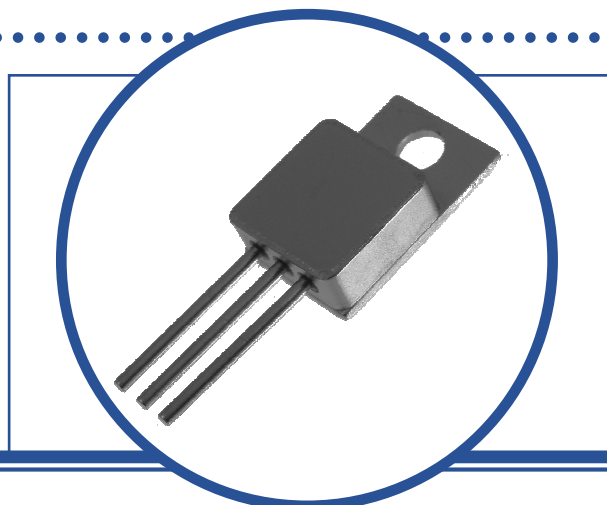


# SILICON NPN EPITAXIAL BIPOLEAR TRANSISTOR

## BDS12M2A

- High Voltage
- Hermetic TO-257AB Isolated Metal Package
- Ideally suited for Power Linear, Switching and general Purpose Applications
- Screening Options Available



### ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ unless otherwise stated)

$V_{CBO}$	Collector – Base Voltage	100V
$V_{CEO}$	Collector – Emitter Voltage	100V
$V_{EBO}$	Emitter – Base Voltage	5V
$I_C$	Continuous Collector Current	15A
$I_E$	Continuous Emitter Current	15A
$I_B$	Base Current	5A
$P_D$	Total Power Dissipation at $T_C \leq 25^\circ\text{C}$	90W
	Derate Above $25^\circ\text{C}$	0.52W/ $^\circ\text{C}$
$T_J$	Junction Temperature Range	-65 to $+200^\circ\text{C}$
$T_{stg}$	Storage Temperature Range	-65 to $+200^\circ\text{C}$

### THERMAL PROPERTIES

Symbols	Parameters	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction To Case	1.94	$^\circ\text{C/W}$

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**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise stated)

Symbols	Parameters	Test Conditions	Min.	Typ	Max.	Units
$I_{CBO}$	Collector Cut-Off Current	$V_{CB} = 100\text{V}$ $I_E = 0$			500	$\mu\text{A}$
$I_{CEO}$	Collector Cut-Off Current	$V_{CE} = 50\text{V}$ $I_B = 0$			1.0	mA
$I_{EBO}$	Emitter Cut-Off Current	$V_{EB} = 5\text{V}$ $I_C = 0$			1.0	
$BV_{CEO}^{(1)}$	Collector-Emitter Breakdown Voltage	$I_C = 20\text{mA}$ $I_B = 0$	100			V
$V_{CE(sat)}^{(1)}$	Collector-Emitter Saturation Voltage	$I_C = 5\text{A}$ $I_B = 0.5\text{A}$			1.0	
		$I_C = 10\text{A}$ $I_B = 2.5\text{A}$			3	
$V_{BE(sat)}^{(1)}$	Base-Emitter Saturation Voltage	$I_C = 10\text{A}$ $I_B = 2.5\text{A}$			2.5	
$V_{BE}^{(1)}$	Base-Emitter Voltage	$I_C = 5\text{A}$ $V_{CE} = 4\text{V}$			1.5	
$h_{FE}^{(1)}$	Forward-current transfer ratio	$I_C = 0.5\text{A}$ $V_{CE} = 4\text{V}$	40		250	
		$I_C = 5\text{A}$ $V_{CE} = 4\text{V}$	15		150	
		$I_C = 10\text{A}$ $V_{CE} = 4\text{V}$	5			

**DYNAMIC CHARACTERISTICS**

$f_T$	Transition Frequency	$I_C = 0.5\text{A}$ $V_{CE} = 4\text{V}$ $f = 1.0\text{MHz}$	3			MHz
$t_{on}$	Turn-On Time	$I_C = 4\text{A}$ $V_{CC} = 30\text{V}$ $I_{B1} = 0.4\text{A}$			0.7	$\mu\text{s}$
$t_s$	Storage Time	$I_C = 4\text{A}$ $V_{CC} = 30\text{V}$			1.0	
$t_f$	Fall Time	$I_{B1} = -I_{B2} = 0.4\text{A}$			0.8	

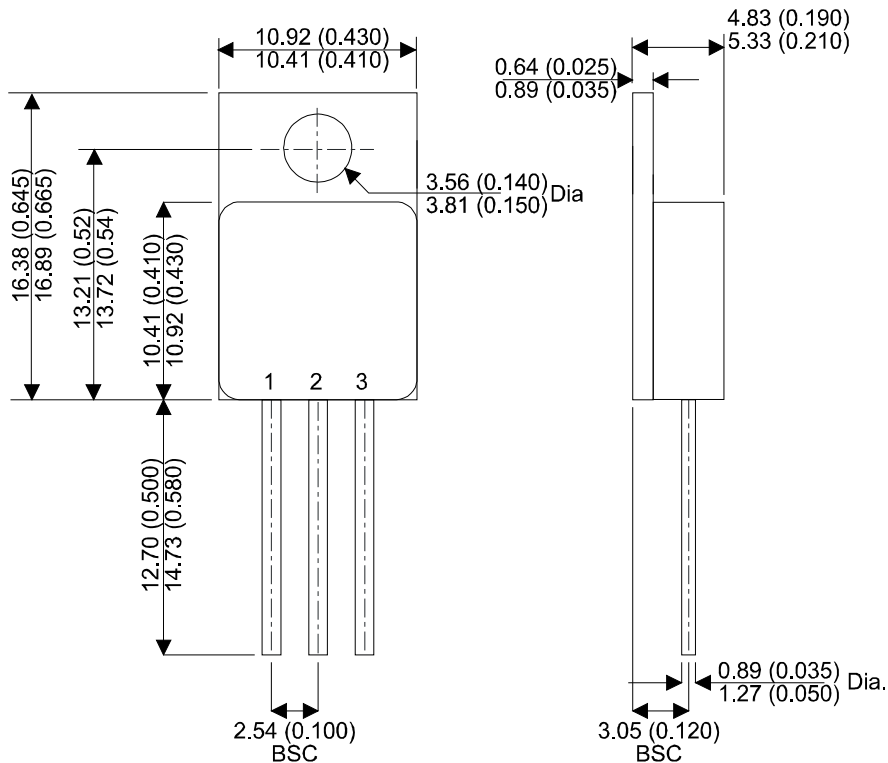
**Notes**

(1) Pulse Width  $\leq 380\mu\text{s}$ ,  $\delta \leq 2\%$

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**MECHANICAL DATA**

Dimensions in mm (inches)



**TO220M (TO-257AB)**

**VARIANT PIN OUT TABLE**

Variant	Pin1	Pin 2	Pin 3
A	Base	Collector	Emitter

# SILICON EPITAXIAL NPN TRANSISTOR BDS12M2A

## SCREENING OPTION

Space Level (JQRS/ESA) and High Reliability options are available in accordance with the [High Reliability and Screening Options Handbook](#) available for download from the from the TT electronics Semelab web site.

ESA Quality Level Products are based on the testing procedures specified in the generic ESCC 5000 and in the corresponding part detail specifications.

Semelabs QR216 and QR217 processing specifications (JQRS), in conjunction with the companies ISO 9001:2000 approval present a viable alternative to the American MIL-PRF-19500 space level processing.

QR217 (Space Level Quality Conformance) is based on the quality conformance inspection requirements of MIL-PRF-19500 groups A (table V), B (table VIa), C (table VII) and also ESA / ESCC 5000 (chart F4) lot validation tests.

QR216 (Space Level Screening) is based on the screening requirements of MIL-PRF-19500 (table IV) and also ESA /ESCC 5000 (chart F3).

JQRS parts are processed to the device data sheet and screened to QR216 with conformance testing to Q217 groups A and B in accordance with MIL-STD-750 methods and procedures.

Additional conformance options are available, for example Pre-Cap Visual Inspection, Buy-Off Visit or Data Packs. These are chargeable and must be specified at the order stage (See Ordering Information). Minimum order quantities may apply.

Alternative or additional customer specific conformance or screening requirements would be considered. Contact Semelab sales with enquires.

## MARKING DETAILS

Typical marking would include part or specification number, week of seal or serial number subject to available space and legibility.

Customer specific marking requirements can be arranged at the time of order.

## ORDERING INFORMATION

Part numbers are built up from Type, Package Variant, and screening level. The part numbers are extended to include the additional options as shown below.

Type – See Electrical Characteristics Table  
Package Variant – See Mechanical Data  
Screening Level – See Screening Options (ESA / JQRS)

Additional Options:

Customer Pre-Cap Visual Inspection	.CVP
Customer Buy-Off visit	.CVB
Data Pack	.DA
Solderability Samples	.SS
Scanning Electron Microscopy	.SEM
Radiography (X-ray)	.XRAY
Total Dose Radiation Test	.RAD
MIL-PRF-19500 (QR217)	
Group B charge	.GRPB
Group B destructive mechanical samples	.GBDM (12 pieces)
Group C charge	.GRPC
Group C destructive electrical samples	.GCDE (12 pieces)
Group C destructive mechanical samples	.GCDM (6 pieces)
ESA/ESCC	
Lot Validation Testing (subgroup 1) charge	.LVT1
LVT1 destructive samples (environmental)	.L1DE (15 pieces)
LVT1 destructive samples (mechanical)	.L1DM (15 pieces)
Lot Validation Testing (subgroup 2) charge	.LVT2
LVT2 endurance samples (electrical)	.L2D (15 pieces)
Lot Validation Testing (subgroup 3) charge	.LVT3
LVT3 destructive samples (mechanical)	.L3D (5 pieces)

Additional Option Notes:

- 1) All 'Additional Options' are chargeable and must be specified at order stage.
- 2) When Group B,C or LVT is required, additional electrical and mechanical destructive samples must be ordered
- 3) All destructive samples are marked the same as other production parts unless otherwise requested.

Example ordering information:

The following example is for the BDS12M2A part with package variant A, JQRS screening, additional Group C conformance testing and a Data pack.

Part Numbers:

BDS12M2A-JQRS (Include quantity for flight parts)  
BDS12M2A-JQRS.GRPC (chargeable conformance option)  
BDS12M2A-JQRS.GCDE (charge for destructive parts)  
BDS12M2A-JQRS.GCDM (charge for destructive parts)  
BDS12M2A-JQRS.DA (charge for Data pack)

Customers with any specific requirements (e.g. marking or screening) may be supplied with a similar alternative part number (there is maximum 20 character limit to part numbers). Contact Semelab sales with enquiries.