

Complementary Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☒ Surface-mounted package
- ☒ Advanced trench cell design

1.2 Applications

- ☒ MB and NB
- ☒ Half – bridge Drivers
- ☒ Motor drivers

1.3 Quick reference

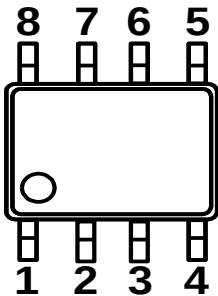
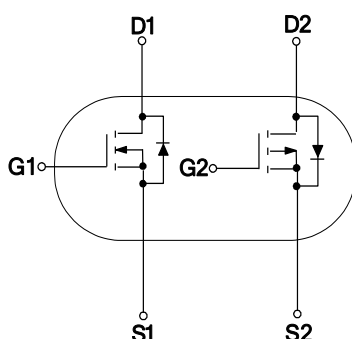
N-channel

- ☒ $BV \leq 30\text{ V}$
- ☒ $P_{\text{tot}} \leq 2\text{ W}$
- ☒ $I_D \leq 9.1\text{ A}$
- ☒ $R_{\text{DS(ON)}} \leq 16\text{ m}\Omega @ V_{\text{GS}} = 10\text{ V}$
 $R_{\text{DS(ON)}} \leq 20\text{ m}\Omega @ V_{\text{GS}} = 4.5\text{ V}$

P-channel

- ☒ $BV \leq -30\text{ V}$
- ☒ $P_{\text{tot}} \leq 2\text{ W}$
- ☒ $I_D \leq -6.3\text{ A}$
- ☒ $R_{\text{DS(ON)}} \leq 33\text{ m}\Omega @ V_{\text{GS}} = -10\text{ V}$
 $R_{\text{DS(ON)}} \leq 47\text{ m}\Omega @ V_{\text{GS}} = -4.5\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Source(S1)	 Top View SOP-8L	
2	Gate(G1)		
3	Source(S2)		
4	Gate(G2)		
5,6	Drain(D2)		
7,8	Drain(D1)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
N-channel					
V_{DS}	Drain-Source Voltage	$T_A = 25\text{ }^{\circ}\text{C}$	-	30	V
V_{GS}	Gate-Source Voltage	$T_A = 25\text{ }^{\circ}\text{C}$	-	± 20	V
I_D^*	Drain Current	$T_A = 25\text{ }^{\circ}\text{C}, V_{GS} = -10\text{ V}$	-	9.1	A
		$T_A = 100\text{ }^{\circ}\text{C}, V_{GS} = -10\text{ V}$	-	5.7	A
$I_{DM}^{*,**}$	Pulsed Drain Current	$T_A = 25\text{ }^{\circ}\text{C}, V_{GS} = -10\text{ V}$	-	36.4	A
P-channel					
V_{DS}	Drain-Source Voltage	$T_A = 25\text{ }^{\circ}\text{C}$	-	- 30	V
V_{GS}	Gate-Source Voltage	$T_A = 25\text{ }^{\circ}\text{C}$	-	± 20	V
I_D^*	Drain Current	$T_A = 25\text{ }^{\circ}\text{C}, V_{GS} = -10\text{ V}$	-	- 6.3	A
		$T_A = 100\text{ }^{\circ}\text{C}, V_{GS} = -10\text{ V}$	-	- 4	A
$I_{DM}^{*,**}$	Pulsed Drain Current	$T_A = 25\text{ }^{\circ}\text{C}, V_{GS} = -10\text{ V}$	-	- 25	A
P_{tot}	Total Power Dissipation	$T_A = 25\text{ }^{\circ}\text{C}$	-	2	W
T_{stg}	Storage Temperature		- 55	150	$^{\circ}\text{C}$
T_J	Junction Temperature		- 55	150	$^{\circ}\text{C}$
$R_{\theta JA}^*$	Thermal Resistance- Junction to Ambient		-	62.5	$^{\circ}\text{C} / \text{W}$

Notes :

* Surface Mounted on 1 in² pad area, $t \leq 10\text{ sec}$

** Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

4. Marking Information

Product Name	Marking
KJ4616S	4616 YWWXXX YWWXXX: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
KJ4616S	SOP8			3000	

Note: KUAJIEXIN defines " Green " as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C)

6. Electrical Characteristics (T_A = 25 °C Unless Otherwise Noted)

N-channel:

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	30	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250 μA	1.0	-	2.0	V
I _{DSS}	Zero Gate Voltage Source Current	V _{DS} = 24 V, V _{GS} = 0 V	-	-	1	μA
		T _J = 85 °C	-	-	30	μA
I _{GSS}	Gate Leakage Current	V _{GS} = ± 20 V, V _{DS} = 0 V	-	-	±100	nA
R _{DS(ON)} ^a	Drain-Source On-State Resistance	V _{GS} = 10 V, I _D = 9 A	-	12	16	m Ω
		V _{GS} = 4.5 V, I _D = 5 A	-	15.5	20	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = 9 A, V _{GS} = 0 V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} = 9 A, dI _{SD} /dt = 100 A/μs	-	34	-	ns
Q _{rr}	Reverse Recovery Charge		-	7.1	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 15 V Frequency = 1 MHz	-	1147	-	pF
C _{oss}	Output Capacitance		-	106	-	
C _{rss}	Reverse Transfer Capacitance		-	90	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = 15 V, V _{GEN} = 10 V, R _G = 4.5 Ω, R _L = 1.6 Ω, I _D = 9 A	-	7	-	ns
t _r	Turn-on Rise Time		-	30	-	
t _{d(off)}	Turn-off Delay Time		-	19	-	
t _f	Turn-off Fall Time		-	18	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =15 V, V _{GS} = 10 V, I _{DS} = 9 A	-	22	-	nC
Q _{gs}	Gate-Source Charge		-	5	-	
Q _{gd}	Gate-Drain Charge		-	3.3	-	

Notes :

a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2 %

b : Guaranteed by design, not subject to production testing

7. Electrical Characteristics (T_A=25 °C Unless Otherwise Noted)

P-channel:

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _{DS} = - 250 μA	- 30	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = - 250 μA	- 1.0	-	- 2.0	V
I _{DSS}	Drain Leakage Current	V _{DS} = - 24 V, V _{GS} = 0 V	-	-	- 1.0	μA
I _{GSS}	Gate Leakage Current	V _{GS} = 0 V, V _{GS} = ± 20 V	-	-	±100	nA
R _{DS(ON)} ^a	On-State Resistance	V _{GS} = - 10 V, I _{DS} = - 6 A	-	25	33	mΩ
		V _{GS} = - 4.5 V, I _{DS} = - 3 A	-	36	47	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = - 6 A, V _{GS} = 0 V	-	-	- 1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} = - 6 A, dI _{SD} / dt = 100 A / μs	-	9.8	-	ns
Q _{rr}	Reverse Recovery Charge		-	1	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = - 15 V Frequency = 1 MHz	-	1292	-	pF
C _{oss}	Output Capacitance		-	118	-	
C _{rss}	Reverse Transfer Capacitance		-	98	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = - 15 V, V _{GEN} = - 10 V, R _G = 4.5 Ω, R _L = 2.5 Ω, I _{DS} = - 6 A	-	14	-	ns
t _r	Turn-on Rise Time		-	42	-	
t _{d(off)}	Turn-off Delay Time		-	141	-	
t _f	Turn-off Fall Time		-	75	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} = - 15 V, V _{GS} = - 10 V, I _{DS} = -6 A	-	22	-	nC
Q _{gs}	Gate-Source Charge		-	5.8	-	
Q _{gd}	Gate-Drain Charge		-	3.3	-	

Notes :

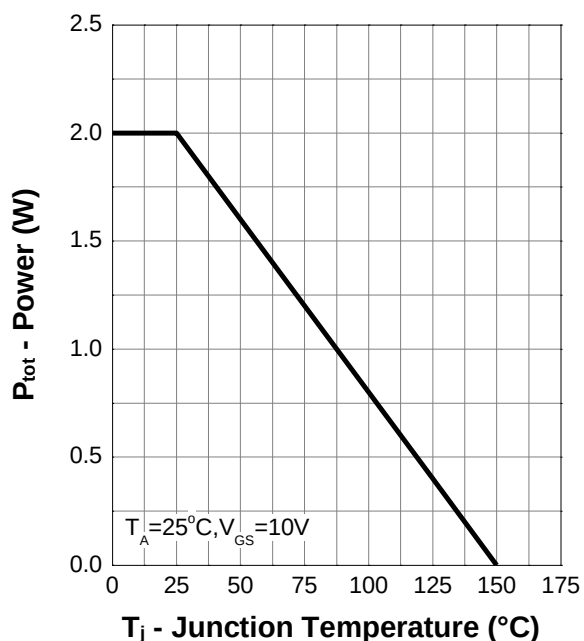
a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2%

b : Guaranteed by design, not subject to production testing

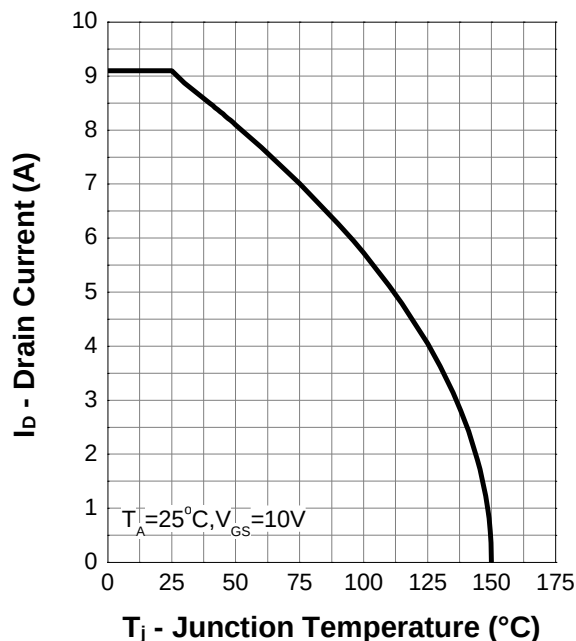
8. Typical Characteristics (Cont.)

N-channel:

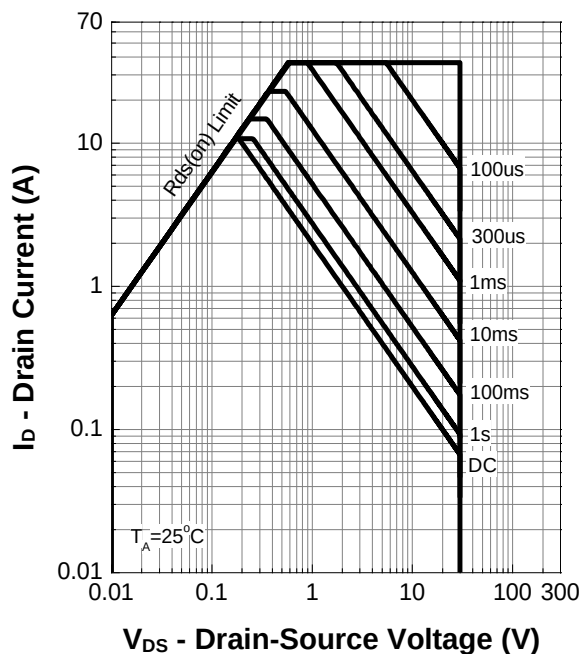
Power Capability



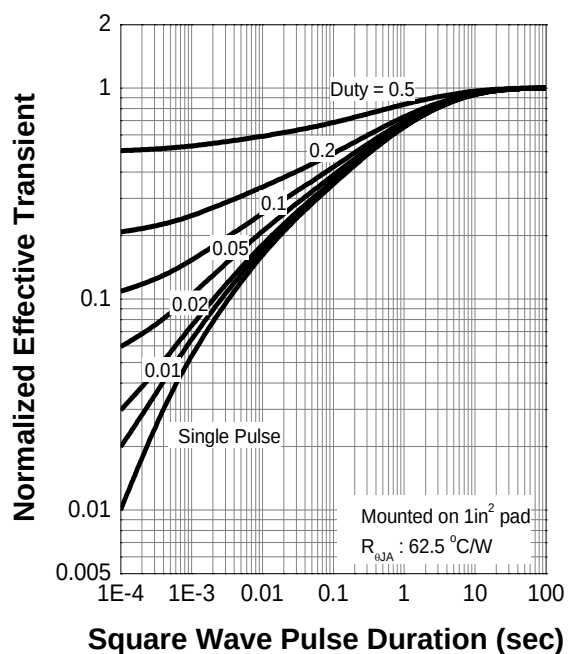
Current Capability



Safe Operation Area



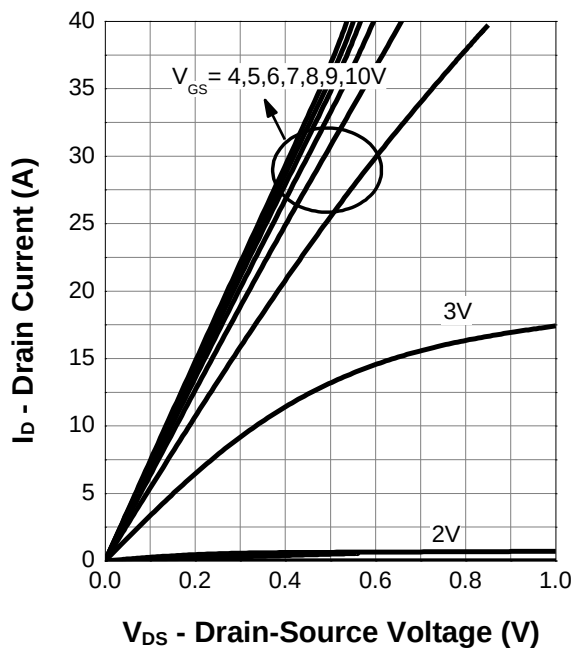
Transient Thermal Impedance



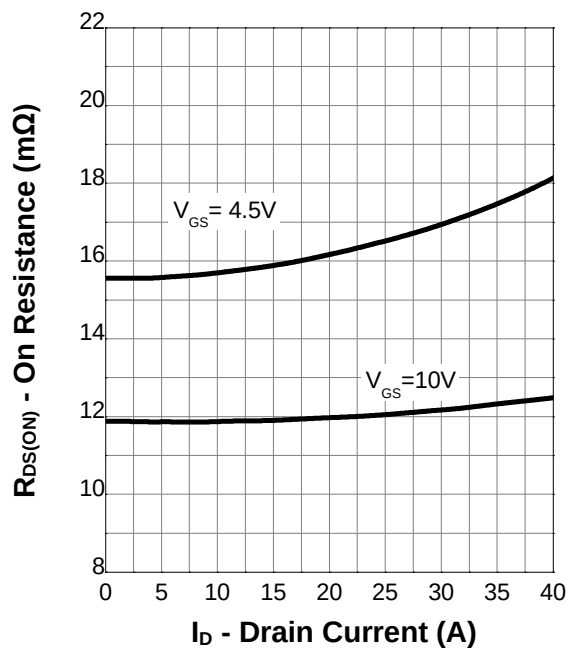
8. Typical Characteristics (Cont.)

N-channel:

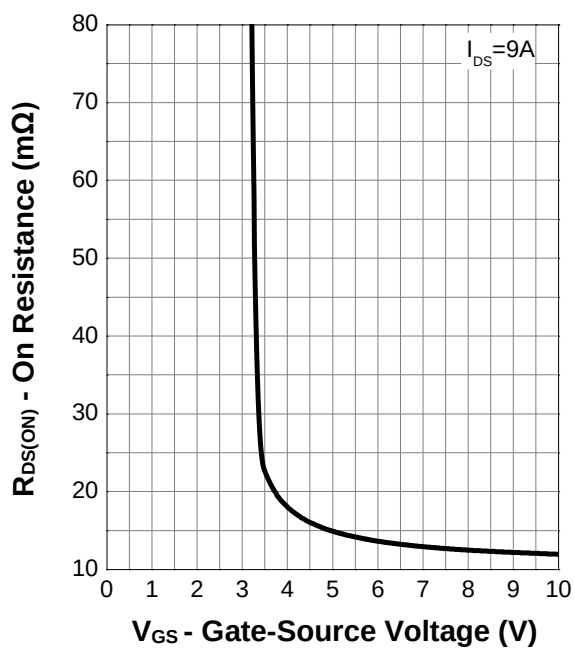
Output Characteristics



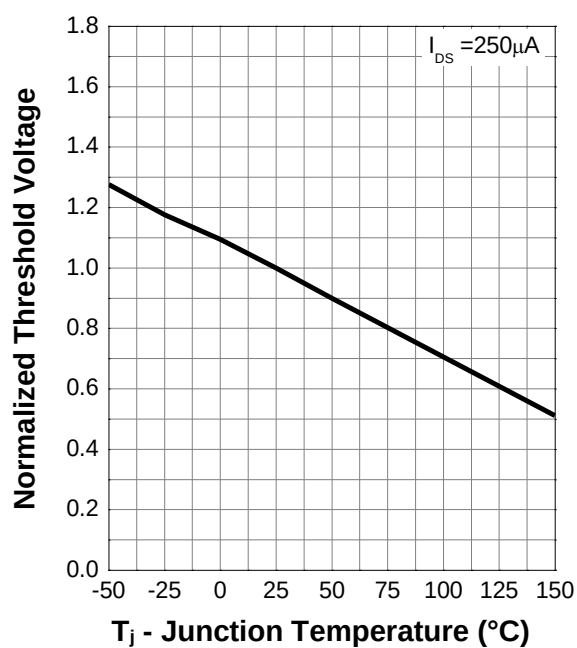
On Resistance



Transfer Characteristics



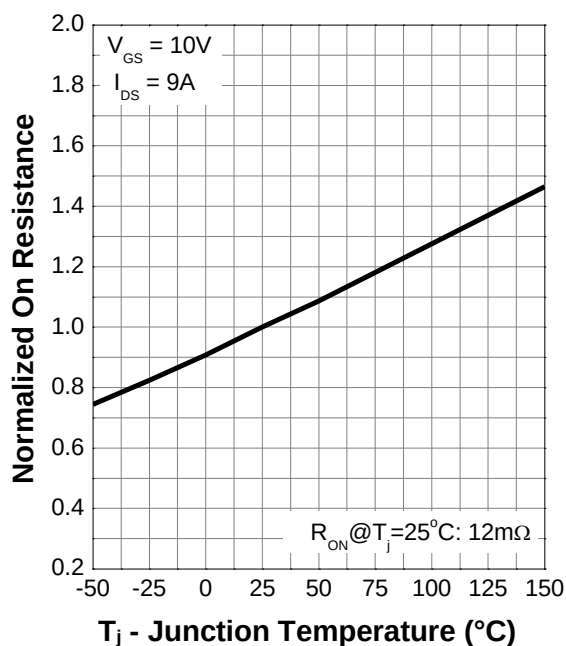
Normalized Threshold Voltage



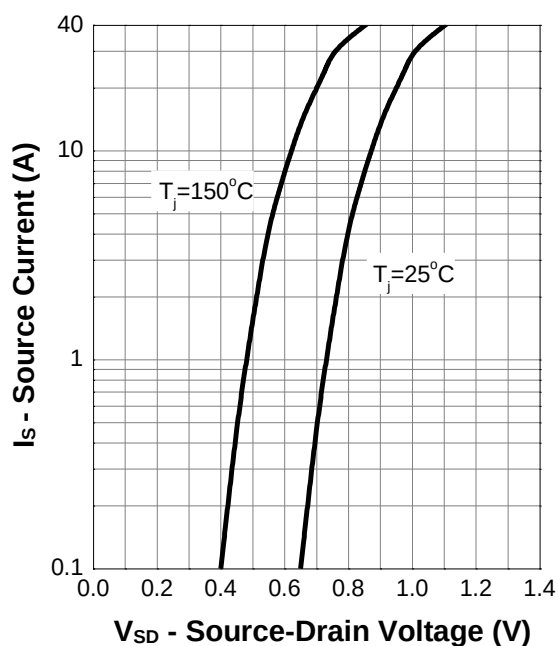
8. Typical Characteristics (Cont.)

N-channel:

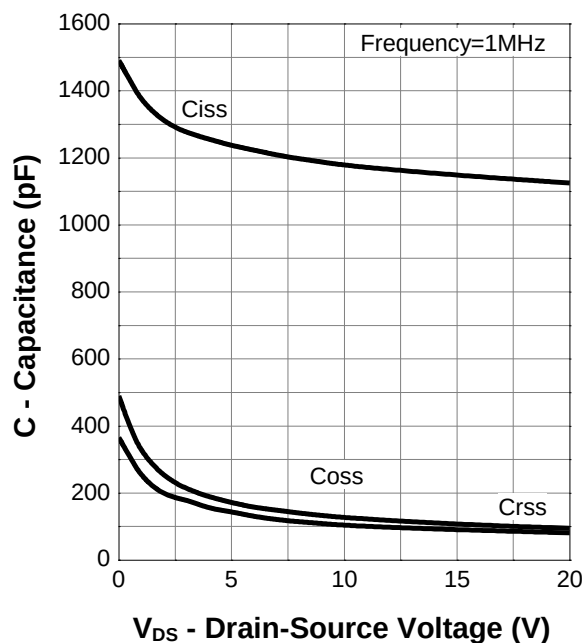
Normalized On Resistance



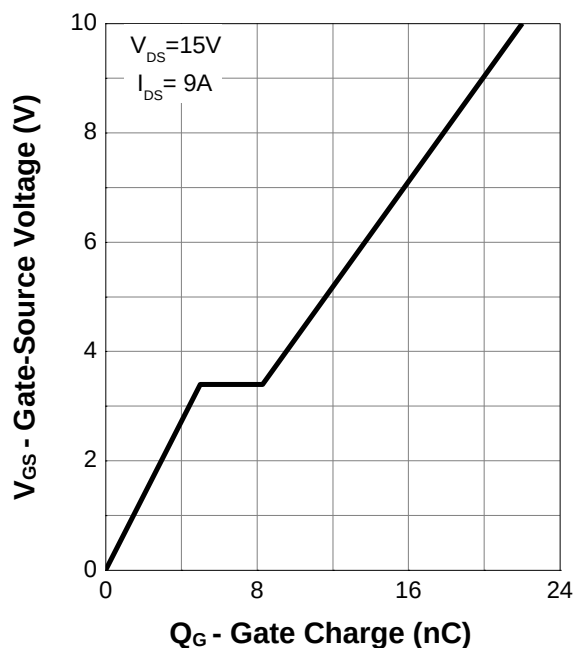
Diode Forward Current



Capacitance



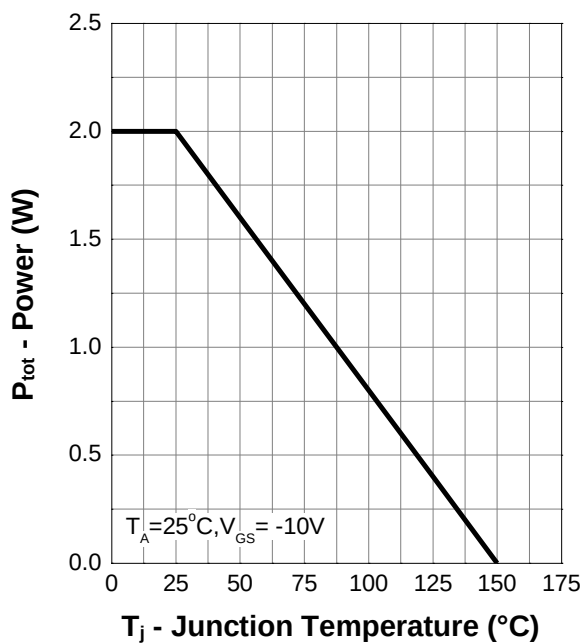
Gate Charge



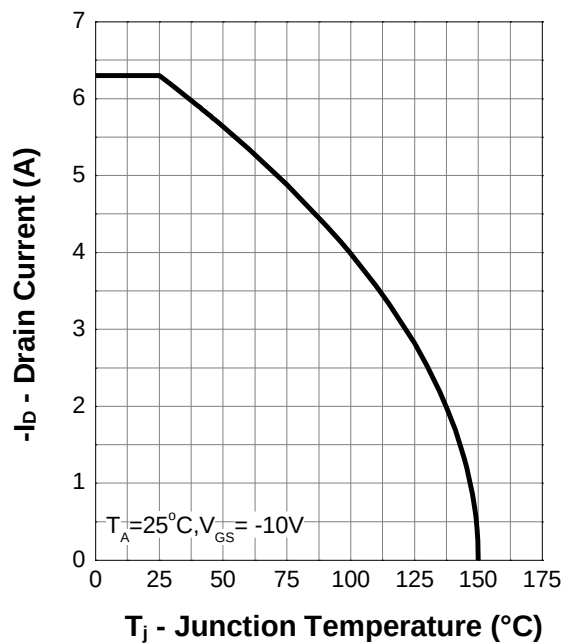
8. Typical Characteristics (Cont.)

P-channel:

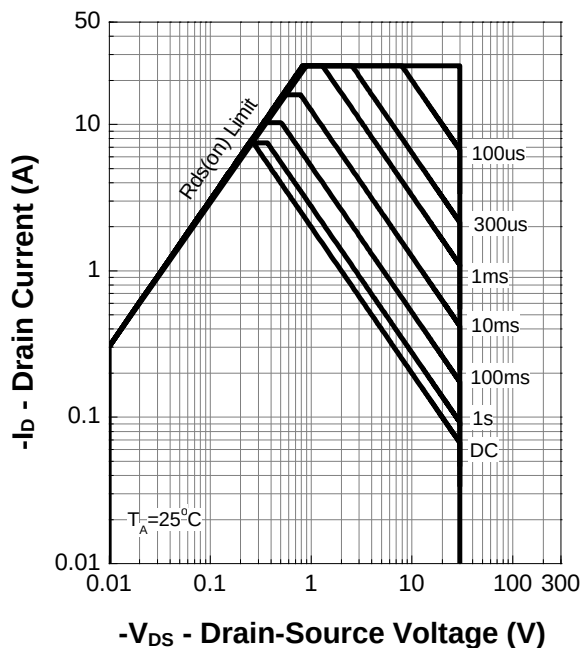
Power Capability



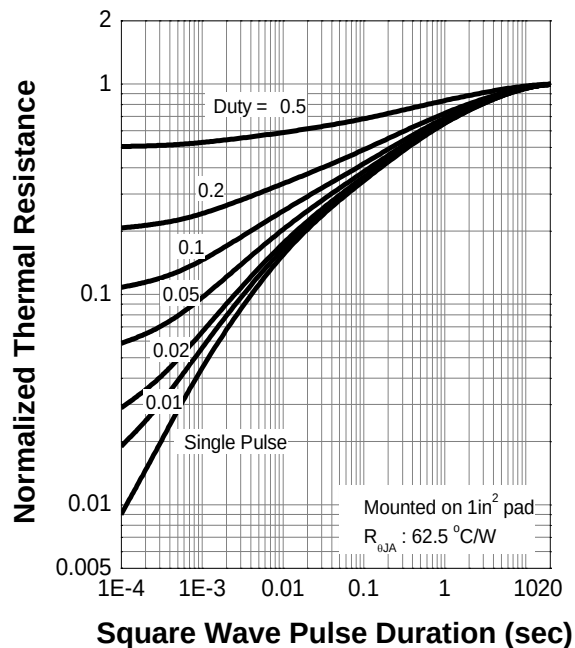
Current Capability



Safe Operation Area



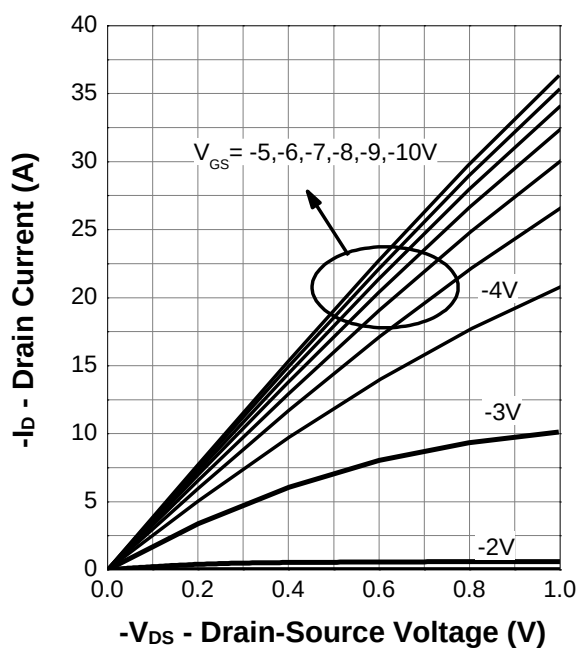
Transient Thermal Impedance



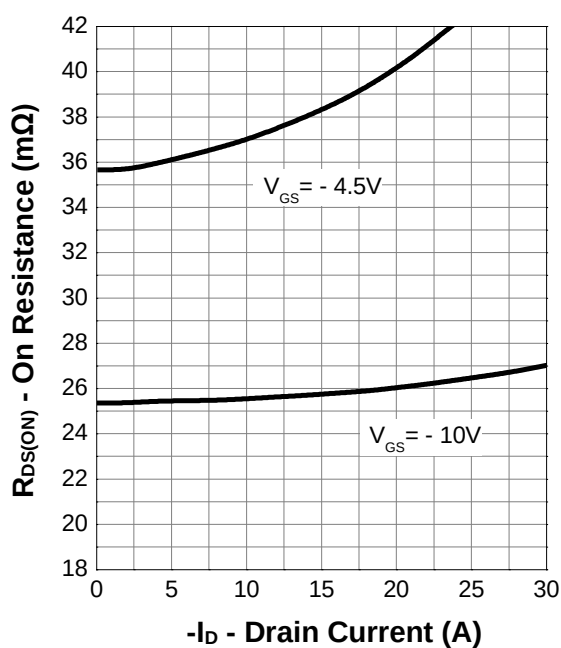
8. Typical Characteristics (Cont.)

P-channel:

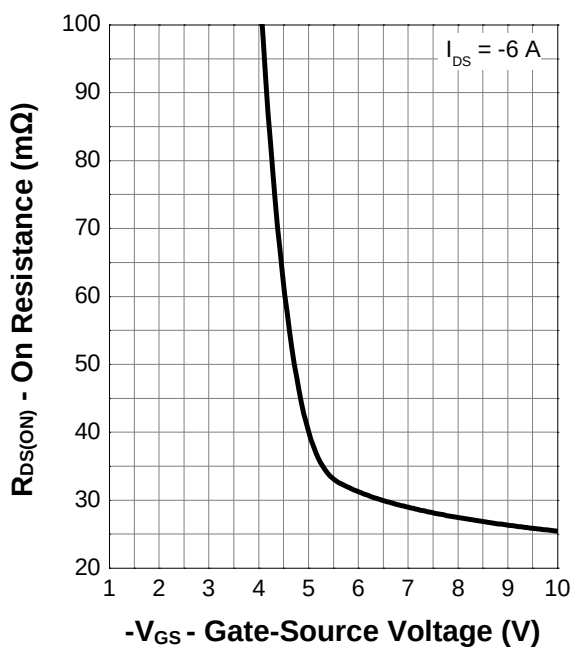
Output Characteristics



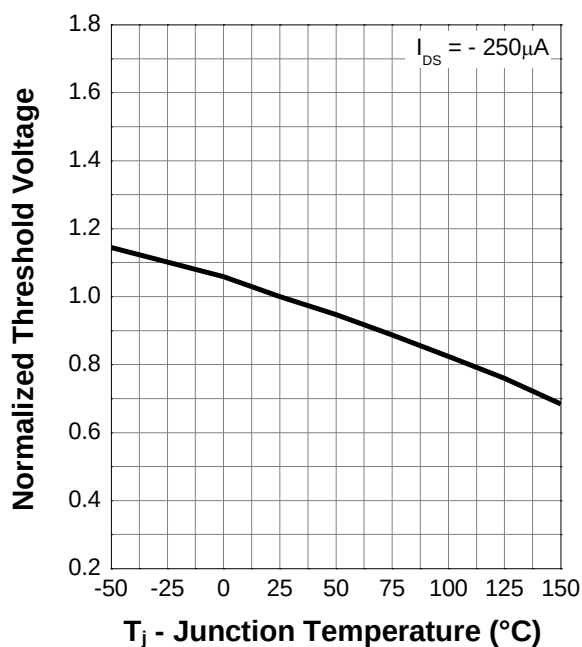
Drain-Source On Resistance



Transfer Characteristics



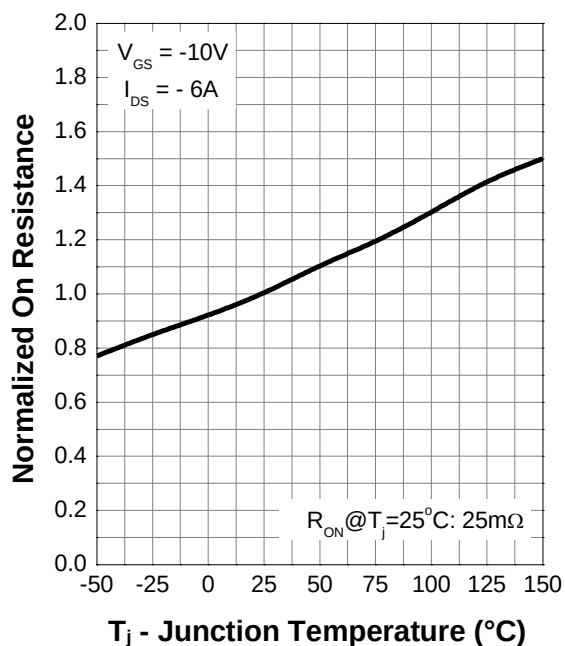
Normalized Threshold Voltage



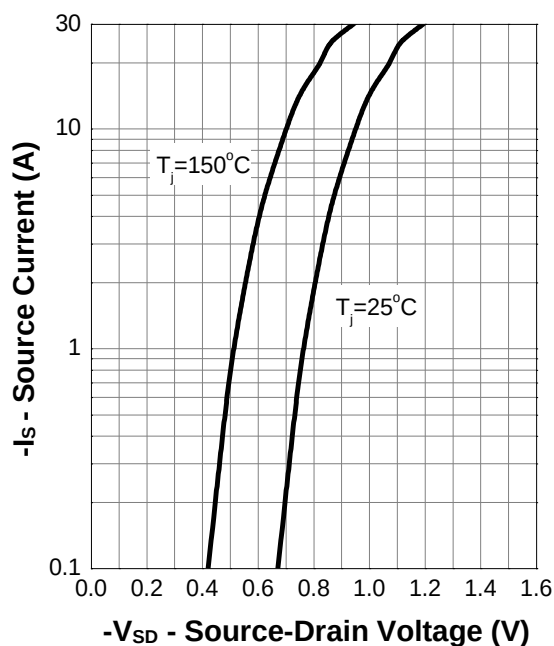
8. Typical Characteristics (Cont.)

P-channel:

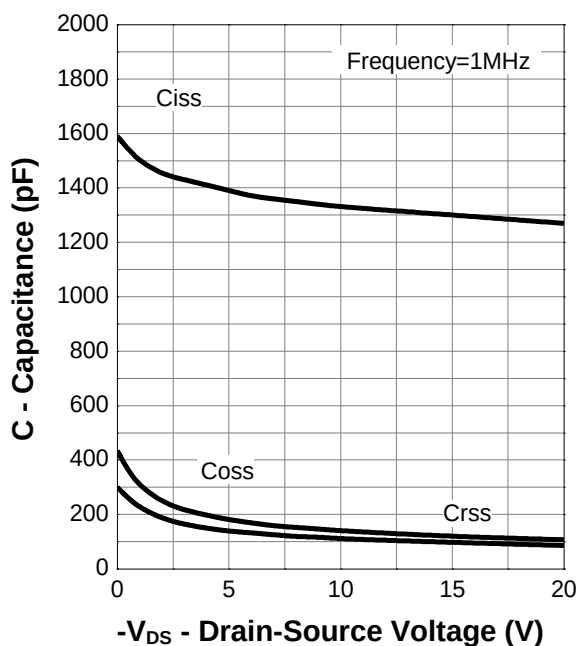
Normalized On Resistance



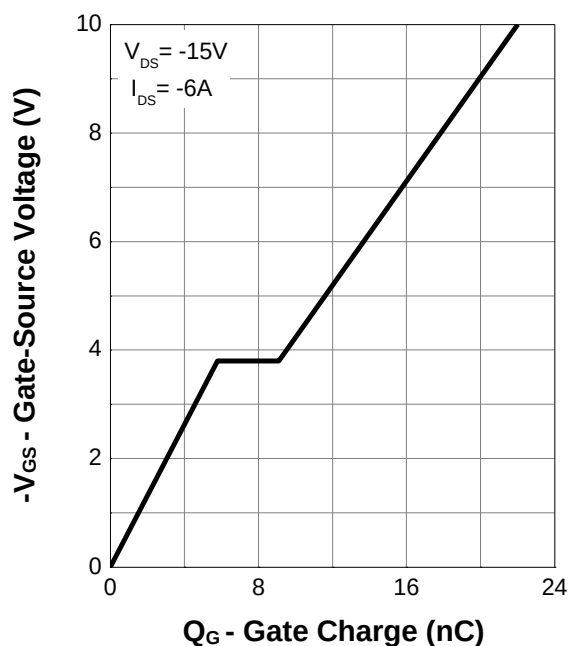
Diode Forward Current



Capacitance

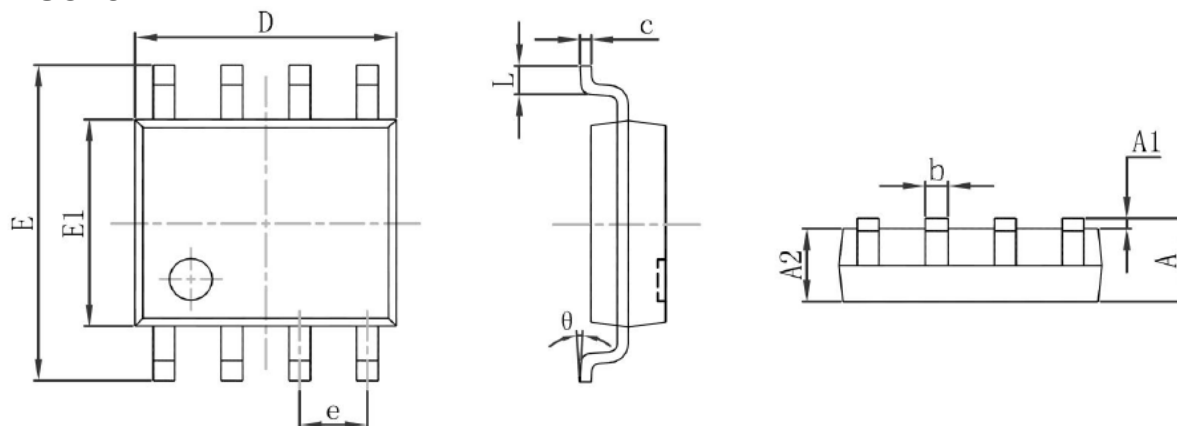


Gate Charge



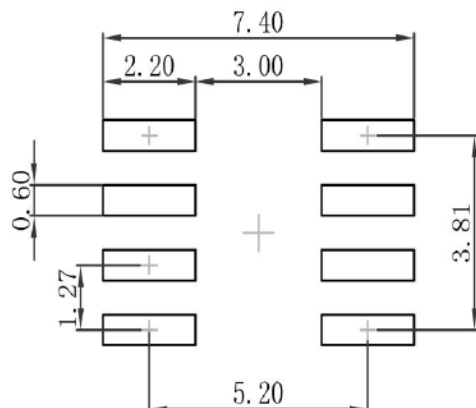
9. Package Dimensions

SOP8



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	1.350	1.750
A1	0.100	0.250
A2	1.350	1.550
b	0.300	0.510
c	0.170	0.250
D	4.800	5.000
E	5.800	6.200
E1	3.800	4.000
e	1.270 BSC	
L	0.400	1.270
θ	0°	8°

SOP-8 Suggested Pad Layout

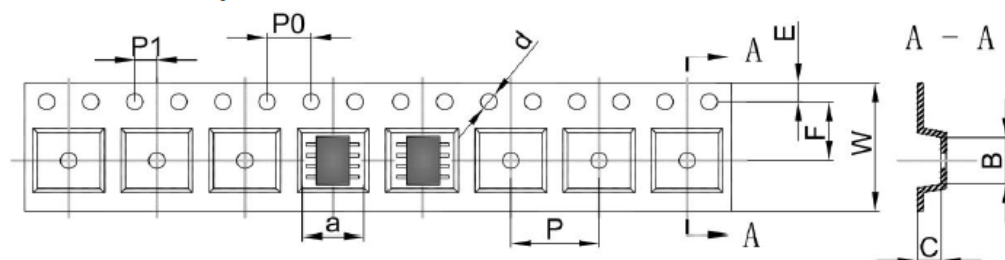


Note:

1. Controlling dimension: in millimeters
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only

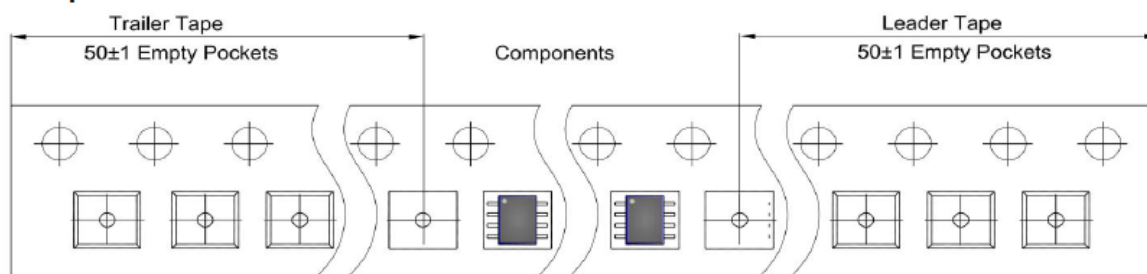
10. SOP-8 Tape and Reel

SOP-8 Embossed Carrier Tape

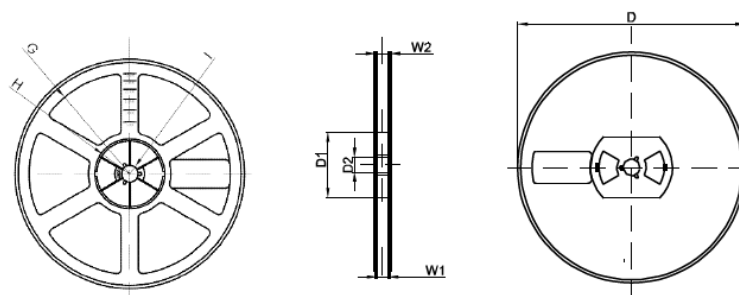


	DIMENSIONS ARE IN MILLIMETER									
TYPE	A	B	C	d	E	F	P0	P	P1	W
SOP-8	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

SOP-8 Tape Leader and Trailer



SOP-8 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
TOLERANCE	±2	±1	±1	±1	±1	±1	±1	±1