N- AND P-CHANNEL ENHANCEMENT MODE POWER MOSFET

MTC4505Q8

	N-CH	P-CH
BV_{DSS}	30V	-30V
I_D	10A	-8.4A
$R_{DSON(max)}$	14mΩ	20mΩ

Description

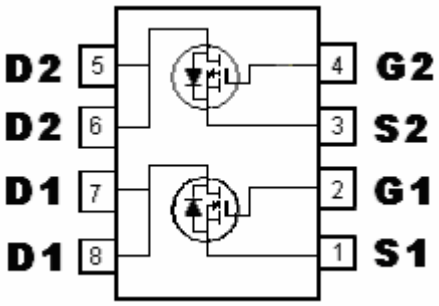
The MTC4505Q8 consists of a N-channel and a P-channel enhancement-mode MOSFET in a single SOP-8 package, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.
The SOP-8 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

Features

- Simple drive requirement
- Low on-resistance
- Fast switching speed
- RoHS compliant package

Equivalent Circuit

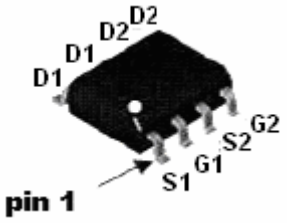
MTC4505Q8



G：Gate
S：Source
D：Drain

Outline

SOP-8



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

Parameter	Symbol	Limits		Unit
		N-channel	P-channel	
Drain-Source Breakdown Voltage	BV_{DSS}	30	-30	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current @T_A=25 °C (Note 1)	I_D	10	-8.4	A
Continuous Drain Current @T_A=70 °C (Note 1)	I_D	7.9	-6.7	A
Pulsed Drain Current (Note 2)	I_{DM}	30	-30	A
Total Power Dissipation @T_A=25°C (Note 1)	Pd	2.0		W
Linear Derating Factor		0.016		W / °C
Operating Junction and Storage Temperature Range	Tj, Tstg	-55~+150		°C
Thermal Resistance, Junction-to-Ambient (Note 1)	Rth,ja	62.5		°C/W

Note : 1.Surface mounted on 1 in² 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
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0, I_D=250μA
$BV_{DSS}/\Delta Tj$	-	0.02	-	V/°C	Reference to 25 °C, I_D=1mA
$V_{GS(th)}$	1.0	1.5	3.0	V	V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0
I_{DSS}	-	-	1	μA	V_{DS}=30V, V_{GS}=0
	-	-	25	μA	V_{DS}=24V, V_{GS}=0, Tj=70°C
*$R_{DS(ON)}$	-	-	14	mΩ	I_D=9A, V_{GS}=10V
	-	-	20		I_D=5A, V_{GS}=4.5V
*G_{FS}	-	14	-	S	V_{DS}=10V, I_D=9A
Dynamic					
Ciss	-	1770	2830	pF	V_{DS}=25V, V_{GS}=0, f=1MHz
Coss	-	430	-		
Crss	-	350	-		
*$t_{d(ON)}$	-	14	-	ns	V_{DS}=15V, I_D=1A, V_{GS}=10V, R_G=3.3Ω, R_D=15Ω
*t_r	-	10	-		
*$t_{d(OFF)}$	-	36	-		
*t_f	-	17	-		
*Qg	-	23	65	nC	V_{DS}=24V, I_D=9A, V_{GS}=4.5V
*Qgs	-	6	-		
*Qgd	-	14	-		
Source-Drain Diode					
*V_{SD}	-	-	1.2	V	V_{GS}=0V, I_S=1.7A
*trr	-	31	-	ns	I_S=9A, V_{GS}=0, dI/dt=100A/μs
*Qrr	-	25	-	nC	

*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
Static					
BV_{DSS}	-30	-	-	V	V_{GS}=0, I_D=-250μA
$BV_{DSS}/\Delta Tj$	-	-0.02	-	V/°C	Reference to 25 °C, I_D=-1mA
$V_{GS(th)}$	-1.0	-	-3.0	V	V_{DS}=V_{GS}, I_D=-250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0
I_{DSS}	-	-	-1	μA	V_{DS}=-30V, V_{GS}=0
	-	-	-25	μA	V_{DS}=-24V, V_{GS}=0, Tj=70°C
*$R_{DS(ON)}$	-	-	20	mΩ	I_D=-8A, V_{GS}=-10V
	-	-	30		I_D=-4A, V_{GS}=-4.5V
*G_{FS}	-	14	-	S	V_{DS}=-10V, I_D=-8A
Dynamic					
Ciss	-	1580	2530	pF	V_{DS}=-25V, V_{GS}=0, f=1MHz
Coss	-	540	-		
Crss	-	450	-		
*$t_{d(ON)}$	-	16	-	ns	V_{DS}=-15V, I_D=-1A, V_{GS}=-10V, R_G=3.3Ω, R_D=15Ω
*t_r	-	11	-		
*$t_{d(OFF)}$	-	40	-		
*t_f	-	25	-		
*Qg	-	27	45	nC	V_{DS}=-24V, I_D=-8A, V_{GS}=-4.5V
*Qgs	-	4	-		
*Qgd	-	18	-		
Source-Drain Diode					
*V_{SD}	-	-	-1.2	V	V_{GS}=0V, I_S=-1.7A
*trr	-	40	-	ns	I_S=-8A, V_{GS}=0, dI/dt=100A/μs
*Qrr	-	32	-	nC	

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

Ordering Information

Device	Package	Shipping	Marking
MTC4505Q8	SOP-8 (RoHS compliant)	3000 pcs / Tape & Reel	4505SS

N-channel Characteristic Curves

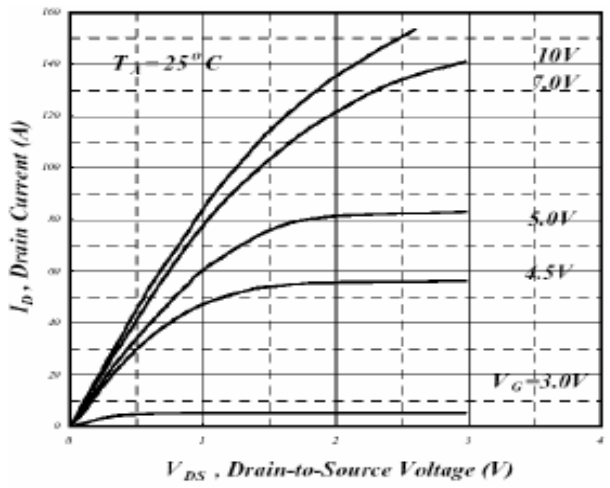


Fig 1. Typical Output Characteristics

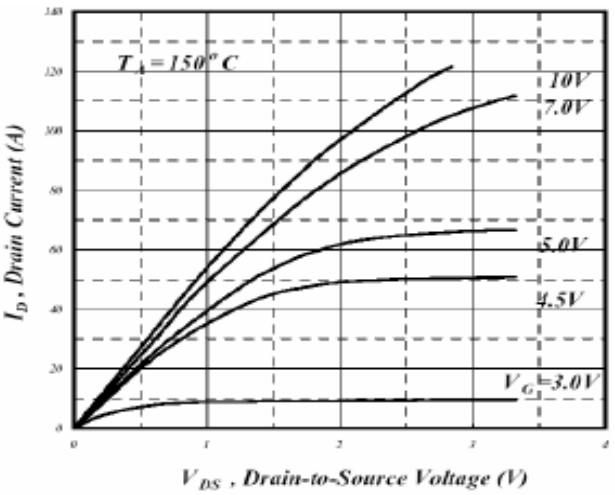


Fig 2. Typical Output Characteristics

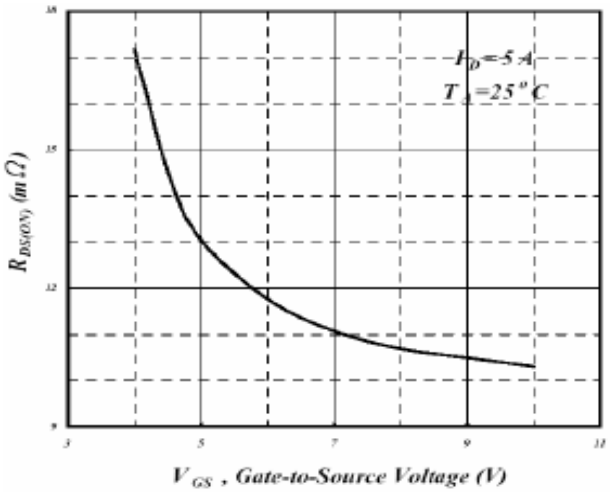


Fig 3. On-Resistance vs. Gate Voltage

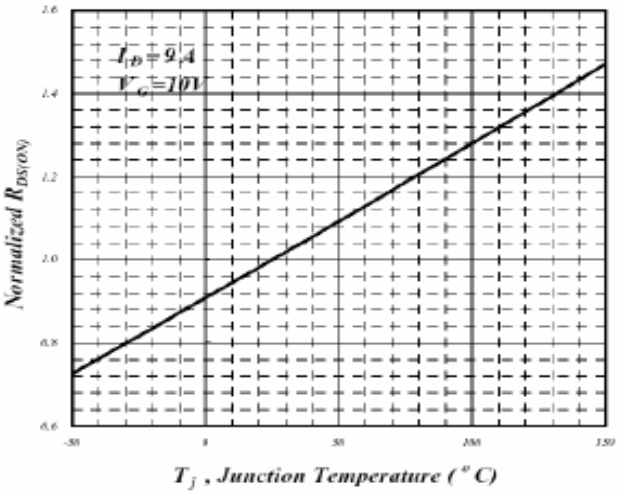


Fig 4. Normalized On-Resistance vs. Junction Temperature

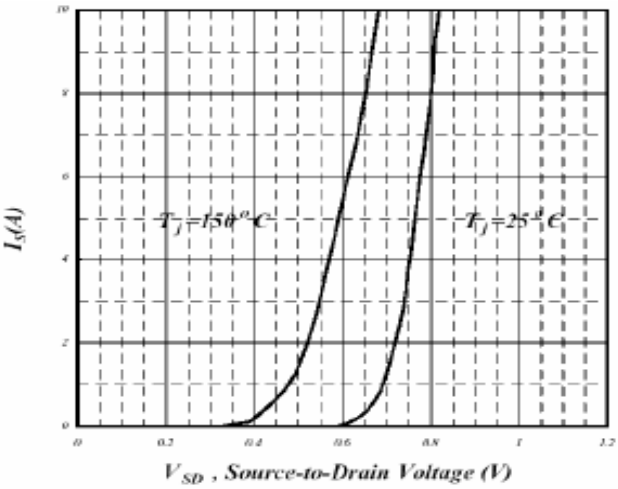


Fig 5. Forward Characteristics of Reverse Diode

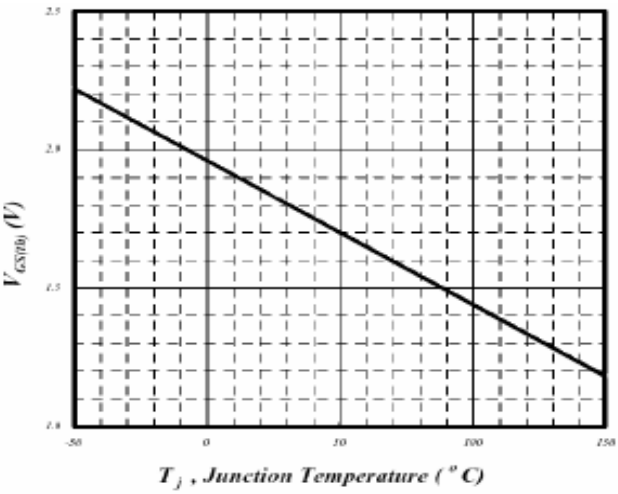


Fig 6. Gate Threshold Voltage vs. Junction Temperature

N-channel Characteristic Curves(Cont.)

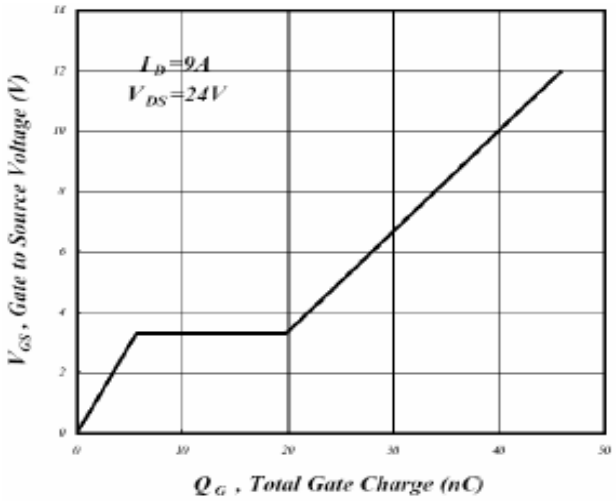


Fig 7. Gate Charge Characteristics

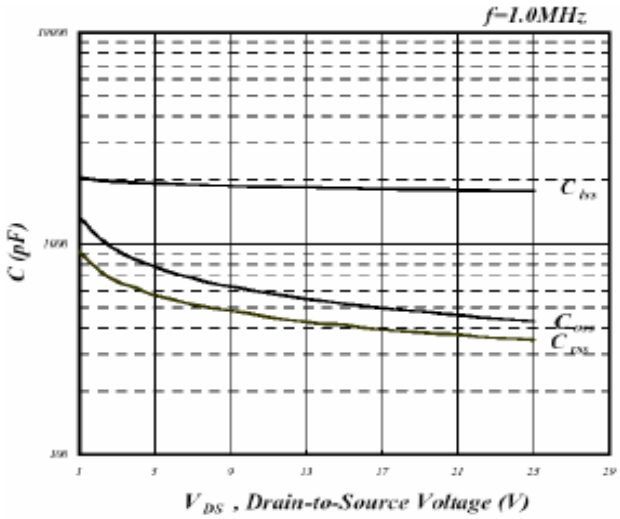


Fig 8. Typical Capacitance Characteristics

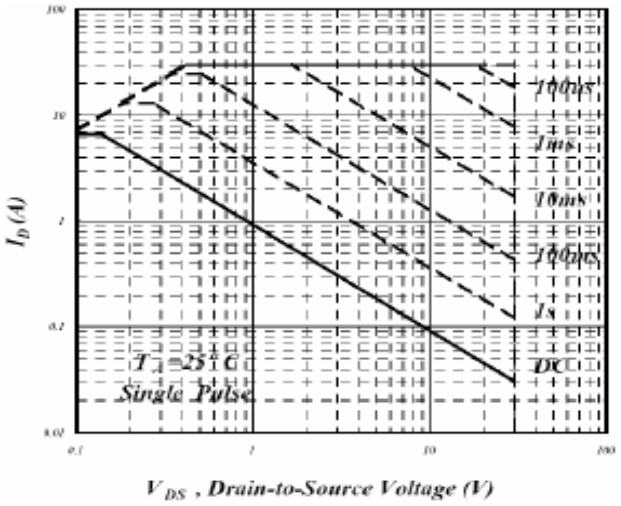


Fig 9. Maximum Safe Operating Area

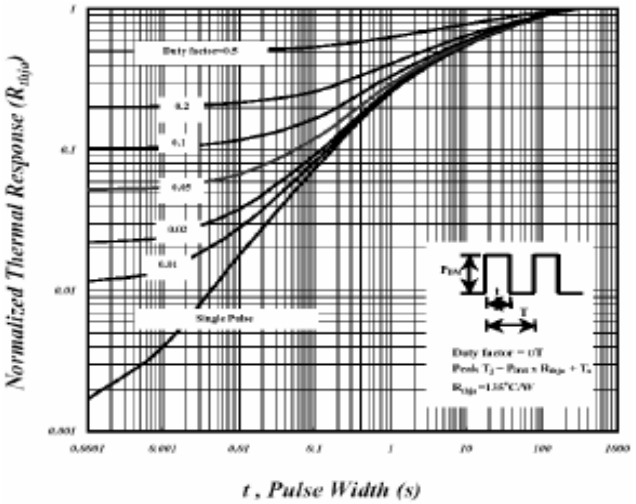


Fig 10. Effective Transient Thermal Impedanc

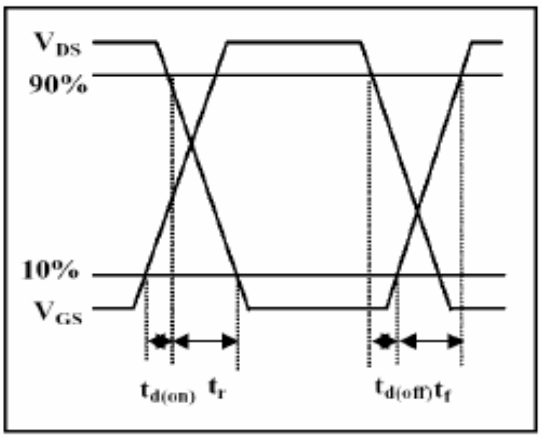


Fig 11. Switching Time Waveform

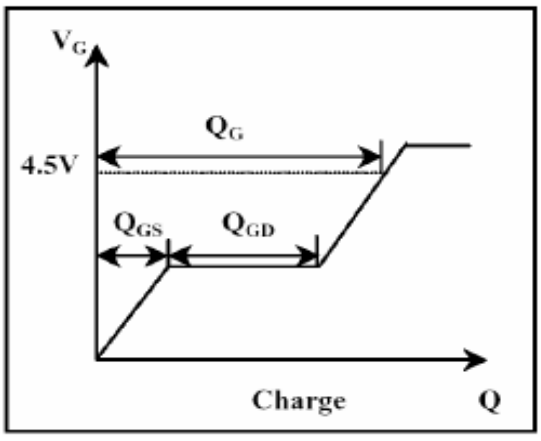


Fig 12. Gate Charge Waveform

P-Channel Characteristic Curves

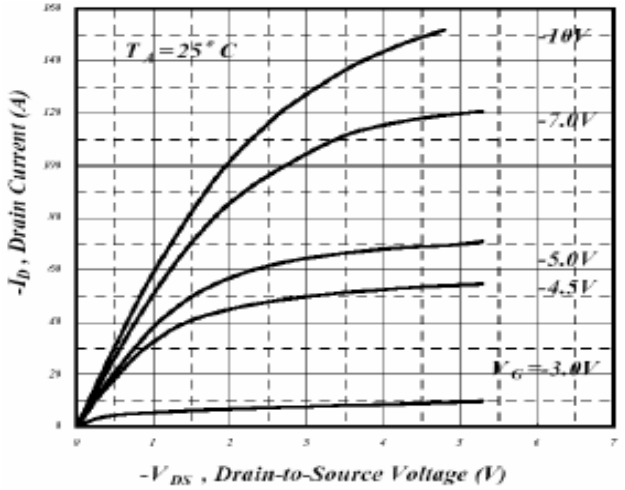


Fig 1. Typical Output Characteristics

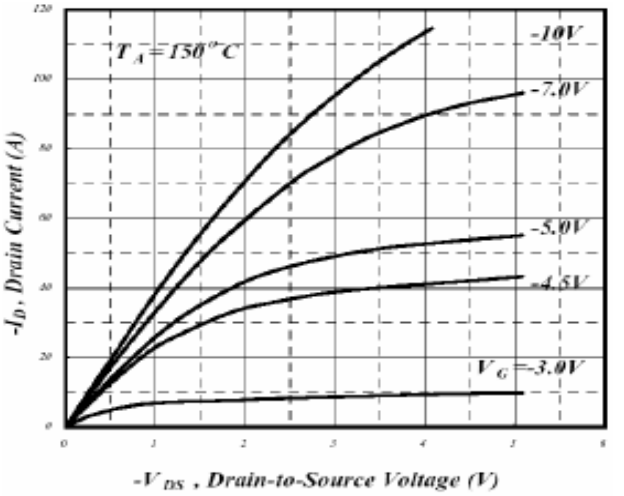
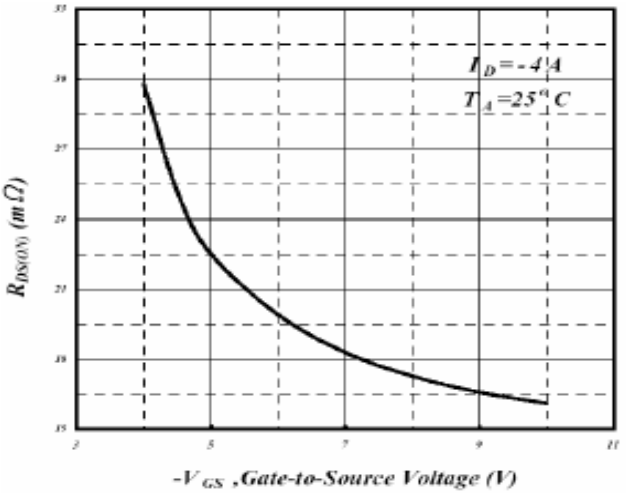


Fig 2. Typical Output Characteristics



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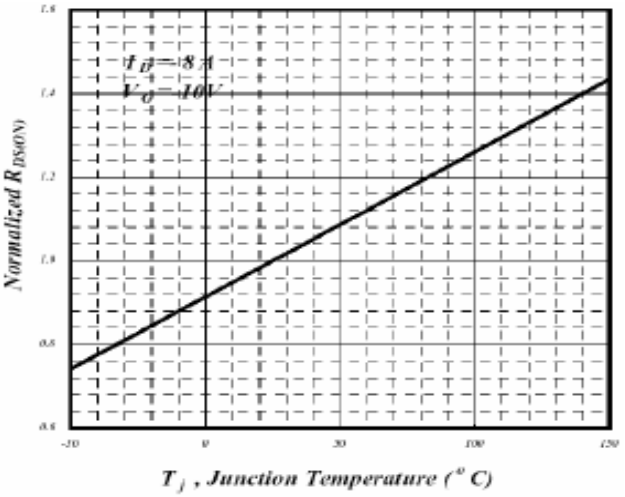


Fig 4. Normalized On-Resistance vs. Junction Temperature

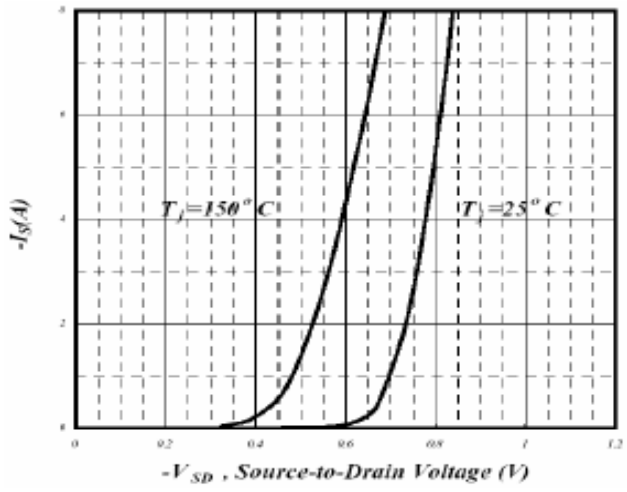


Fig 5. Forward Characteristics of Reverse Diode

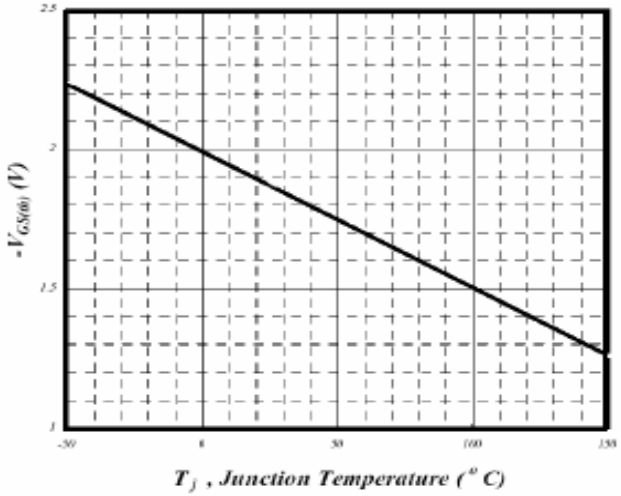


Fig 6. Gate Threshold Voltage vs. Junction Temperature

P-channel Characteristic Curves(Cont.)

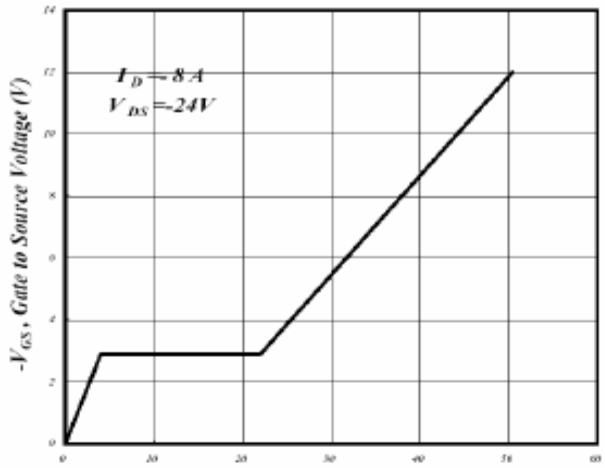
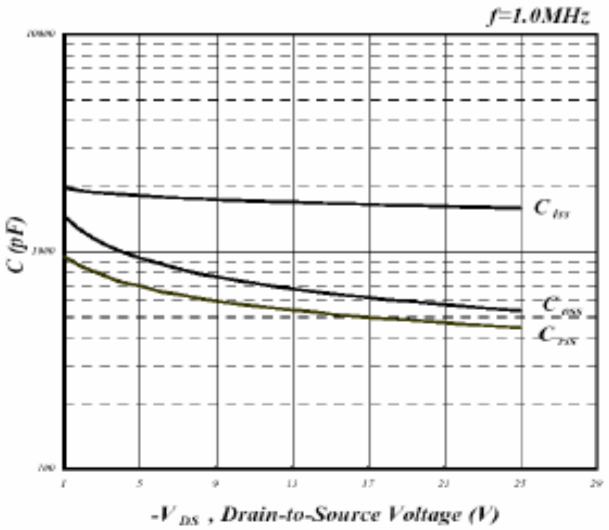


Fig 7. Gate Charge Characteristics



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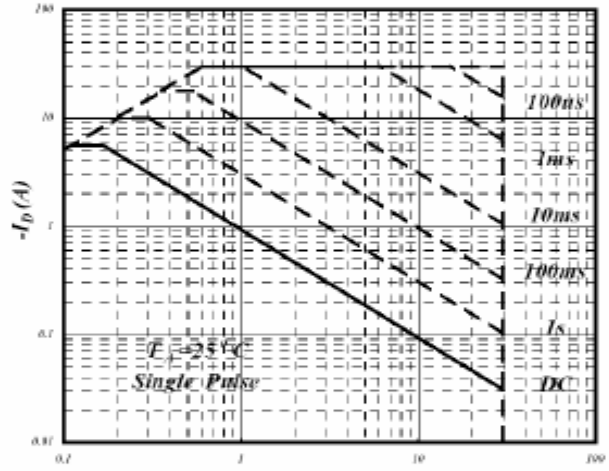


Fig 9. Maximum Safe Operating Area

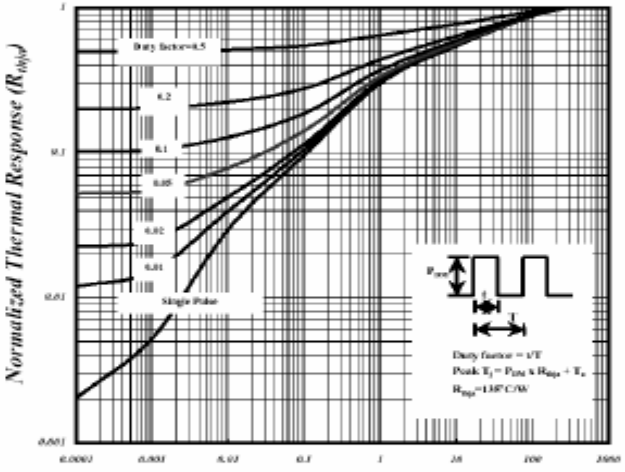


Fig 10. Effective Transient Thermal Impedance

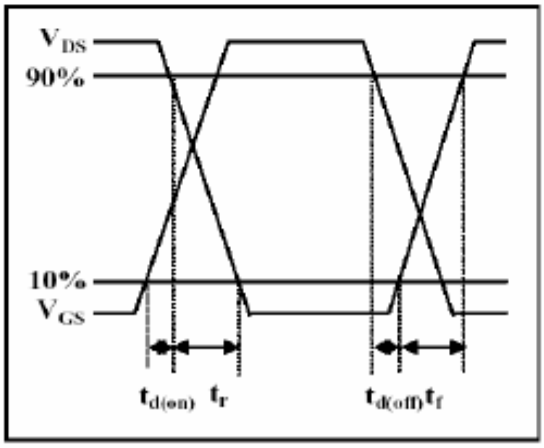


Fig 11. Switching Time Waveform

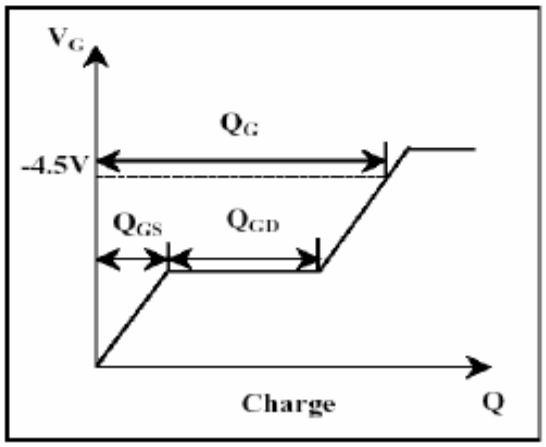
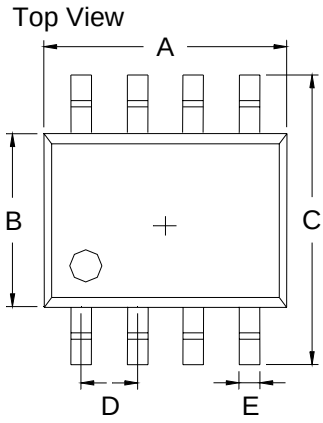
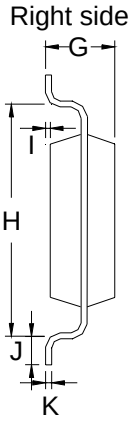
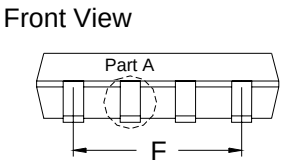


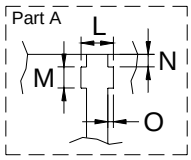
Fig 12. Gate Charge Waveform

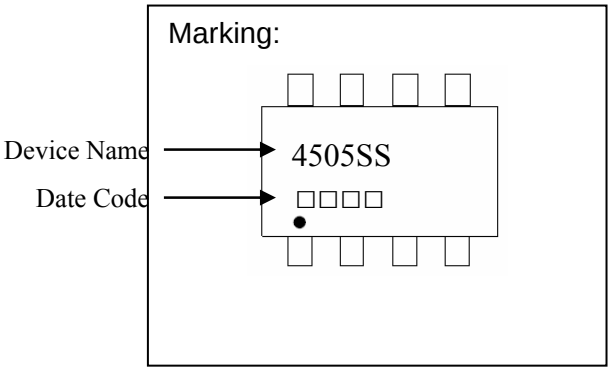
SOP-8 Dimension











8-Lead SOP-8 Plastic Package
CYStek Package Code: Q8

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