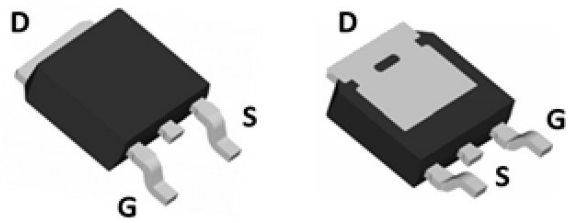
N-Channel Enhancement Mode Field Effect Transistor

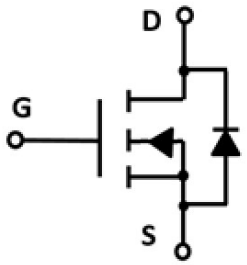
RC90N06

Product Summary

- V_{DS} 60V
- I_D 90A
- $R_{DS(ON)}$(at V_{GS}=10V) <7.5 mohm
- $R_{DS(ON)}$(at V_{GS}=4.5V) <9.5 mohm
- 100% UIS Tested
- 100% ▽V_{DS} Tested



TO-252



General Description

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Applications

- DC-DC Converters
- Power management functions
- Industrial and Motor Drive application

■ Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	60	V
Gate-source Voltage		V_{GS}	±20	V
Drain Current (Silicon limited)	Tc=25℃	I_D	90	A
	Tc=100℃		50	
Pulsed Drain Current [A]		I_{DM}	300	A
Avalanche energy [B]		E_{AS}	150	mJ
Total Power Dissipation [C]	Tc=25℃	P_D	78	W
	Tc=100℃		31	
Junction and Storage Temperature Range		T_J ,T_{STG}	-55～+150	℃

■Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient [D]	t≤10S	$R_{\theta JA}$	15	20	℃/W
Thermal Resistance Junction-to-Ambient [D]	Steady-State		40	50	
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	1.3	1.6	

■ Ordering Information (Example)

PREFERED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
RC90N06	F1	90N06	2500	2500	25000	13“ reel

■ Electrical Characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Static Parameter							
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D=250μA		60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	T_J=25℃			1	μA
			T_J=55℃			5	
Gate-Body Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V				±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250μA		1.2	1.7	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}= 10V, I_D=20A			5.5	7.5	mΩ
		V_{GS}= 4.5V, I_D=10A			6.9	9.5	
Diode Forward Voltage	V_{SD}	I_S=20A,V_{GS}=0V			0.85	1.3	V
Maximum Body-Diode Continuous Current	I_S					80	A
Dynamic Parameters							
Input Capacitance	C_{iss}	V_{DS}=35V,V_{GS}=0V,f=1MHZ			2000		pF
Output Capacitance	C_{oss}				390		
Reverse Transfer Capacitance	C_{rss}				13		
Gate Resistance	R_g	f=1MHZ, Open drain			1.6		Ω
Switching Parameters							
Total Gate Charge	Q_g(10V)	V_{DS}=30V,I_D=20A			34		nC
Total Gate Charge	Q_g(4.5V)				15.8		
Gate-Source Charge	Q_{gs}				7.8		
Gate-Drain Charge	Q_{gd}				5.2		
Reverse Recovery Charge	Q_{rr}	I_F=20A, di/dt=200A/us			36		
Reverse Recovery Time	t_{rr}				27		ns
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V,V_{DD}=30V,I_D=12A R_{GEN}=3Ω			10		
Turn-on Rise Time	t_r				36		
Turn-off Delay Time	$t_{D(off)}$				30		
Turn-off fall Time	t_f				57		

A. Repetitive rating; pulse width limited by max. junction temperature.
B. V_{DD}=50V, R_G=25Ω, L=0.5mH, I_{AS}=24.5A,.
C. Pd is based on max. junction temperature, using junction-case thermal resistance.
D. The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ t≤ 10s and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

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■ Typical Performance Characteristics

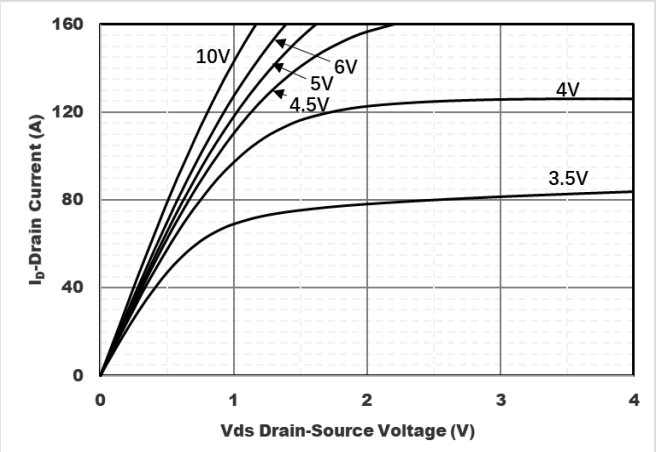

Figure1. Output Characteristics

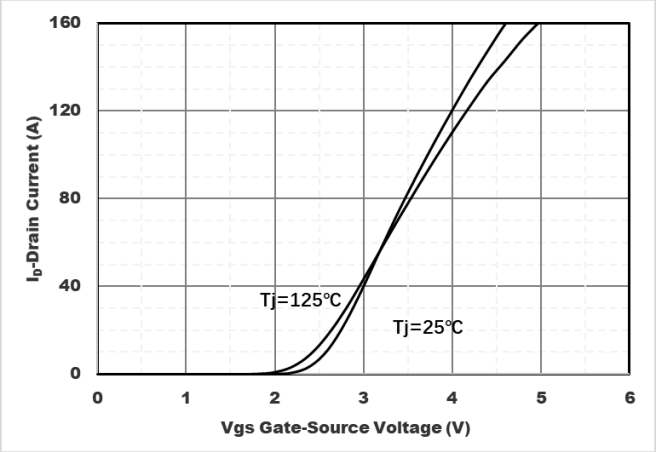

Figure2. Transfer Characteristics

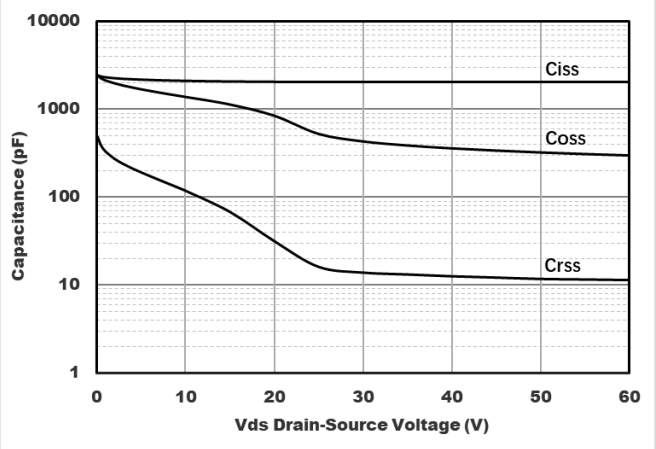

Figure3. Capacitance Characteristics

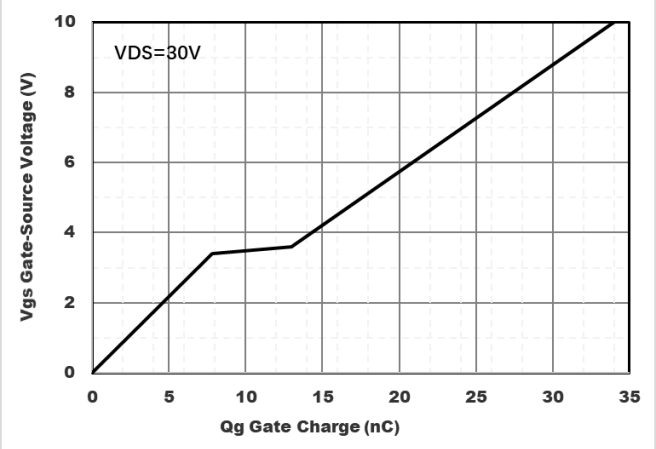

Figure4. Gate Charge

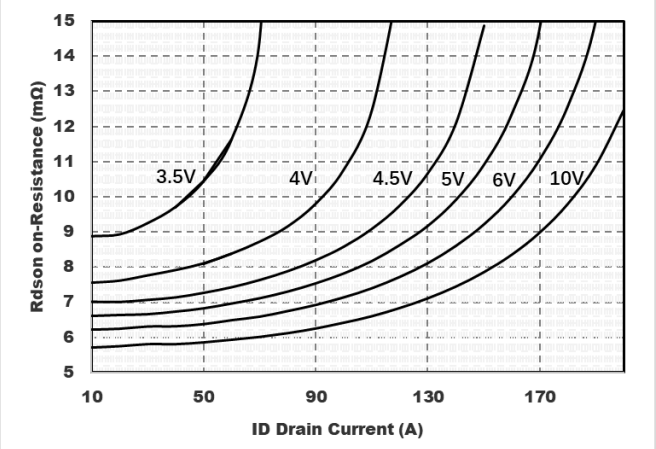

Figure5. Drain-Source on Resistance

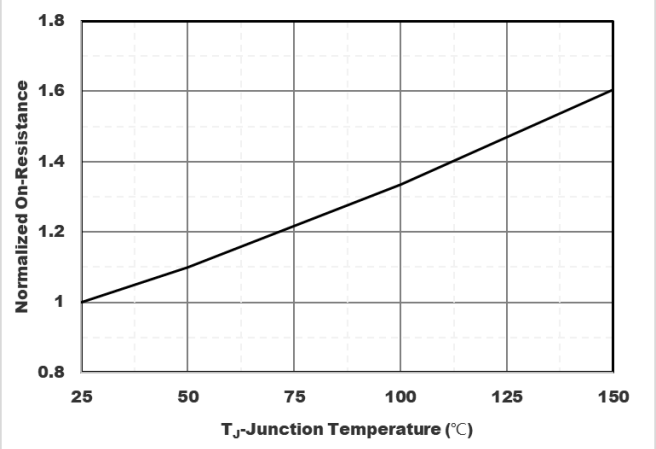

Figure6. Normalized On-Resistance

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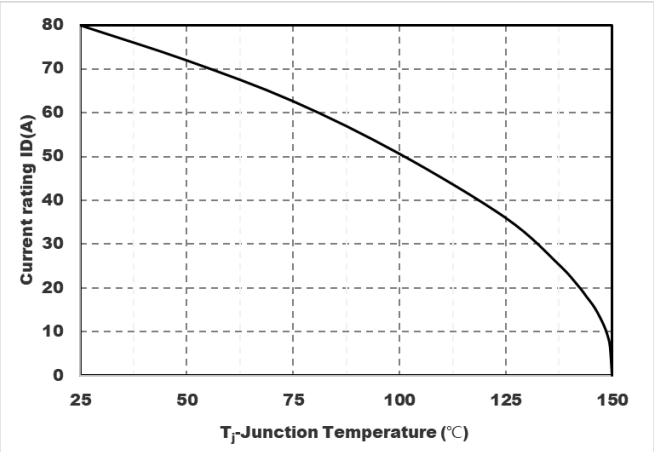

Figure7. Drain current

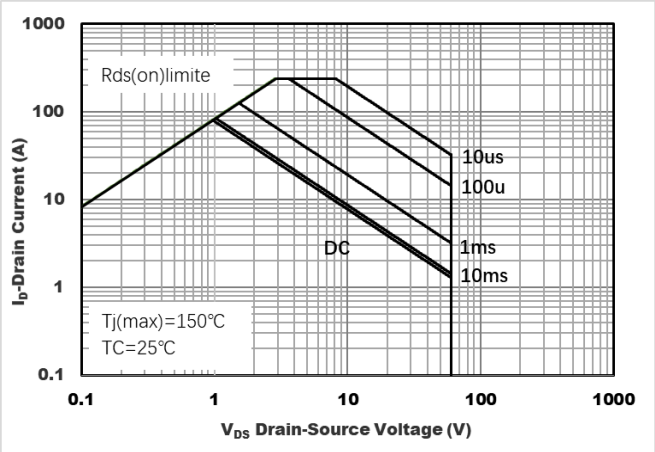

Figure8. Safe Operation Area

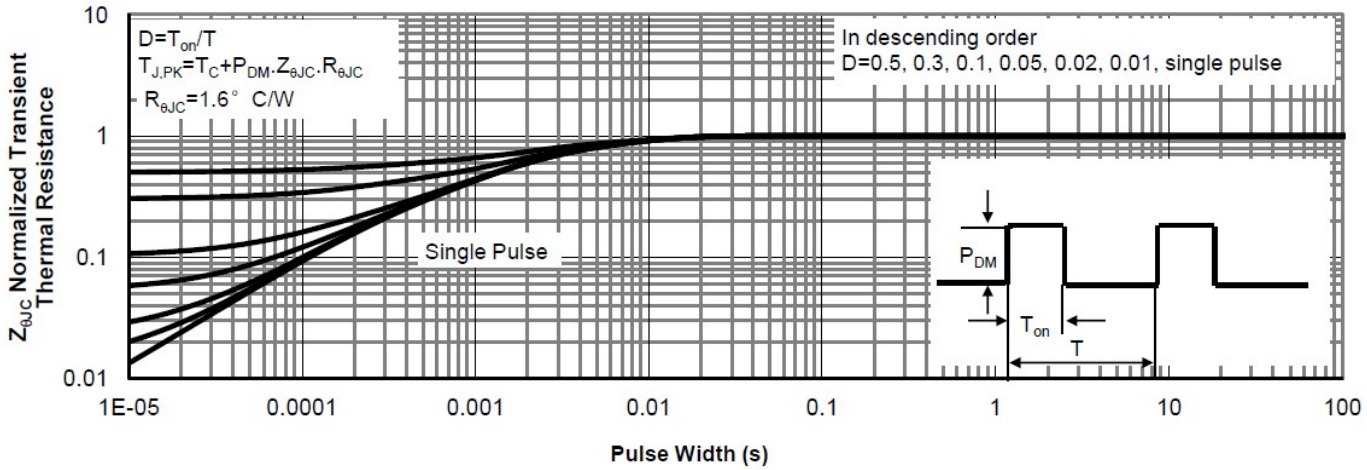

Figure8. Normalized Maximum Transient Thermal Impedance

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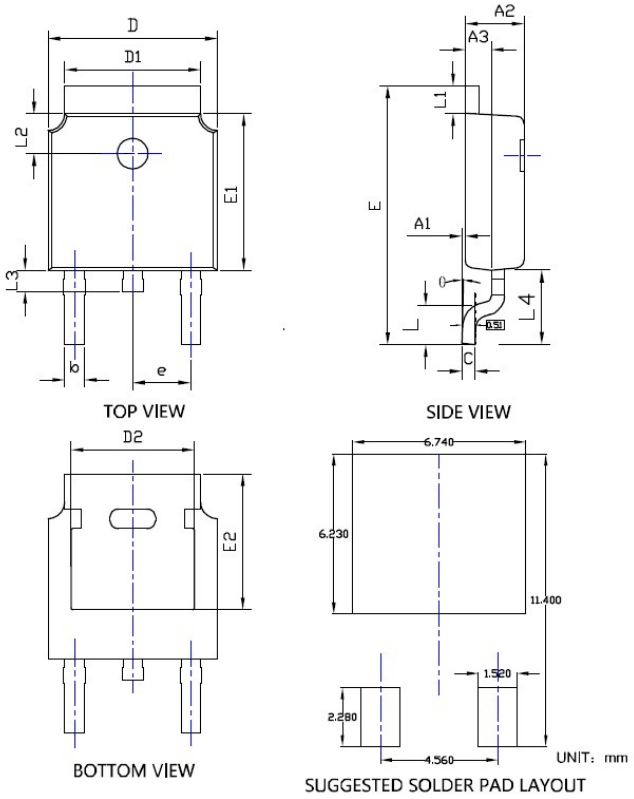
■ TO-252 Package information



SYMBOL	DIMENSIONS					
	INCHES			Millmeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A1	0.000	---	0.008	0.000	---	0.200
A2	0.087	0.091	0.094	2.200	2.300	2.400
A3	0.035	0.039	0.043	0.900	1.000	1.100
b	0.026	0.030	0.034	0.660	0.760	0.860
c	0.018	0.020	0.023	0.460	0.520	0.580
D	0.256	0.260	0.264	6.500	6.600	6.700
D1	0.203	0.209	0.215	5.150	5.300	5.450
D2	0.181	0.189	0.195	4.600	4.800	4.950
E	0.390	0.398	0.406	9.900	10.100	10.300
E1	0.236	0.240	0.244	6.000	6.100	6.200
E2	0.203	0.209	0.215	5.150	5.300	5.450
e	0.090BSC			2.286BSC		
L	0.049	0.059	0.069	1.250	1.500	1.750
L1	0.035	---	0.050	0.900	---	1.270
L2	0.055	---	0.075	1.400	---	1.900
L3	0.240	0.310	0.039	0.600	0.800	1.000
L4	0.114REF			2.900REF		
θ	0°	---	10°	0°	---	10°

NOTE:
1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.