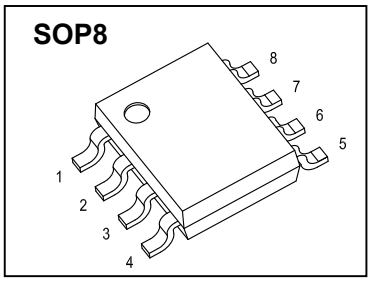
JIANGSU CHANGJING ELECTRONICS TECHNOLOGY CO., LTD.

SOP8 Plastic-Encapsulate MOSFETS

CJQ2040M04 N-Channel + P-Channel MOSFET

$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D
40V	15mΩ@10V	6A
	21mΩ@4.5V	
-40V	30mΩ@-10V	-4A
	40mΩ@-4.5V	



DESCRIPTIONS

The Device uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs form a high-speed power inverter, suitable for a multitude of applications.

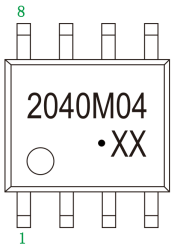
FEATURE

- Surface Mount Package
- Super High Density Cell Design for Extremely Low RDS(ON)

APPLICATION

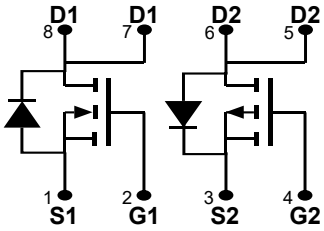
- Suitable for a multitude of applications
- High-speed power inverter

MARKING



2040M04 = Device code.
Solid dot = Green molding compound device, if none, the normal device.
XX = Code.

EQUIVALENT CIRCUIT



MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
N-MOSFET			
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	6	A
Pulsed Drain Current	I_{DM} ①	24	A
Single Pulsed Avalanche Energy	E_{AS} ②	40	mJ
P-MOSFET			
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	-4	A
Pulsed Drain Current	I_{DM} ①	-16	A
Single Pulsed Avalanche Energy	E_{AS} ③	45	mJ
Temperature and Thermal Resistance			
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$ ⑥	75	℃/W
Power Dissipation	P_D	1.7	W
Operating Junction and Storage Temperature Range	T_J ,T_{stg}	-55~+150	℃

MOSFET ELECTRICAL CHARACTERISTICS

N-Channel MOSFET ELECTRICAL CHARACTERISTICS, T_a=25 ℃ unless otherwise specified

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
Off characteristics							
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA		40	–	–	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=32V, V_{GS}=0V	T_J=25℃	–	–	1.0	μA
			T_J=125℃	–	–	100	
Gate-body leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±20V		–	–	±100	nA
On characteristics ④							
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA		1.0	1.6	2.5	V
Static drain-source on-sate resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =8A		–	15	21	mΩ
		V_{GS} =4.5V, I_D =6A		–	21	29	mΩ
Dynamic characteristics ⑤							
Input capacitance	C_{iss}	V_{DS} =20V,V_{GS} =0V, f =1MHz		–	916	–	pF
Output capacitance	C_{oss}			–	96	–	
Reverse transfer capacitance	C_{rss}			–	90	–	
Gate resistance	R_g	f =1MHz		–	2.0	–	Ω
Switching characteristics ⑤							
Total gate charge	Q_g	V_{GS}=4.5V,V_{DS}=20V,I_D=6A		–	9	–	nC
Total gate charge	Q_g	V_{GS}=10V,V_{DS}=20V,I_D=6A		–	20	–	
Gate-source charge	Q_{gs}			–	3	–	
Gate-drain charge	Q_{gd}			–	5	–	
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V, R_L=3.3Ω, V_{GS}=10V, R_G=10Ω		–	7	–	ns
Turn-on rise time	t_r			–	33	–	
Turn-off delay time	$t_{d(off)}$			–	34	–	
Turn-off fall time	t_f			–	25	–	
Drain-Source Diode Characteristics							
Drain-source diode forward voltage	V_{SD} ④	V_{GS} =0V, I_S=10A		–	–	1.2	V
Continuous drain-source diode forward current	I_S			–	–	6	A
Pulsed drain-source diode forward current	I_{SM} ①			–	–	24	A

MOSFET ELECTRICAL CHARACTERISTICS

P-Channel MOSFET ELECTRICAL CHARACTERISTICS, T_a=25 ℃ unless otherwise specified

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
Off characteristics							
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	V_{GS} = 0V, I_D = -250μA		-40	–	–	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V	T_J=25℃	–	–	-1.0	μA
			T_J=125℃	–	–	-100	
Gate-body leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±20V		–	–	±100	nA
On characteristics ④							
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250μA		-1.0	-1.8	-3.0	V
Static drain-source on-sate resistance	$R_{DS(on)}$	V_{GS} =-10V, I_D =-10A		–	30	45	mΩ
		V_{GS} =-4.5V, I_D =-8A		–	40	60	
Dynamic characteristics ⑤							
Input capacitance	C_{iss}	V_{DS} =-20V,V_{GS} =0V, f =1MHz		–	1264	–	pF
Output capacitance	C_{oss}			–	109	–	
Reverse transfer capacitance	C_{rss}			–	99	–	
Gate resistance	R_g	f =1MHz		–	5.4	–	Ω
Switching characteristics ⑤							
Total gate charge	Q_g	V_{GS}=-4.5V,V_{DS}=-20V,I_D=-4A		–	11	–	nC
Total gate charge	Q_g	V_{GS}=-10V,V_{DS}=-20V, I_D=-4A		–	24	–	
Gate-source charge	Q_{gs}			–	4	–	
Gate-drain charge	Q_{gd}			–	5	–	
Turn-on delay time	$t_{d(on)}$	V_{DD}=-20V,R_L=5Ω, V_{GS}=-10V, R_G=10Ω		–	7	–	ns
Turn-on rise time	t_r			–	16	–	
Turn-off delay time	$t_{d(off)}$			–	51	–	
Turn-off fall time	t_f			–	34	–	
Drain-Source Diode Characteristics							
Drain-source diode forward voltage	V_{SD} ④	V_{GS} =0V, I_S=-10A		–	–	-1.2	V
Continuous drain-source diode forward current	I_S			–	–	-4	A
Pulsed drain-source diode forward current	I_{SM} ①			–	–	-16	A

Notes:

1.P_W≤10μs, Duty cycle≤1%.

2.EAS condition: VDD=20V,VGS=10V, L=0.5mH, Rg=25Ω Starting T_J = 25℃.

3.EAS condition: VDD=-20V,VGS=-10V, L=0.5mH, Rg=25Ω Starting T_J = 25℃.

4.Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.

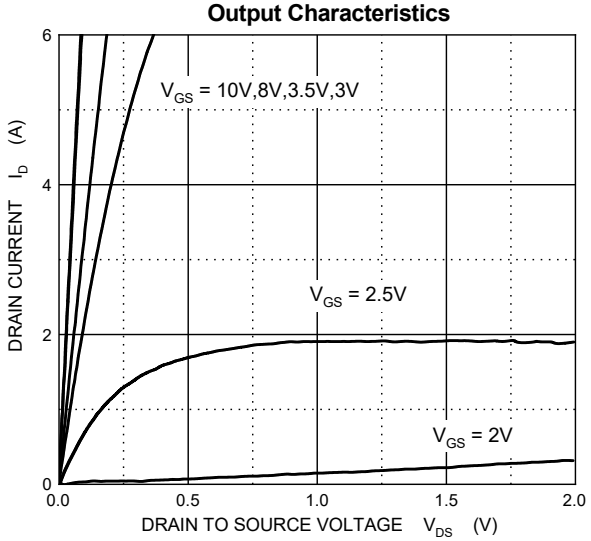
5.Guaranteed by design, not subject to production.

6.Device mounted on 1 in^2 FR-4 board with 2oz. single-sided Copper, in a still air environment with T_A=25℃.Single-sided active.

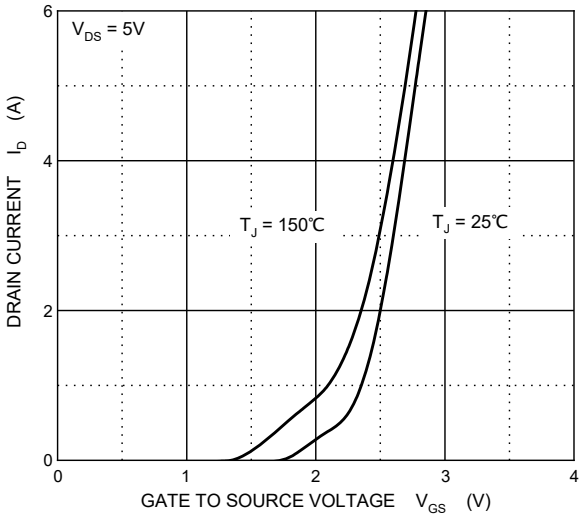
Typical Characteristics

N-Channel MOS,T_J=25℃ unless otherwise specified

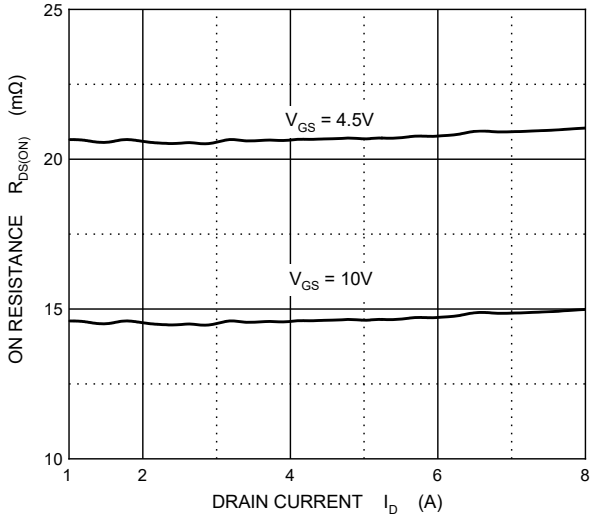
Output Characteristics



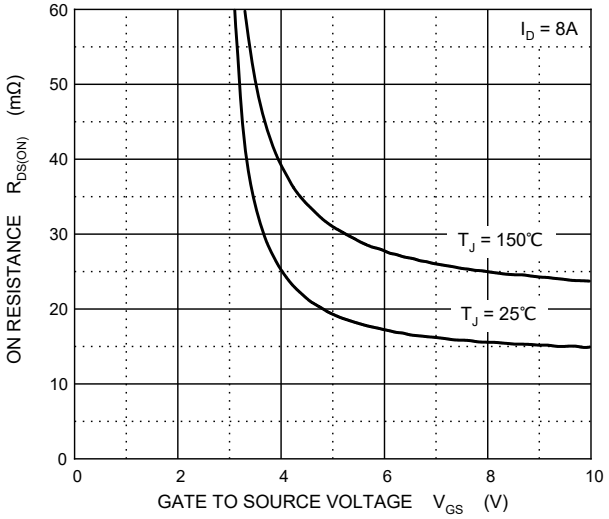
Transfer Characteristics



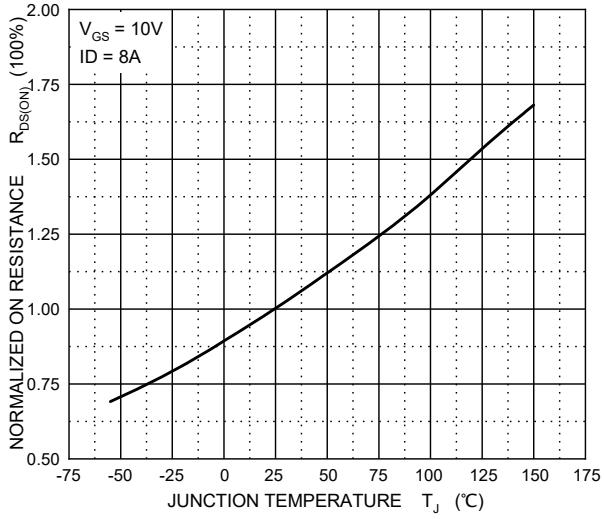
On Resistance vs. Drain Current



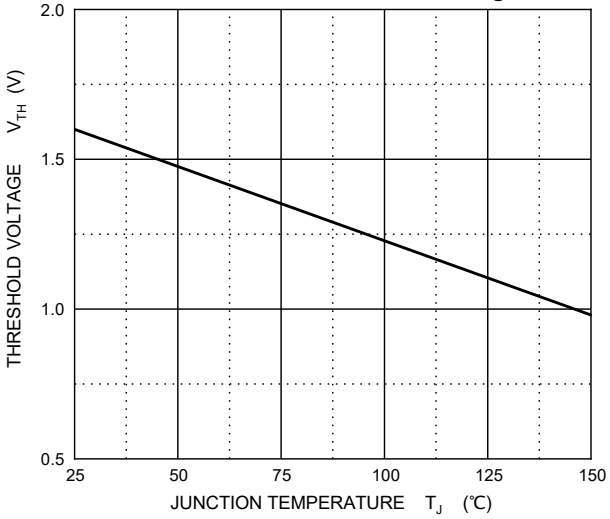
On Resistance vs. Gate-Source Bias



On Resistance vs. Junction Temperature



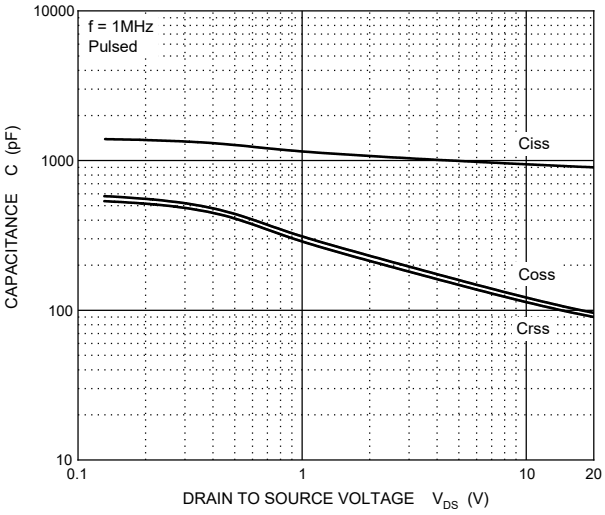
Gate-Source Threshold Voltage



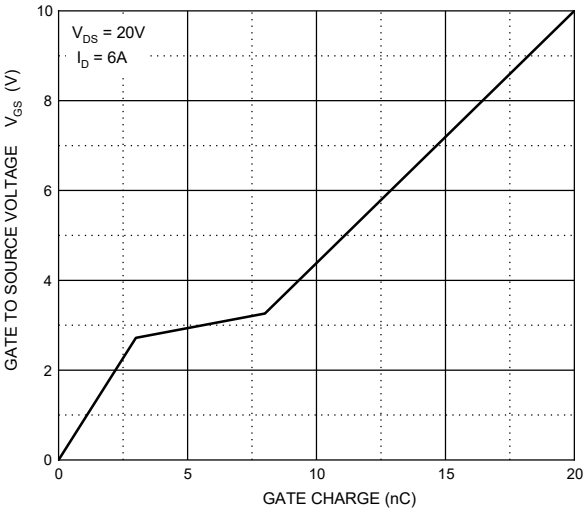
Typical Characteristics

N-Channel MOS,T_J=25℃ unless otherwise specified

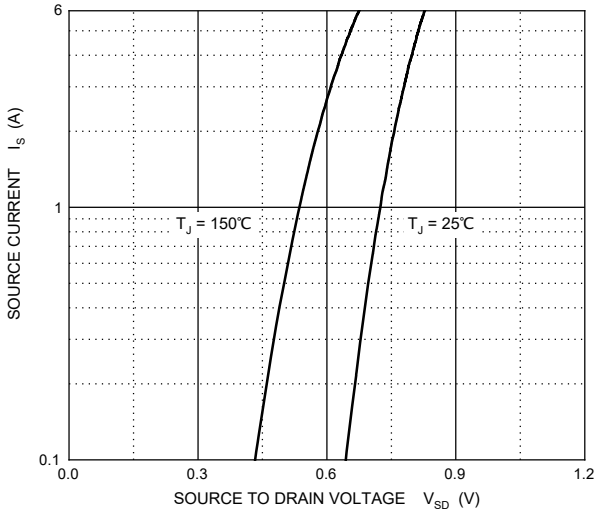
Typical Capacitances



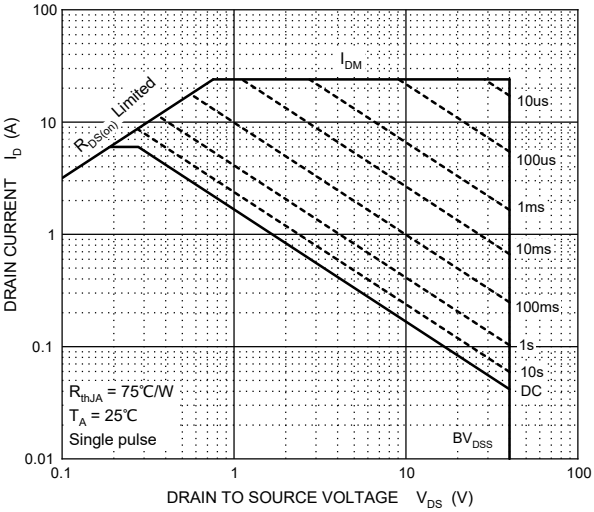
Gate Charge



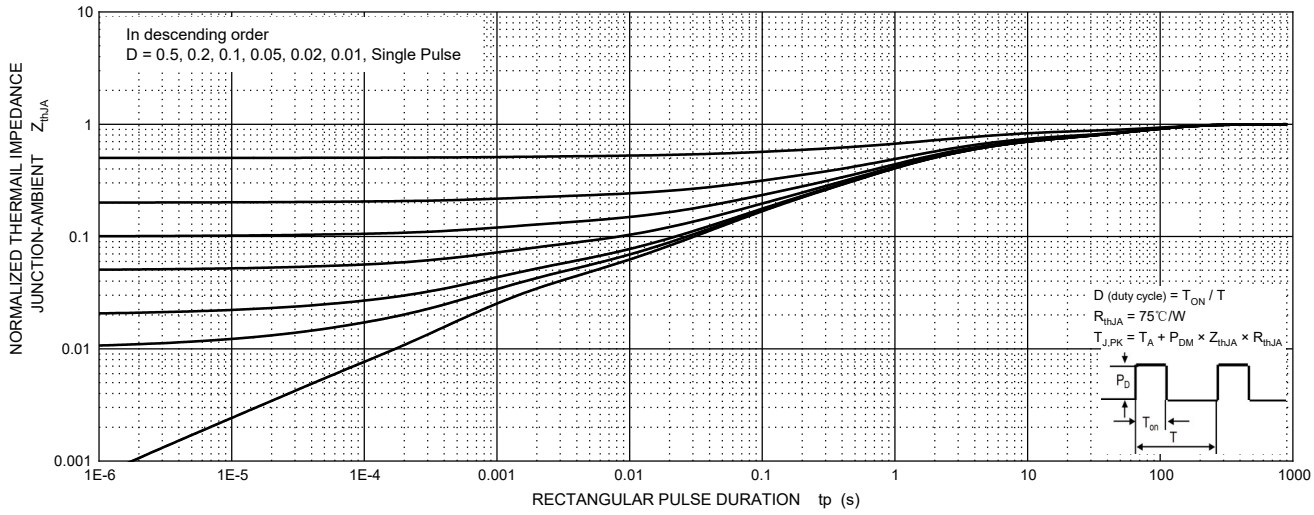
Source-Drain Diode Forward Characteristics



Maximum Safe Operating Area



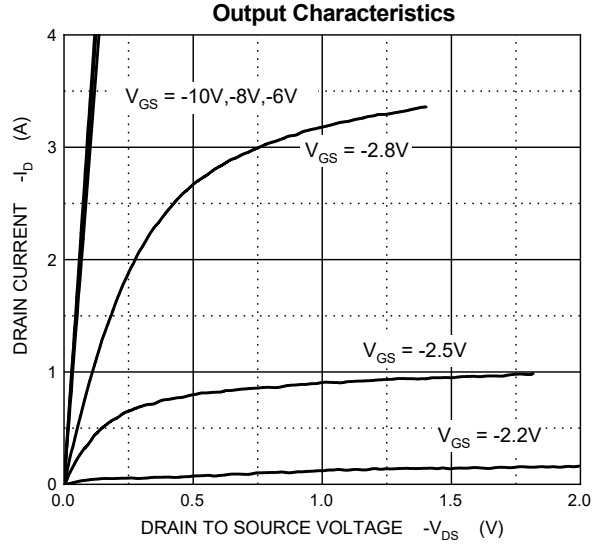
Transient Thermal Impedance, Junction-Ambient



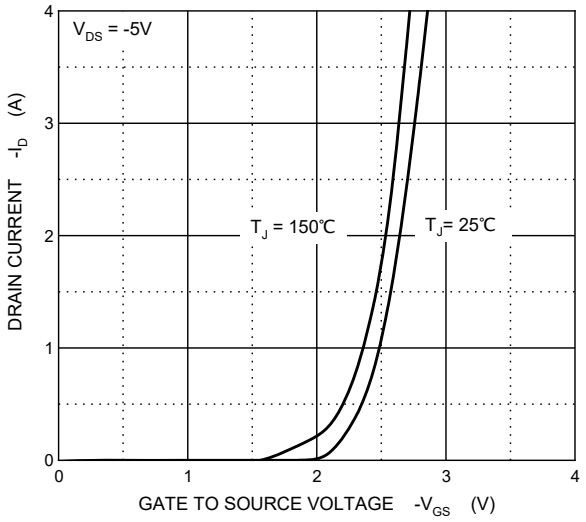
Typical Characteristics

P-Channel MOS,T_J=25℃ unless otherwise specified

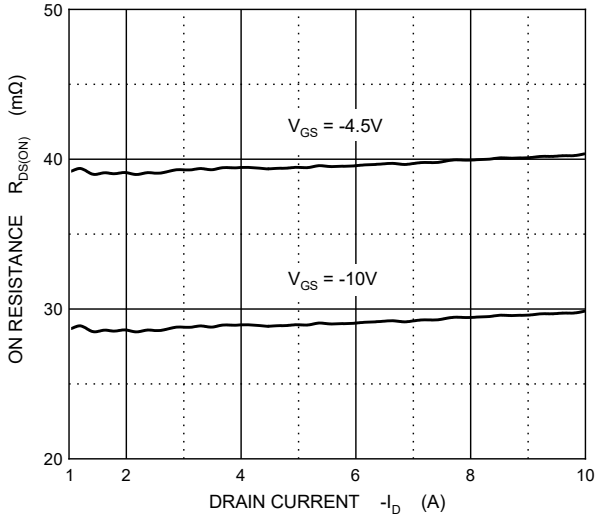
Output Characteristics



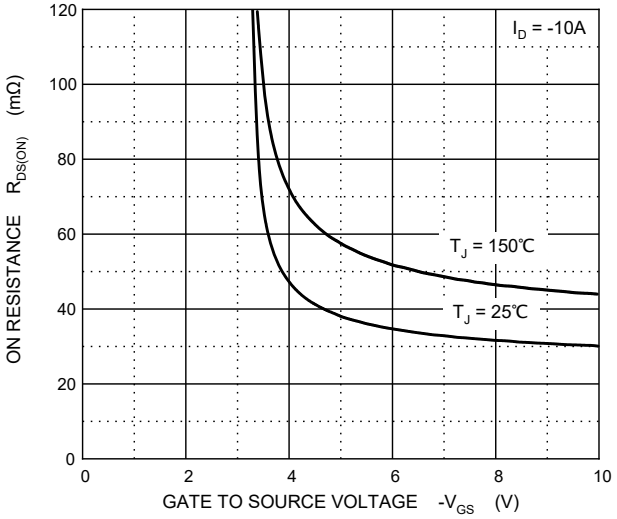
Transfer Characteristics



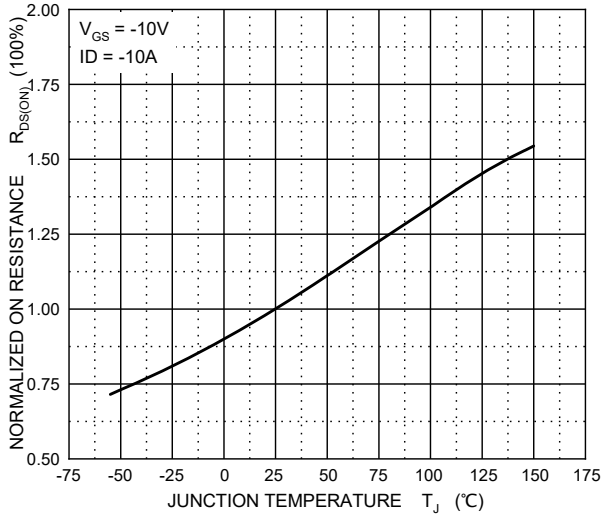
On Resistance vs. Drain Current



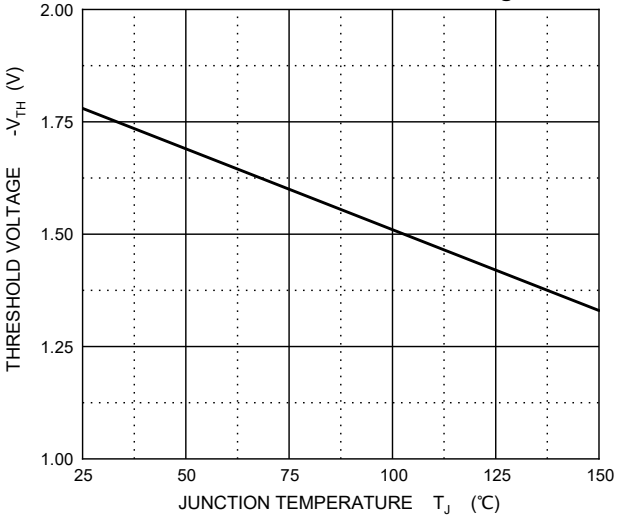
On Resistance vs. Gate-Source Bias



On Resistance vs. Junction Temperature



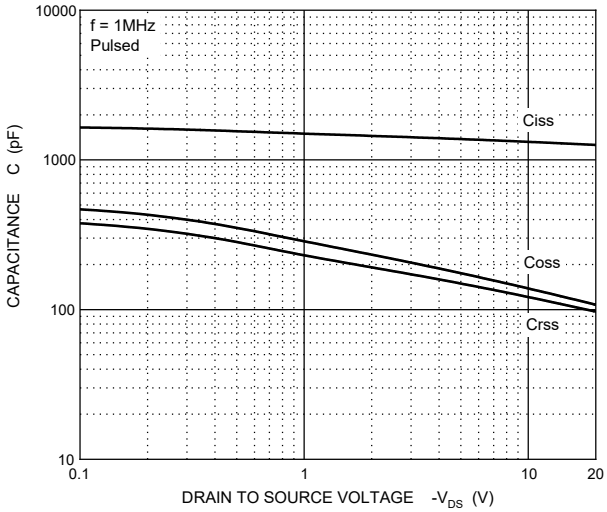
Gate-Source Threshold Voltage



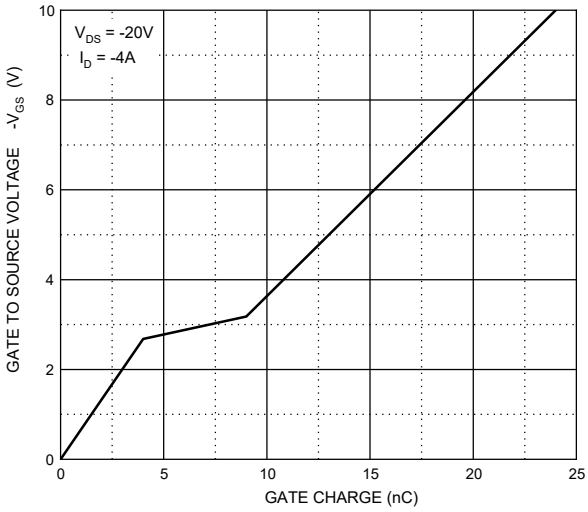
Typical Characteristics

P-Channel MOS,T_J=25℃ unless otherwise specified

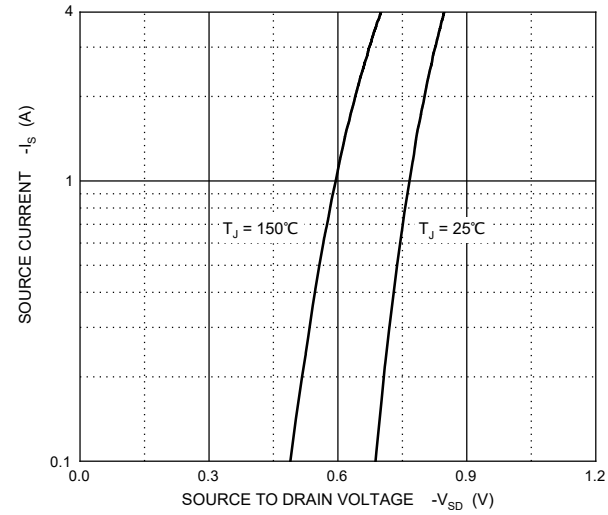
Typical Capacitances



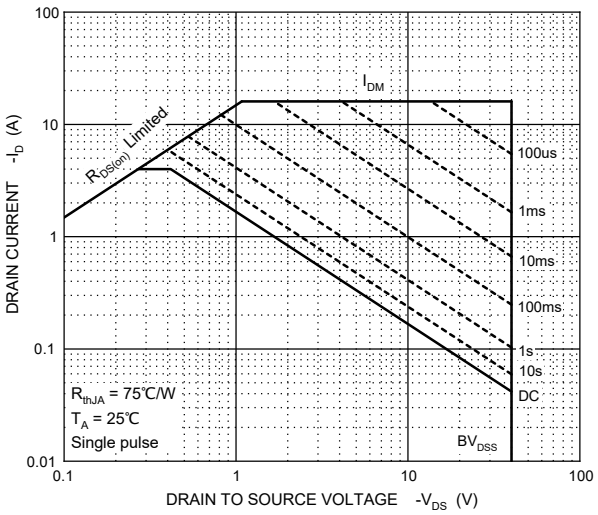
Gate Charge



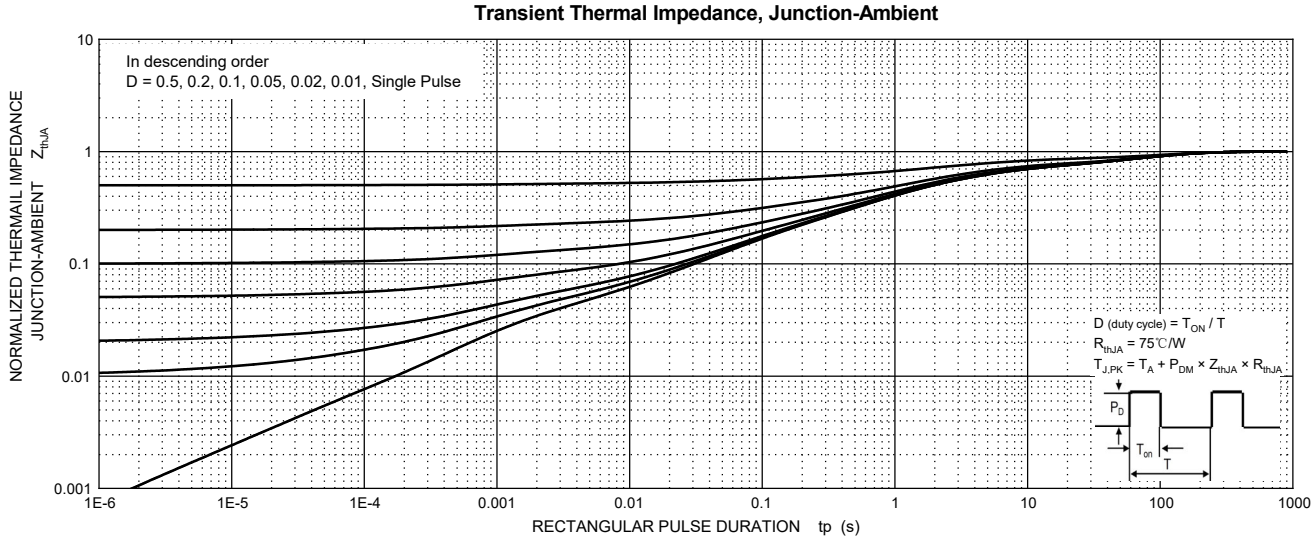
Source-Drain Diode Forward Characteristics



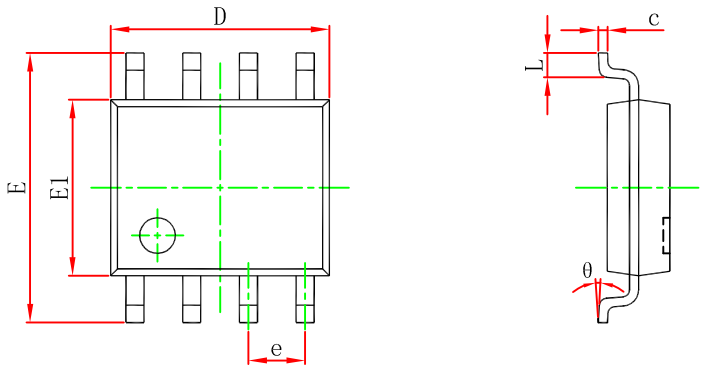
Maximum Safe Operating Area

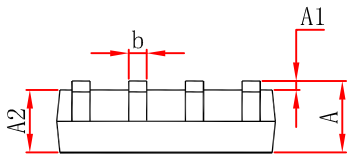


Transient Thermal Impedance, Junction-Ambient



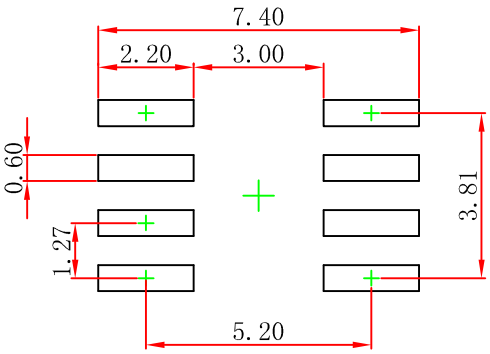
SOP8 Package Outline Dimensions





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	**Max**	**Min**	**Max**
A	1.450	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
e	1.270（BSC）		0.050（BSC）	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

SOP8 Suggested Pad Layout



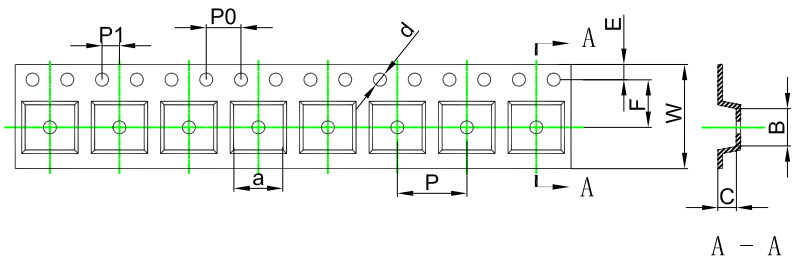
Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

NOTICE

JSCJ reserves the right to make modifications,enhancements,improvements,corrections or other changes without further notice to any product herein. JSCJ does not assume any liability arising out of the application or use of any product described herein.

SOP8 Tape and Reel

SOP8 Embossed Carrier Tape



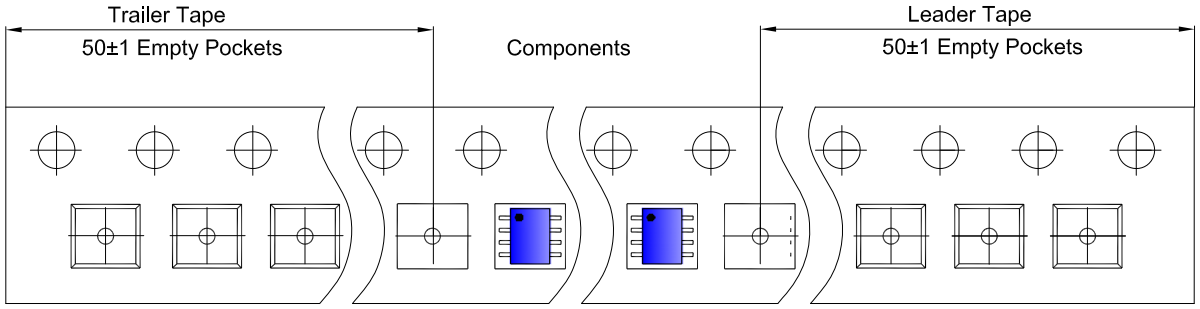
Packaging Description:

SOP8 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 2,500 units per 13" or 33cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

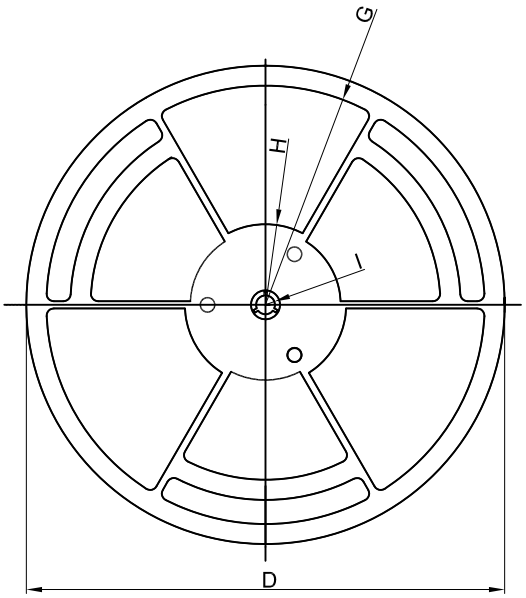
ALL DIM IN mm

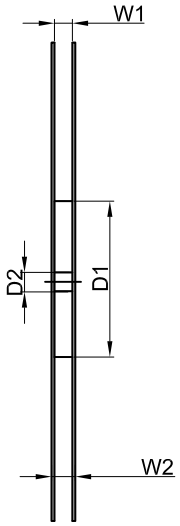
Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
SOP8	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

SOP8 Tape Leader and Trailer



SOP8 Reel





Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
13"Dia	Ø330.00	100.00	13.00	R151.00	R56.00	R6.50	12.40	17.60

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
4,000 pcs	13 inch	8,000 pcs	360×360×65	40,000 pcs	565×380×390	