

Description:

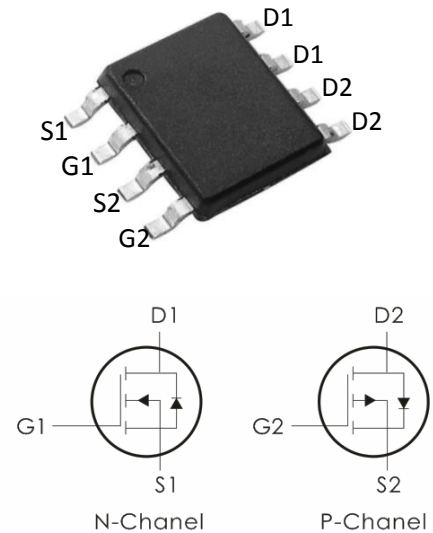
This N+P Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge. It can be used in a wide variety of applications.

Features:

N-Channel: $V_{DS}=40V, I_D=8A, R_{DS(on)}<22m\Omega @V_{GS}=10V$

P-Channel: $V_{DS}=-40V, I_D=-6A, R_{DS(on)}<53m\Omega @V_{GS}=-10V$

- 1)
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low $R_{DS(on)}$.
- 5) Excellent package for good heat dissipation.



Absolute Maximum Ratings: ($T_A=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Continuous Drain Current- $T_A=25^\circ\text{C}$	8	-6	A
	Continuous Drain Current- $T_A=100^\circ\text{C}$	5.2	-3.9	
I_{DM}	Pulsed Drain Current ^{note1}	32	-24	A
E_{AS}	Single Pulsed Avalanche Energy ^{note2}	13	17.6	mJ
P_D	Power Dissipation - $T_A=25^\circ\text{C}$	2.0	3.2	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		$^\circ\text{C}$

Thermal Characteristics:

Symbol	Parameter	N-CH	P-CH	Units
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62.5	39	$^\circ\text{C}/\text{W}$

Package Marking and Ordering Information:

Part NO.	Marking	Package
DOS4614E	S4614E	SOP-8D

N-Channel Electrical Characteristics: ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Sourctce Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	40	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =40V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V, V _{DS} =0A	---	---	± 100	nA
On Characteristics ³						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	1	1.5	2.5	V
R _{DS(ON)}	Drain-Source On Resistance ^{note3}	V _{GS} =10V, I _D =8A	---	17	22	m Ω
		V _{GS} =4.5V, I _D =5A	---	25	35	
Dynamic Characteristics ⁴						
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz	---	620	---	pF
C _{OSS}	Output Capacitance		---	65	---	
C _{rSS}	Reverse Transfer Capacitance		---	55	---	
Q _g	Gate Charge	V _{GS} =8V V _{DS} =20V I _D =10A		12	---	nC
Q _{gs}	Gate-Source Charge			3.2	---	
Q _{gd}	Gate-Drain Charge			3.1	---	
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time	V _{DS} =20V, R _L =2.5 Ω , R _{REN} =3 Ω ,V _{GS} =10V	---	4	---	ns
t _r	Rise Time		---	3	---	ns
t _{d(off)}	Turn-Off Delay Time		---	15	---	ns
t _f	Fall Time		---	2	---	ns
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	---	---	----	8	A
I _{SM}	Pulsed Drain to Source Diode	---	---	---	32	A

V_{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =8A	---	---	1.2	V
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Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition : T_J=25°C, V_{DD}=20V, V_G=10V, L=0.5mH, R_g=25Ω, I_{AS}=7.2A
T_J=25°C, V_{DD}=-20V, V_G= -10V, L=0.5mH, R_g=25Ω, I_{AS}=-8.4A
3. Pulse Test: Pulse Width≤300μs, Duty Cycles≤2%

Typical Performance Characteristics-N

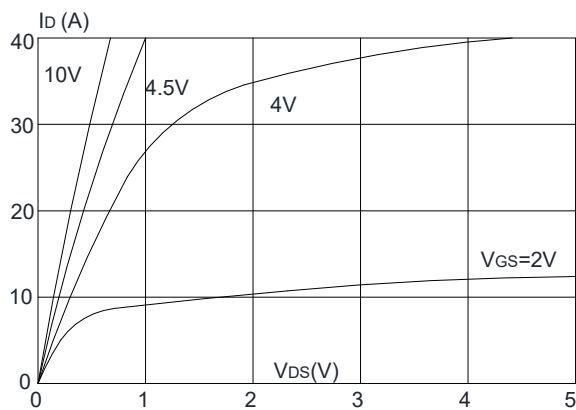


Figure 1: Output Characteristics

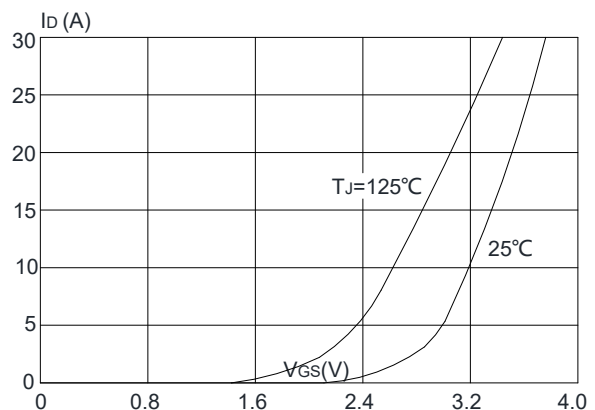


Figure 2: Typical Transfer Characteristics

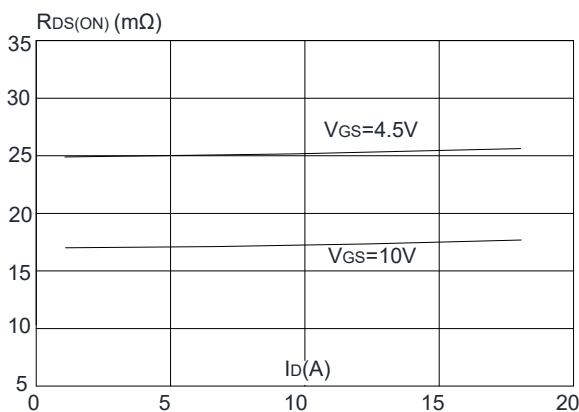


Figure 3: On-resistance vs. Drain Current

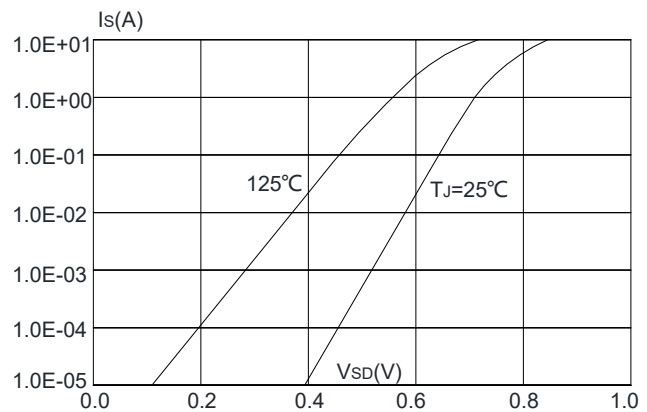


Figure 4: Body Diode Characteristics

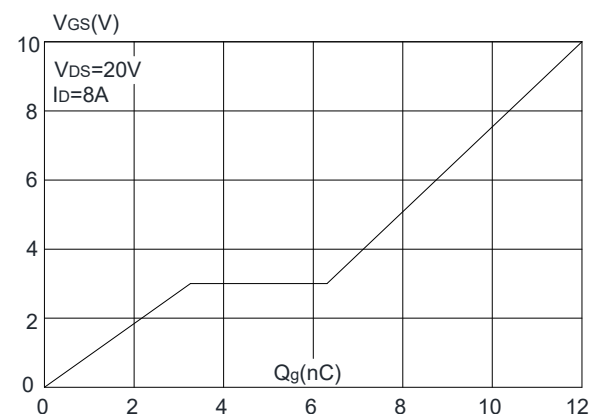


Figure 5: Gate Charge Characteristics

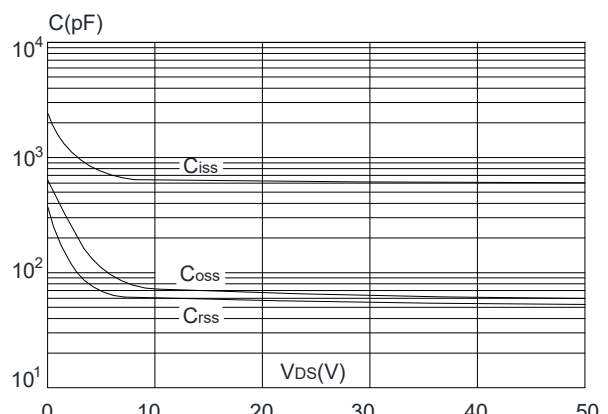


Figure 6: Capacitance Characteristics

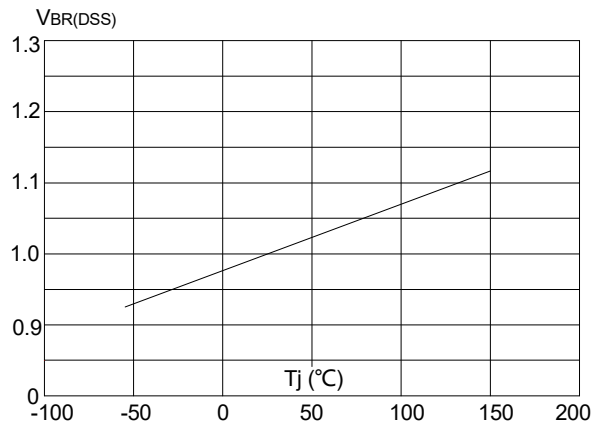


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

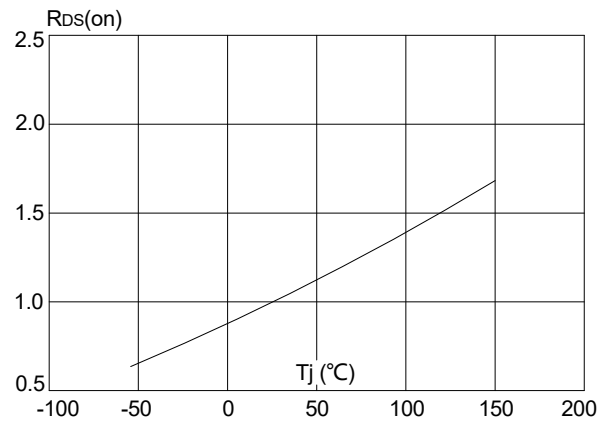


Figure 8: Normalized on Resistance vs. Junction Temperature

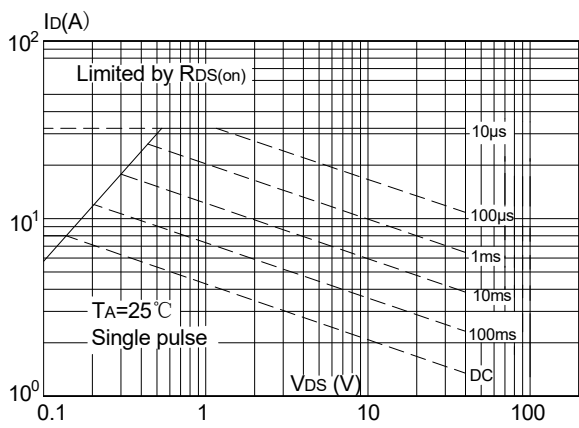


Figure 9: Maximum Safe Operating Area

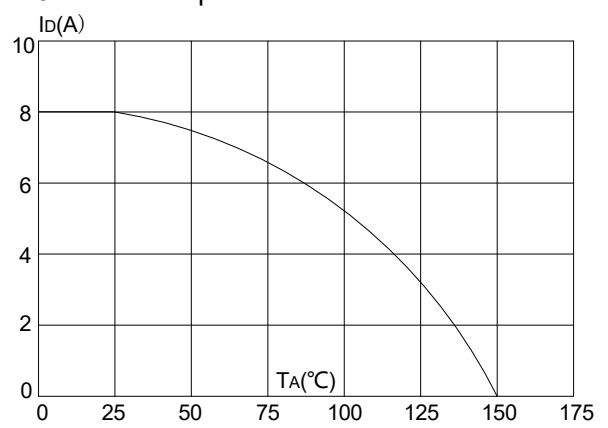


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

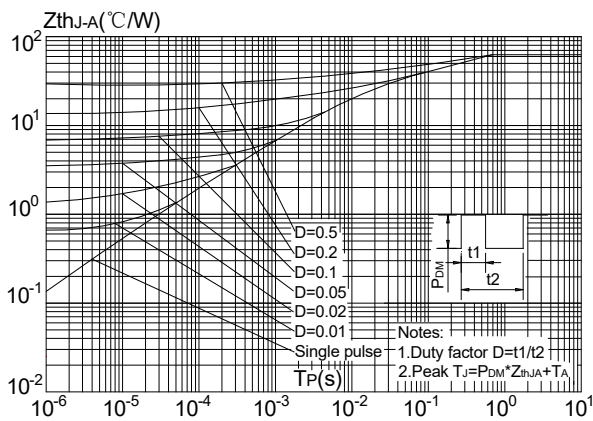


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

P-Channel Electrical Characteristics: ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	-40	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-40V	---	---	-1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V, V _{DS} =0A	---	---	±100	nA
On Characteristics ³						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	-1	-1.6	-2.5	V
R _{DS(ON)}	Drain-Source On Resistance ^{note3}	V _{GS} =-10V, I _D =-6A	---	41	53	m Ω
		V _{GS} =-4.5V, I _D =-4A	---	58	81	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-20V, V _{GS} =0V, f=1MHz	---	850	---	pF
C _{oss}	Output Capacitance		---	85	---	
C _{rss}	Reverse Transfer Capacitance		---	68	---	
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time	V _{DD} = -20V, R _L =2.3 Ω V _{GS} = -10V, R _{GEN} =6 Ω	---	7.5	---	ns
t _r	Rise Time		---	5.5	---	ns
t _{d(off)}	Turn-Off Delay Time		---	19	---	ns
t _f	Fall Time		---	7	---	ns
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-20V, I _D =-6A	---	13	---	nC
Q _{gs}	Gate-Source Charge		---	3.8	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	3.1	---	nC
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	---	---	---	-6	A
I _{SM}	Pulsed Drain to Source Diode	---	---	---	-24	---
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =-6A	---	---	-1.2	V

Typical Performance Characteristics-P

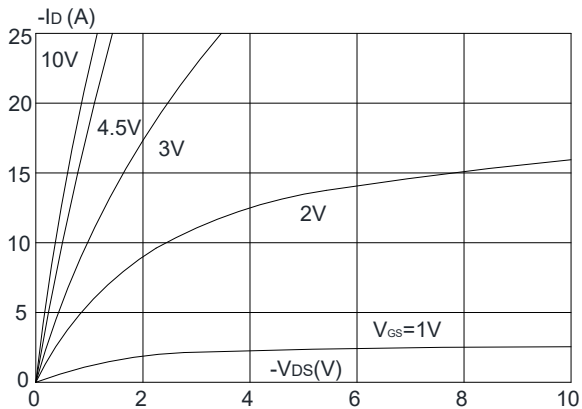


Figure 1: Output Characteristics

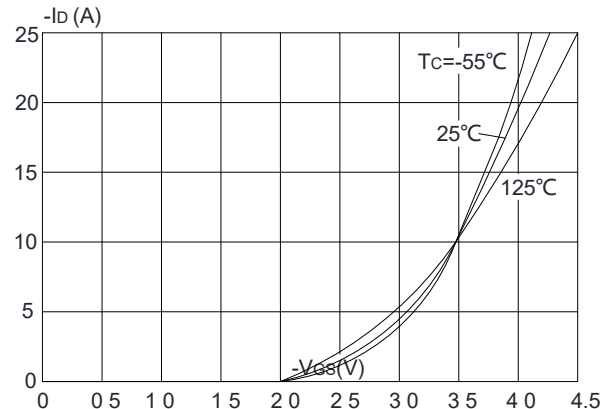


Figure 2: Typical Transfer Characteristics

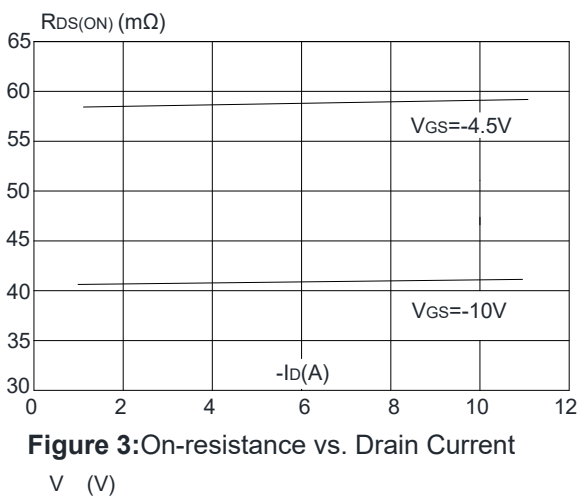


Figure 3: On-resistance vs. Drain Current

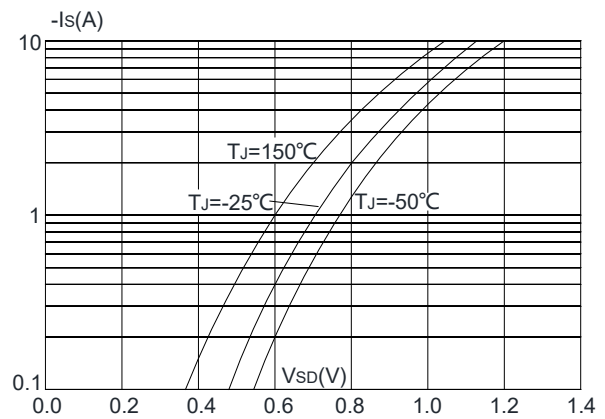


Figure 4: Body Diode Characteristics

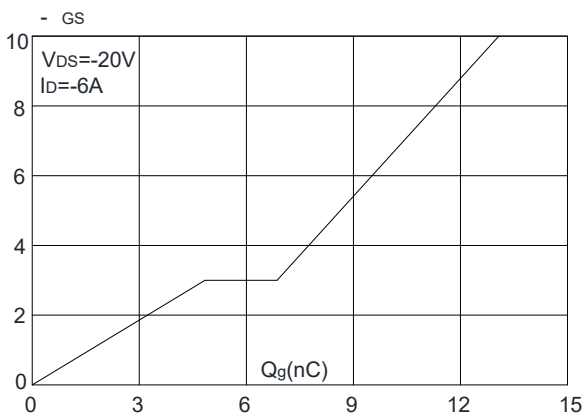


Figure 5: Gate Charge Characteristics

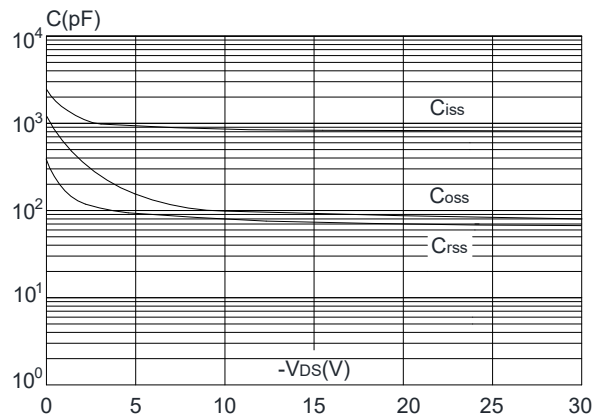


Figure 6: Capacitance Characteristics

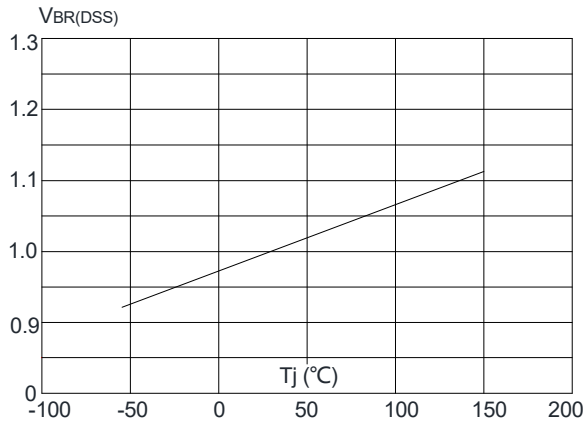


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

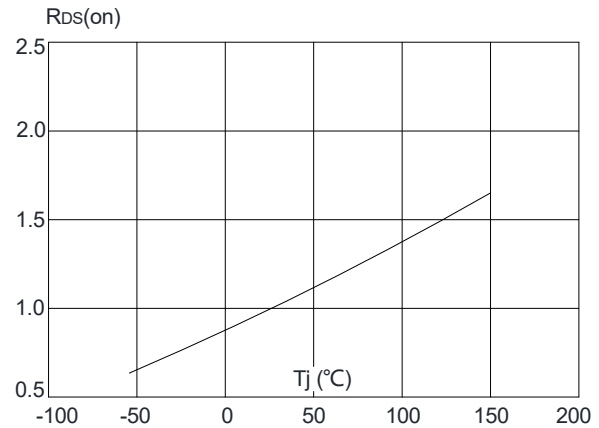


Figure 8: Normalized on Resistance vs. Junction Temperature

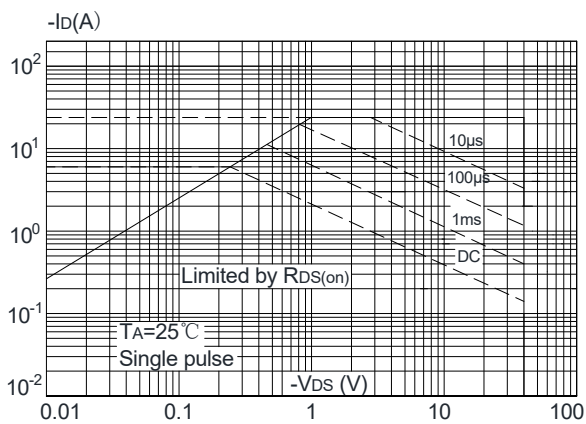


Figure 9: Maximum Safe Operating Area

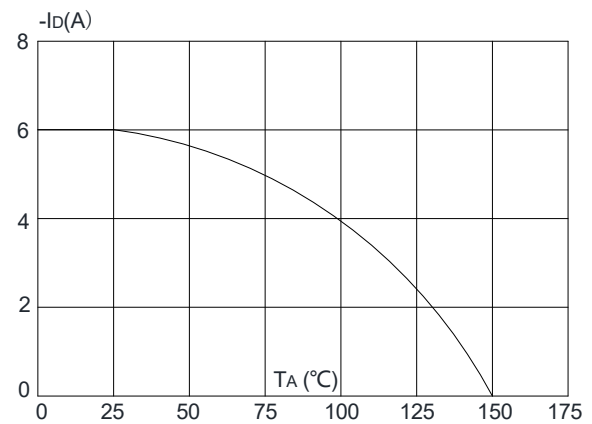


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

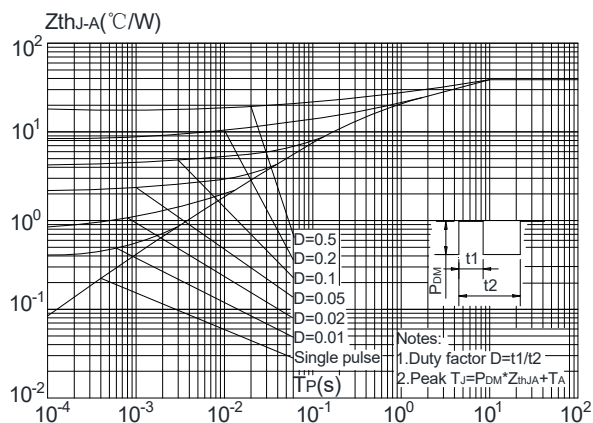


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient