

Dual N-channel MOSFET with schottky diode

ELM341503A-N

■ General description

ELM341503A-N uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

■ Features

- | | |
|---|---|
| Q2 | Q1 |
| • $V_{ds}=30V$ | • $V_{ds}=30V$ |
| • $I_d=9A(V_{gs}=10V)$ | • $I_d=8A(V_{gs}=10V)$ |
| • $R_{ds(on)}<15.8m\Omega(V_{gs}=10V)$ | • $R_{ds(on)}<21.0m\Omega(V_{gs}=10V)$ |
| • $R_{ds(on)}<20.0m\Omega(V_{gs}=4.5V)$ | • $R_{ds(on)}<32.0m\Omega(V_{gs}=4.5V)$ |

■ Maximum absolute ratings

$T_a=25^\circ C$. Unless otherwise noted.

Parameter	Symbol	Limit			Unit	Note
		Q2	Q1	Schottky		
Drain-source voltage	V_{ds}	30	30		V	
Gate-source voltage	V_{gs}	± 20	± 20		V	
Continuous drain current	$T_a=25^\circ C$	9	8		A	
	$T_a=70^\circ C$	7	6			
Pulsed drain current	I_{dm}	35	30		A	1
Avalanche current	I_{as}	29	21		A	
Avalanche energy	$L=0.1mH$	E_{as}	43	23	mJ	
Reverse current	$V_r=25V$	I_r		0.05	mA	
Forward voltage	$I_f=1A$	V_f		0.45	V	
Power dissipation	$T_c=25^\circ C$	P_d	2.0		W	
	$T_c=70^\circ C$		1.28			
Junction and storage temperature range	T_j, T_{stg}	-55 to 150			$^\circ C$	

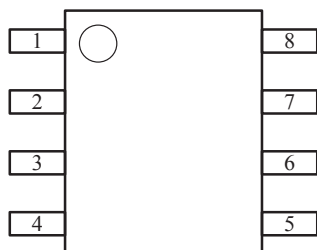
NOTE : 1. Pulsed width limited by maximum junction temperature.

■ Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Maximum junction-to-ambient	$R_{\theta ja}$		62.5	$^\circ C/W$	

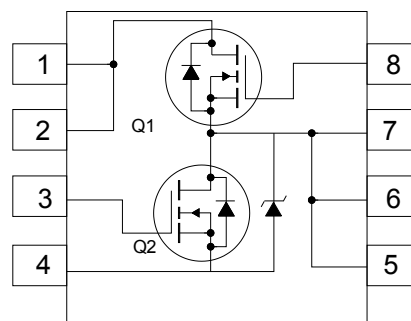
■ Pin configuration

SOP-8(TOP VIEW)



Pin No.	Pin name
1	DRAIN1
2	DRAIN1
3	GATE2
4	SOURCE2
5	DRAIN2/SOURCE1
6	DRAIN2/SOURCE1
7	DRAIN2/SOURCE1
8	GATE1

■ Circuit



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■Electrical characteristics(Q2)

Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V	30			V	
Zero gate voltage drain current	Idss	Vds=24V, Vgs=0V			1	μA	
		Vds=20V, Vgs=0V, Ta=125°C			10		
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA	1.0	1.7	3.0	V	
On state drain current	Id(on)	Vgs=10V, Vds=5V	35			A	1
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=9A		10.5	15.8	mΩ	1
		Vgs=4.5V, Id=7A		14.2	20.0		
Forward transconductance	Gfs	Vds=10V, Id=9A		25		S	1
Diode forward voltage	Vsd	If=9A, Vgs=0V			0.7	V	1
Max.body-diode continuous current	Is				2.8	A	
DYNAMIC PARAMETERS							
Input capacitance	Ciss	N-Channel Vgs=0V, Vds=15V, f=1MHz		1040		pF	
Output capacitance	Coss			295		pF	
Reverse transfer capacitance	Crss			139		pF	
Gate resistance	Rg	Vgs=0V, Vds=0V, f=1MHz		1.5		Ω	
SWITCHING PARAMETERS							
Total gate charge (Vgs=10V)	Qg	Vgs=10V, Vds=15V, Id=9A		20.0		nC	2
Total gate charge (Vgs=4.5V)				9.0		nC	2
Gate-source charge	Qgs			3.5		nC	2
Gate-drain charge	Qgd			3.5		nC	2
Turn-on delay time	td(on)	Vgs=10V, Vds=15V Id=1A, Rgen=6Ω		18		ns	2
Turn-on rise time	tr			12		ns	2
Turn-off delay time	td(off)			40		ns	2
Turn-off fall time	tf			8		ns	2
Body diode reverse recovery time	trr	If=9A, dIf/dt=100A/μs		15		ns	
Body diode reverse recovery charge	Qrr			6		nC	

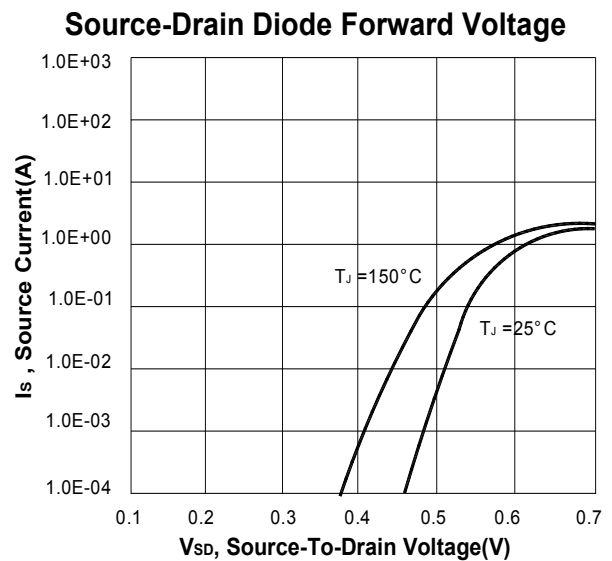
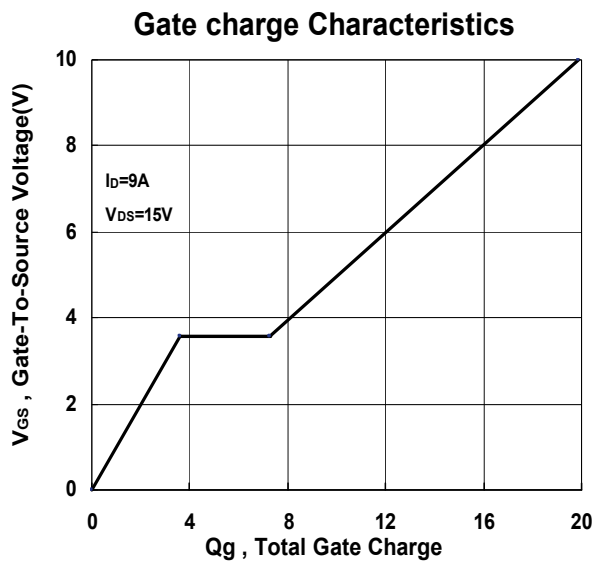
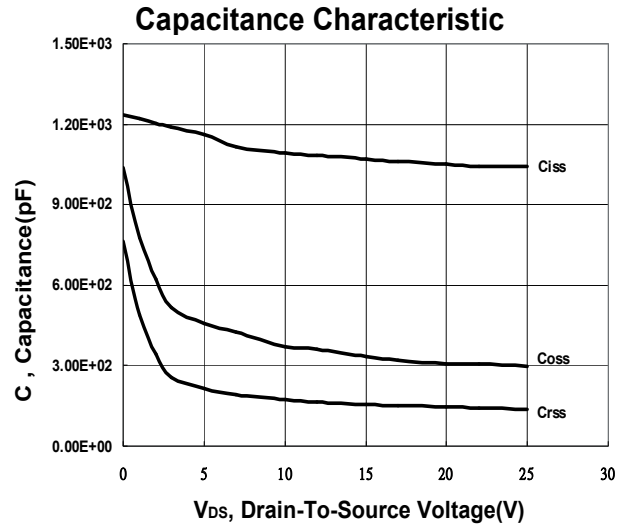
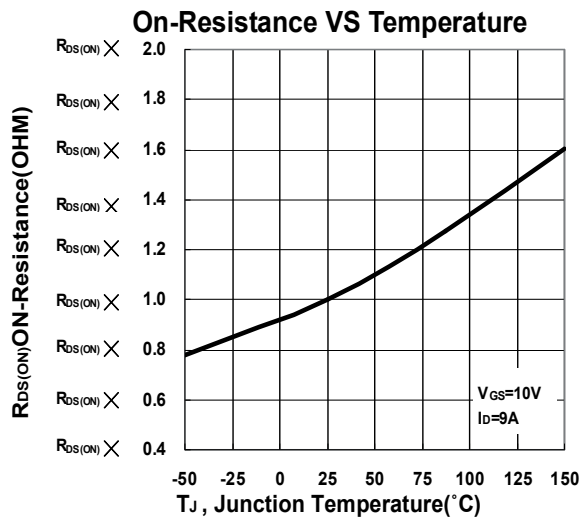
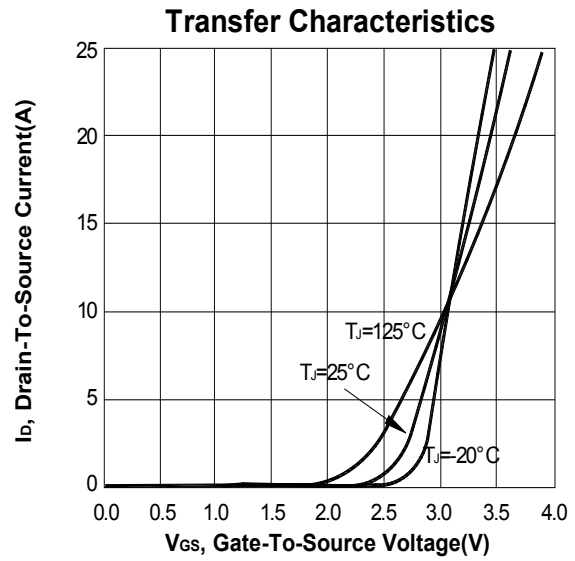
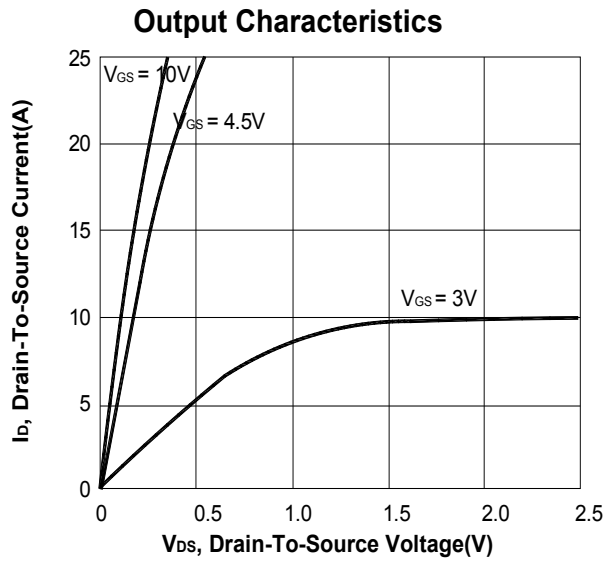
NOTE :

1. Pulsed width≤300μsec and Duty cycle≤2%.
2. Independent of operating temperature.

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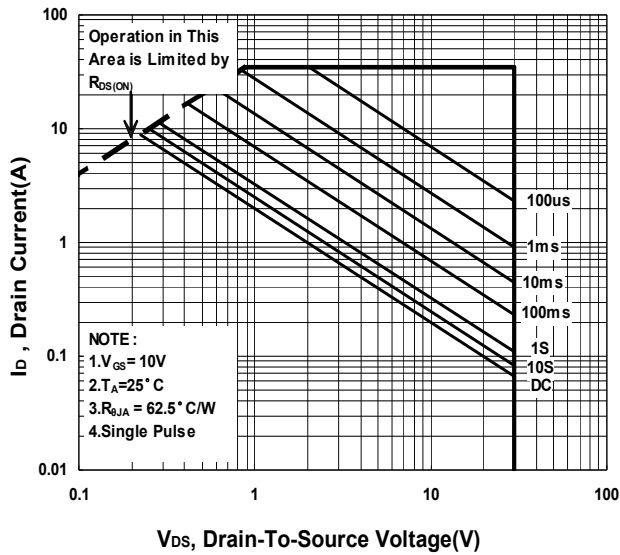
■ Typical electrical and thermal characteristics (Q2)



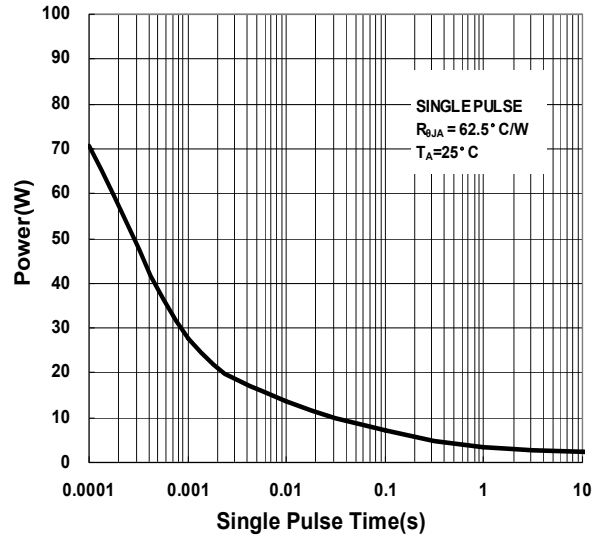
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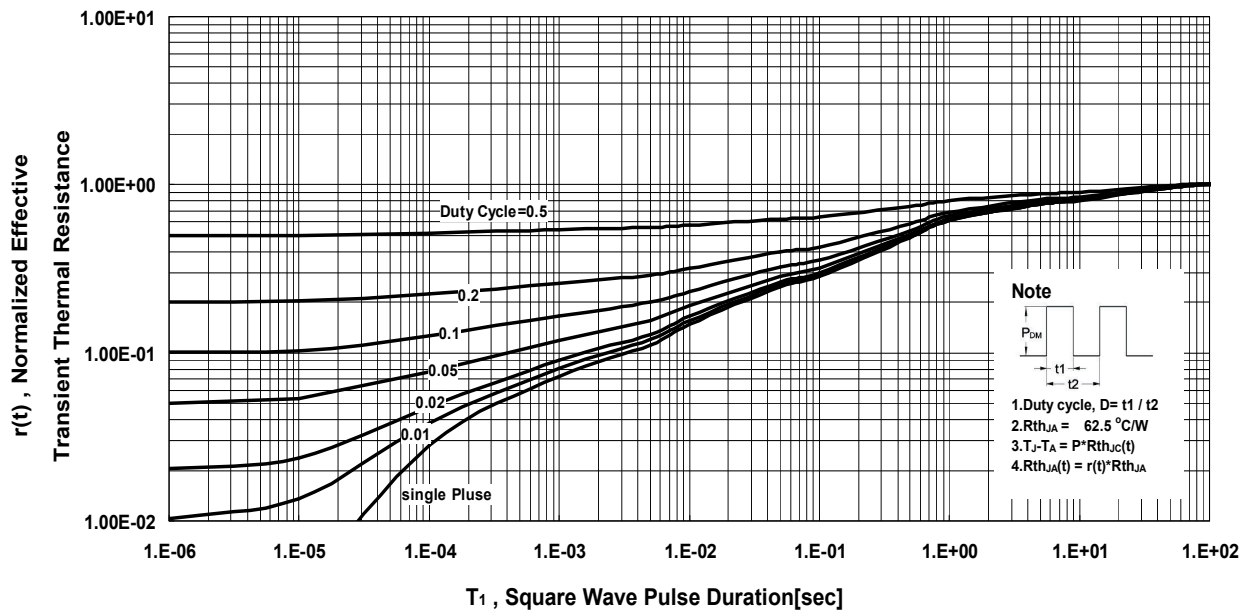
Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve



Dual N-channel MOSFET with schottky diode

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■Electrical characteristics(Q1)

Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V	30			V	
Zero gate voltage drain current	Idss	Vds=24V, Vgs=0V			-1	μA	
		Vds=20V, Vgs=0V, Ta=125°C			-10		
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA	1.0	2.0	3.0	V	
On state drain current	Id(on)	Vgs=10V, Vds=5V	30			A	1
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=9A		15.8	21.0	mΩ	1
		Vgs=4.5V, Id=6A		25.6	32.0		
Forward transconductance	Gfs	Vds=10V, Id=7A		15		S	1
Diode forward voltage	Vsd	If=7A, Vgs=0V			1.0	V	1
Max.body-diode continuous current	Is				2.0	A	
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=15V, f=1MHz		560		pF	
Output capacitance	Coss			160		pF	
Reverse transfer capacitance	Crss			84		pF	
Gate resistance	Rg	Vgs=0V, Vds=0V, f=1MHz		2.0		Ω	
SWITCHING PARAMETERS							
Total gate charge (Vgs=10V)	Qg	Vgs=10V, Vds=15V, Id=9A		11.0		nC	2
Total gate charge (Vgs=4.5V)				5.5		nC	2
Gate-source charge	Qgs			2.5		nC	2
Gate-drain charge	Qgd			2.5		nC	2
Turn-on delay time	td(on)				19		ns
Turn-on rise time	tr	Vgs=10V, Vds=15V		8		ns	2
Turn-off delay time	td(off)	Id=1A, Rgen=6Ω		39		ns	2
Turn-off fall time	tf			6		ns	2
Body diode reverse recovery time	trr	If=7A, dIf/dt=100A/μs		20		ns	
Body diode reverse recovery charge	Qrr			12		nC	

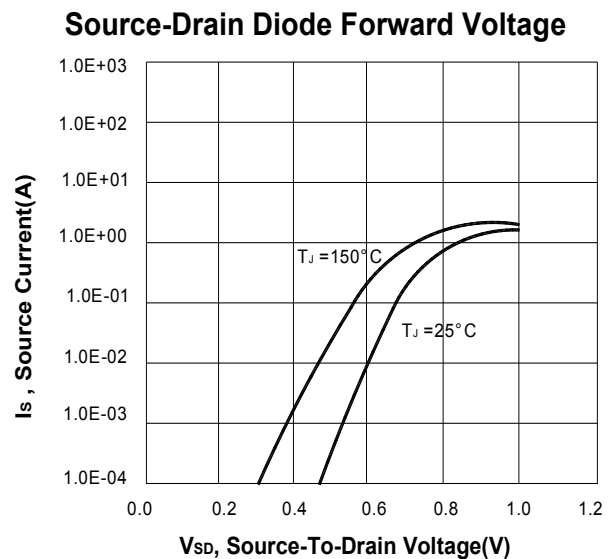
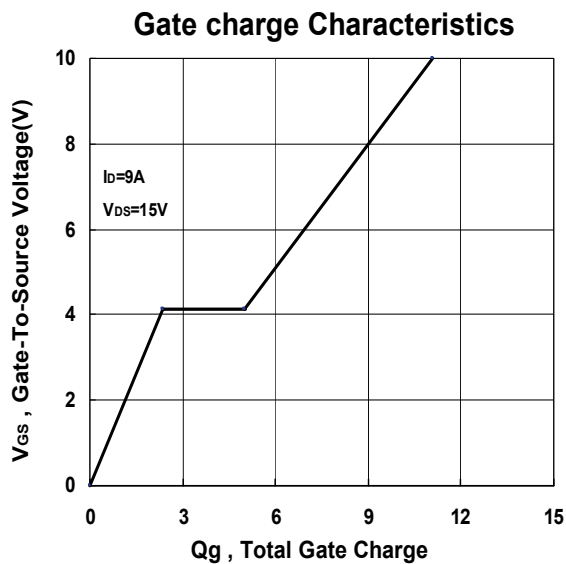
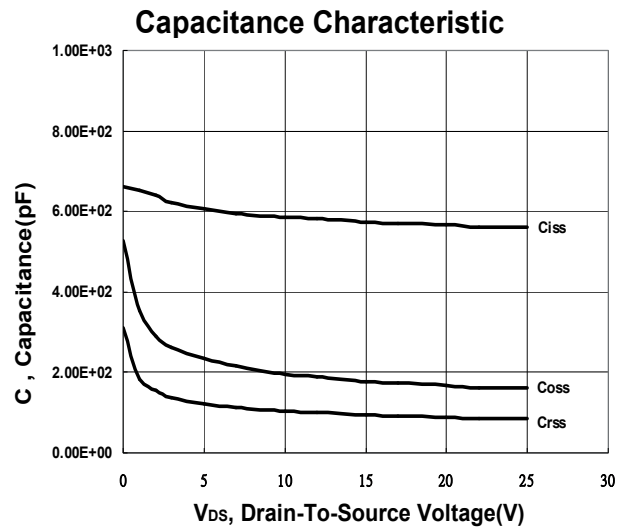
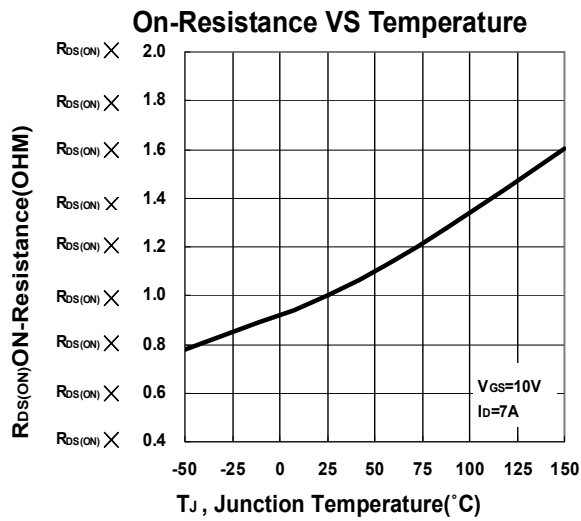
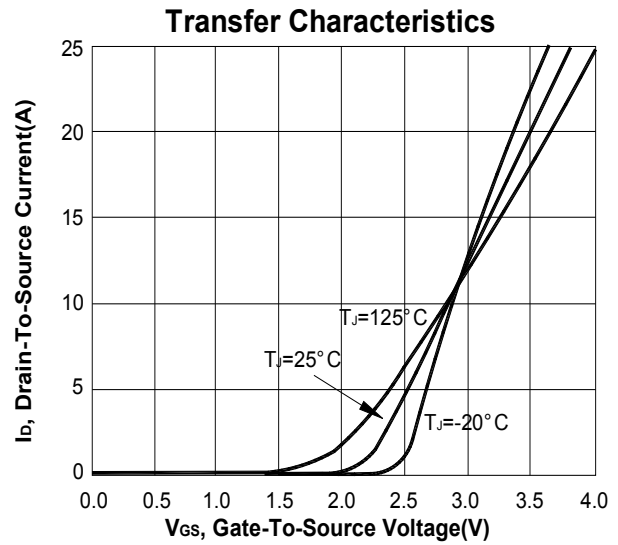
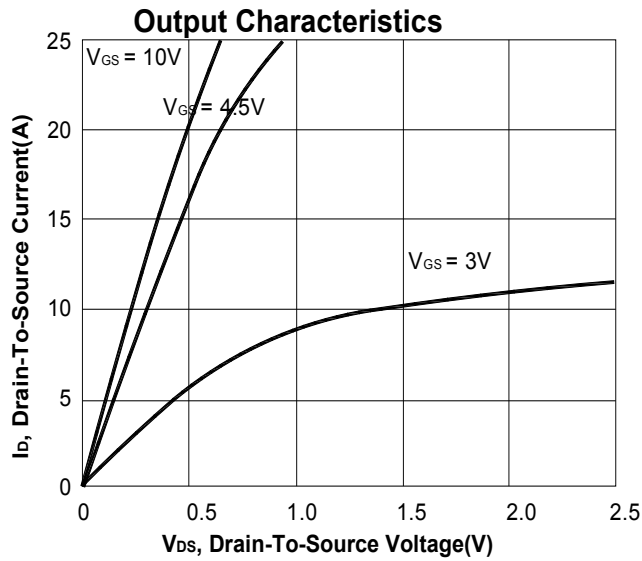
NOTE :

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2. Independent of operating temperature.

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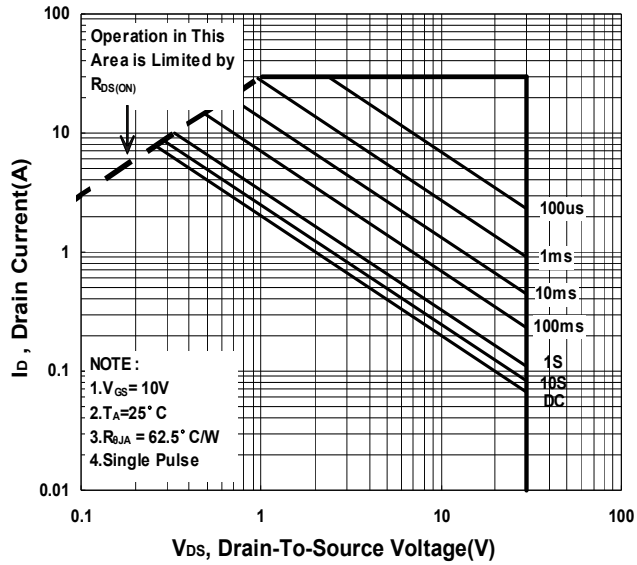
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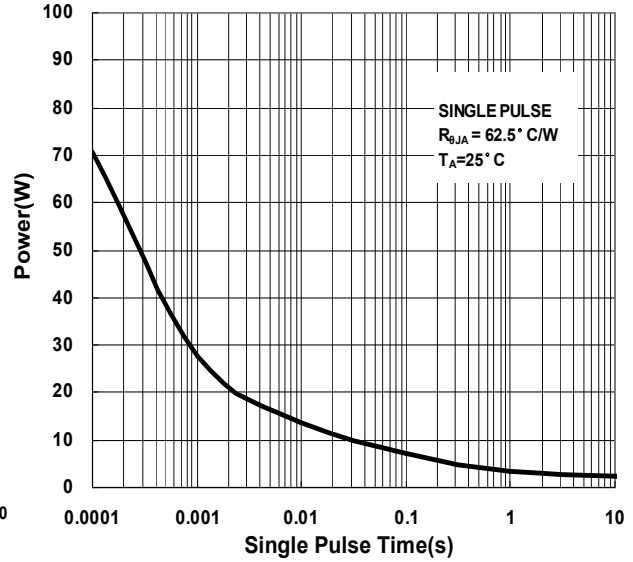
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