

Complementary Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☒ Surface-mounted package
- ☒ Low gate charge

1.2 Applications

- ☒ Motor driver appliances
- ☒ Adapter appliances
- ☒ Power management

1.3 Quick reference

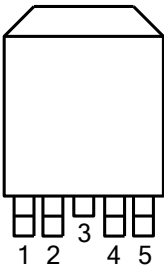
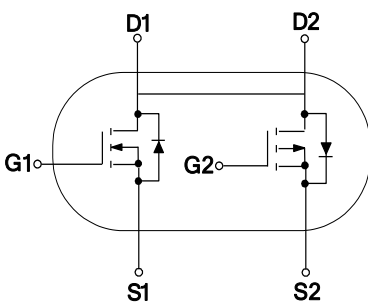
N-channel

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

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)		

**快捷****KJ45Y03K**

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
N-channel					
V_{DS}	Drain-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	30	V
V_{GS}	Gate-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	± 20	V
$I_{D^{***}}$	Drain Current	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	20	A
		$T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	20	A
$I_{DM^{*,**,***}}$	Pulsed Drain Current	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	40	A
P-channel					
V_{DS}	Drain-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	- 30	V
V_{GS}	Gate-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	± 20	V
$I_{D^{***}}$	Drain Current	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = - 10\text{ V}$	-	- 20	A
		$T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = - 10\text{ V}$	-	- 17.9	A
$I_{DM^{*,**,***}}$	Pulsed Drain Current	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = - 10\text{ V}$	-	- 40	A
P_{tot}	Total Power Dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	-	31	W
T_{stg}	Storage Temperature		- 55	150	$^{\circ}\text{C}$
T_J	Junction Temperature		- 55	150	$^{\circ}\text{C}$
I_S	Diode Forward Current	$T_C = 25\text{ }^{\circ}\text{C}$	-	20	A
$R_{\theta JC^{*}}$	Thermal Resistance- Junction to Case		-	4	$^{\circ}\text{C} / \text{W}$
$R_{\theta JA^{*}}$	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 $\leq 2\%$
- *** Limited by bonding wire

4. Marking Information

Product Name	Marking
KJ45Y03K	4045 YWWXXX YWWXXX: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
KJ45Y03K	TO-252-4L			2500	

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)

**快捷****KJ45Y03K****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 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	uA
I _{GSS}	Gate Leakage Current	V _{GS} = ± 20 V, V _{DS} = 0 V	-	-	± 100	nA
R _{DS(ON)} ^a	Channel On-State Resistance	V _{GS} = 10 V, I _D = 10 A	-	10.5	13	mΩ
		V _{GS} = 4.5 V, I _D = 5 A	-	13.5	17	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = 10 A, V _{GS} = 0 V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} = 10 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	-	1181	-	pF
C _{oss}	Output Capacitance		-	107	-	
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 = 1.5 Ω, I _{DS} = 10 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 V, V _{DS} = 15 V, I _{DS} = 10 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

**快捷****KJ45Y03K****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 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	uA
		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	On-State Resistance	V _{GS} = - 10 V, I _{DS} = - 10 A	-	20	26	mΩ
		V _{GS} = - 4.5 V, I _{DS} = - 5 A	-	34	44	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = - 10 A, V _{GS} = 0 V	-	-	- 1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} = - 10 A, dI _{SD} /dt = 100 A/μs	-	9.8	-	nS
Q _{rr}	Revers Recovery Charge		-	1	-	nC
Dynamic Characteristics ^b						
C _{iSS}	Input Capacitance	V _{GS} = 0 V, V _{DS} = - 15 V Frequency = 1 MHz	-	1210	-	pF
C _{oSS}	Output Capacitance		-	122	-	
C _{rSS}	Reverse Transfer Capacitance		-	104	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = -15 V, V _{GEN} = -10 V, R _G = 4.5 Ω, R _L = 1.5 Ω, I _{DS} = -10 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 V, V _{DS} = -15 V, I _{DS} = -10 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



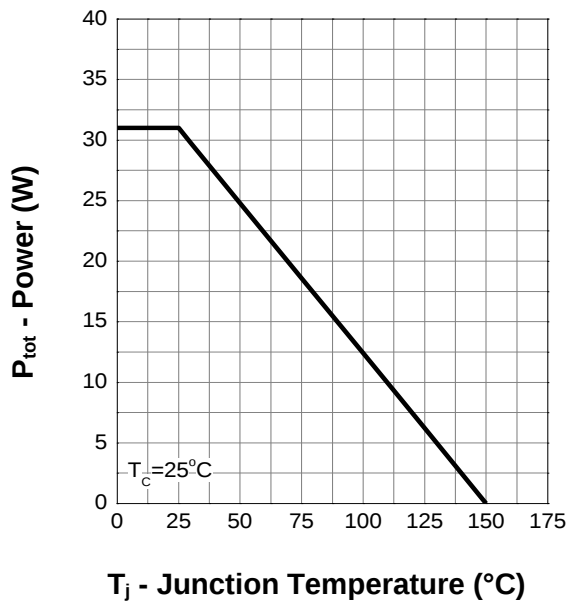
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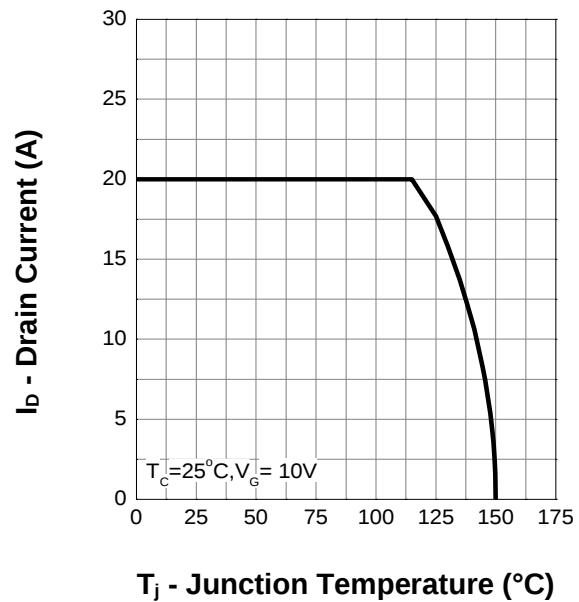
8. Typical Characteristics

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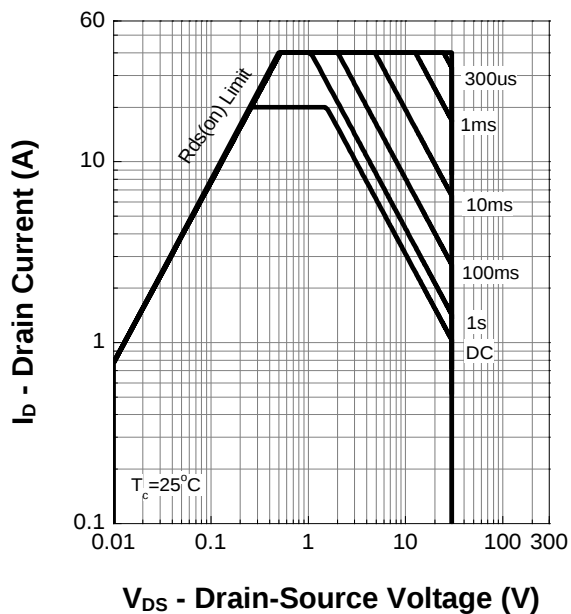
Power Capability



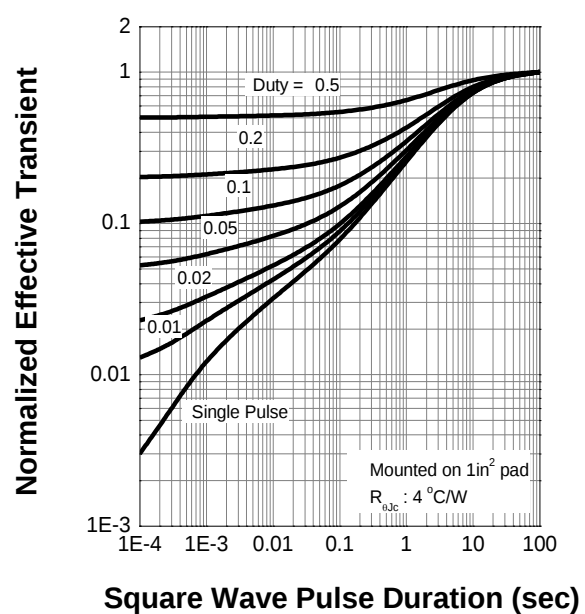
Current Capability



Safe Operation Area



Thermal Transient Impedance





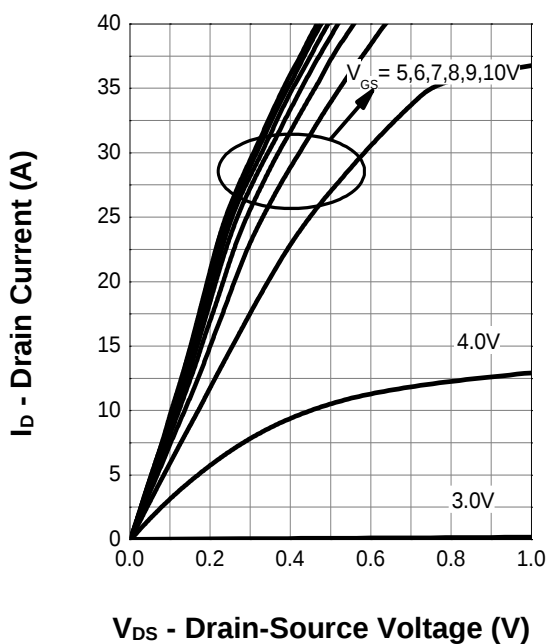
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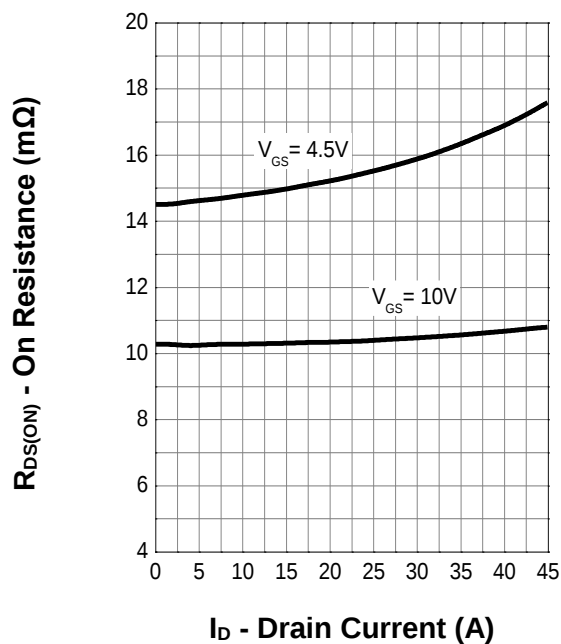
8. Typical Characteristics (cont.)

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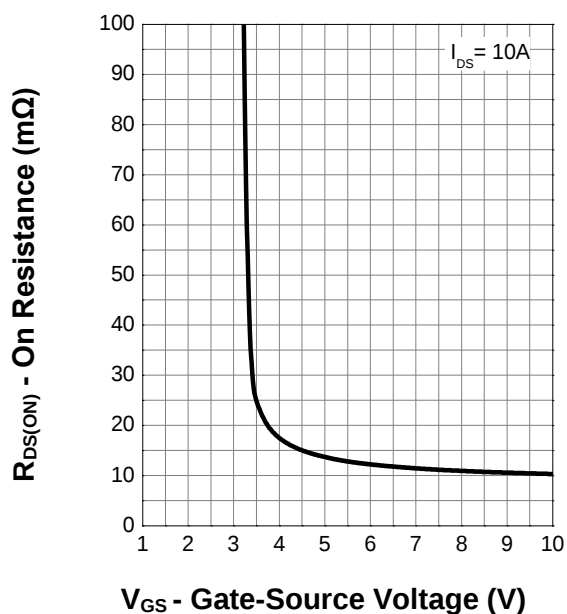
Output Characteristics



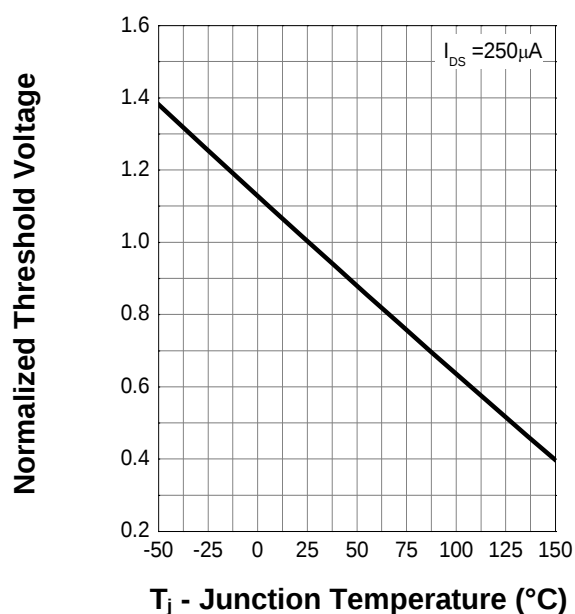
On Resistance



Transfer Characteristics



Normalized Threshold Voltage





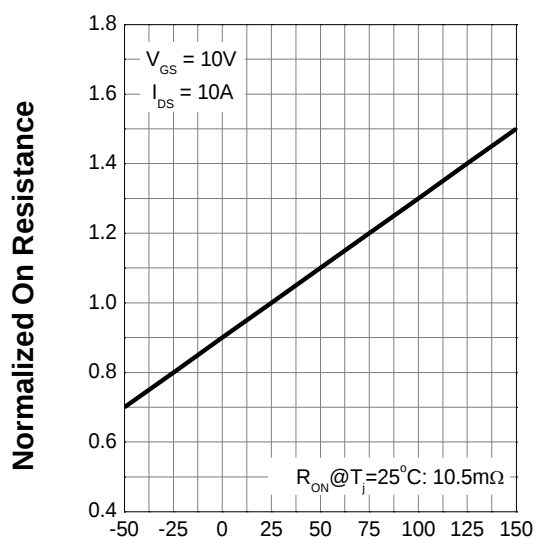
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8. Typical Characteristics (cont.)

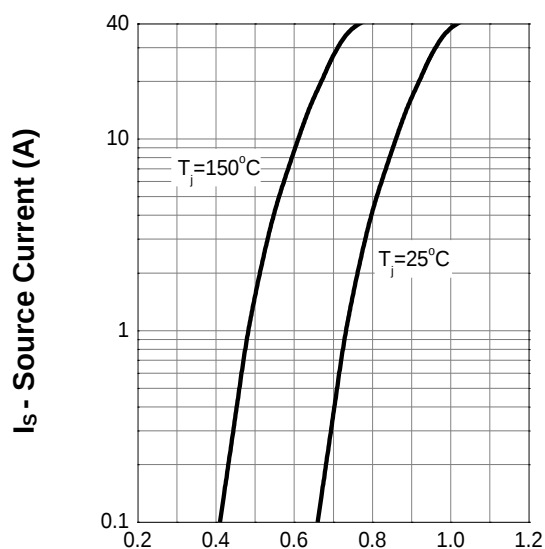
N-channel:

Normalized On Resistance



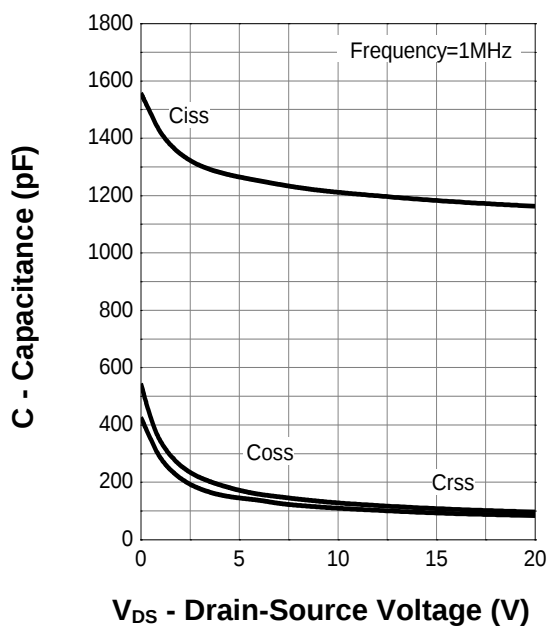
T_j - Junction Temperature ($^{\circ}\text{C}$)

Diode Forward Current



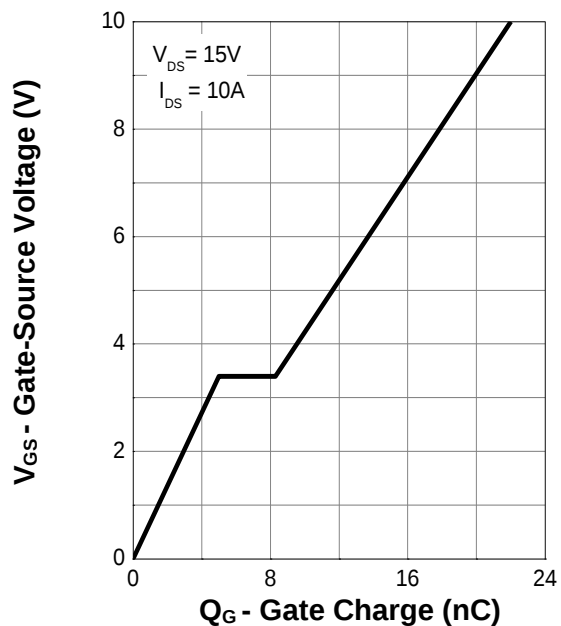
V_{SD} - Source-Drain Voltage (V)

Capacitance



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

Gate Charge





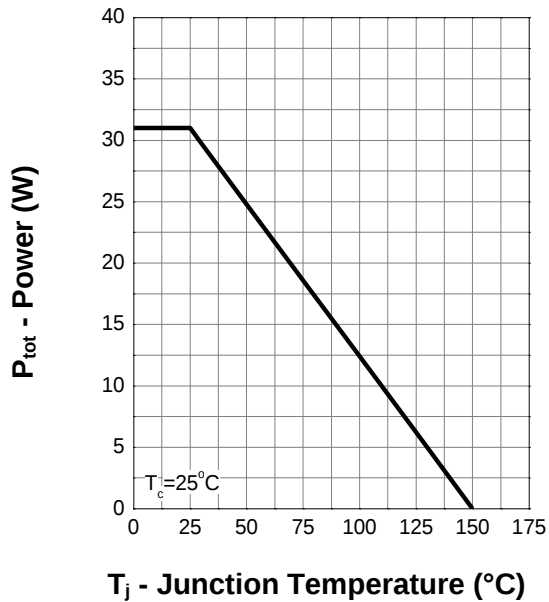
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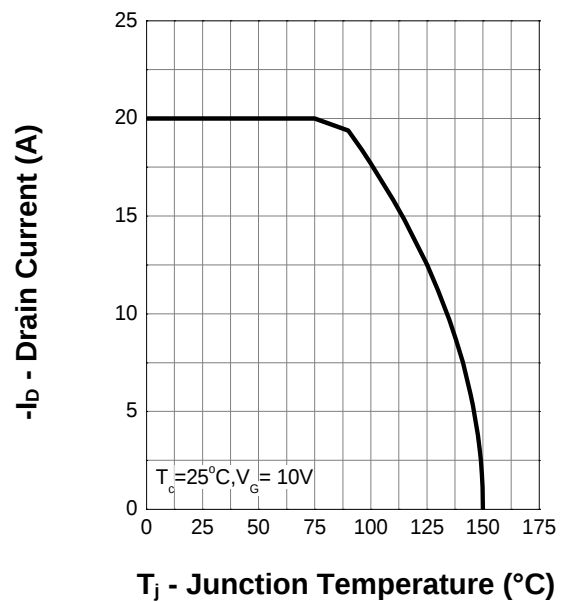
9. Typical Characteristics

P-channel:

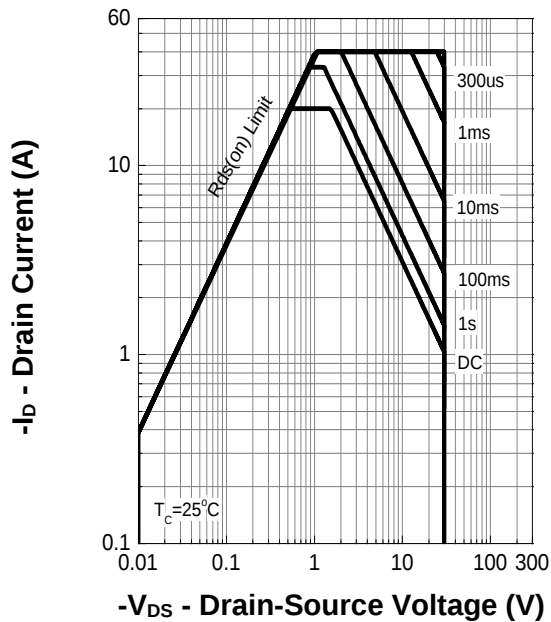
Power Capability



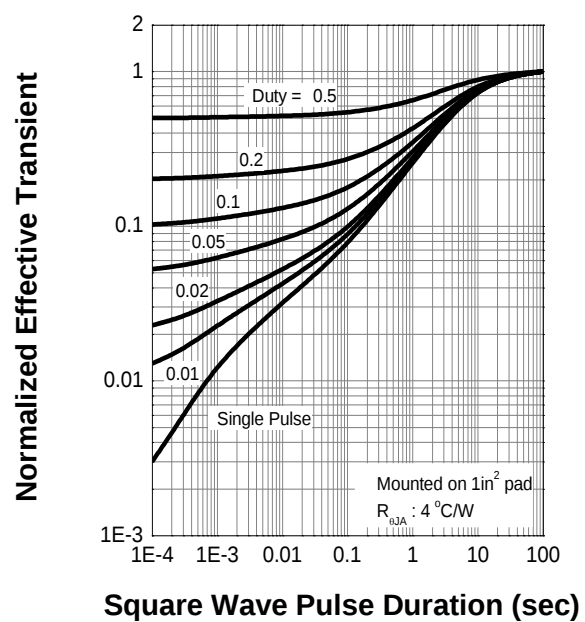
Current Capability



Safe Operation Area



Thermal Transient Impedance





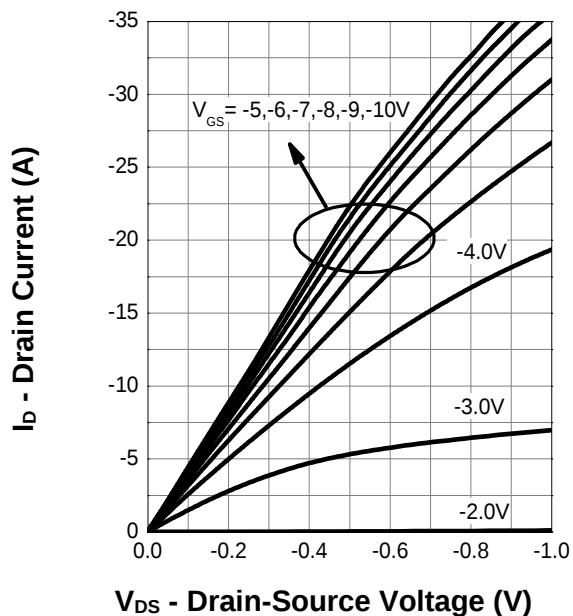
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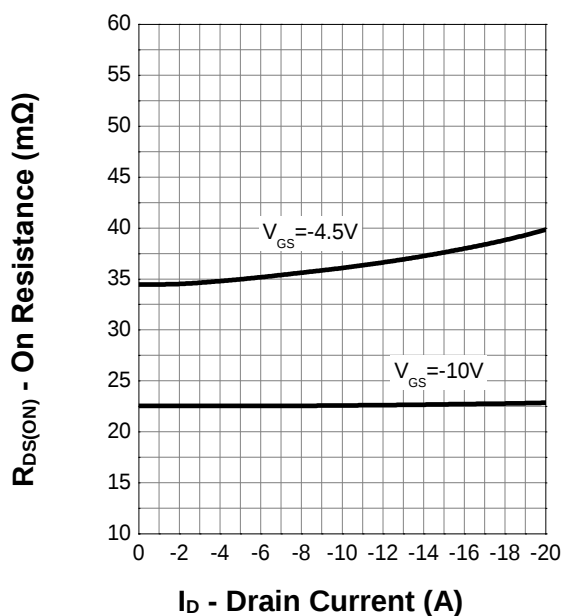
9. Typical Characteristics (cont.)

P-channel:

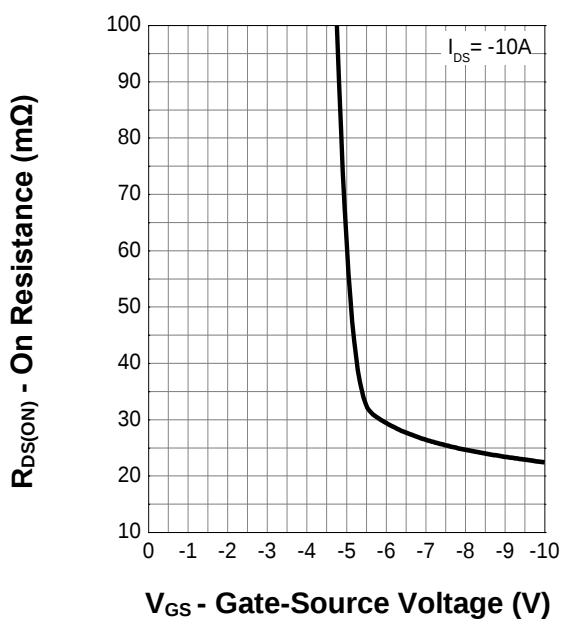
Output Characteristics



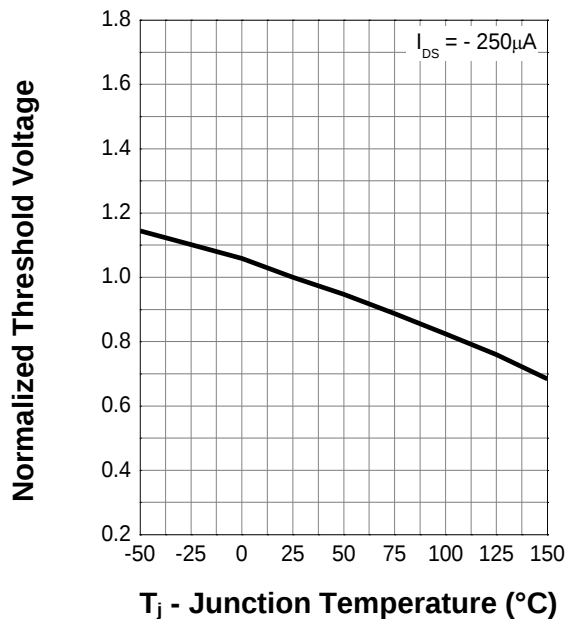
On Resistance



Transfer Characteristics



Normalized Threshold Voltage





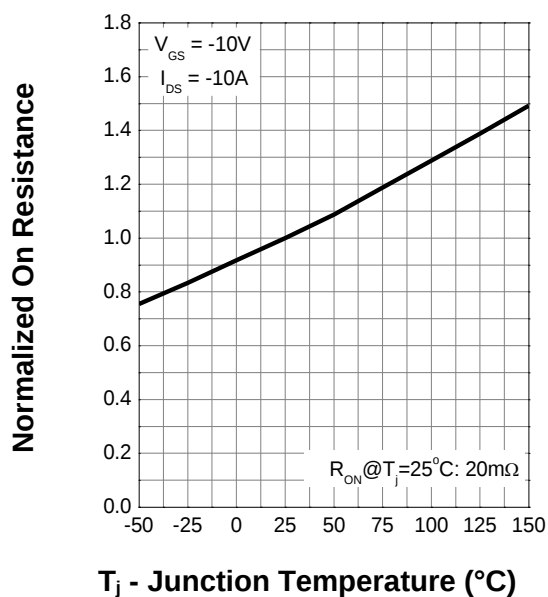
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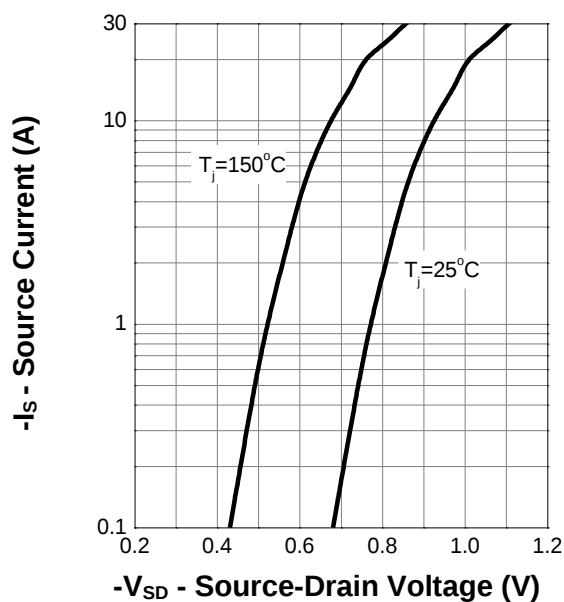
9. Typical Characteristics (cont.)

P-channel:

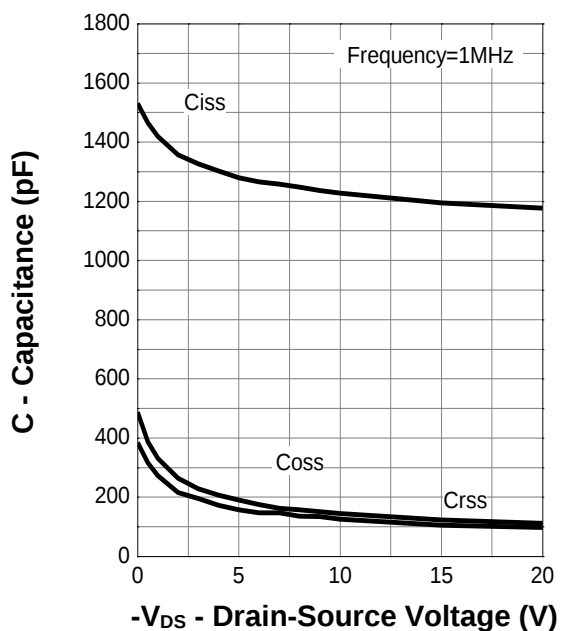
Normalized On Resistance



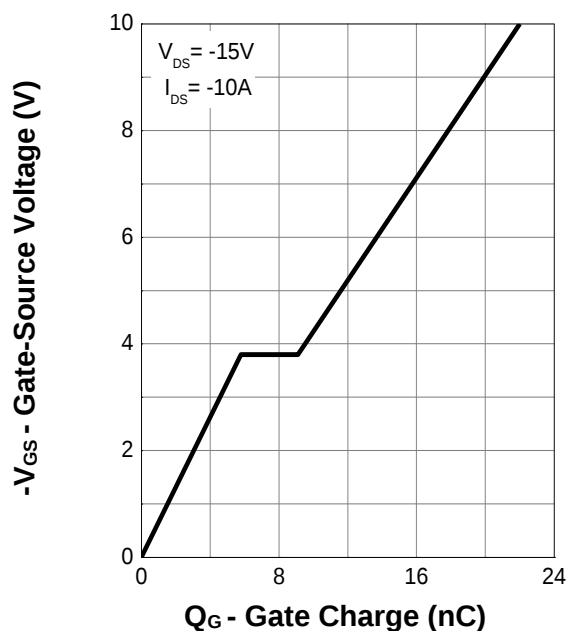
Diode Forward Current



Capacitance



Gate Charge



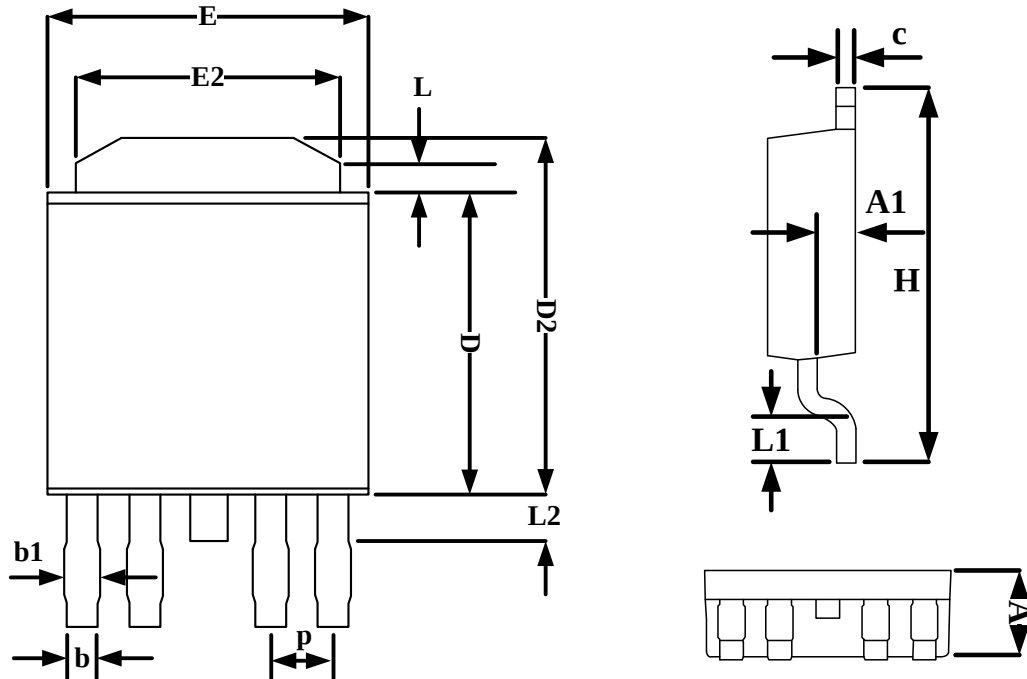


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10. Package Dimensions

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