



YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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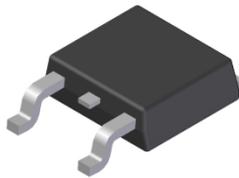
Features

- $BV_{CEO} > -100V$
- $I_C = -6A$ Continuous Collector Current
- $I_{CM} = -10A$ Peak Pulse Current
- Ideal for Power Switching or Amplification Applications
- Complementary NPN Type: NK-MJD41CQ

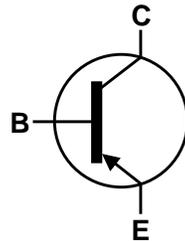
Mechanical Data

- Package: TO252
- Package Material: Molded Plastic, "Green" Molding Compound
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per
MIL-STD-202, Method 208 (3)
- Weight: 0.34 grams (Approximate)

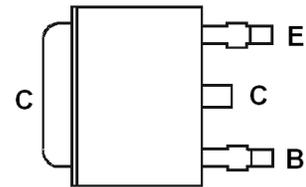
TO252 (DPAK)



Top View



Device Schematic



Pin Out Configuration
Top View

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	-120	V
Collector-Emitter Voltage	V _{CEO}	-100	V
Emitter-Base Voltage	V _{EBO}	-7	V
Continuous Collector Current	I _C	-6	A
Peak Pulse Collector Current	I _{CM}	-10	A
Continuous Base Current	I _B	-2	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	(Note 5)	2.7
		(Note 6)	2.4
		(Note 7)	1.5
Thermal Resistance, Junction to Ambient Air	R _{θJA}	(Note 5)	46
		(Note 6)	52
		(Note 7)	83
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 8)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the exposed collector pad on 25mm x 25mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 6. Same as Note 5, except mounted on 25mm x 25mm 1oz copper.
 7. Same as Note 5, except mounted on minimum recommended pad (MRP) layout.
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics

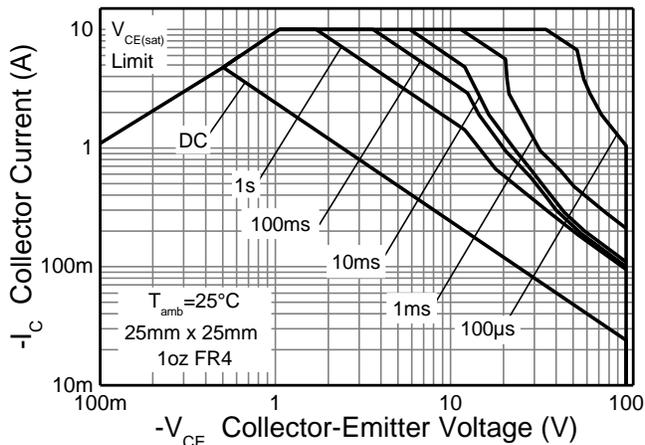


Figure 1. Safe Operating Area

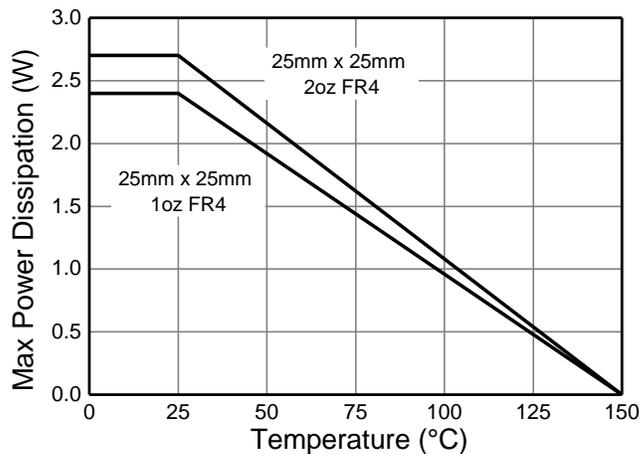


Figure 2. Derating Curve

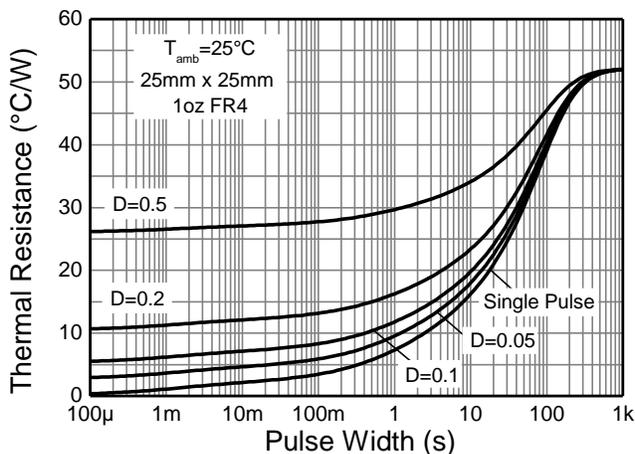


Figure 3. Transient Thermal Impedance

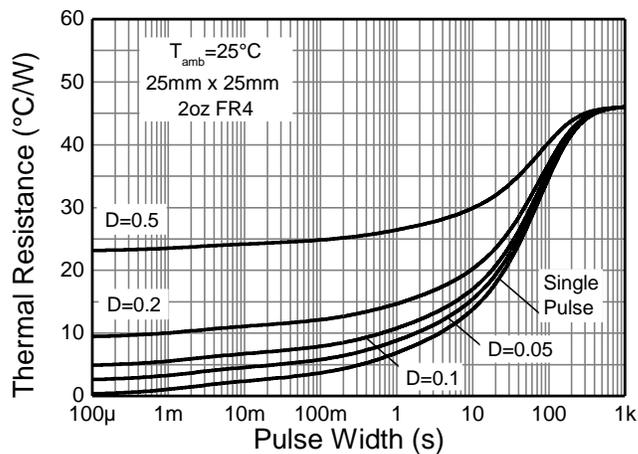


Figure 4. Transient Thermal Impedance

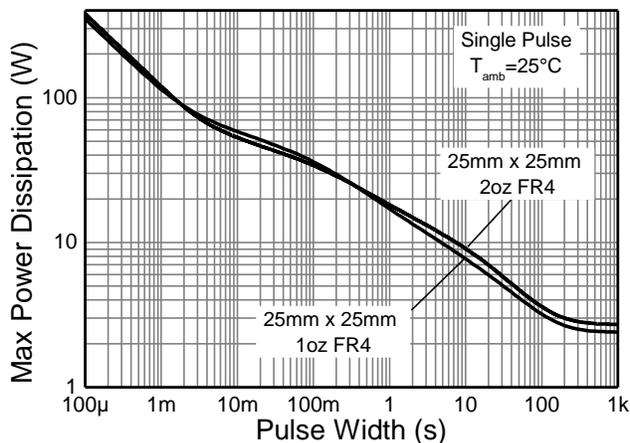


Figure 5. Pulse Power Dissipation

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-120	—	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-100	—	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	—	—	V	$I_E = -100\mu\text{A}$
Collector Cutoff Current	I_{CES}	—	—	-1	μA	$V_{CE} = -100\text{V}$
Collector-Base Cutoff Current	I_{CBO}	—	—	-100	nA	$V_{CB} = -100\text{V}$
Emitter Cutoff Current	I_{EBO}	—	—	-1	μA	$V_{EB} = -6\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	—	-1.5	V	$I_C = -6\text{A}, I_B = -600\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	—	-1.4	V	$I_C = -6\text{A}, I_B = -600\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	—	—	-2	V	$I_C = -6\text{A}, V_{CE} = -4\text{V}$
DC Current Gain (Note 9)	h_{FE}	30 15	— —	— —	—	$V_{CE} = -4\text{V}, I_C = -0.3\text{A}$ $V_{CE} = -4\text{V}, I_C = -3\text{A}$
Small Signal Current Gain	h_{fe}	20	—	—	—	$V_{CE} = -10\text{V}, I_C = -0.5\text{A}, f = 1\text{kHz}$
Current Gain-Bandwidth Product	f_T	3	—	—	MHz	$I_C = -0.5\text{A}, V_{CE} = -10\text{V}, f = 100\text{MHz}$
Output Capacitance	C_{obo}	—	75	—	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Input Capacitance	C_{ibo}	—	855	—	pF	$V_{EB} = -0.5\text{V}, f = 1\text{MHz}$
Delay Time	t_d	—	5	—	ns	$I_C = -2\text{A}, V_{CC} = -10\text{V}$ $-I_{B1} = I_{B2} = -200\text{mA}$
Rise Time	t_r	—	95	—	ns	
Storage Time	t_s	—	295	—	ns	
Fall Time	t_f	—	50	—	ns	

 Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

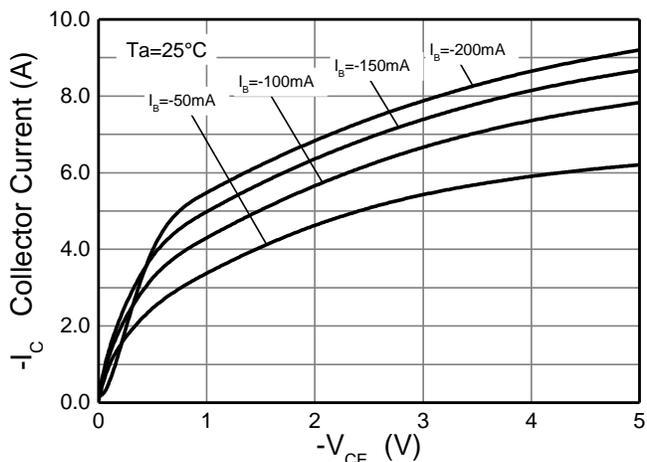


Figure 6. $I_C \ v \ V_{CE}$

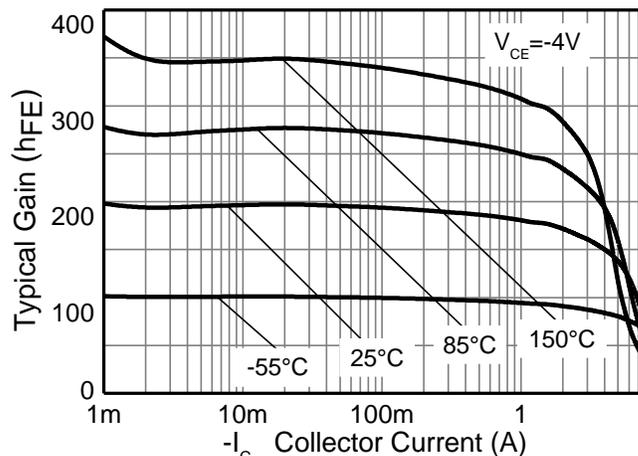


Figure 7. $h_{FE} \ v \ I_C$

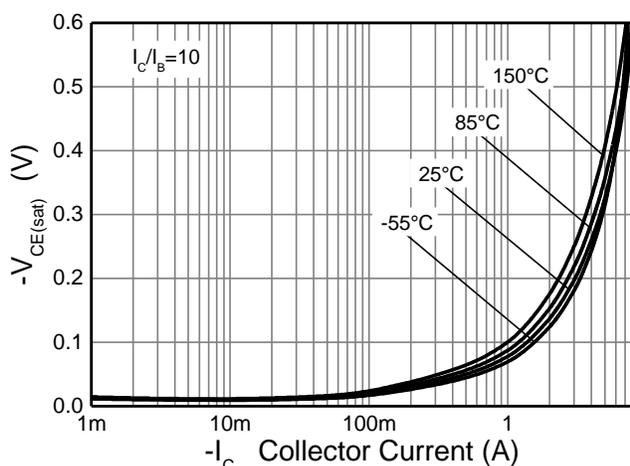


Figure 8. $V_{CE(sat)} \ v \ I_C$

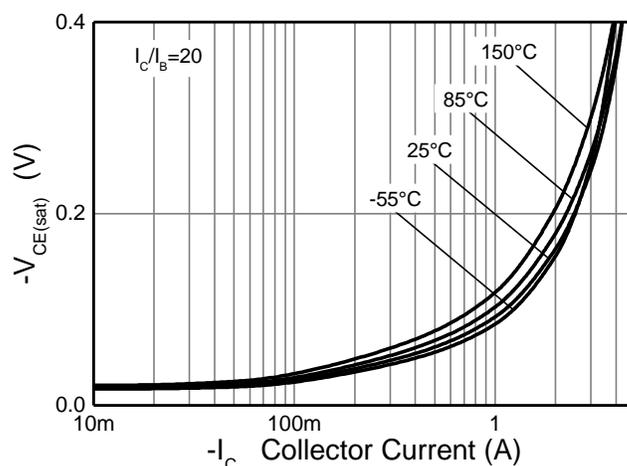


Figure 9. $V_{CE(sat)} \ v \ I_C$

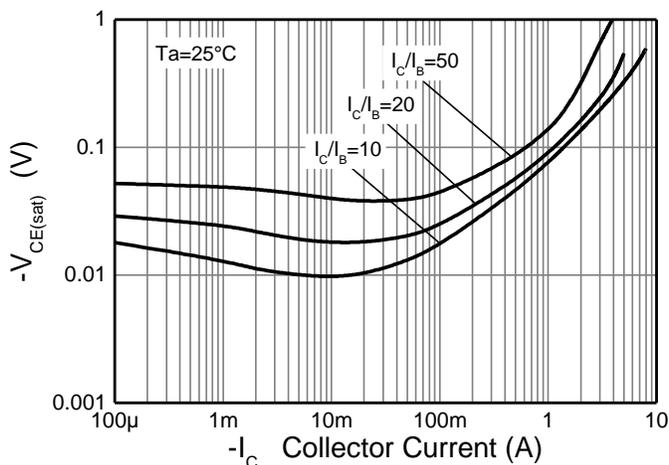


Figure 10. $V_{CE(sat)} \ v \ I_C$

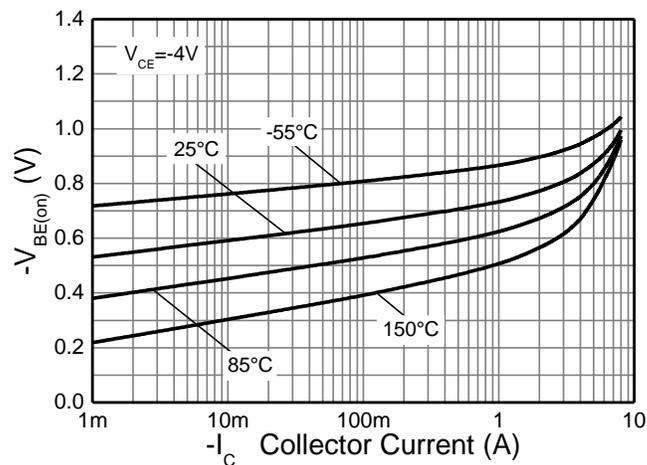


Figure 11. $V_{BE(on)} \ v \ I_C$

Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.) (continued)

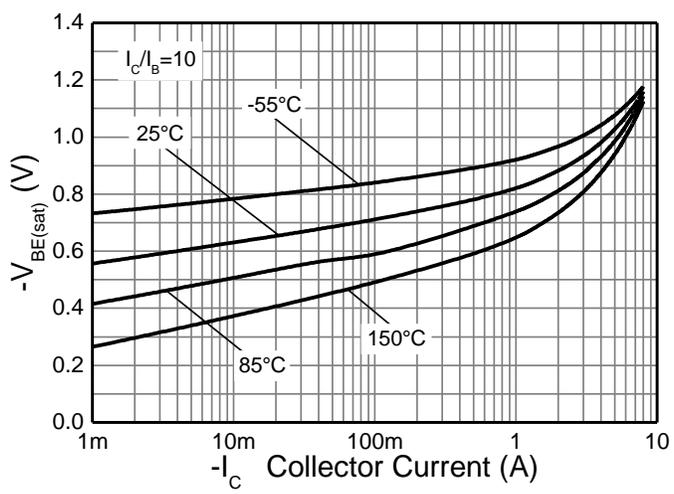
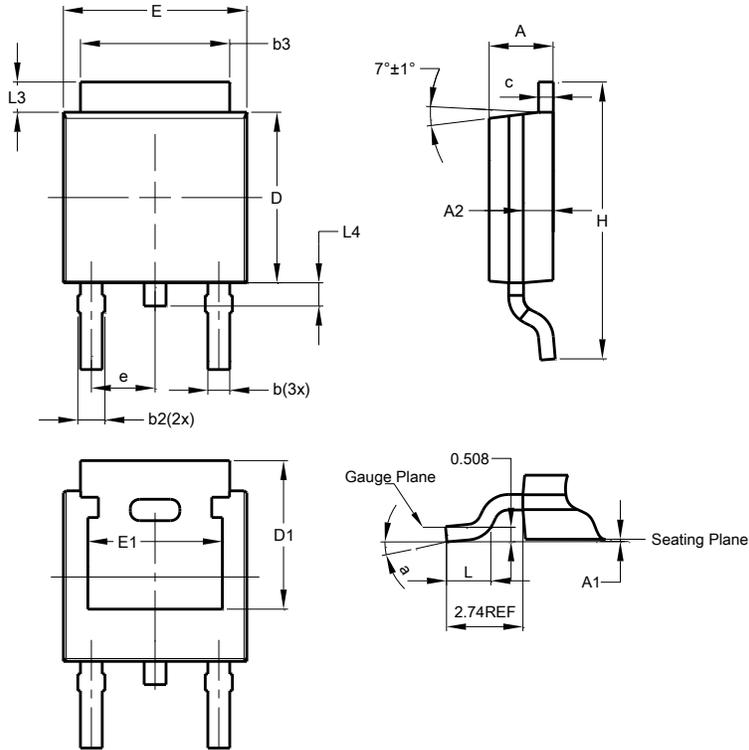


Figure 12. $V_{BE(sat)}$ v I_C

Package Outline Dimensions

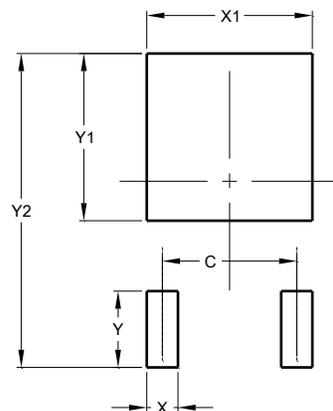
TO252 (DPAK)



TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.50	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	--	--
e	2.286 BSC		
E	6.45	6.70	6.58
E1	4.32	--	--
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	--
All Dimensions in mm			

Suggested Pad Layout

TO252 (DPAK)



Dimensions	Value (in mm)
C	4.572
X	1.060
X1	5.632
Y	2.600
Y1	5.700
Y2	10.700