# P-Channel Enhancement Mode Power MOSFET

Description

The RM70P30LD 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. It is ESD protested.

General Features

- V_{DS} =-30V,I_D =-70A

    $R_{DS(ON)}$ <7.2mΩ @ V_{GS}=-10V

    $R_{DS(ON)}$ <12mΩ @ V_{GS}=-4.5V

- Super high dense cell design
- Advanced trench process technology
- Reliable and rugged
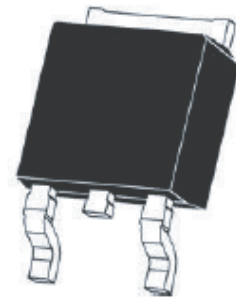- High density celldesign for ultra low on-resistance

Application

- Power switch
- DC/DC converters
- Halogen-free
- P/N suffix V means AEC-Q101 qualified, e.g:RM70P30LDV

100% UIS TESTED!
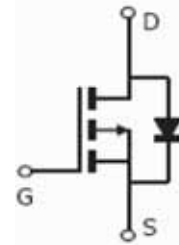
100% ∆Vds TESTED!

Schematic diagram
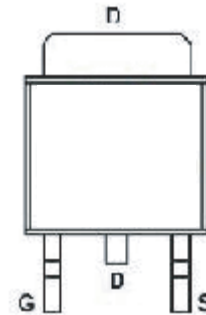
Marking and pin assignment

TO-252 -2Ltop view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
70P30	RM70P30LD	TO-252-2L	-	-	-

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	-70	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	-50	A
Pulsed Drain Current	I_{DM}	-200	A
Maximum Power Dissipation	P_D	90	W
Single pulse avalanche energy [Note 5]	E_{AS}	80	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case (Note 2)	$R_{\theta Jc}$	1.6	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

| Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250µA	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V,V_{GS}=0V	-	-	1	µA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics [Note 3]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250µA	-1.2	-	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D= -20A	-	6	7.2	mΩ
		V_{GS}=-4.5V, I_D= -15A	-	9.5	12	
Dynamic Characteristics [Note4]						
Input Capacitance	C_{Iss}	V_{DS}=-25V,V_{GS}=0V, F=1.0MHz	-	3450	-	PF
Output Capacitance	C_{oss}		-	255	-	PF
Reverse Transfer Capacitance	C_{rss}		-	140	-	PF
Switching Characteristics [Note 4]						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V,I_D=-10A V_{GS}=-20V,R_{GEN}=3.3Ω	-	17	-	nS
Turn-on Rise Time	t_r		-	40	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	55	-	nS
Turn-Off Fall Time	t_f		-	13	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V,I_D=-18A, V_{GS}=-10V	-	60	-	nC
Gate-Source Charge	Q_{gs}		-	9	-	nC
Gate-Drain Charge	Q_{gd}		-	15	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage [Note 3]	V_{SD}	V_{GS}=0V,I_S=-1A	-	-	-1.2	V
Diode Forward Current [Note 2]	I_S	-	-	-	-70	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF =-20A di/dt = 100A/µs[Note3]	-	22	-	nS
Reverse Recovery Charge	Qrr		-	72	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.

2. Surface Mounted on FR4 Board, t ≤ 10 sec.

3. Pulse Test: Pulse Width ≤ 300µs, Duty Cycle ≤ 2%.

4. Guaranteed by design, not subject to production

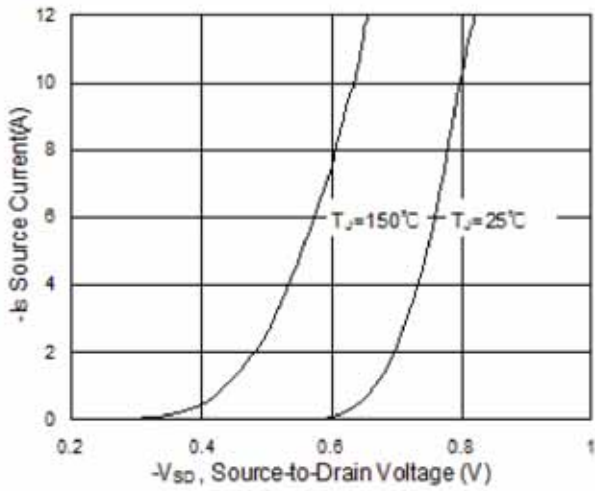**5.** E_{AS} condition：Tj=25℃,V_{DD}=-50V,V_G=-10V,L=0.5mH,Rg=25Ω

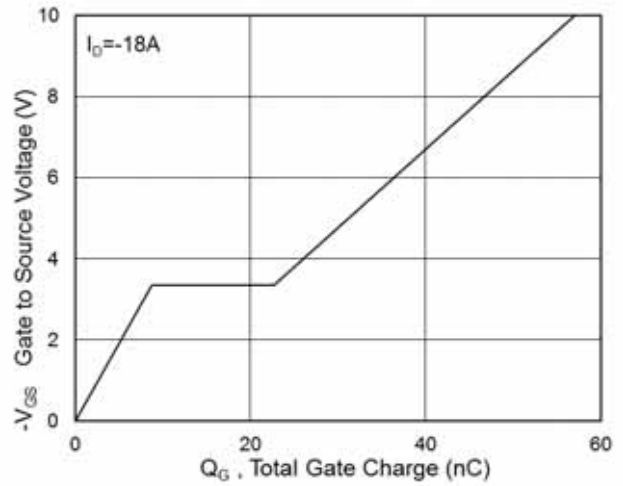# RATING AND CHARACTERISTICS CURVES (RM70P30LD)
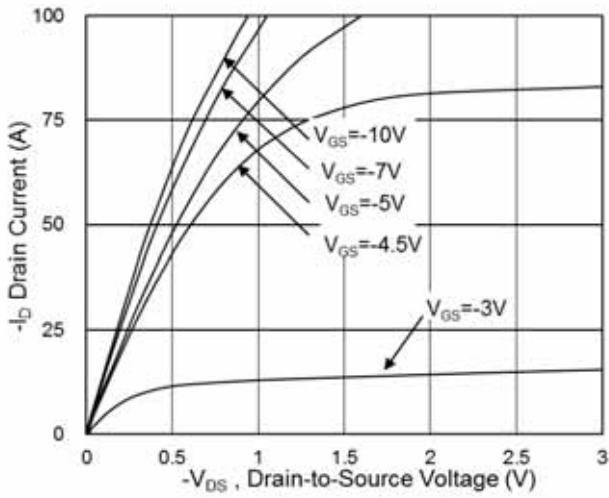
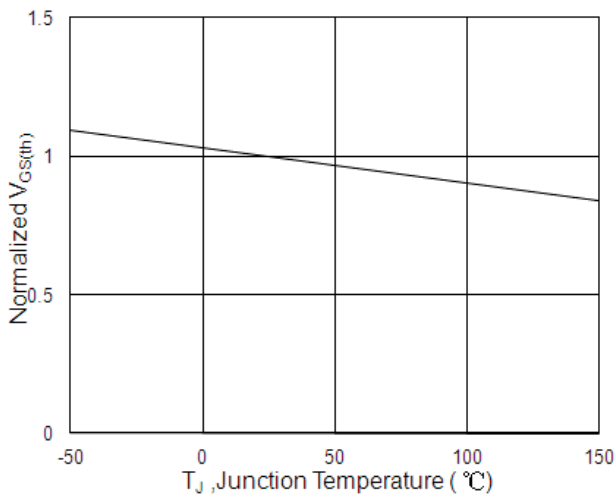**Fig.1 Typical Output Characteristics**
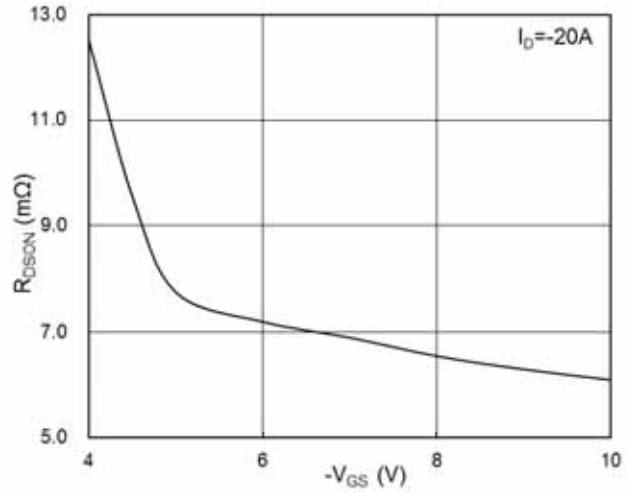
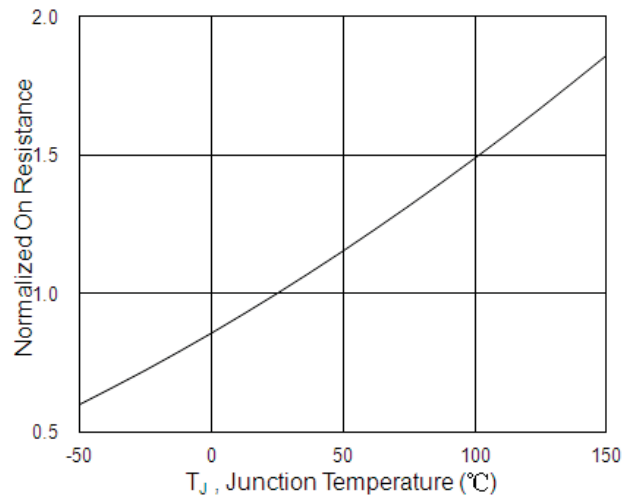**Fig.2 On-Resistance vs. Gate-Source Voltage**

Fig.3 Forward Characteristics of Reverse
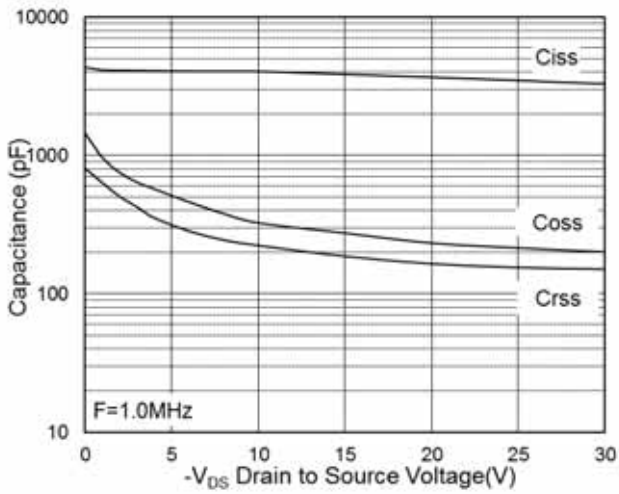
Fig.4 Gate-Charge Characteristics

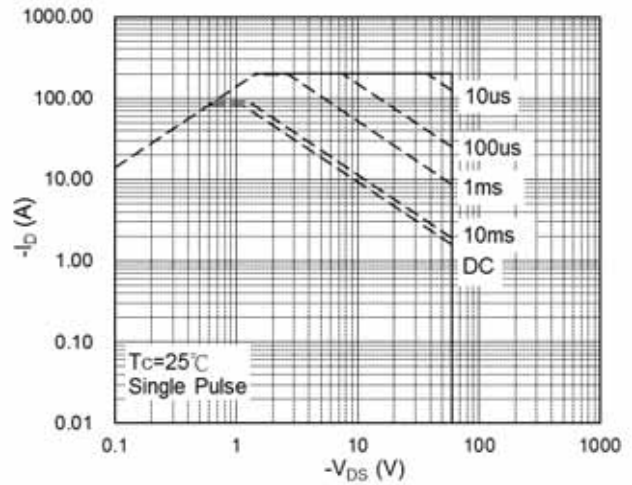**Fig.5 Normalized -$V_{GS(th)}$ vs. T_J**
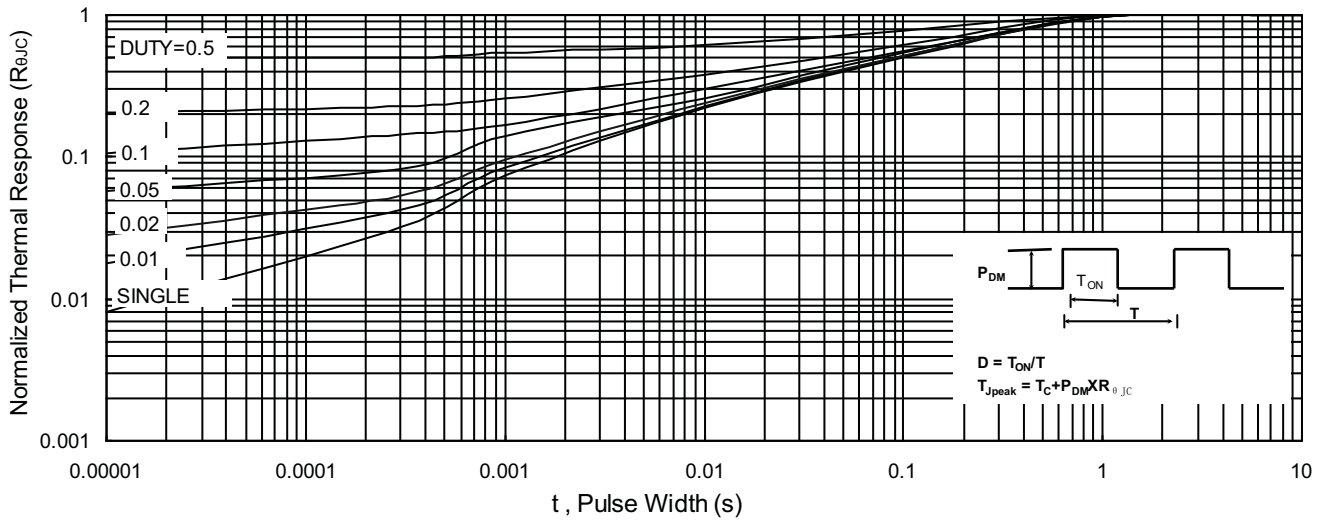
Fig.6 Normalized R_{DSON} vs. T_J
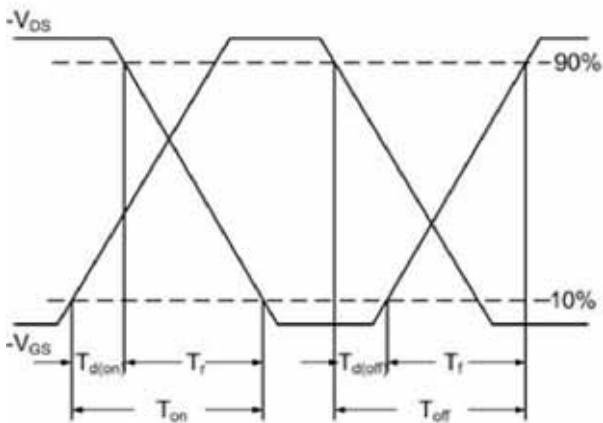
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RATING AND CHARACTERISTICS CURVES (RM70P30LD)
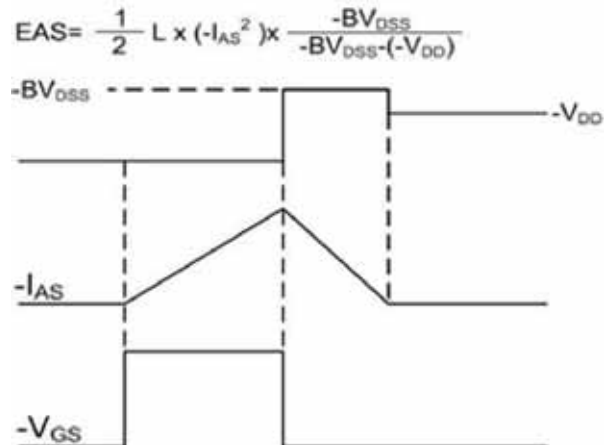

Fig.7 Capacitance

Fig.8 Safe Operating Area

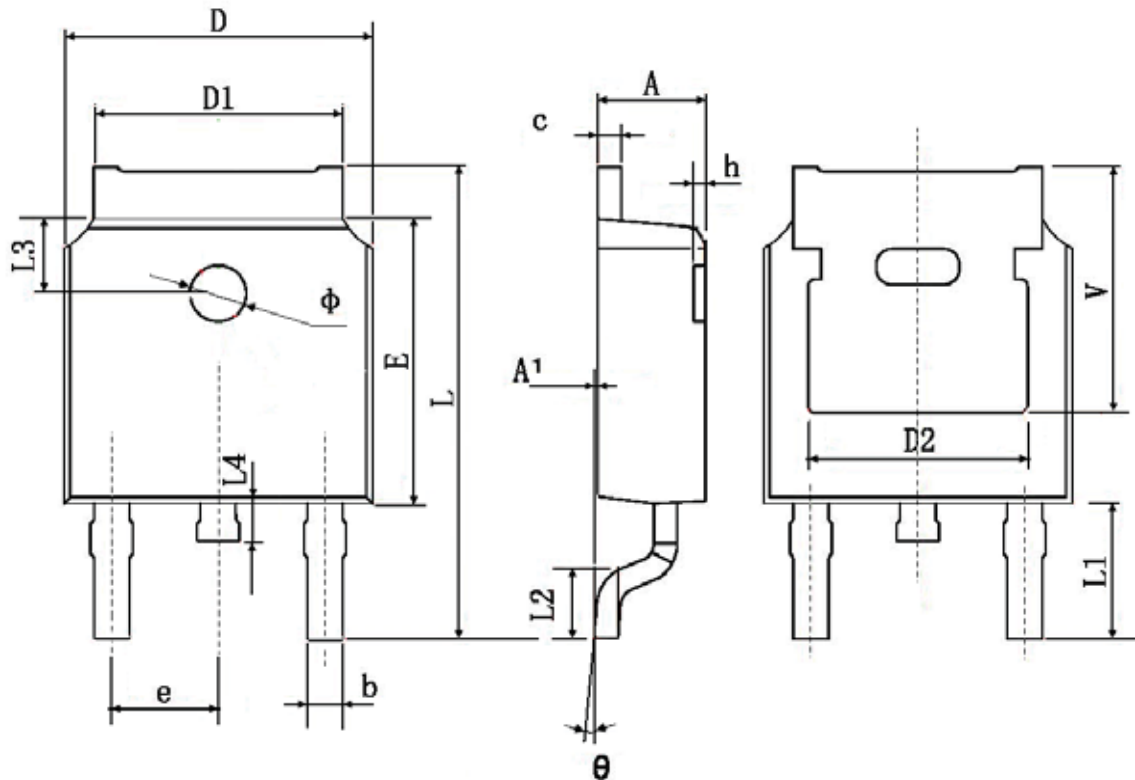**Fig.9 Normalized Maximum Transient Thermal Impedance**

Fig.10 Switching Time Waveform

Fig.11 Unclamped Inductive Switching Waveform

$$EAS = \frac{1}{2} L \times (-I_{AS}^2) \times \frac{-BV_{DSS}}{-BV_{DSS} - (-V_{DD})}$$

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TO-252 Package Information

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

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