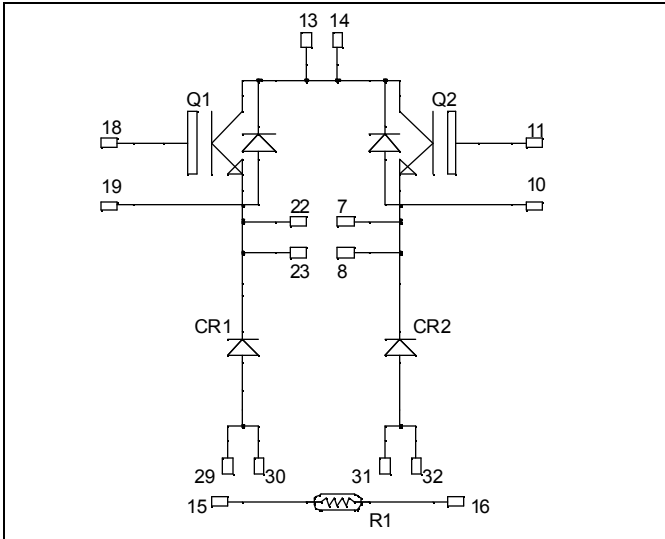


## Dual Buck chopper NPT IGBT Power Module

$V_{CES} = 1200V$   
 $I_C = 25A @ T_c = 80^\circ C$

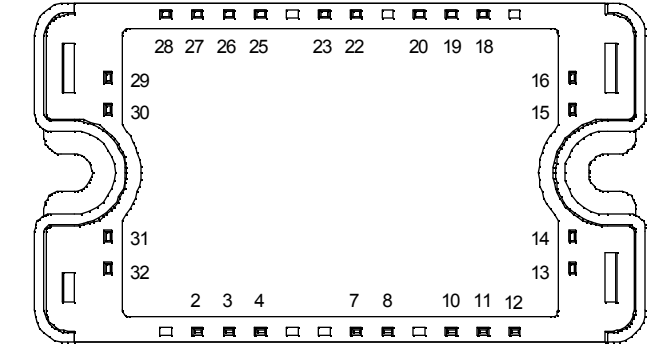


### Application

- AC and DC motor control
- Switched Mode Power Supplies

### Features

- Non Punch Through (NPT) Fast IGBT®
  - Low voltage drop
  - Low tail current
  - Switching frequency up to 50 kHz
  - Soft recovery parallel diodes
  - Low diode VF
  - Low leakage current
  - Avalanche energy rated
  - RBSOA and SCSOA rated
  - Symmetrical design
- Kelvin emitter for easy drive
- Very low stray inductance
- High level of integration
- Internal thermistor for temperature monitoring



### Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- Easy paralleling due to positive TC of VCEsat
- Each leg can be easily paralleled to achieve a single buck of twice the current capability.

All multiple inputs and outputs must be shorted together  
Example: 13/14 ; 29/30 ; 22/23 ...

### Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
$V_{CES}$	Collector - Emitter Breakdown Voltage	1200	V
$I_C$	Continuous Collector Current	$T_c = 25^\circ C$	40
		$T_c = 80^\circ C$	25
$I_{CM}$	Pulsed Collector Current	$T_c = 25^\circ C$	100
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	208
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	50A@1150V

**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

All ratings @  $T_j = 25^\circ\text{C}$  unless otherwise specified

## Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
$I_{CES}$	Zero Gate Voltage Collector Current	$V_{GE} = 0\text{V}$ $V_{CE} = 1200\text{V}$	$T_j = 25^\circ\text{C}$	1	500	$\mu\text{A}$	
			$T_j = 125^\circ\text{C}$	1		$\text{mA}$	
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15\text{V}$ $I_C = 25\text{A}$	$T_j = 25^\circ\text{C}$	2.5	3.2	3.7	V
			$T_j = 125^\circ\text{C}$		4.0		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1\text{mA}$	4		6	V	
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			400	nA	

## Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
$C_{ies}$	Input Capacitance	$V_{GE} = 0\text{V}$ $V_{CE} = 25\text{V}$ $f = 1\text{MHz}$		1650		pF	
$C_{oes}$	Output Capacitance			250			
$C_{res}$	Reverse Transfer Capacitance			110			
$Q_g$	Total gate Charge	$V_{GE} = 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 25\text{A}$		160		nC	
$Q_{ge}$	Gate – Emitter Charge			10			
$Q_{gc}$	Gate – Collector Charge			70			
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ\text{C}$ ) $V_{GE} = 15\text{V}$ $V_{Bus} = 400\text{V}$ $I_C = 25\text{A}$ $R_G = 22\Omega$		60		ns	
$T_r$	Rise Time			50			
$T_{d(off)}$	Turn-off Delay Time			305			
$T_f$	Fall Time			30			
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $125^\circ\text{C}$ ) $V_{GE} = 15\text{V}$ $V_{Bus} = 400\text{V}$ $I_C = 25\text{A}$ $R_G = 22\Omega$		60		ns	
$T_r$	Rise Time			50			
$T_{d(off)}$	Turn-off Delay Time			346			
$T_f$	Fall Time			40			
$E_{on}$	Turn-on Switching Energy ①			3.5			mJ
$E_{off}$	Turn-off Switching Energy ②			1.5			

①  $E_{on}$  includes diode reverse recovery

② In accordance with JEDEC standard JESD24-1

## Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		1200			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1200\text{V}$	$T_j = 25^\circ\text{C}$		250	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$		500	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle		60		A
$V_F$	Diode Forward Voltage	$I_F = 60\text{A}$		2	2.5	V
		$I_F = 120\text{A}$		2.3		
		$I_F = 60\text{A}$	$T_j = 125^\circ\text{C}$	1.8		
$t_{rr}$	Reverse Recovery Time	$I_F = 60\text{A}$ $V_R = 800\text{V}$ $di/dt = 200\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	400		ns
			$T_j = 125^\circ\text{C}$	470		
$Q_{rr}$	Reverse Recovery Charge	$I_F = 60\text{A}$ $V_R = 800\text{V}$ $di/dt = 200\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	1.2		$\mu\text{C}$
			$T_j = 125^\circ\text{C}$	4		

**Temperature sensor NTC**

*Symbol Characteristic*

		<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
R <sub>25</sub>	Resistance @ 25°C		68		kΩ
B <sub>25/85</sub>	T <sub>25</sub> = 298.16 K		4080		K

$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

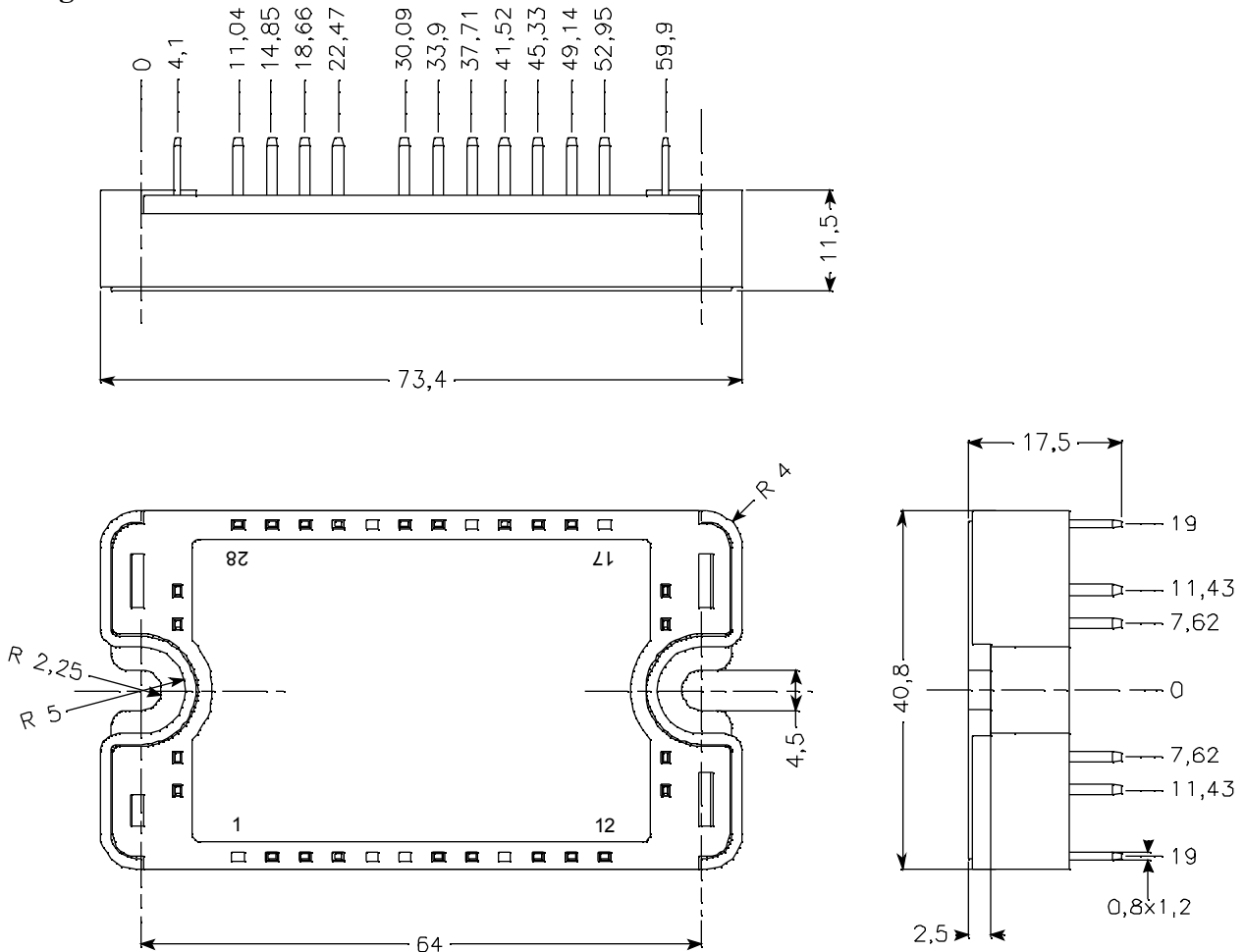
T: Thermistor temperature  
R<sub>T</sub>: Thermistor value at T

**Thermal and package characteristics**

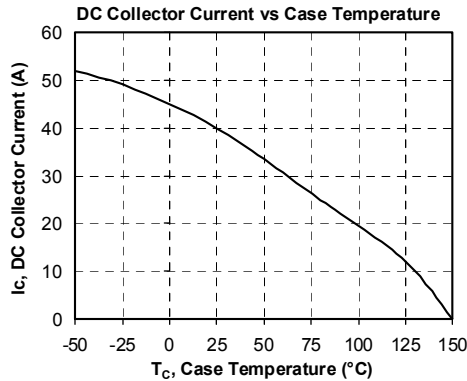
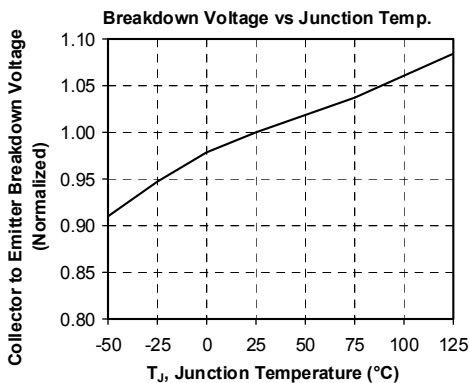
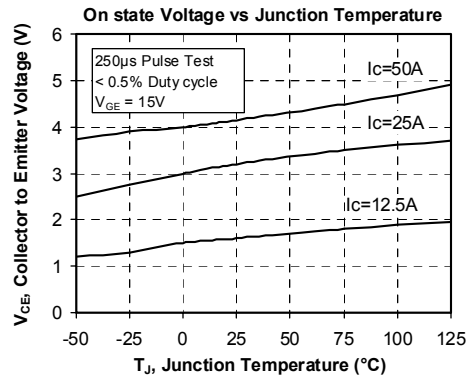
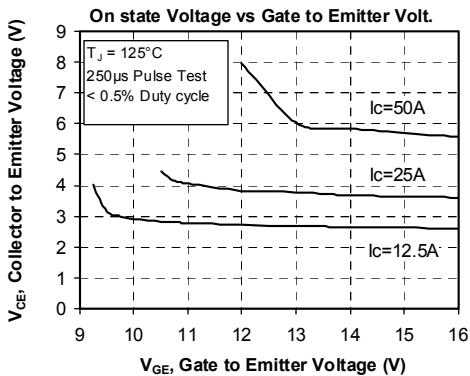
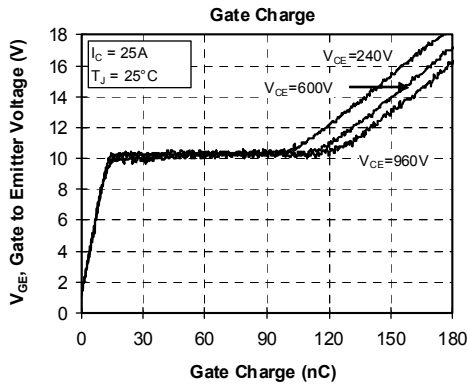
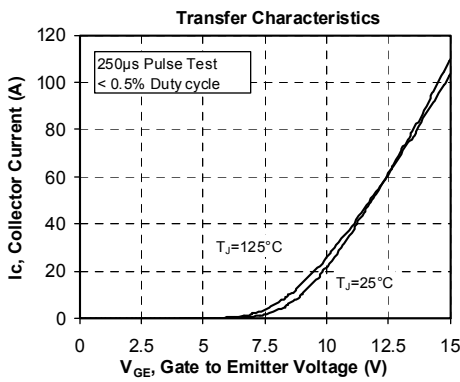
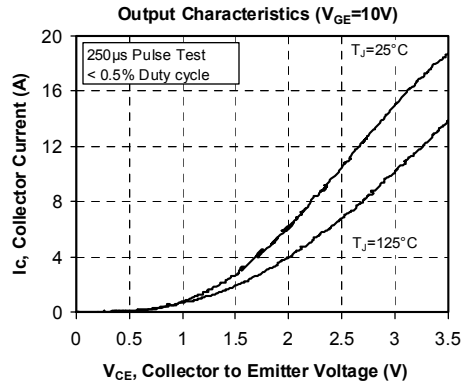
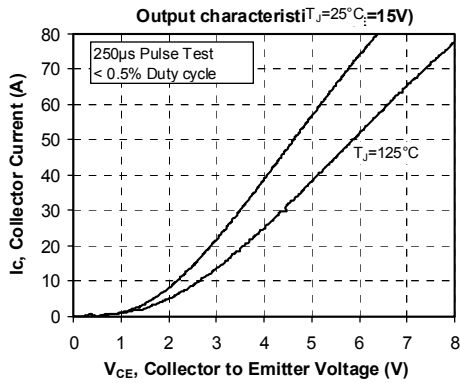
*Symbol Characteristic*

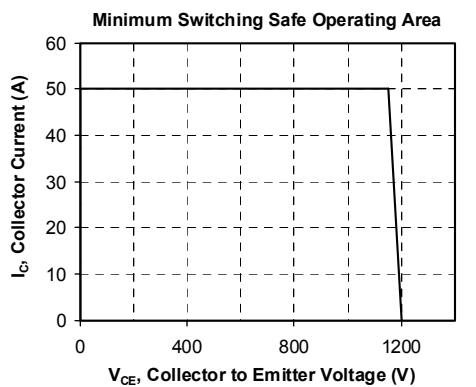
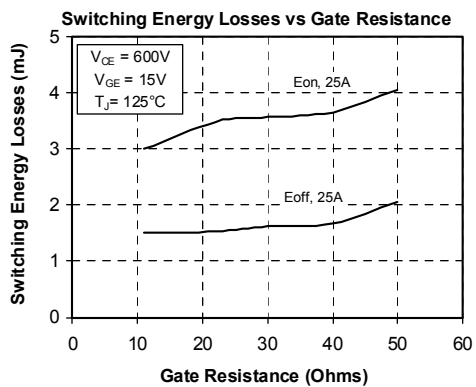
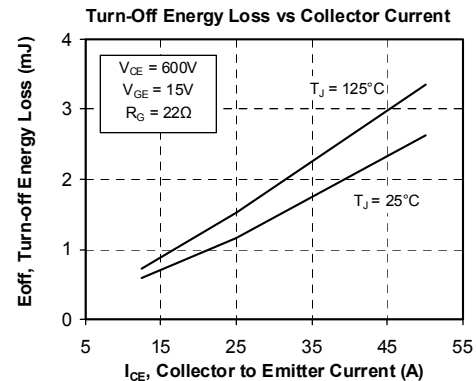
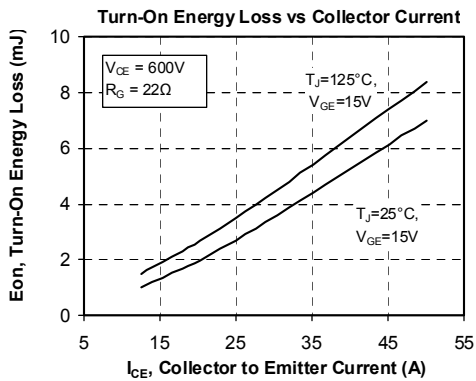
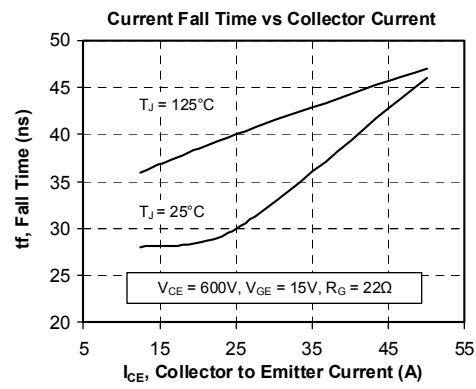
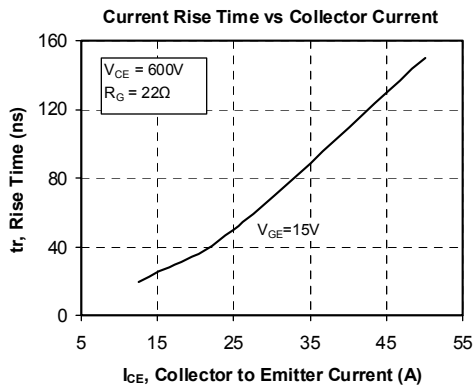
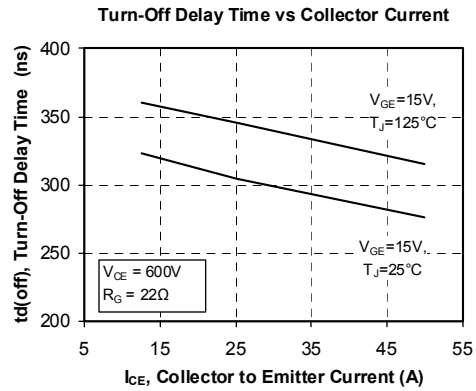
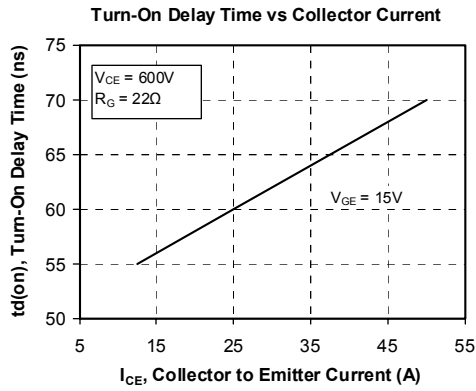
		<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	
R <sub>thJC</sub>	Junction to Case	IGBT		0.6	°C/W	
		Diode		0.9		
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, I <sub>isol</sub> <1mA, 50/60Hz	2500			V	
T <sub>J</sub>	Operating junction temperature range	-40		150	°C	
T <sub>STG</sub>	Storage Temperature Range	-40		125		
T <sub>C</sub>	Operating Case Temperature	-40		100		
Torque	Mounting torque		To heatsink	M4	4.7	N.m
Wt	Package Weight				110	g

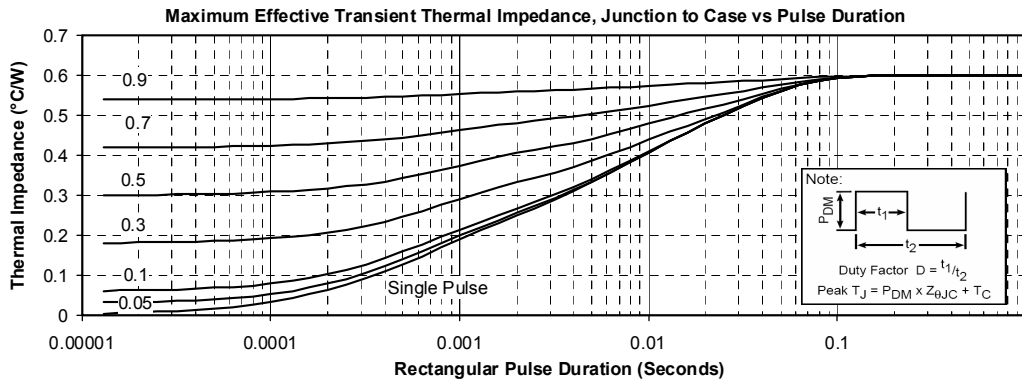
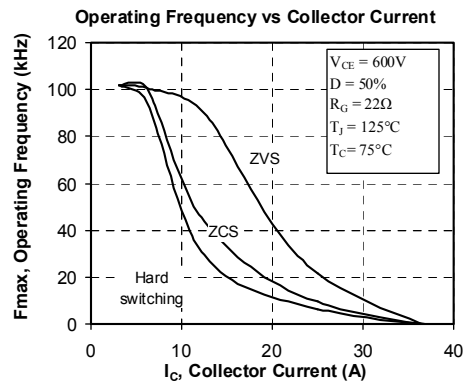
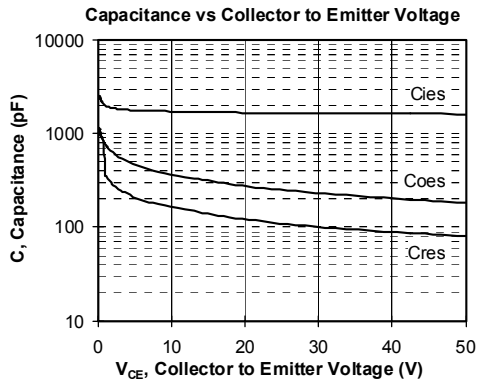
**Package outline**



## Typical Performance Curve







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