

BV_{DSS}	R_{DS(ON)}	I_D
60 V	3 Ω	320 mA

SOT-23

Features

- $R_{DS(ON)} \leq 3\Omega @ V_{GS}=10V$
- $R_{DS(ON)} \leq 3.2\Omega @ V_{GS}=4.5V$
- High Density Cell Design For Ultra Low On-Resistance
- Very Low Leakage Current In Off Condition
- ESD Protected 2KV HBM

Mechanical Data

- Case : SOT-23
- Marking : K72

Ordering Information

Part No.	Remark	Package	Packing
TNMNG30H	RoHS Compliant	SOT-23	3000 / Tape & Reel
TNMNG30H-H	Halogen Free		
TNMNG30H-Q	AEC-Q101 qualified		

Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain	I_D	320	mA
Pulsed Drain Current (NOTE 1)	I_{DM}	2000	mA
Total Power Dissipation (NOTE 3)	P_D	350	mW
Junction and Storage Temperature Range	T_J, T_{STG}	-55~150	°C
Typical Thermal Resistance	$R_{\theta JA}$	357	°C/W

NOTE :

- 1.Maximum DC current limited by the package
- 2.Pulse test : pulse width $\leq 300\mu s$, duty cycle $\leq 2.0\%$.
- 3.1*MRP FR-4 PC board,2oz.



Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Static						
Drain-source breakdown voltage	$V_{GS}=0V, I_D=10\mu A$	$V_{(BR)DSS}$	60	-	-	V
Gate-threshold voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	1	-	2.1	V
Drain-Source On-Resistance	$V_{GS}=5V, I_D=50mA$	$R_{DS(on)}$	-	-	2.8	Ω
	$V_{GS}=4.5V, I_D=200mA$		-	-	3.2	
	$V_{GS}=10V, I_D=500mA$		-	-	3.0	
Zero gate voltage drain current	$V_{DS}=60V, V_{GS}=0V$	I_{DSS}	-	-	1	μA
Gate-source leakage current	$V_{DS}=0V, V_{GS}=\pm 20V$	I_{GSS}	-	-	± 10	μA
Forward Transconductance	$V_{DS}=15V, I_D=250mA$	g_{fs}	-	300	-	mS

Dynamic Characteristics

Total Gate Charge	$V_{DS} = 15V, V_{GS} = 5V, I_D = 200mA$	Q_g	-	-	0.8	nC
Delay Turn-On Time	$V_{DD}=30V, R_L=150\Omega, I_D=200mA, V_{GEN}=10V, R_G=10\Omega$	$t_{d(on)}$	-	6	-	ns
Delay Turn-Off Time		$t_{d(off)}$	-	13	-	
Input capacitance	$V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$	C_{iss}	-	-	35	pF
Output capacitance		C_{oss}	-	-	12	
Reverse transfer capacitance		C_{rss}	-	-	7	

Source-Drain Diode

Diode Forward Voltage	$V_{GS}=0V, I_S=200mA$	V_{SD}	-	0.82	1.1	V
Continuous Source Current		I_S	-	-	300	mA
Reverse Recovery Time	$V_{GS}=0V, V_{DD}=30V, I_S=1A, dI_S/dt=100A/\mu s$	t_{rr}	-	16.42	-	nS
Reverse Recovery Charge		Q_{rr}	-	9.02	-	nC



Characteristics Curves

FIG. 1-Output Characteristics

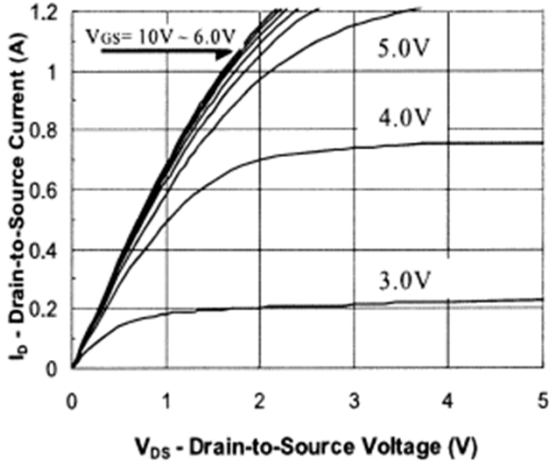


FIG. 2-Breakdown Voltage VS. Junction Temperature

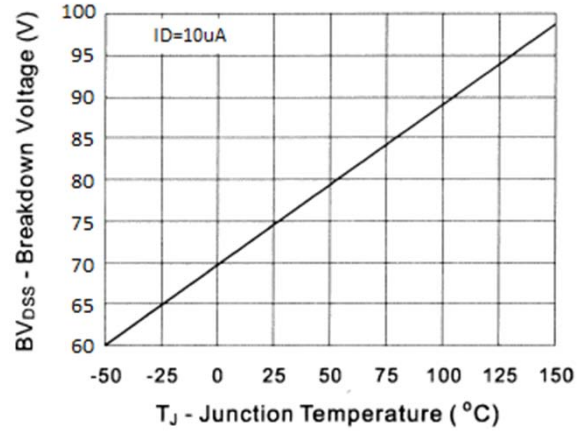


FIG. 3-On-Resistance VS. Drain Current

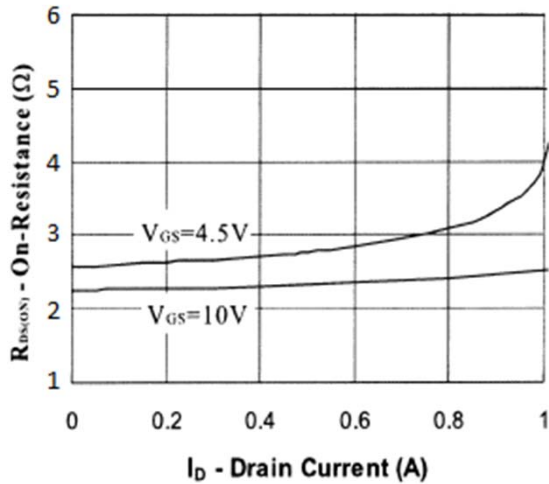


FIG. 4-On-Resistance VS. Gate-Source voltage

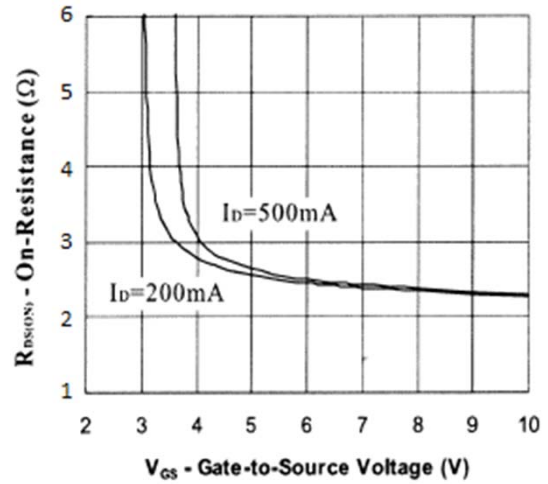


FIG. 5-On-Resistance VS. Junction Temperature

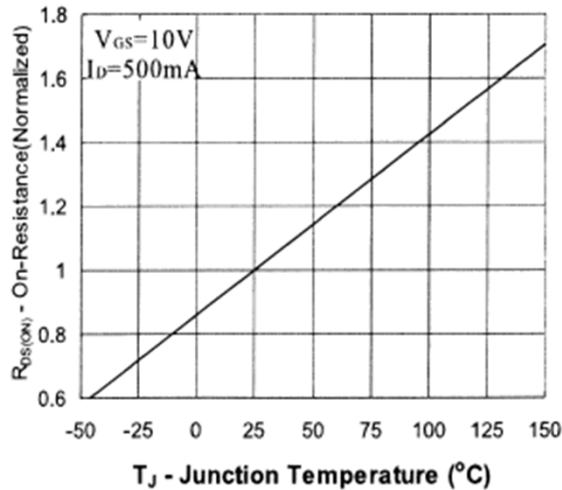
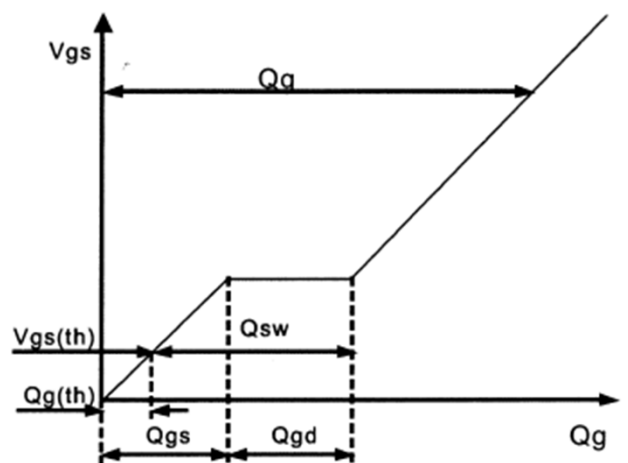


FIG. 6-Gate Charge Waveform





Characteristics Curves

FIG. 7-Gate Charge

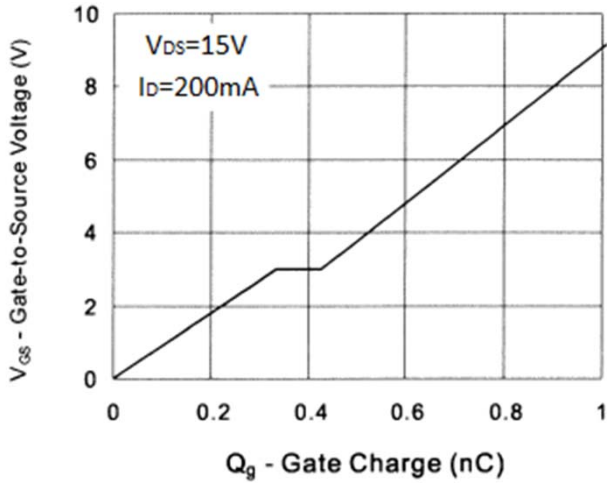


FIG. 8-Threshold Voltage VS. Temperature

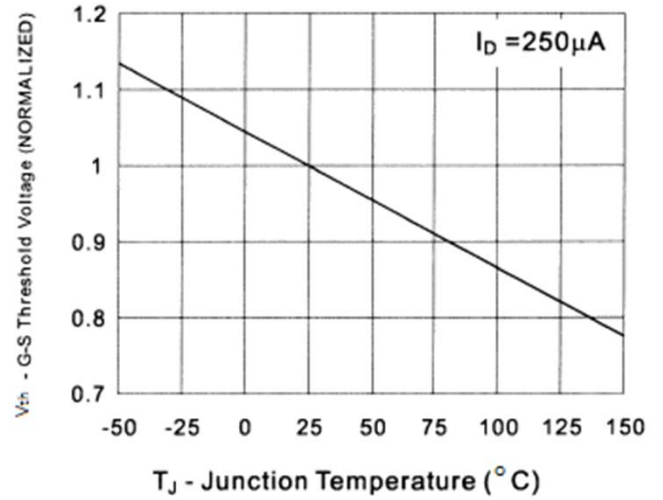


FIG. 9-Capacitance VS. Drain to Source Voltage

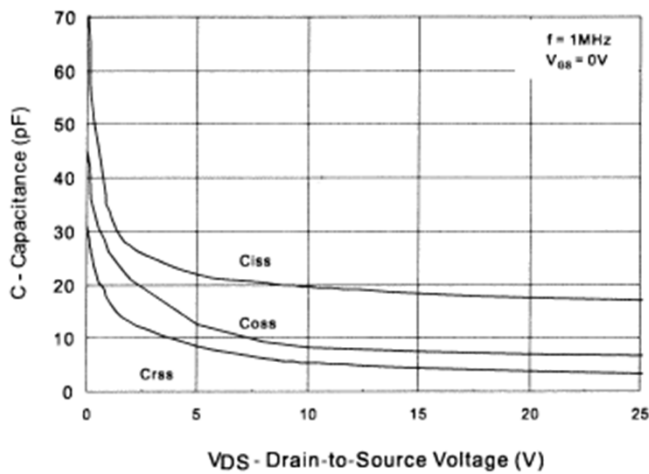


FIG. 10-Source-Drain Diode Forward Voltage

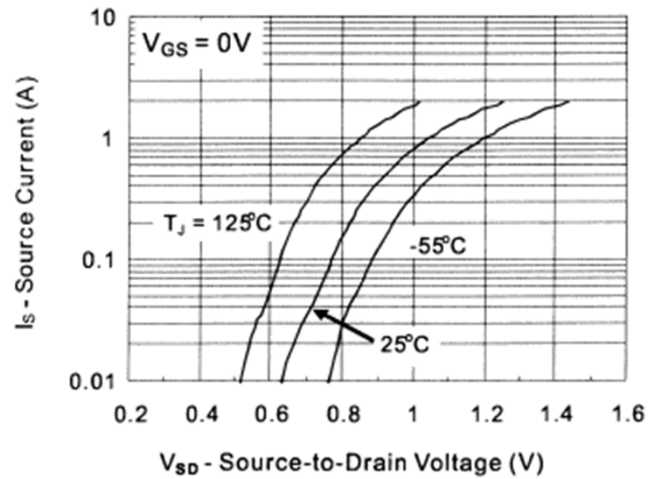
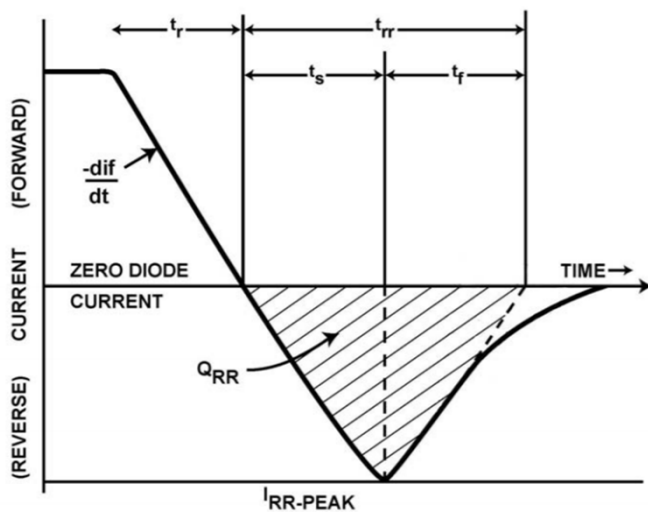
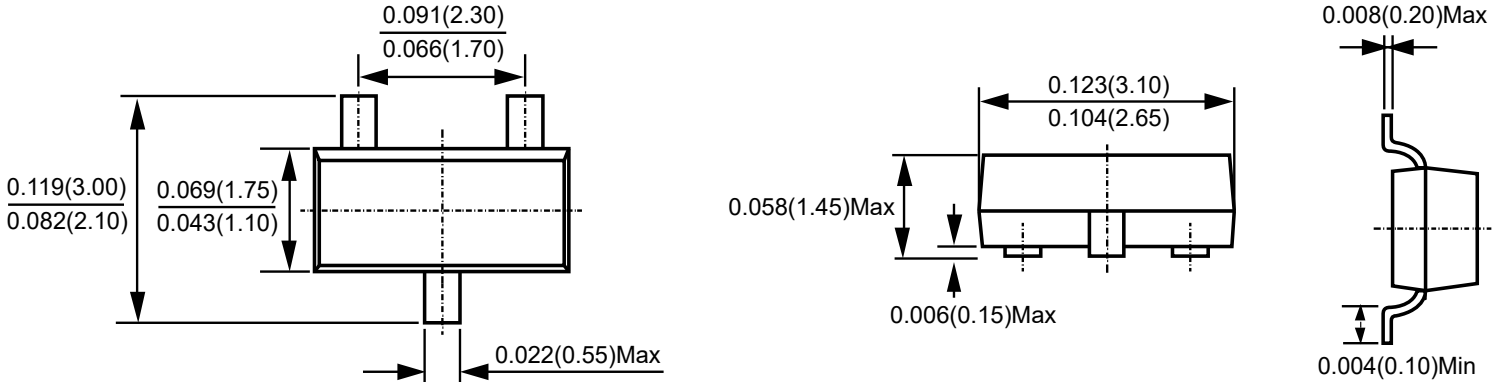


FIG. 11-QRR and TRR Waveform definitions





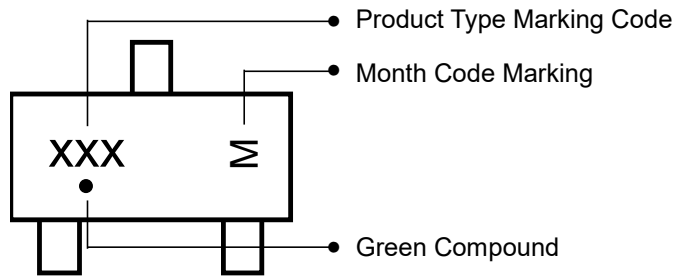
Package Outline Dimensions



SOT-23

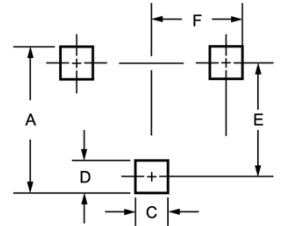
Dimensions in inches and (millimeters)

Marking Information



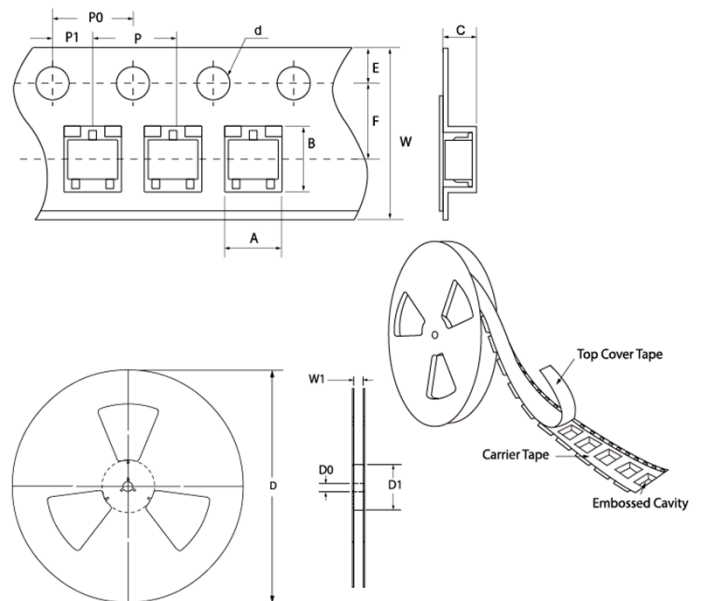
Suggested Pad Layout

Symbol	Outline	SOT-23 millimeters
A		2.90
C		0.80
D		0.90
E		2.00
F		1.35



Tape & Reel Specification

Item	Symbol	SOT-23 (mm)
Carrier width	A	3.15 ± 0.25
Carrier length	B	2.95 ± 0.35
Carrier depth	C	1.35 ± 0.25
Sprocket hole	d	1.50 ± 0.1
Reel outside diameter	D	178.0 ± 2.0
Reel inner diameter	D1	50 (min)
Feed hole diameter	D0	13.0 ± 1.0
Sprocket hole position	E	1.75 ± 0.1
Punch hole position	F	3.50 ± 0.1
Punch hole pitch	P	4.00 ± 0.1
Sprocket hole pitch	P0	4.00 ± 0.1
Embossment center	P1	2.00 ± 0.1
Tape width	W	8.00 ± 0.3
Reel width	W1	9.50 ± 1.5





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