

Complementary Enhancement Mode MOSFET

1. Product Information

1.1 Features

- Surface-mounted package
- Low gate charge

1.2 Applications

- Motor driver appliances
- Power management
- Adapter appliances

1.3 Quick reference

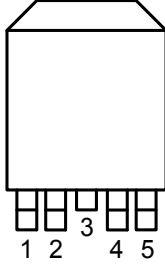
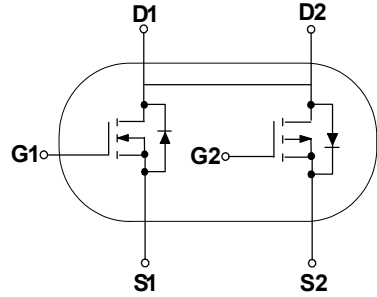
N-channel

- $BV \geq 30\text{ V}$
- $P_{\text{tot}} \leq 31\text{ W}$
- $I_D \leq 20\text{ A}$
- $R_{\text{DS(ON)}} \leq 13\text{ m}\Omega @ V_{\text{GS}} = 10\text{ V}$
 $R_{\text{DS(ON)}} \leq 17\text{ m}\Omega @ V_{\text{GS}} = 4.5\text{ V}$

P-channel

- $BV \leq -30\text{ V}$
- $P_{\text{tot}} \leq 31\text{ W}$
- $I_D \leq -20\text{ A}$
- $R_{\text{DS(ON)}} \leq 26\text{ m}\Omega @ V_{\text{GS}} = -10\text{ V}$
 $R_{\text{DS(ON)}} \leq 44\text{ m}\Omega @ V_{\text{GS}} = -4.5\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Source (S1)	 Top View TO-252-4L	
2	Gate (G1)		
3	Drain (D1) / (D2)		
4	Source (S2)		
5	Gate (G2)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
N-channel					
V _{DS}	Drain-Source Voltage	T _C = 25 °C	-	30	V
V _{GS}	Gate-Source Voltage	T _C = 25 °C	-	± 20	V
I _D ^{*,***}	Drain Current	T _C = 25 °C, V _{GS} = 10 V	-	20	A
		T _C = 100 °C, V _{GS} = 10 V	-	20	A
I _{DM} ^{*,**,***}	Pulsed Drain Current	T _C = 25 °C, V _{GS} = 10 V	-	40	A
P-channel					
V _{DS}	Drain-Source Voltage	T _C = 25 °C	-	- 30	V
V _{GS}	Gate-Source Voltage	T _C = 25 °C	-	± 20	V
I _D ^{*,***}	Drain Current	T _C = 25 °C, V _{GS} = - 10 V	-	- 20	A
		T _C = 100 °C, V _{GS} = - 10 V	-	- 17.9	A
I _{DM} ^{*,**,***}	Pulsed Drain Current	T _C = 25 °C, V _{GS} = - 10 V	-	- 40	A
P _{tot}	Total Power Dissipation	T _C = 25 °C	-	31	W
T _{stg}	Storage Temperature		- 55	150	°C
T _J	Junction Temperature		- 55	150	°C
I _S	Diode Forward Current	T _C = 25 °C	-	20	A
R _{θJC} [*]	Thermal Resistance- Junction to Case		-	4	°C / W
R _{θJA} [*]	Thermal Resistance- Junction to Ambient		-	62.5	°C / W

Notes :

- * Surface Mounted on 1 in² pad area, t ≤ 5 sec
- ** Pulse width ≤ 300 μs, duty cycle ≤ 2 %
- *** Limit by bonding wire

4. Marking Information

Product Name	Marking
KJ45Y03K	<div style="display: inline-block; border: 1px solid black; padding: 2px;"> 4045 YWWXXX </div> YWW: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
KJ45Y03K	TO252-4			2500	

Note: KUAJIJIXIN 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 ($T_A = 25\text{ }^\circ\text{C}$ Unless Otherwise Noted)

N-channel:

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_{DS} = 250\text{ }\mu\text{A}$	30	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{DS} = 250\text{ }\mu\text{A}$	1.0	-	2.0	V
I_{DSS}	Drain Leakage Current	$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}$	-	-	1	μA
I_{GSS}	Gate Leakage Current	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$	-	-	± 100	nA
$R_{DS(on)}^a$	Channel On-State Resistance	$V_{GS} = 10\text{ V}, I_D = 10\text{ A}$	-	10.5	13	m Ω
		$V_{GS} = 4.5\text{ V}, I_D = 5\text{ A}$	-	13.5	17	
Diode Characteristics						
V_{SD}^a	Diode Forward Voltage	$I_{SD} = 10\text{ A}, V_{GS} = 0\text{ V}$	-	-	1.3	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 10\text{ A}, dI_{SD}/dt = 100\text{ A}/\mu\text{s}$	-	34	-	ns
Q_{rr}	Reverse Recovery Charge		-	7.1	-	nC
Dynamic Characteristics^b						
C_{iss}	Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 15\text{ V}$ Frequency = 1 MHz	-	1181	-	pF
C_{oss}	Output Capacitance		-	107	-	
C_{riss}	Reverse Transfer Capacitance		-	90	-	
$t_d(on)$	Turn-on Delay Time	$V_{DS} = 15\text{ V}, V_{GEN} = 10\text{ V},$ $R_G = 4.5\text{ }\Omega, R_L = 1.5\text{ }\Omega,$ $I_{DS} = 10\text{ A}$	-	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	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V},$ $I_{DS} = 10\text{ A}$	-	22	-	nC
Q_{gs}	Gate-Source Charge		-	5	-	
Q_{gd}	Gate-Drain Charge		-	3.3	-	

Notes :

- a : Pulse test ; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
- b : Guaranteed by design, not subject to production testing

7. Electrical Characteristics ($T_A = 25\text{ }^\circ\text{C}$ Unless Otherwise Noted)

P-channel :

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_{DS} = -250\text{ }\mu\text{A}$	-30	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{DS} = -250\text{ }\mu\text{A}$	-1.0	-	-2.0	V
I_{DSS}	Drain Leakage Current	$V_{DS} = -24\text{ V}, V_{GS} = 0\text{ V}$	-	-	-1	μA
		$T_J = 85\text{ }^\circ\text{C}$	-	-	-30	μA
I_{GSS}	Gate Leakage Current	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$	-	-	± 100	nA
$R_{DS(ON)}^a$	On-State Resistance	$V_{GS} = -10\text{ V}, I_{DS} = -10\text{ A}$	-	20	26	$\text{m}\Omega$
		$V_{GS} = -4.5\text{ V}, I_{DS} = -5\text{ A}$	-	34	44	
Diode Characteristics						
V_{SD}^a	Diode Forward Voltage	$I_{SD} = -10\text{ A}, V_{GS} = 0\text{ V}$	-	-	-1.3	V
t_{rr}	Reverse Recovery Time	$I_{SD} = -10\text{ A}, dI_{SD}/dt = 100\text{ A}/\mu\text{s}$	-	9.8	-	nS
Q_{rr}	Revers Recovery Charge		-	1	-	nC
Dynamic Characteristics^b						
C_{iss}	Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = -15\text{ V}$ Frequency = 1 MHz	-	1210	-	μF
C_{oss}	Output Capacitance		-	122	-	
C_{rss}	Reverse Transfer Capacitance		-	104	-	
$t_{d(on)}$	Turn-on Delay Time	$V_{DS} = -15\text{ V}, V_{GEN} = -10\text{ V},$ $R_G = 4.5\text{ }\Omega, R_L = 1.5\text{ }\Omega,$ $I_{DS} = -10\text{ A}$	-	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	$V_{GS} = -10\text{ V}, V_{DS} = -15\text{ V},$ $I_{DS} = -10\text{ A}$	-	22	-	nC
Q_{gs}	Gate-Source Charge		-	5.8	-	
Q_{gd}	Gate-Drain Charge		-	3.3	-	

Notes :

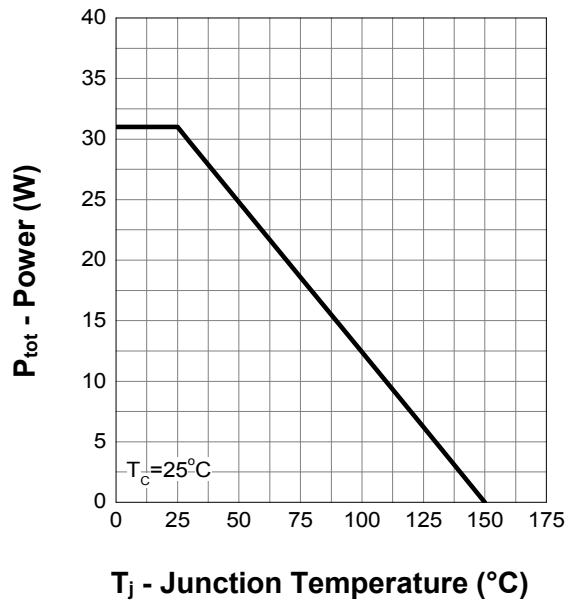
a : Pulse test ; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

b : Guaranteed by design, not subject to production testing

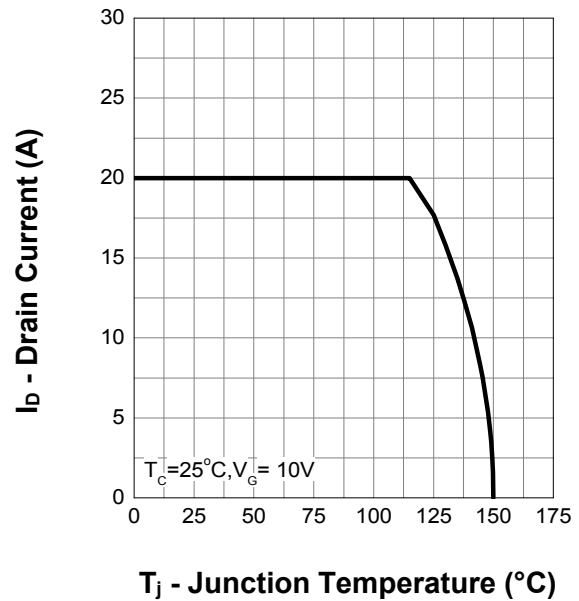
8. Typical Characteristics

N-channel:

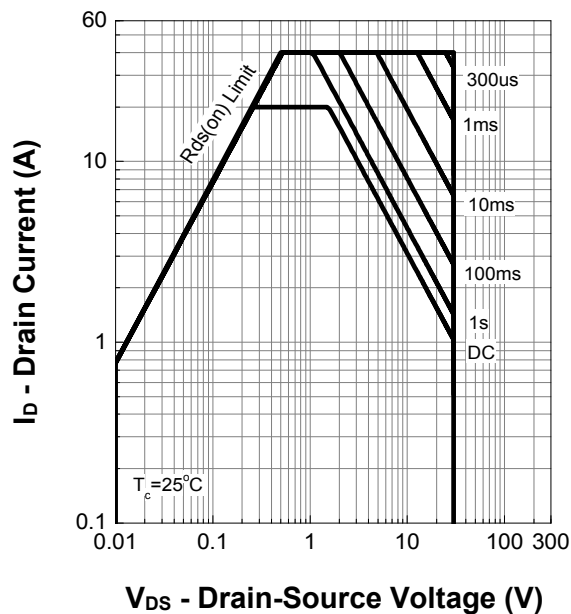
Power Capability



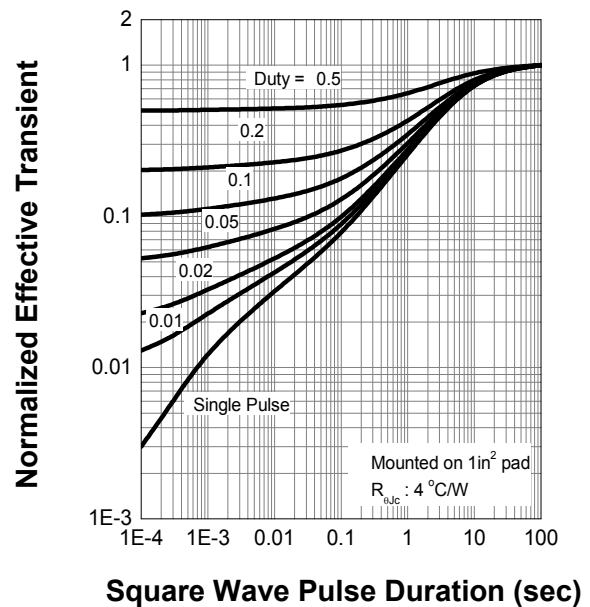
Current Capability



Safe Operation Area



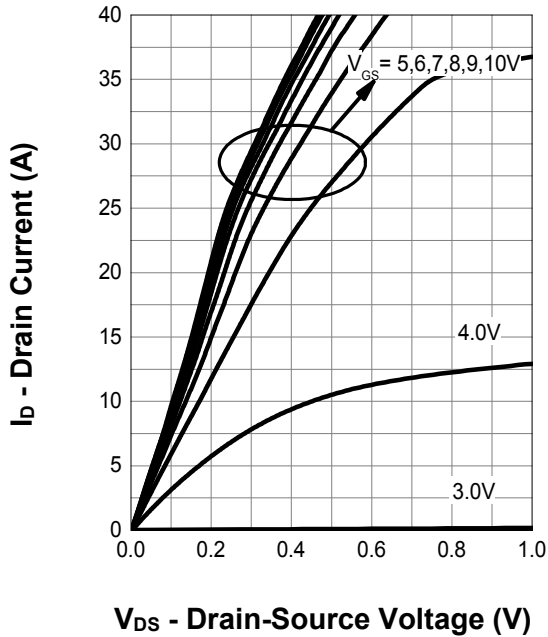
Thermal Transient Impedance



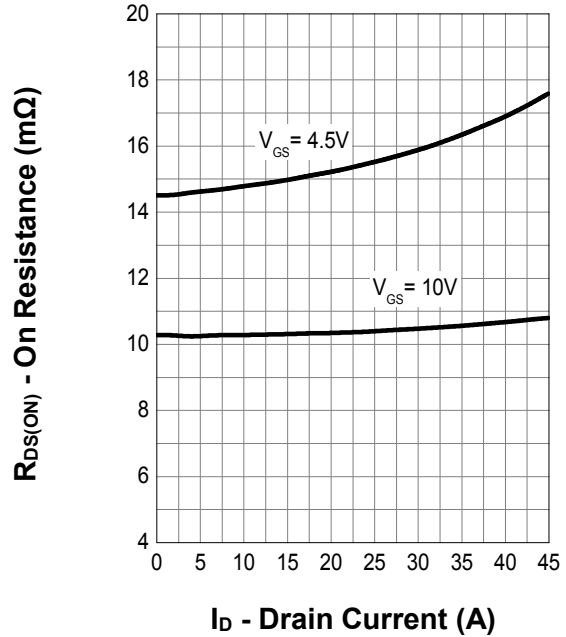
8. Typical Characteristics (cont.)

N-channel:

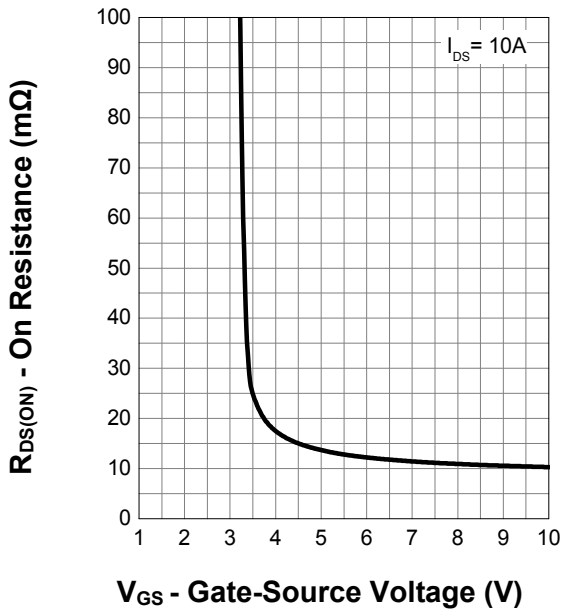
Output Characteristics



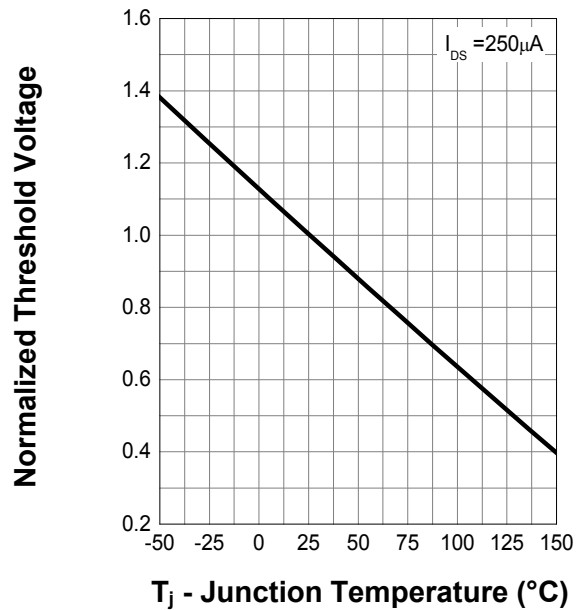
On Resistance



Transfer Characteristics



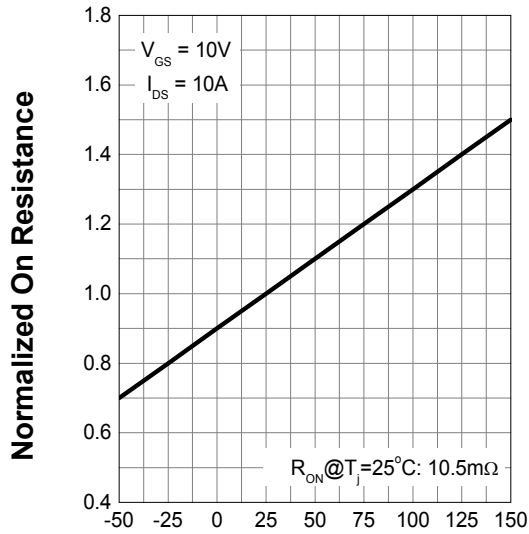
Normalized Threshold Voltage



8. Typical Characteristics (cont.)

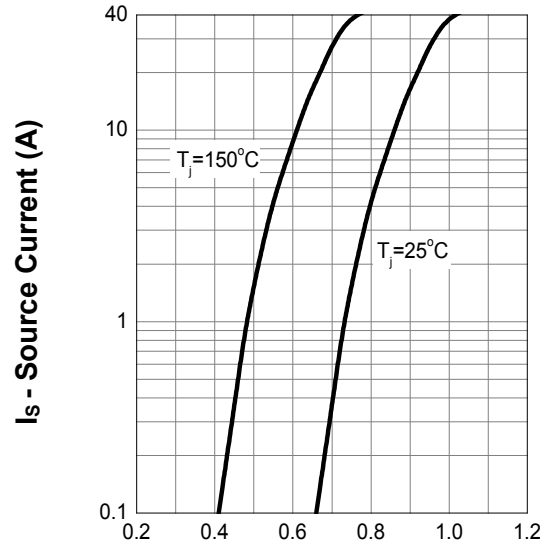
N-channel:

Normalized On Resistance



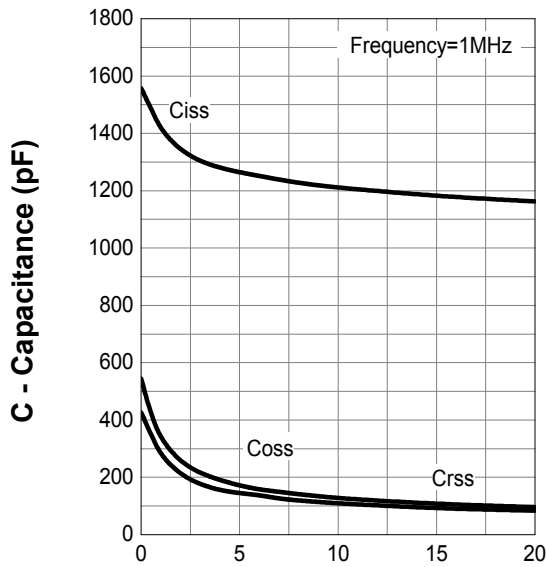
T_j - Junction Temperature ($^\circ C$)

Diode Forward Current



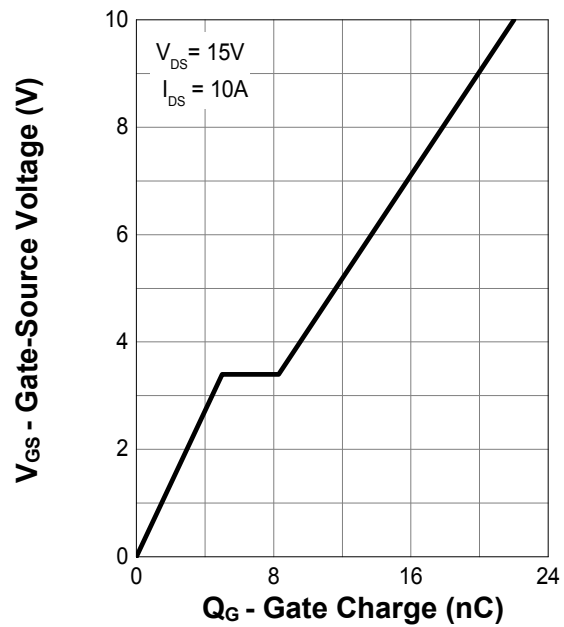
V_{SD} - Source-Drain Voltage (V)

Capacitance



V_{DS} - Drain-Source Voltage (V)

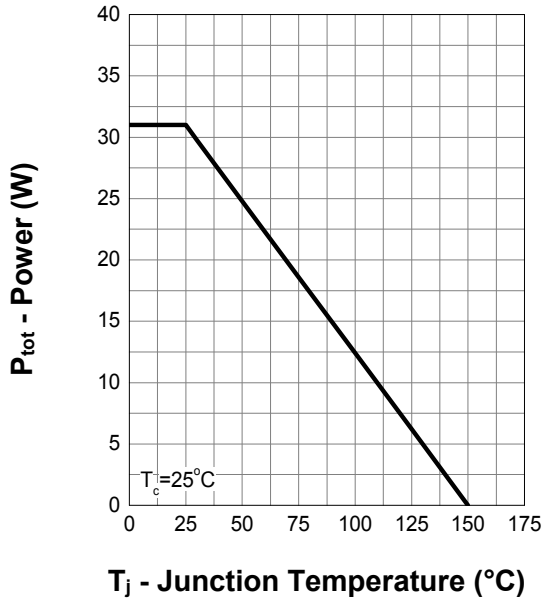
Gate Charge



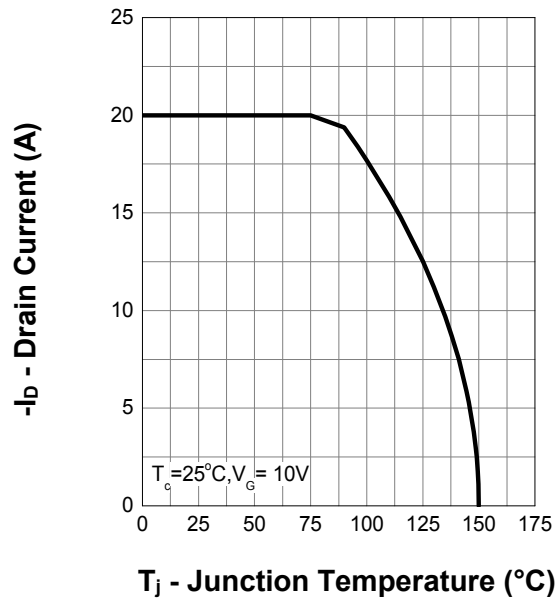
9. Typical Characteristics

P-channel:

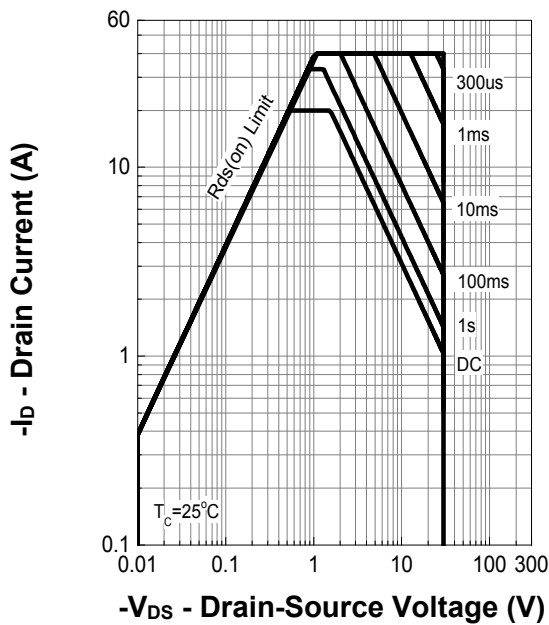
Power Capability



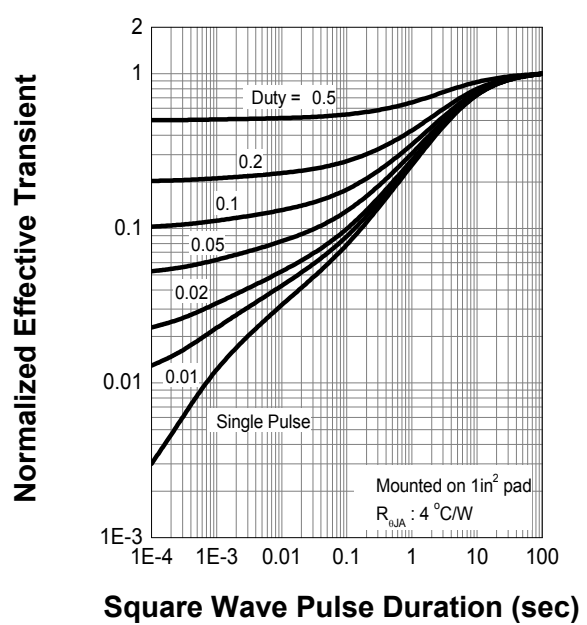
Current Capability



Safe Operation Area



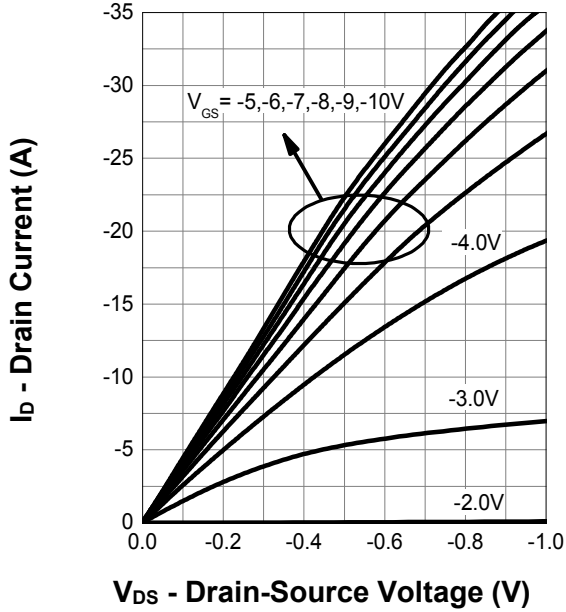
Thermal Transient Impedance



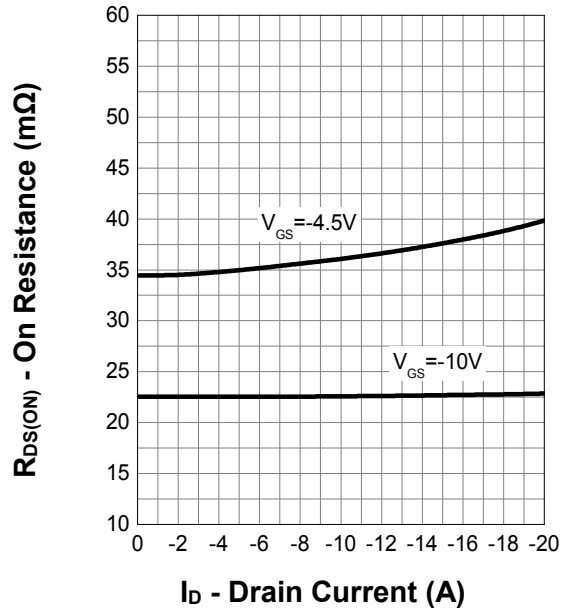
9. Typical Characteristics (cont.)

P-channel:

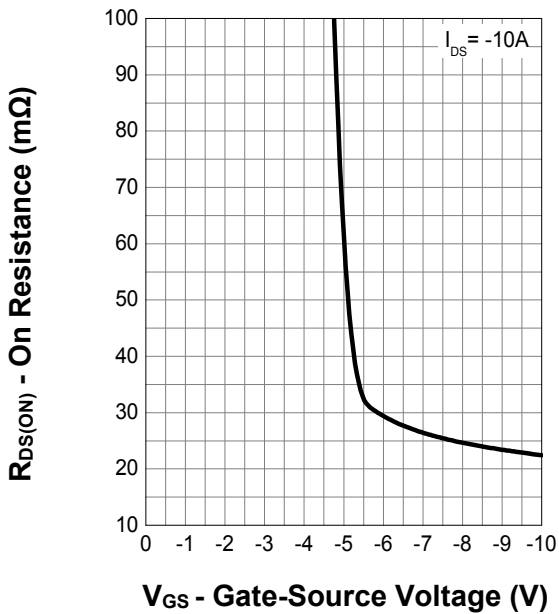
Output Characteristics



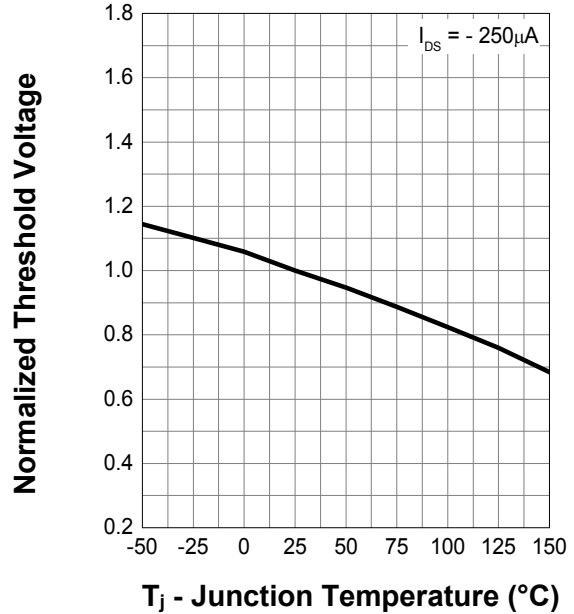
On Resistance



Transfer Characteristics



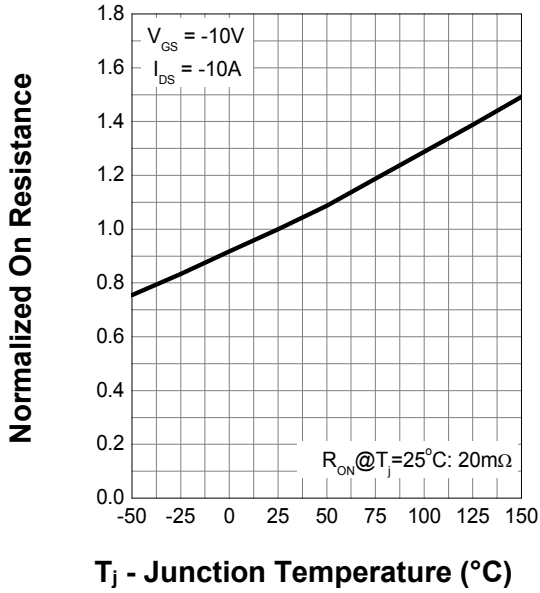
Normalized Threshold Voltage



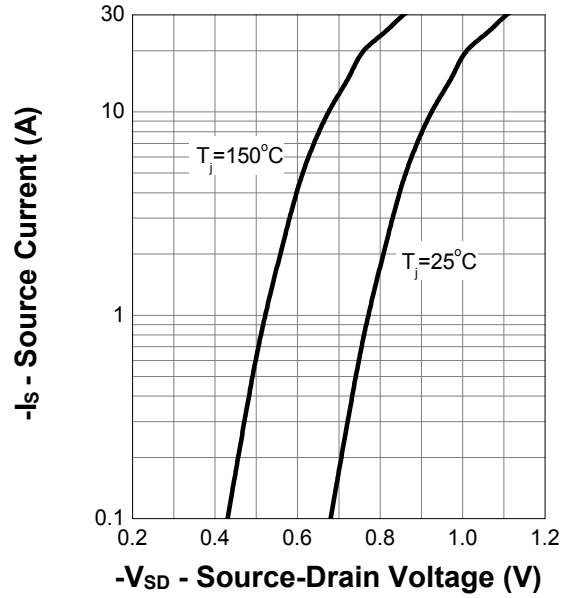
9. Typical Characteristics (cont.)

P-channel:

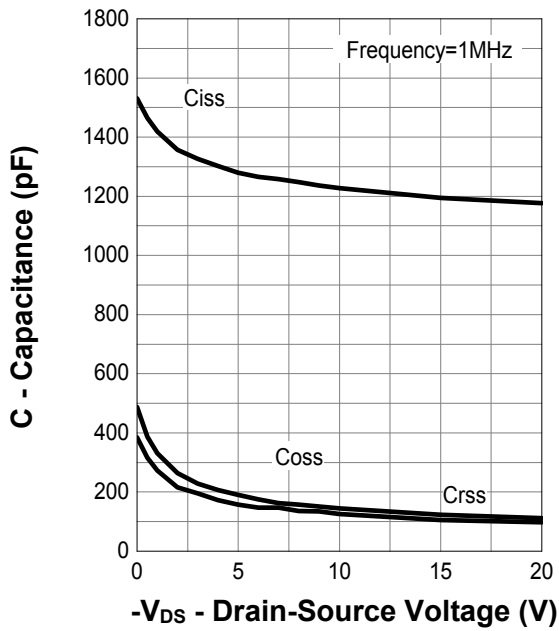
Normalized On Resistance



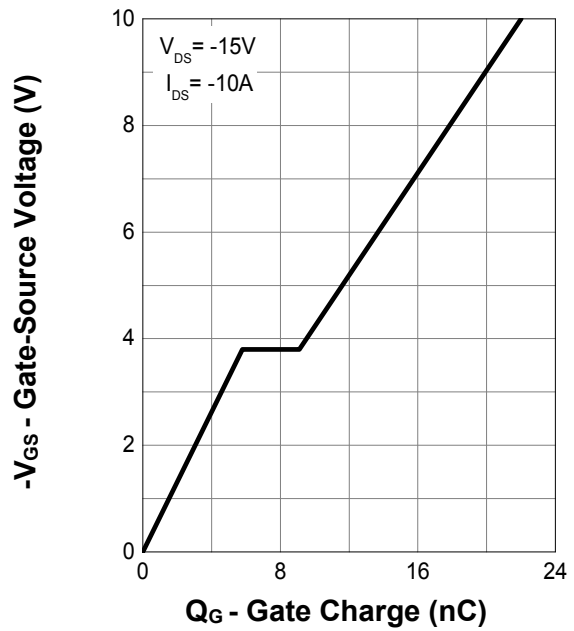
Diode Forward Current



Capacitance

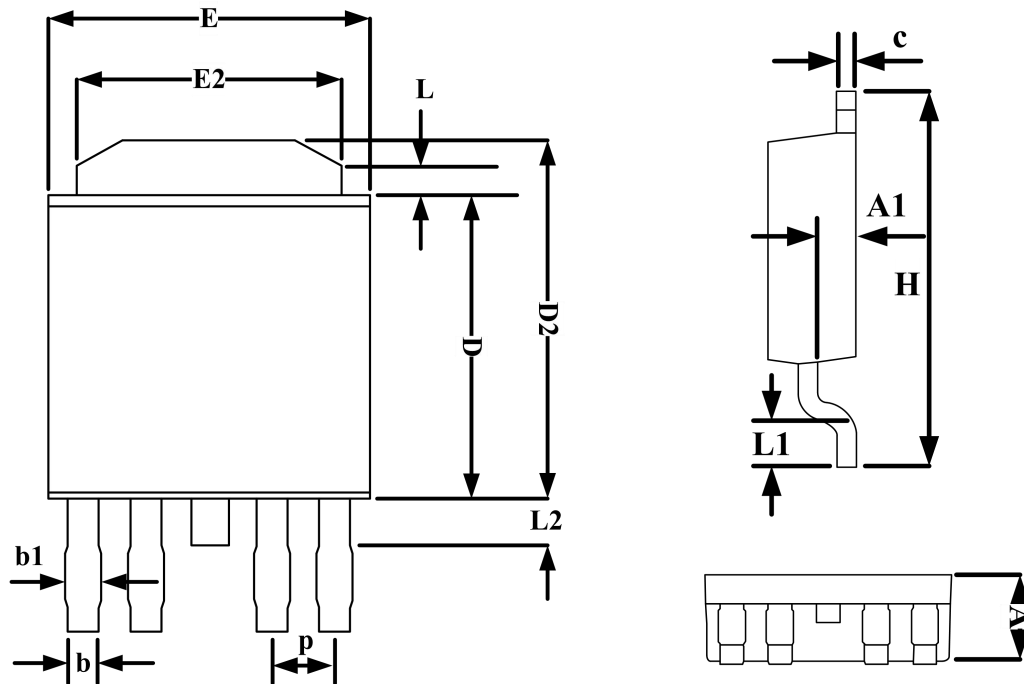


Gate Charge



10. Package Dimensions

TO-252-4L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	2.22	2.38
A1	0.95	1.05
C	0.49	0.53
E	6.4	6.60
E2	5.23	5.43
D	6.00	6.20
D2	7.05	7.35
H	9.60	10.2
L	0.6	Ref
L1	1.4	1.65
L2	0.65	0.95
b	0.55	0.65
b1	0.64	0.84
P	1.27	BSC