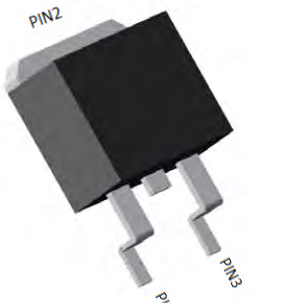
MSR2R3N04CTB

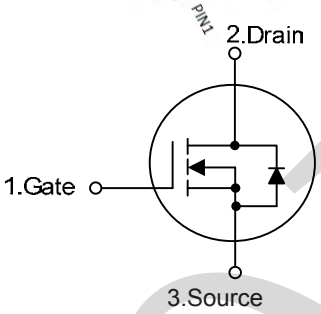
10-JUN-2021

Trench N-channel Power MOSFET

MSR2R3N04CTB

TO-263





V_{DS}	40	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	1.8	mΩ
I_D	120	A

Features

1、Low on – resistance
2、Package TO-263
3、TrenchFET Power MOSFET

Applications

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

Maximum ratings, at T_A =25°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_D	Continuous drain current @VGS=10V	T_C =25°C(Silicon limit)	--	A
		T_C =25°C(Package limit)	120	A
		T_C =100°C(Silicon limit)	135	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	400	A
EAS	Avalanche energy, single pulsed ②		1406	mJ
P_D	Maximum power dissipation	T_C =25°C	150	W
T_{STG},T_J	Storage and Junction Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.0	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62	°C/W

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
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	--	1.8	2.3	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	VGS=0V, f=1MHz , VDS=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_D=30A, R_G=1.6Ω, Tj=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)

V_{SD}	Forward on voltage	I_{SD}=20A,V_{GS}=0V	--	0.8	1.0	V
Trr	Reverse Recovery Time	I_{sd}=40A , di/dt=100A/μs	--	40	--	ns
Qrr	Reverse Recovery Charge		--	63	--	nC

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

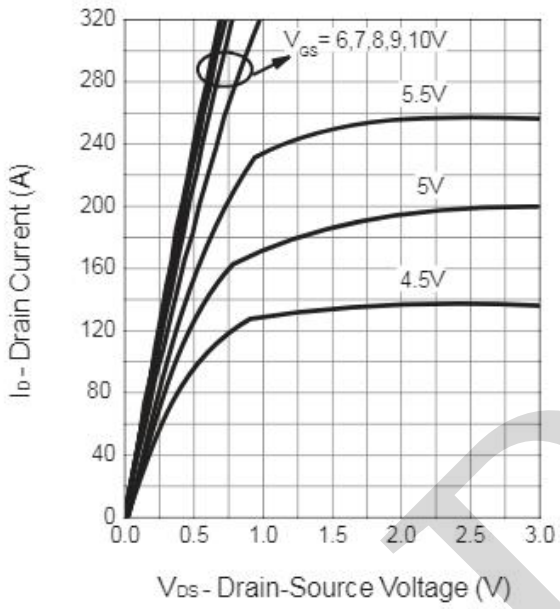
② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH, R_G = 25Ω. Part not recommended for use above this value

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

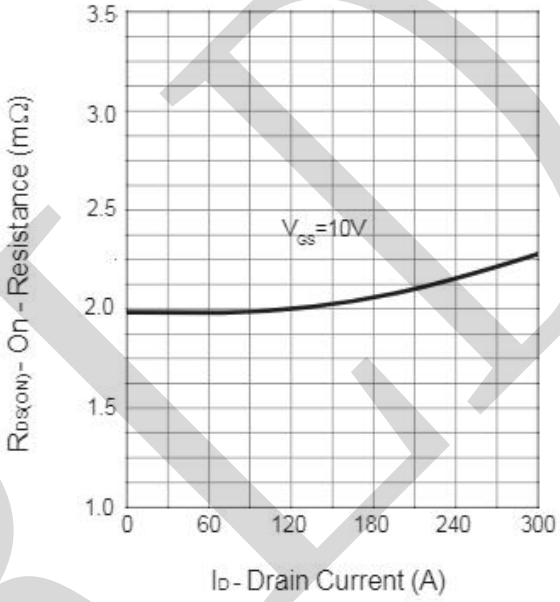
④ Pulse width ≤ 380μs; duty cycle≤ 2%.

Typical Characteristics

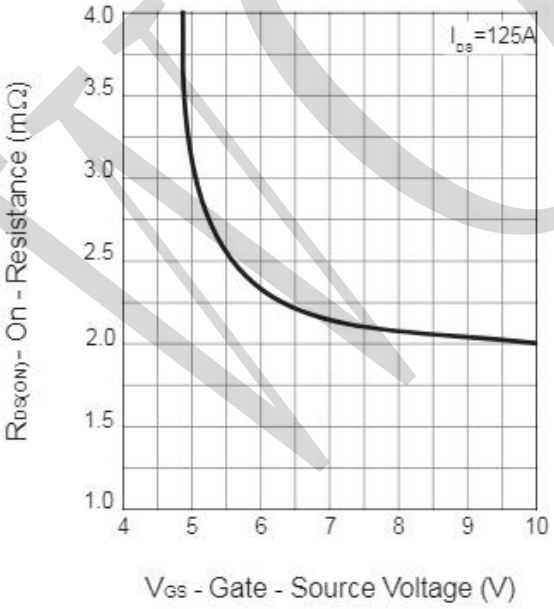
Output Characteristics



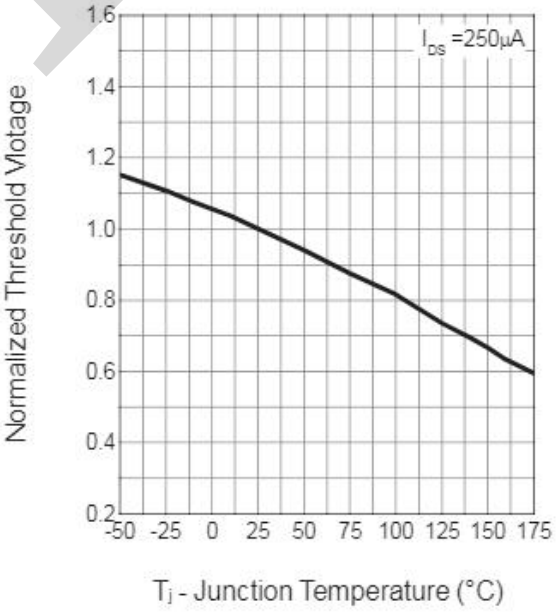
Drain-Source On Resistance



Drain-Source On Resistance

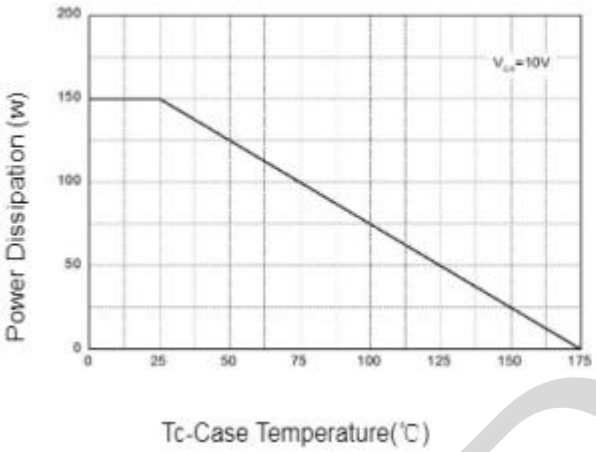


Gate Threshold Voltage

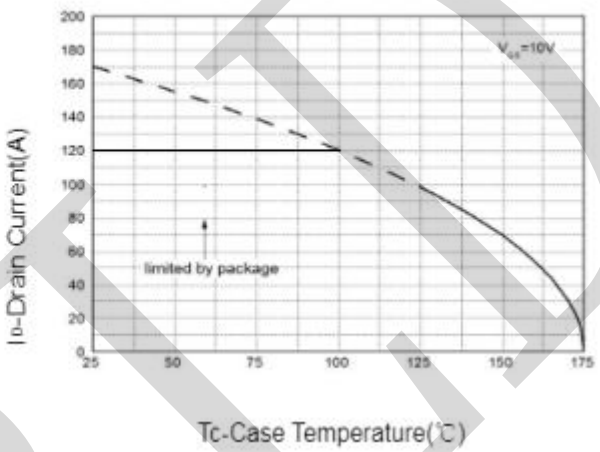


Typical Characteristics

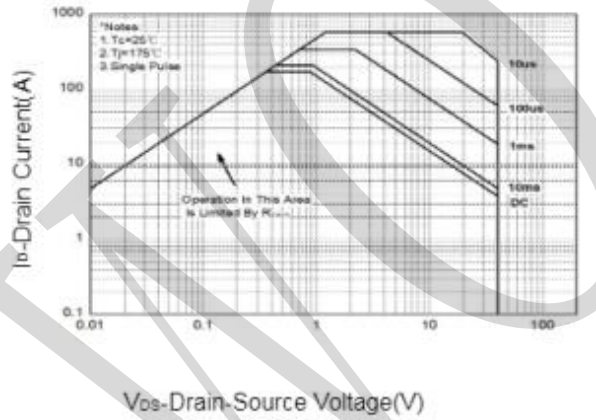
Power Dissipation



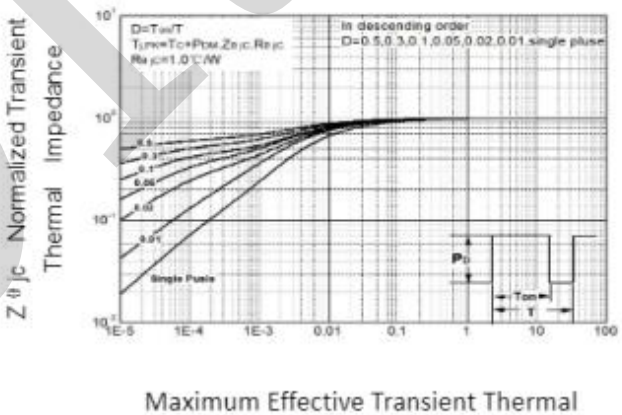
Drain Current



Safe Operation Area



Thermal Transient Impedance



PACKAGE OUTLINE DIMENSIONS

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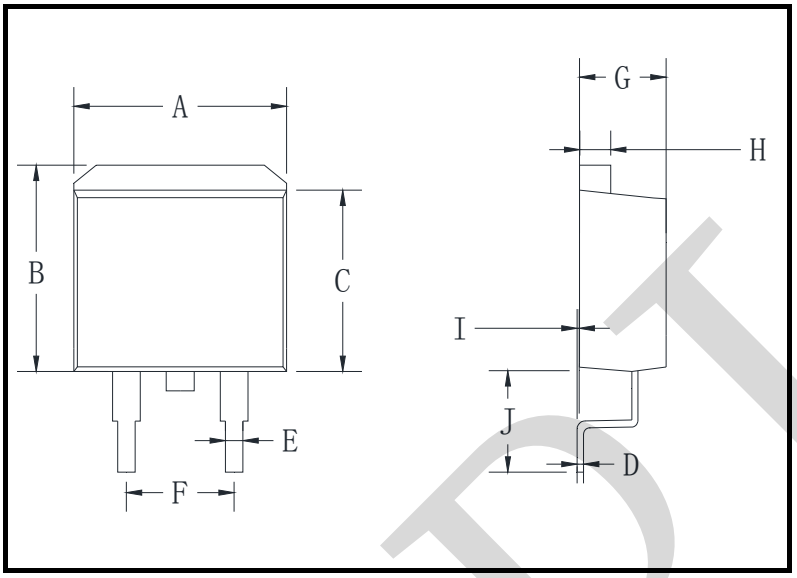
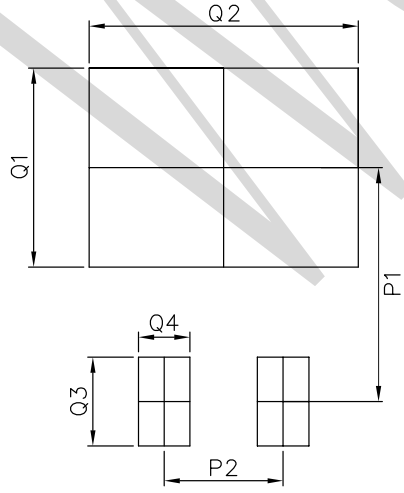


TO-263 mechanical data

UNIT		A	B	C	D	E	F	G	H	I	J
mm	max	11.5	10.5	9.0	0.64	0.94	5.6	5.1	1.4	0.6	6.1
	min	9.5	9.7	8.4	0.28	0.68	4.5	4.0	1.1	0	4.9
mil	max	452.7	413.3	354.3	25.2	37.0	220.5	200.8	55.1	23.6	240.1
	min	374.0	381.8	330.7	11.0	26.7	177.2	157.5	43.3	0.6	192.9

TO-263 Suggested Pad Layout



UNIT		P1	P2	Q1	Q2	Q3	Q4
mm	min	10.0	4.00	8.5	11.5	3.8	2.1
mil	min	393.3	157.5	39.37	334.6	149.6	82.7