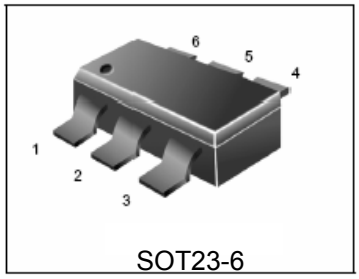
Small Signal MOSFET
300 mAmps, 60 Volts
N–Channel SOT23-6

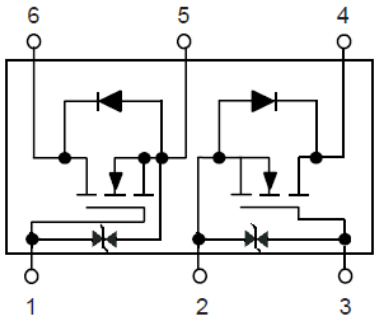


SOT23-6

- We declare that the material of product compliance with RoHS requirements.
- ESD Protected:1000V
- S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

300 mAMPS
60 VOLTS
$R_{DS(on)}$ = 7.5 Ω

N - Channel



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain–Source Voltage	V_{DSS}	60	Vdc
Drain–Gate Voltage (R_{GS} = 1.0 MΩ)	V_{DGR}	60	Vdc
Drain Current – Continuous T_C = 25°C (Note 1.) T_C = 100°C (Note 1.) – Pulsed (Note 2.)	I_D I_D I_{DM}	±300 ±75 ±800	mAdc
Gate–Source Voltage – Continuous – Non–repetitive ($t_p \leq 50$ μs)	V_{GS} V_{GSM}	±20 ±40	Vdc Vpk

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR–5 Board (Note 3.) T_A = 25°C Derate above 25°C	P_D	225 1.8	mW mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate,(Note 4.) T_A = 25°C Derate above 25°C	P_D	300 2.4	mW mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T_J, T_{stg}	-55 to +150	°C

1. The Power Dissipation of the package may result in a lower continuous drain current.
2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
3. FR–5 = 1.0 x 0.75 x 0.062 in.
4. Alumina = 0.4 x 0.3 x 0.025 in 99.5% alumina.

ORDERING INFORMATION

Device	Marking	Shipping
HM7002KDM	72D	3000 Tape & Reel
HM7002KDM	72D	10000 Tape & Reel

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain–Source Breakdown Voltage (V_{GS} = 0, I_D =250μAdc)		$V_{(BR)DSS}$	60	–	–	Vdc
Zero Gate Voltage Drain Current (V_{GS} = 0, V_{DS} = 60 Vdc)	T_J = 25°C T_J = 125°C	I_{DSS}	– –	– –	1.0 500	μAdc
Gate–Body Leakage Current, Forward (V_{GS} = 20 Vdc)		I_{GSSF}	–	–	1.0	μAdc
Gate–Body Leakage Current, Reverse (V_{GS} = –20 Vdc)		I_{GSSR}	–	–	–1.0	μAdc
ON CHARACTERISTICS (Note 2.)						
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 250 μAdc)		$V_{GS(th)}$	0.7	1.3	1.9	Vdc
On–State Drain Current ($V_{DS} \geq 2.0\ V_{DS(on)}$, V_{GS} = 10 Vdc)		$I_{D(on)}$	500	–	–	mA
Static Drain–Source On–State Voltage (V_{GS} = 10 Vdc, I_D = 500 mAdc) (V_{GS} = 5.0 Vdc, I_D = 50 mAdc)		$V_{DS(on)}$	 – –	 – –	 3.75 0.375	Vdc
Static Drain–Source On–State Resistance (V_{GS} = 10 V, I_D = 500 mAdc) (V_{GS} = 5.0 Vdc, I_D = 50 mAdc) 	 T_C = 25°C T_C = 125°C T_C = 25°C T_C = 125°C	$r_{DS(on)}$	 – – – –	 1.8 – 1.95 –	 2.2 13.5 3.0 13.5	Ohms
Forward Transconductance ($V_{DS} \geq 2.0\ V_{DS(on)}$, I_D = 200 mAdc)		g_{FS}	80	–	–	mmhos
DYNAMIC CHARACTERISTICS						
Input Capacitance (V_{DS} = 25 Vdc, V_{GS} = 0, f = 1.0 MHz)		C_{iss}	–	17	50	pF
Output Capacitance (V_{DS} = 25 Vdc, V_{GS} = 0, f = 1.0 MHz)		C_{oss}	–	10	25	pF
Reverse Transfer Capacitance (V_{DS} = 25 Vdc, V_{GS} = 0, f = 1.0 MHz)		C_{rss}	–	2.5	5.0	pF
SWITCHING CHARACTERISTICS (Note 2.)						
Turn–On Delay Time	(V_{DD} = 25 Vdc , $I_D \cong$ 500 mAdc, R_G = 25 Ω, R_L = 50 Ω, V_{gen} = 10 V)	$t_{d(on)}$	–	7	20	ns
Turn–Off Delay Time		$t_{d(off)}$	–	11	40	ns
BODY–DRAIN DIODE RATINGS						
Diode Forward On–Voltage (I_S =300 mAdc, V_{GS} = 0 V)		V_{SD}	–	–	–1.5	Vdc
Source Current Continuous (Body Diode)		I_S	–	–	–300	mAdc
Source Current Pulsed		I_{SM}	–	–	–900	mAdc

2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

TYPICAL ELECTRICAL CHARACTERISTICS

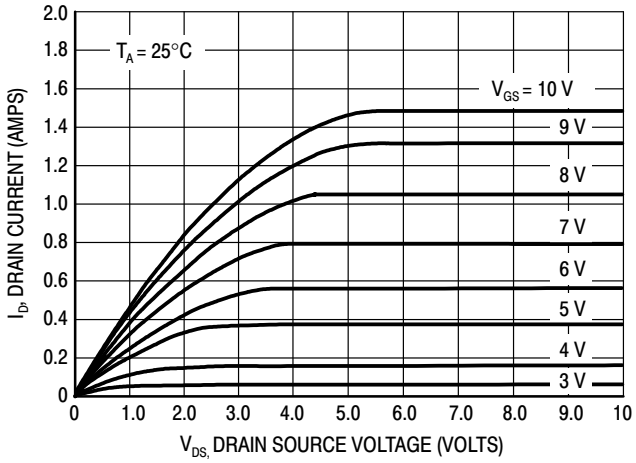


Figure 1. Ohmic Region

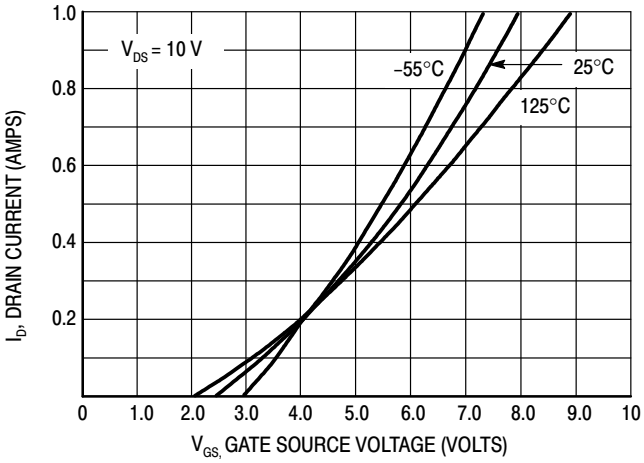


Figure 2. Transfer Characteristics

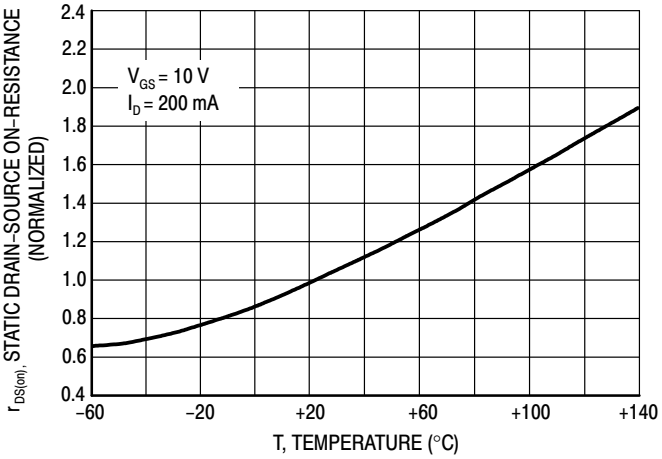


Figure 3. Temperature versus Static Drain–Source On–Resistance

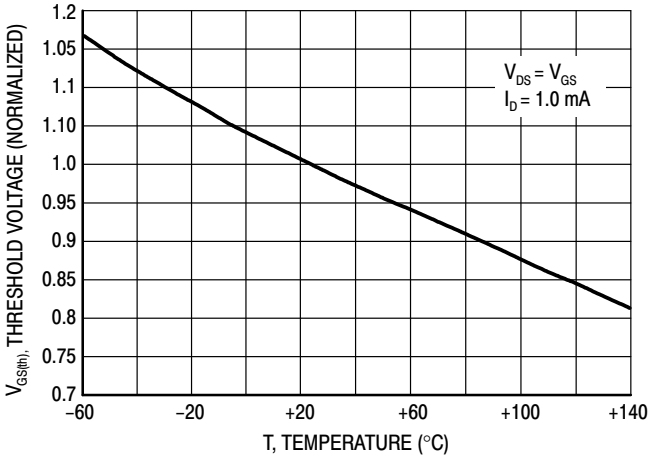
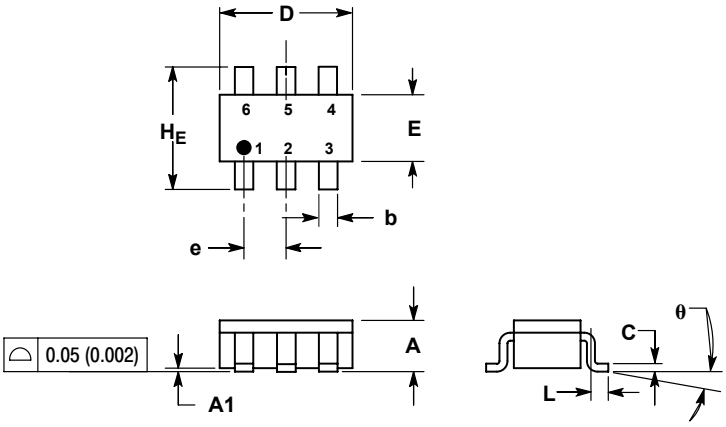


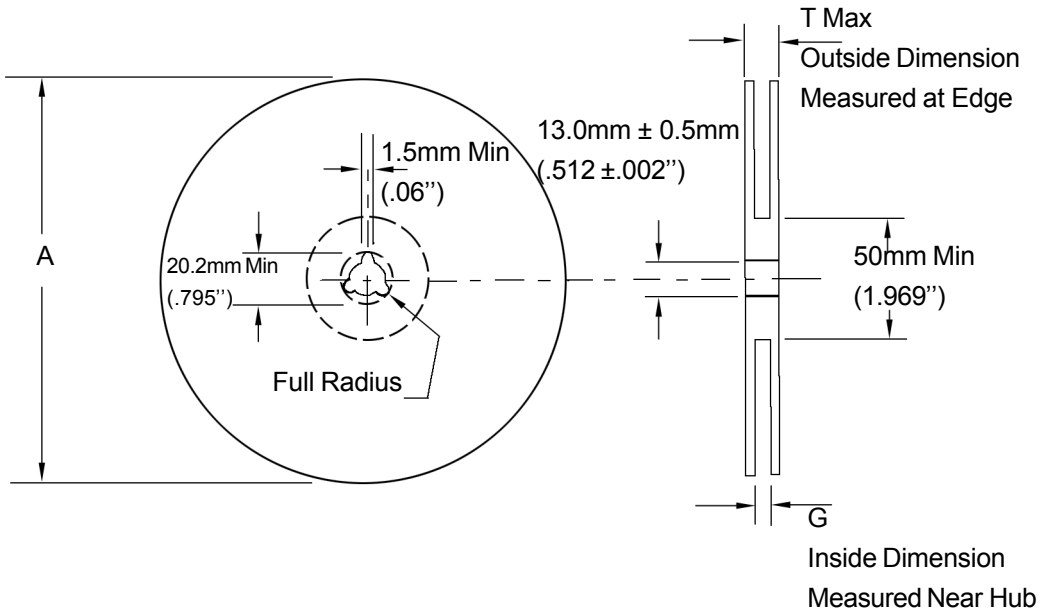
Figure 4. Temperature versus Gate Threshold Voltage

SOT23-6



DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.25	0.37	0.50	0.010	0.015	0.020
c	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
e	0.85	0.95	1.05	0.034	0.037	0.041
L	0.20	0.40	0.60	0.008	0.016	0.024
H_E	2.50	2.75	3.00	0.099	0.108	0.118
θ	0°	–	10°	0°	–	10°

EMBOSSED TAPE AND REEL DATA FOR DISCRETES



Size	A Max	G	T Max
8 mm	178.0mm (7.0")	8.4mm+1.5mm, -0.0 (.33"+.039", -0.00)	10.9mm (.43")

Reel Dimensions

Metric Dimensions Govern — English are in parentheses for reference only

Storage Conditions

Temperature: 5 to 40 Deg.C (20 to 30 Deg. C is preferred)
Humidity: 30 to 80 RH (40 to 60 is preferred)
Recommended Period: One year after manufacturing
(This recommended period is for the soldering condition only. The characteristics and reliabilities of the products are not restricted to this limitation)