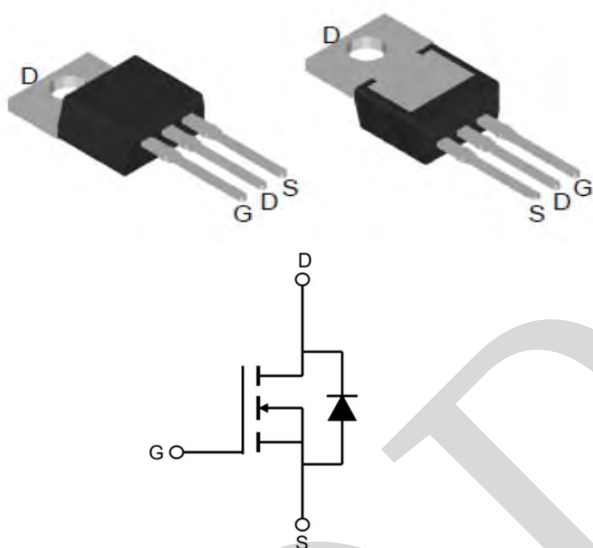


Trench N-channel Power MOSFET

MSR2R5N04CT TO-220AB



V_{DS}	40	V
$R_{DS(on),TYP@ V_{GS}=10V}$	2.0	mΩ
I_D	120	A

Features

- 1、Low on – resistance
- 2、Package TO-220AB
- 3、TrenchFET Power MOSFET

Applications

- 1、Load Switch for Portable Devices
- 2、DC/DC Converter

Maximum ratings, at $T_A = 25^\circ\text{C}$, unless otherwise specified

Symbol	Parameter	Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage	40	V
V_{GS}	Gate-Source voltage	± 20	V
I_S	Diode continuous forward current	$T_C = 25^\circ\text{C}$	A
I_D	Continuous drain current @ $V_{GS}=10V$	$T_C = 25^\circ\text{C}$	120
		$T_C = 100^\circ\text{C}$	90
I_{DM}	Pulse drain current tested ①	$T_C = 25^\circ\text{C}$	400
E_{AS}	Avalanche energy, single pulsed ②	1406	mJ
P_D	Maximum power dissipation	$T_C = 25^\circ\text{C}$	150
T_{STG}, T_J	Storage and Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typical	Unit
R _{θJC}	Thermal Resistance, Junction-to-Case	1.0	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	62	°C/W

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
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Static Electrical Characteristics @ T_j=25°C (unless otherwise stated)

V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	40	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V	--	--	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2.0	2.7	4.0	V
R _{DS(on)}	Drain-Source On-State Resistance ④	V _{GS} =10V, I _D =30A	--	2.0	2.5	mΩ

Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)

C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz	--	5677	--	pF
C _{oss}	Output Capacitance		--	872	--	pF
C _{rss}	Reverse Transfer Capacitance		--	529	--	pF
R _g	Gate Resistance	V _{GS} =0V, f=1MHz V _{DS} =0.015V,	--	3.3	--	Ω
Q _g (10V)	Total Gate Charge	V _{DS} =20V, I _D =30A , V _{GS} =10V	--	60	--	nC
Q _{gs}	Gate-Source Charge		--	14	--	nC
Q _{gd}	Gate-Drain Charge		--	10	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V _{DD} =20V, I _{DS} =30A, R _G =1.6Ω, T _J =25°C	--	14	--	ns
Tr	Turn-on Rise Time		--	49	--	ns
Td(off)	Turn-Off Delay Time		--	40	--	ns
Tf	Turn-Off Fall Time		--	7	--	ns

Source- Drain Diode Characteristics@ T_J = 25°C (unless otherwise stated)

VSD	Forward on voltage	I _{SD} =20A, V _{GS} =0V	--	0.8	1.0	V
Trr	Reverse Recovery Time	T _J =25°C, I _{sd} =40A , V _{GS} =0V	--	40	--	ns
Qrr	Reverse Recovery Charge	di/dt=100A/μs	--	63	--	nC

NOTE: ① Repetitive rating; pulse width limited by max junction temperature.

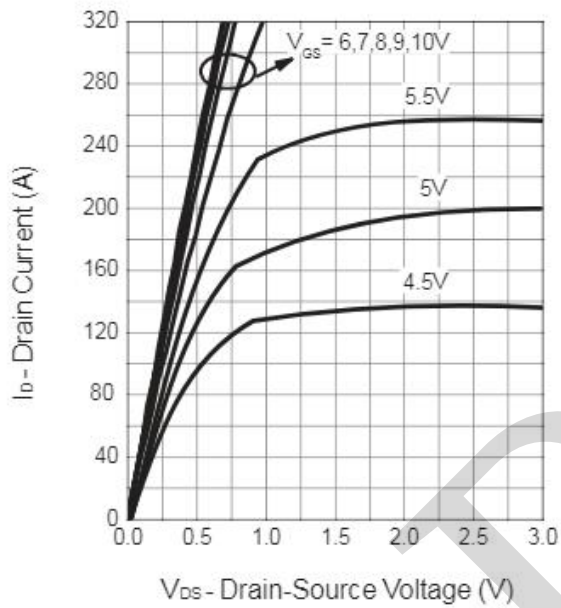
② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH, R_G = 25Ω, I_{AS} = 9A, V_{GS} = 10V. Part not recommended for use above this value

③ The power dissipation P_{DSM} is based on R_{θJA} and the maximum allowed junction temperature of 150°C.

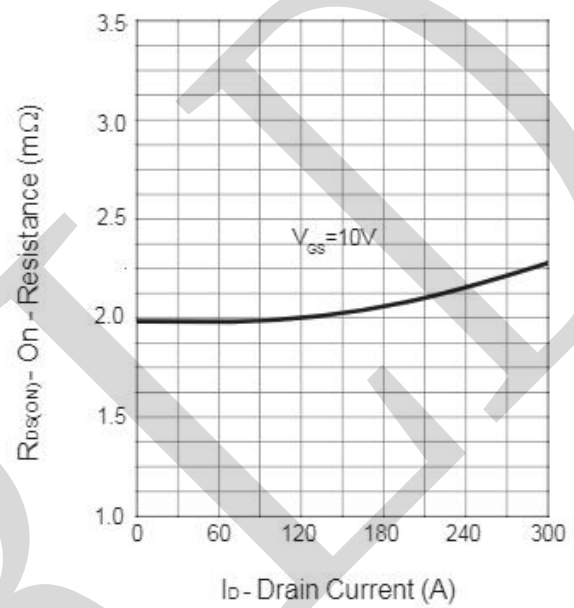
④ Pulse width ≤ 380μs; duty cycle ≤ 2%.

Typical Characteristics

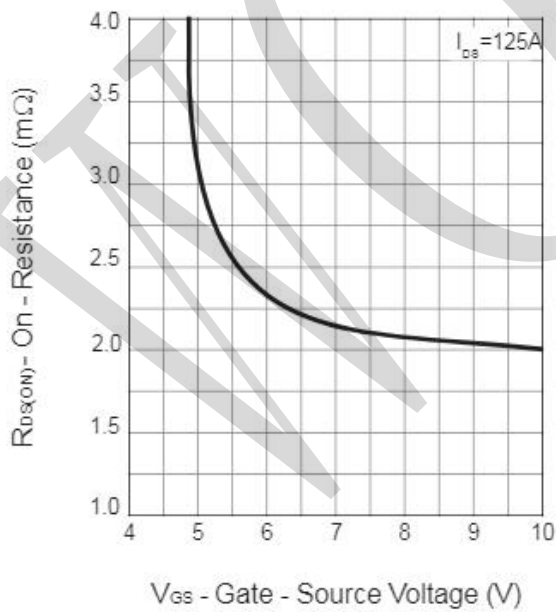
Output Characteristics



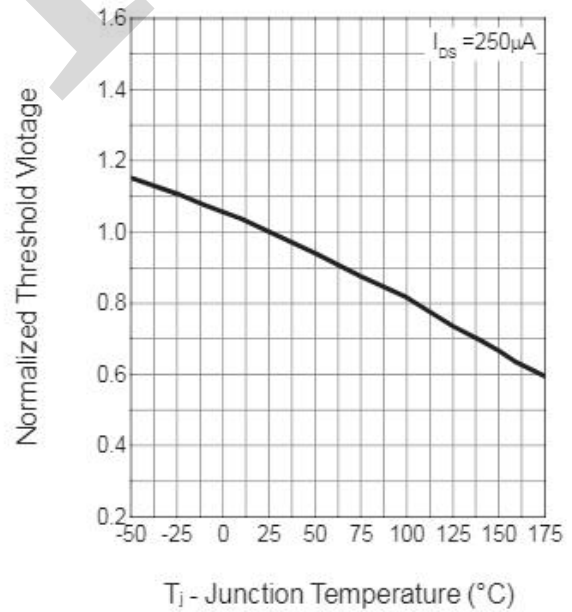
Drain-Source On Resistance



Drain-Source On Resistance

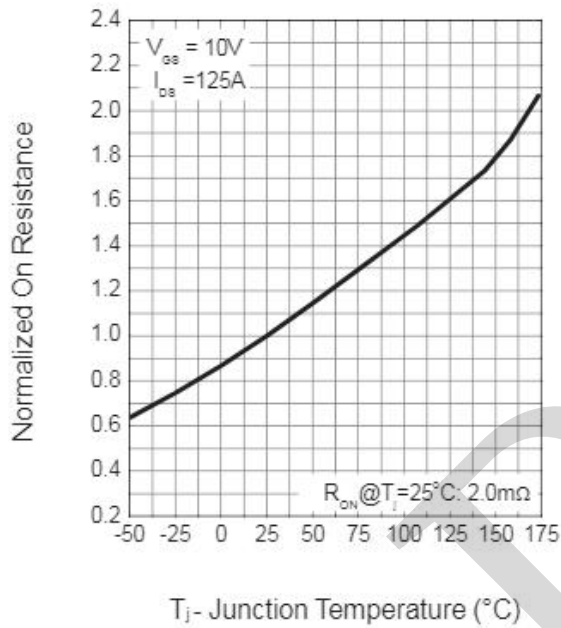


Gate Threshold Voltage

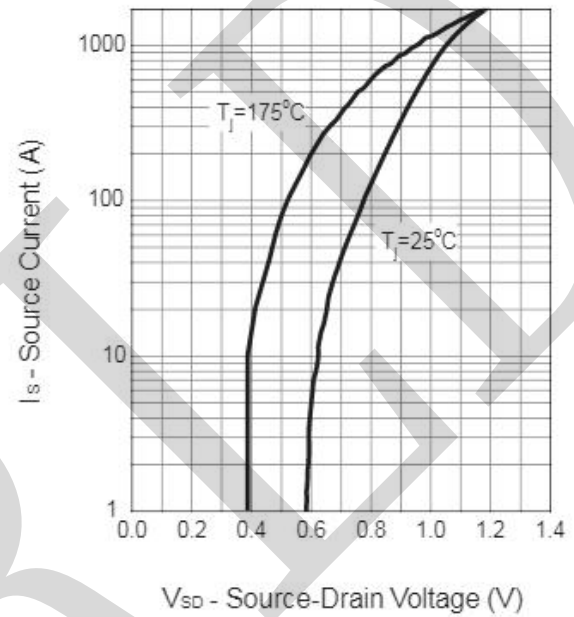


Typical Characteristics

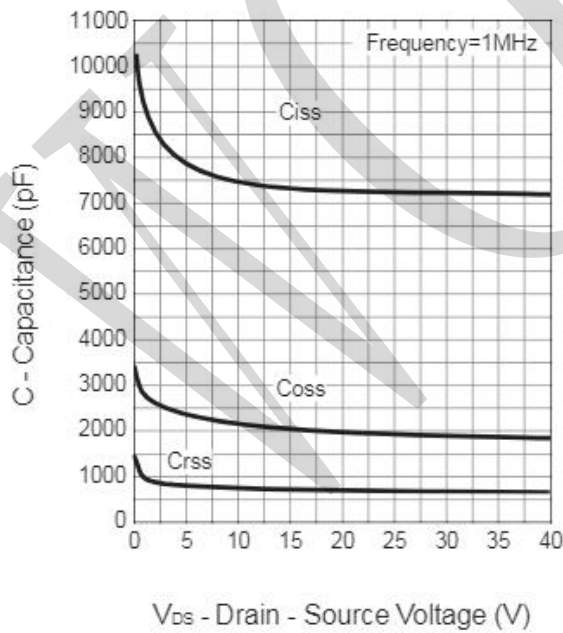
Drain-Source On Resistance



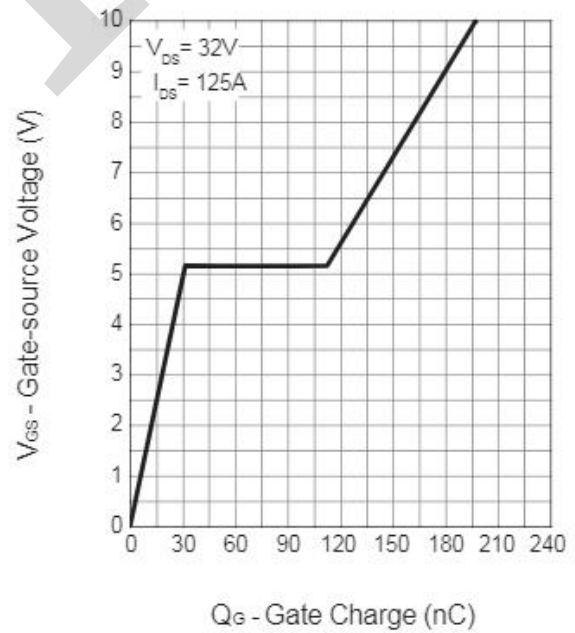
Source-Drain Diode Forward



Capacitance

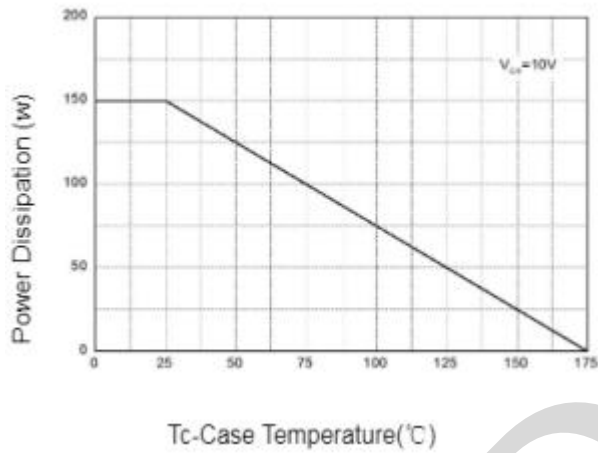


Gate Charge

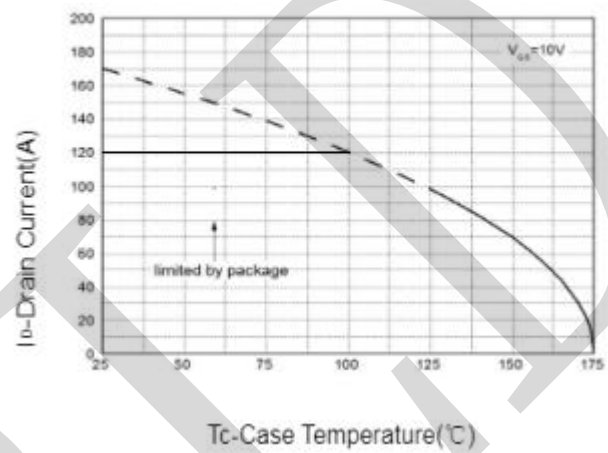


Typical Characteristics

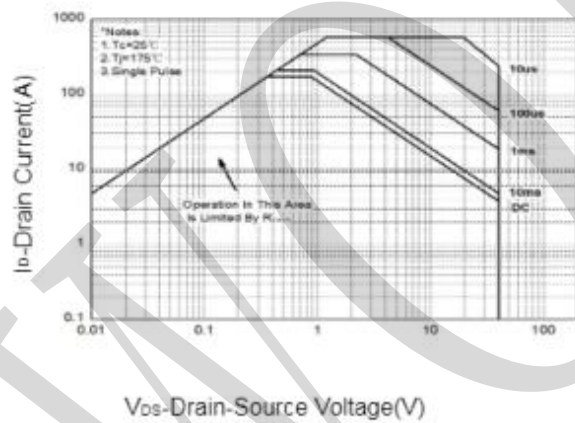
Power Dissipation



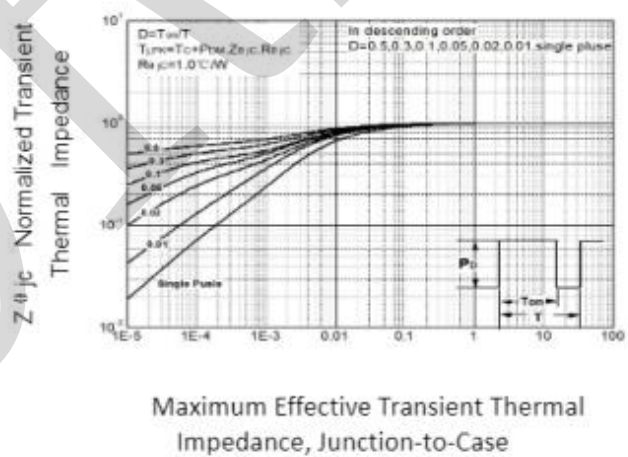
Drain Current



Safe Operation Area



Thermal Transient Impedance



PACKAGE OUTLINE DIMENSIONS

Note:unit mm

TO-220AB

