RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

RM47N600T7
RM47N600T2

POWER FIELD EFFECT TRANSISTOR

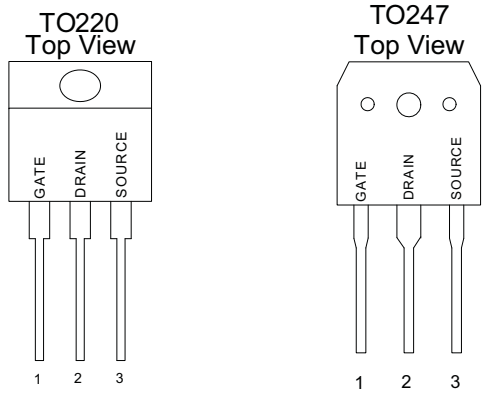
GENERAL DESCRIPTION

This high voltage MOSFET uses an advanced termination scheme to provide enhanced voltage-blocking capability without degrading performance over time. In addition, this advanced MOSFET is designed to withstand high energy in avalanche and commutation modes. The new energy efficient design also offers a drain-to-source diode with a fast recovery time. Designed for high voltage, high speed switching applications in power supplies, converters and PWM motor controls, these devices are particularly well suited for bridge circuits where diode speed and commutating safe operating areas are critical and offer additional and safety margin against unexpected voltage transients.

FEATURES

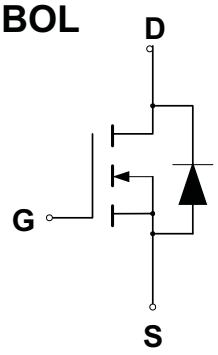
- Robust High Voltage Termination
- Avalanche Energy Specified
- Source-to-Drain Diode Recovery Time Comparable to a Discrete Fast Recovery Diode
- Diode is Characterized for Use in Bridge Circuits
- I_{DSS} and V_{DS}(on) Specified at Elevated Temperature
- Isolated Mounting Hole Reduces Mounting Hardware

PIN CONFIGURATION



RM47N600T2 RM47N600T7

SYMBOL



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current — Continuous	$I_{D(1)}$	47	A
— Pulsed	I_{DM}	141	
Gate-to-Source Voltage — Continue	V_{GS}	±20	V
Total Power Dissipation TO220	P_D	50	W
TO247		417	
Derate above 25℃ TO220		0.4	W/℃
TO247		2.78	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	℃
Single Pulse Drain-to-Source Avalanche Energy — T_J = 25℃ (V_{DD} = 100V, V_{GS} = 10V, I_L = 12A, L = 10mH, R_G = 25Ω)	E_{AS}	720	mJ
Thermal Resistance — Junction to Case TO220	$R\theta_{JC}$	2.5	℃/W
— Junction to Case TO247		0.3	
— Junction to Ambient TO220	$R\theta_{JA}$	62.5	
— Junction to Ambient TO247		40	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	260	℃

(1) Drain current limited by maximum junction temperature

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, T_J = 25℃.

Characteristic		Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage (V_{GS} = 0 V, I_D = 250 μA)		$V_{(BR)DSS}$	600			V
Drain-Source Leakage Current (V_{DS} =600 V, V_{GS} = 0 V)		I_{DSS}			1	uA
Gate-Source Leakage Current-Forward (V_{gsf} = 20 V, V_{DS} = 0 V)		I_{GSSF}			100	nA
Gate-Source Leakage Current-Reverse (V_{gsr} = - 20 V, V_{DS} = 0 V)		I_{GSSR}			100	nA
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 250 μA)		$V_{GS(th)}$	2	3	4	V
Static Drain-Source On-Resistance (V_{GS} = 10 V, I_D = 15.6A) *		$R_{DS(on)}$		68	81	mΩ
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz)	C_{iss}		3111.9		pF
Output Capacitance		C_{oss}		2399.1		pF
Reverse Transfer Capacitance		C_{rss}		61.6		pF
Turn-On Delay Time	(V_{DD} = 300 V, I_D = 20 A, R_G = 25Ω) *	$t_{d(on)}$		45.5		ns
Rise Time		t_r		120.56		ns
Turn-Off Delay Time		$t_{d(off)}$		137.06		ns
Fall Time		t_f		116.2		ns
Total Gate Charge	(V_{DS} = 480 V, I_D = 20 A, V_{GS} = 10 V)*	Q_g		87.967		nC
Gate-Source Charge		Q_{gs}		21.758		nC
Gate-Drain Charge		Q_{gd}		41.14		nC
SOURCE-DRAIN DIODE CHARACTERISTICS						
Forward On-Voltage(1)	(I_S = 20 A, d_{IS}/d_t = 100A/μs)	V_{SD}			1.5	V
Forward Turn-On Time		t_{on}		**		ns
Reverse Recovery Time		t_{rr}		947.1		ns

* Pulse Test: Pulse Width ≦300μs, Duty Cycle ≦2%

** Negligible, Dominated by circuit inductance

RATING AND CHARACTERISTICS CURVES (RM47N600T7(T2))

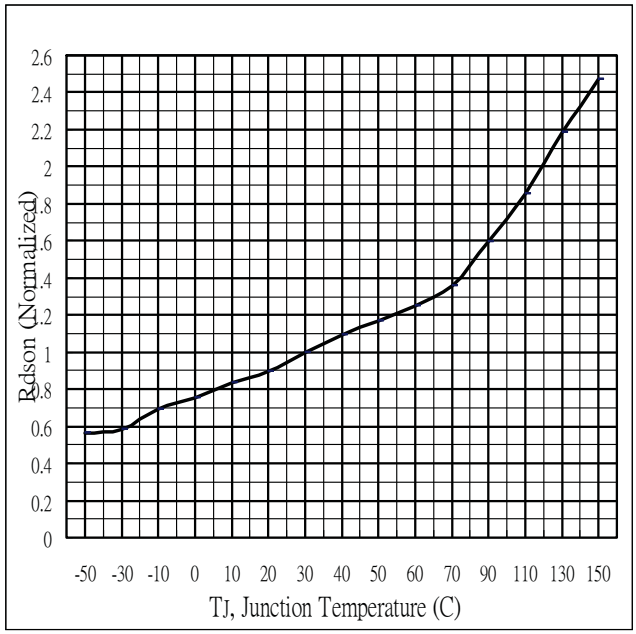


Fig 1. On-Resistance Variation with vs. Temperature

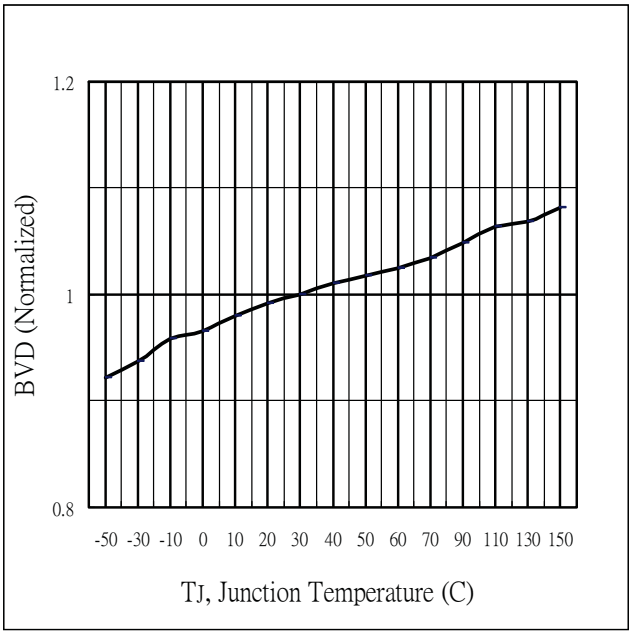


Fig.2 Breakdown Voltage Variation vs. Temperature

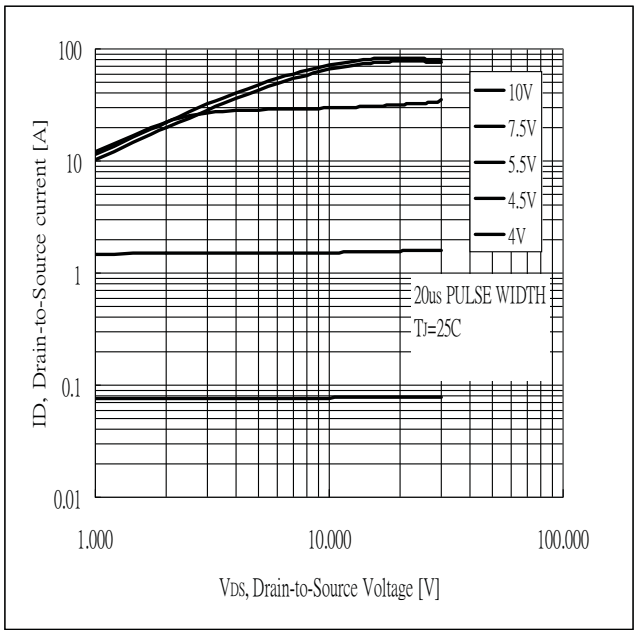


Fig 3. Typical Output Characteristics

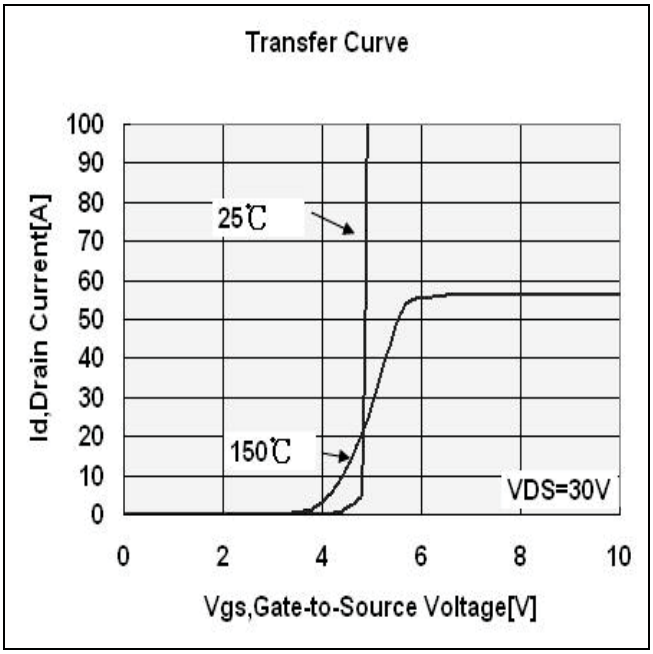


Fig 4. Typical Transfer Characteristics

RATING AND CHARACTERISTICS CURVES (RM47N600T7(T2))

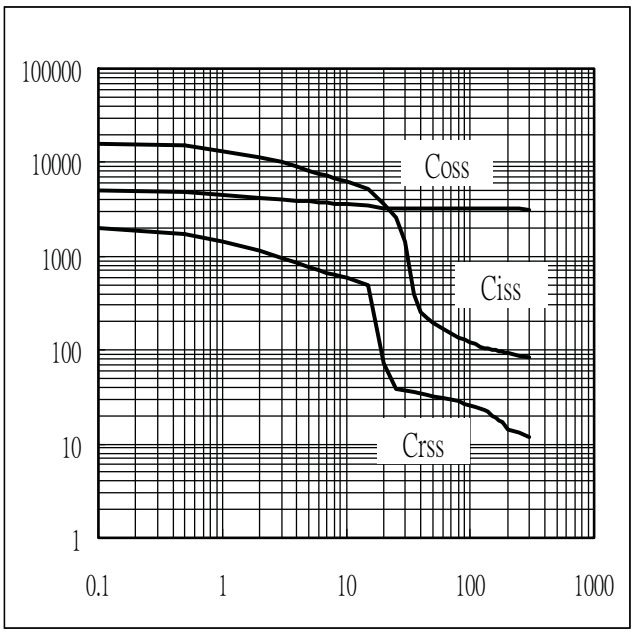


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

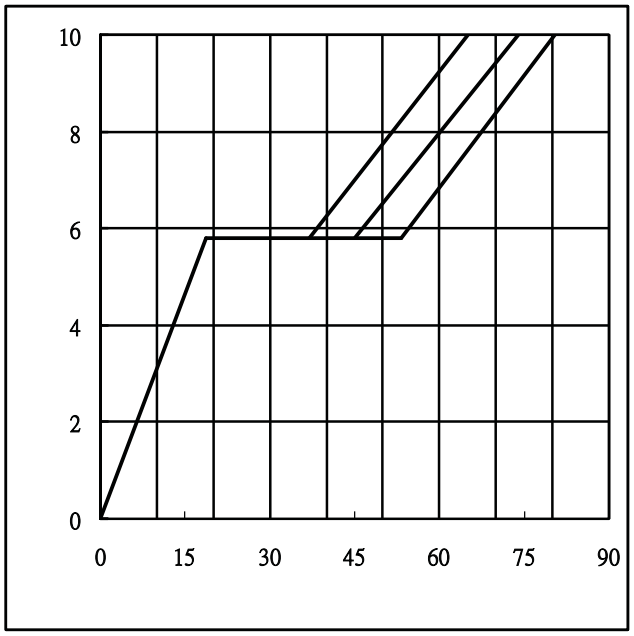
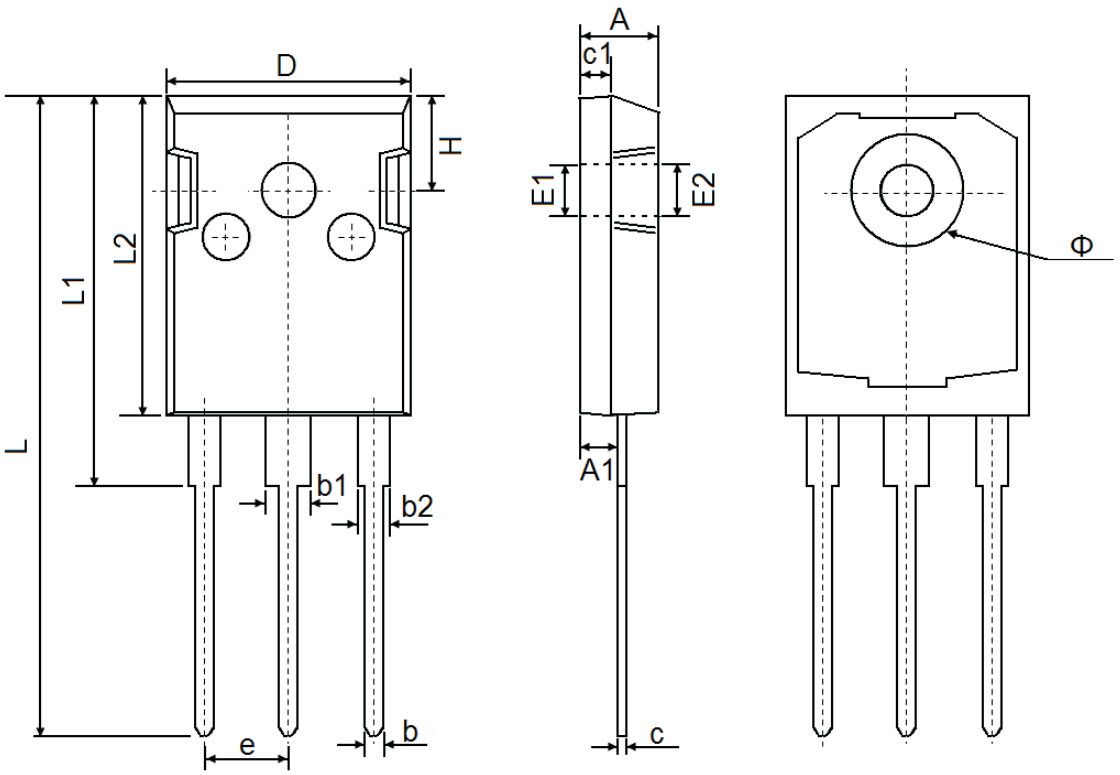


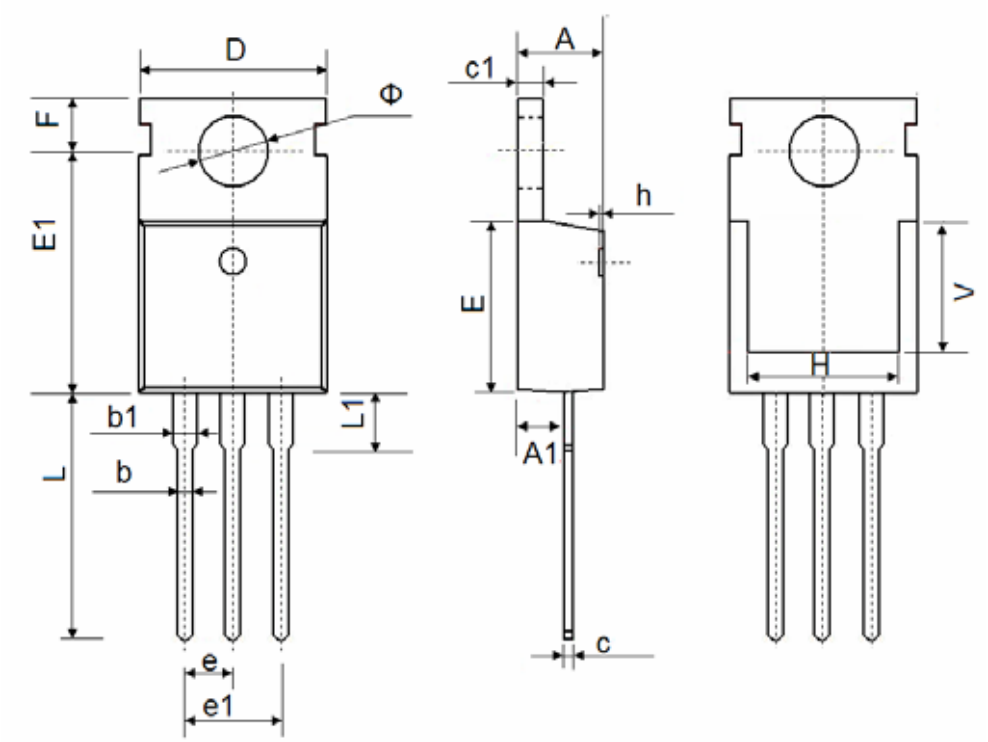
Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

TO-247 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
b2	1.800	2.200	0.071	0.087
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF		0.138 REF	
E2	3.600 REF		0.142 REF	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
Φ	7.100	7.300	0.280	0.287
e	5.450 TYP		0.215 TYP	
H	5.980 REF		0.235 REF	

TO-220-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	7.500 REF.		0.295 REF.	
Φ	3.400	3.800	0.134	0.150

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