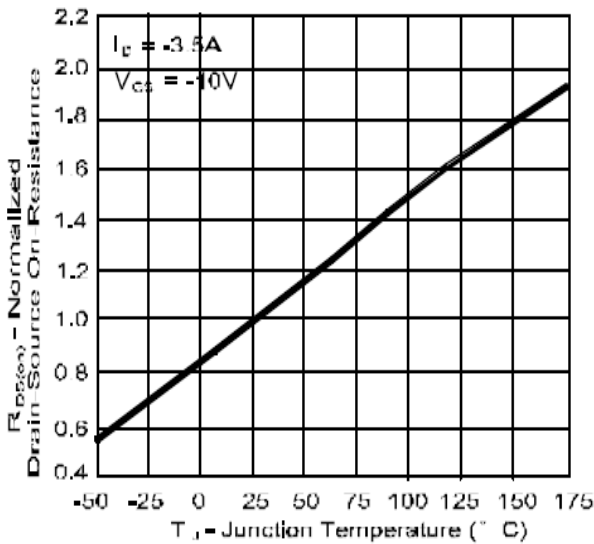
On Region Characteristics



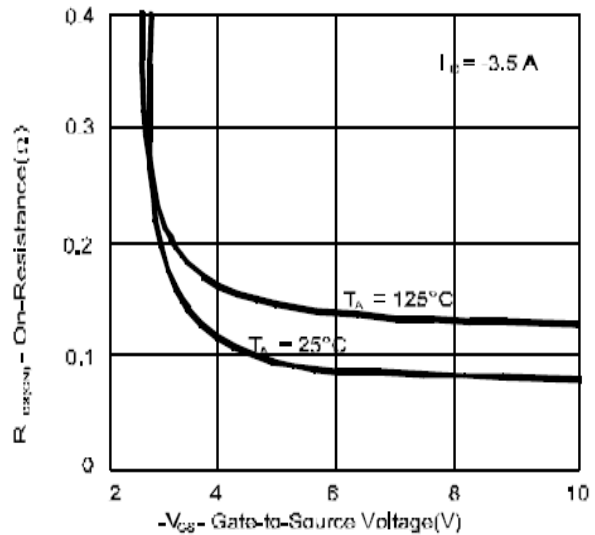
On-Resistance Variation with Drain Current and Gate Volt



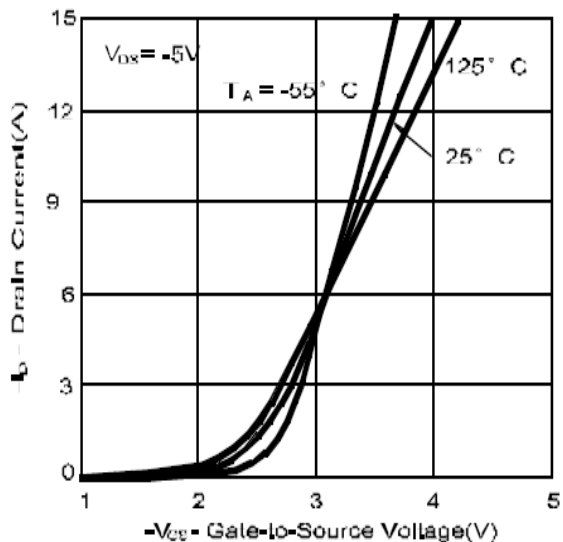
On-Resistance Variation with Temperature



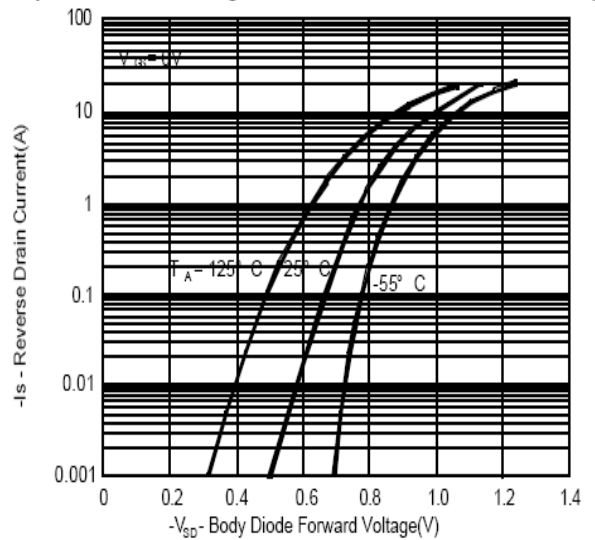
On-Resistance Variation with Gate-to-Source Voltage



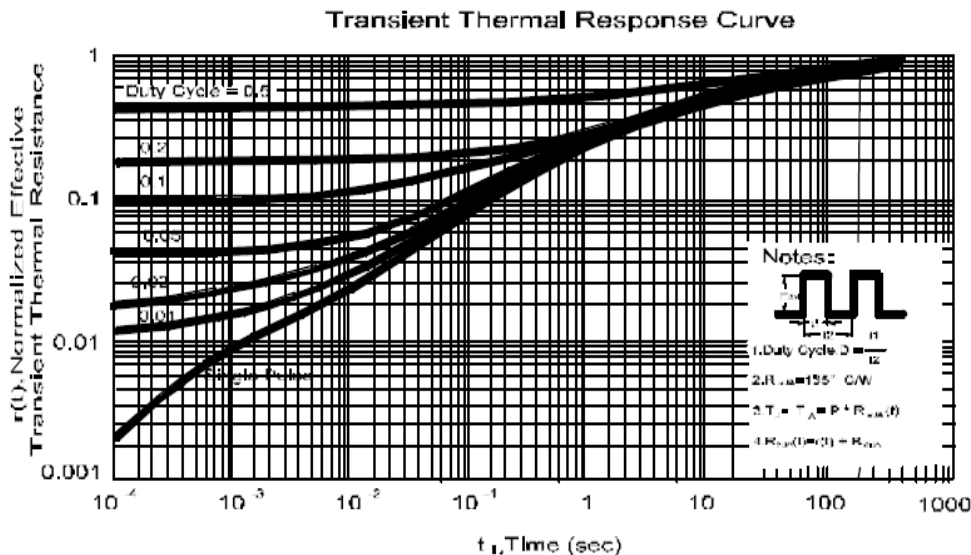
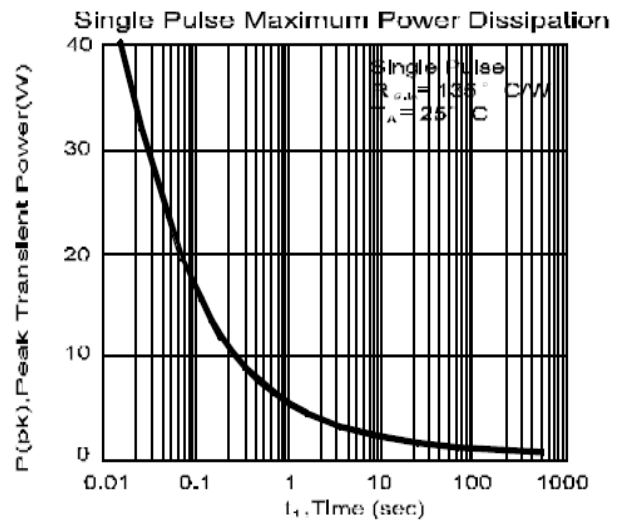
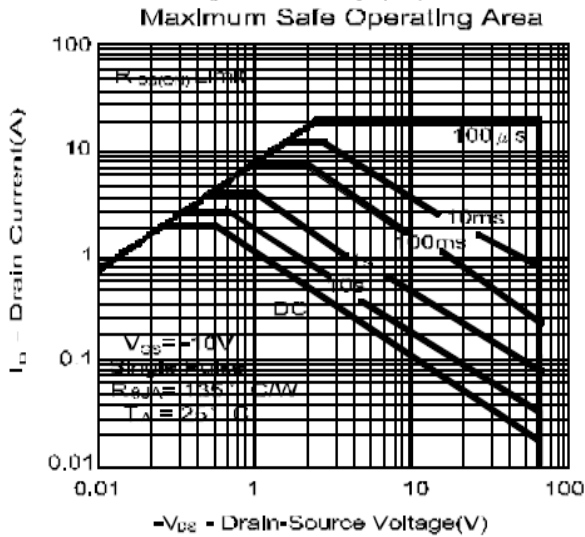
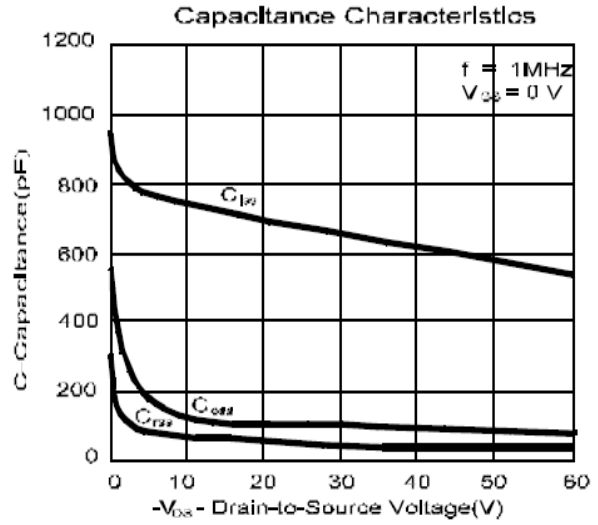
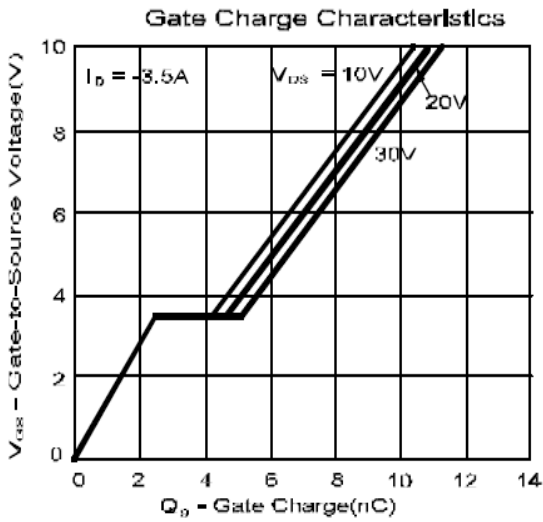
Transfer Characteristics



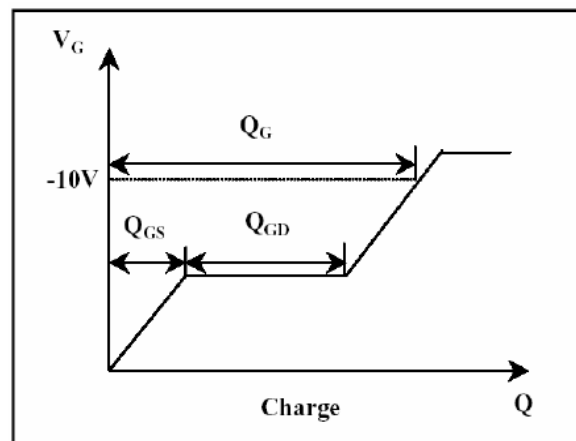
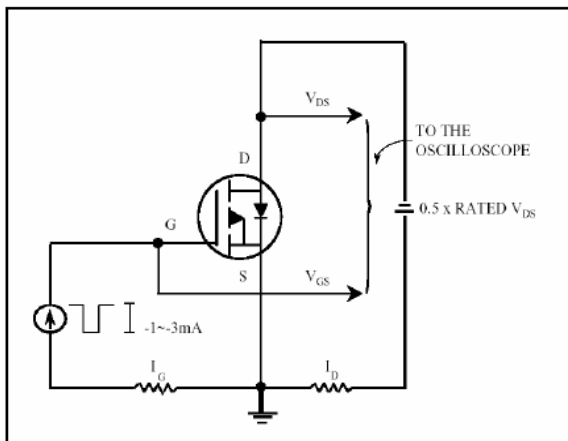
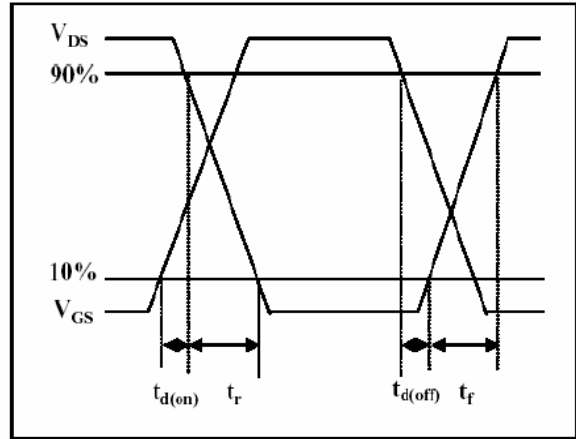
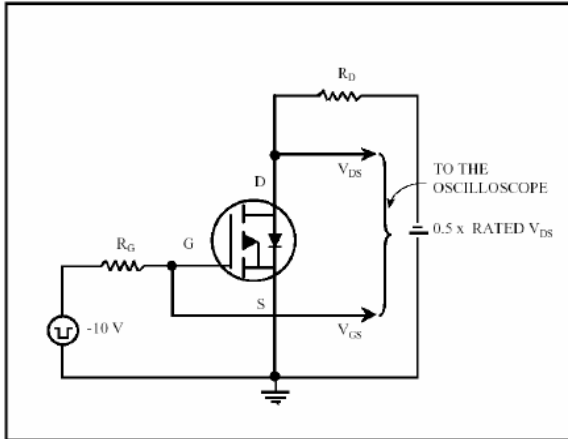
Body Diode Forward Voltage Variation with Source Current and Tempera



**P-channel Characteristic Curves(Cont.)**

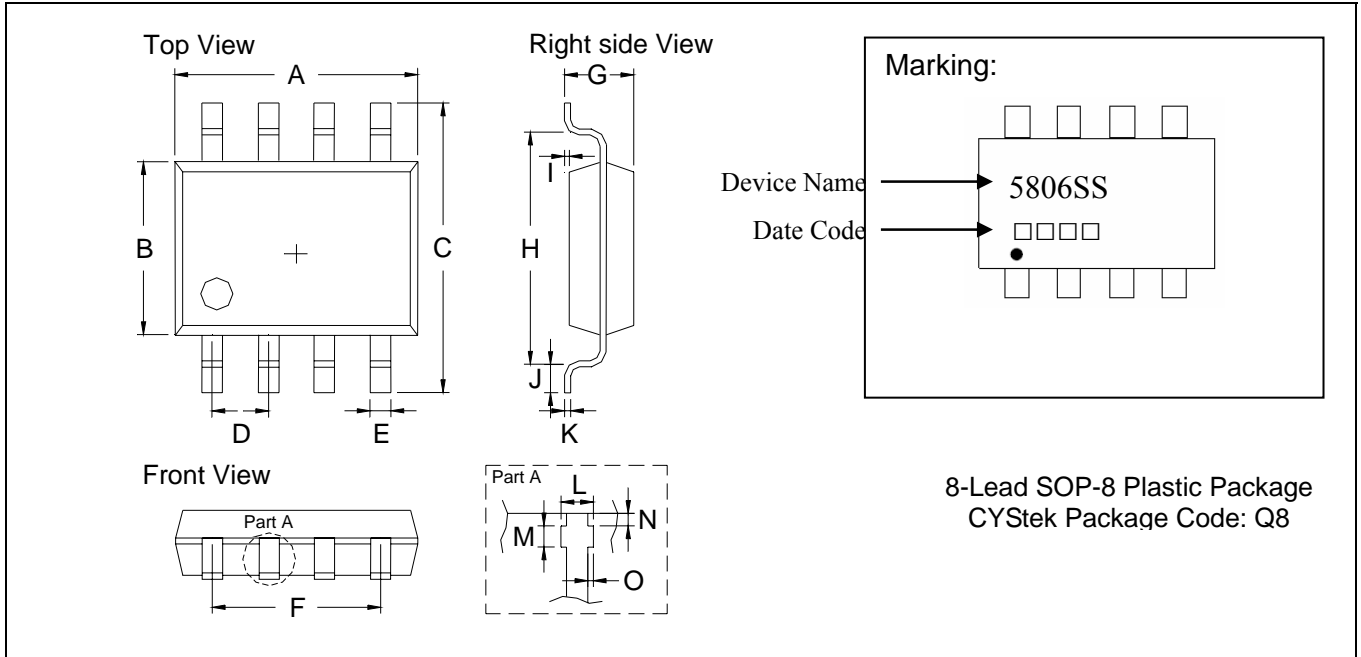


**Test Circuit and Waveforms**





**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 ; pure tin plated plating
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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