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FGD3050G2

EcoSPARK™ 2 300mJ, 500V, N-Channel Ignition IGBT

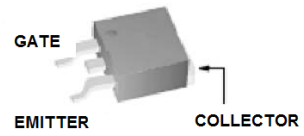
Features

- SCIS Energy = 300mJ at TJ = 25°C
- Logic Level Gate Drive
- RoHS Compliant

Applications

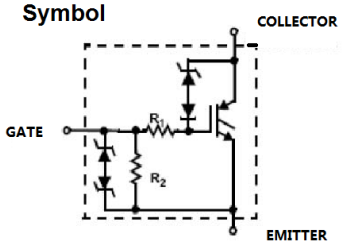
- Automotive Ignition Coil Driver Circuits
- Coil On Plug Applications

Package



JEDEC TO-252
D-Pak

Symbol



Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter		Ratings	Units
BV_{CER}	Collector to Emitter Breakdown Voltage (I_C = 1mA)		500	V
BV_{ECS}	Emitter to Collector Voltage - Reverse Battery Condition (I_C = 10mA)		20	V
E_{SCIS25}	I_{SCIS} = 14.2A, L = 3.0mHy, R_{GE} = 1KΩ	T_C = 25°C	300	mJ
$E_{SCIS150}$	I_{SCIS} = 11.0A, L = 3.0mHy, R_{GE} = 1KΩ	T_C = 150°C	180	mJ
I_{C25}	Collector Current Continuous, at T_C = 25°C, V_{GE} = 5.0V		32	A
I_{C110}	Collector Current Continuous, at T_C = 110°C, V_{GE} = 5.0V		27	A
V_{GEM}	Gate to Emitter Voltage Continuous		±10	V
P_D	Power Dissipation Total	T_C = 25°C	150	W
	Power Dissipation Derating	T_C > 25°C	1.1	W/°C
T_J	Operating Junction Temperature Range		-40 to +175	°C
T_{STG}	Storage Junction Temperature Range		-40 to +175	°C
T_L	Max Lead Temp for soldering (Leads at 1.6mm from case for 10s)		300	°C
T_{PKG}	Max Lead Temp for soldering (Package Body for 10s)		260	°C
ESD	Electrostatic Discharge Voltage at 100pF, 1500Ω		4	kV

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance Junction to Case	0.9	°C/W

Electrical Characteristics of the IGBT T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min	Typ	Max	Units
Off Characteristics							
BV_{CER}	Collector to Emitter Breakdown Voltage	V_{GE} = 0V,I_{CE} = 2mA, R_{GE} = 1KΩ, T_J = -40 to 150°C		470	-	530	V
BV_{CES}	Collector to Emitter Breakdown Voltage	V_{GE} = 0V, I_{CE} = 10mA, R_{GE} = 0Ω, T_J = -40 to 150°C		495	-	555	V
BV_{ECS}	Emitter to Collector Breakdown Voltage	V_{GE} = 0V, I_{CE} = -75mA, T_J = 25°C		20	-	-	V
BV_{GES}	Gate to Emitter Breakdown Voltage	I_{GES} = ±5mA		±12	±14	-	V
I_{CER}	Collector to Emitter Leakage Current	V_{CE} = 250V, R_{GE} = 1KΩ	T_J = 25°C	-	-	25	μA
			T_J = 150°C	-	-	1	mA
I_{ECS}	Emitter to Collector Leakage Current	V_{EC}=15V	T_J = 25°C	-	-	1	mA
			T_J = 150°C	-	-	40	
R_1	Series Gate Resistance			-	111	-	Ω
R_2	Gate to Emitter Resistance			10K	-	30K	Ω
On Characteristics							
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	V_{GE} = 4V, I_{CE} = 6A	T_J = 25°C	-	1.1	1.2	V
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	V_{GE} = 4.5V, I_{CE} = 10A	T_J = 150°C	-	1.3	1.45	V
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	V_{GE} = 4.5V, I_{CE} = 15A	T_J = 150°C	-	1.6	1.75	V
Dynamic Characteristics							
$Q_{G(ON)}$	Gate Charge	V_{GE} = 5V, V_{CE} = 12V, I_{CE} = 10A		-	22	-	nC
$V_{GE(TH)}$	Gate to Emitter Threshold Voltage	I_{CE} = 1mA, V_{CE} = V_{GE},	T_J = 25°C	1.3	1.6	2.2	V
			T_J = 150°C	0.75	1.1	1.8	
V_{GEP}	Gate to Emitter Plateau Voltage	V_{CE} = 12V, I_{CE} = 10A		-	2.7	-	V
Switching Characteristics							
$t_{d(ON)R}$	Current Turn-On Delay Time-Resistive	V_{CE} = 14V, R_L = 1Ω, V_{GE} = 5V, R_G = 1KΩ		-	0.9	4	μs
t_{rR}	Current Rise Time-Resistive			-	1.6	7	μs
$t_{d(OFF)L}$	Current Turn-Off Delay Time-Inductive	V_{CE} = 300V, L = 2mH, V_{GE} = 5V, R_G = 1KΩ		-	5.4	15	μs
t_{fL}	Current Fall Time-Inductive			-	1.4	15	μs

Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FGD3050G2	FGD3050G2_F085	TO-252AA	330mm	16mm	2500units

Typical Performance Curves

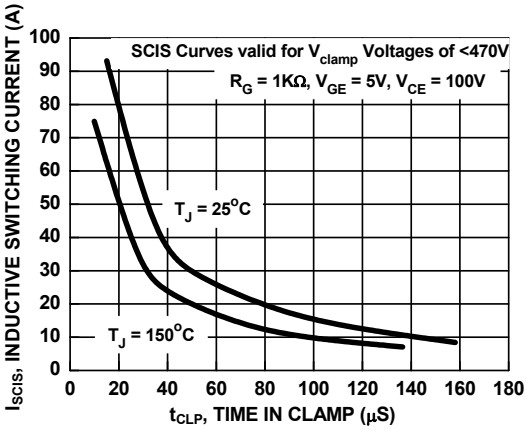


Figure 1. Self Clamped Inductive Switching Current vs. Time in Clamp

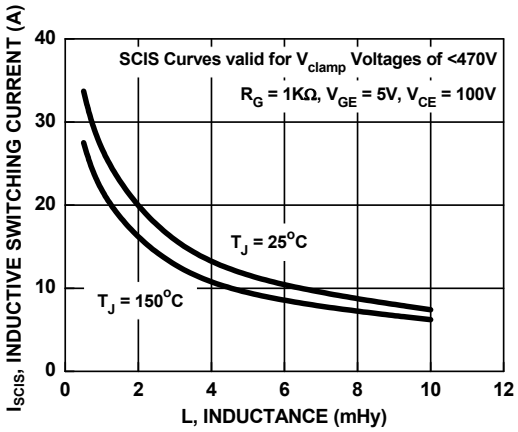


Figure 2. Self Clamped Inductive Switching Current vs. Inductance

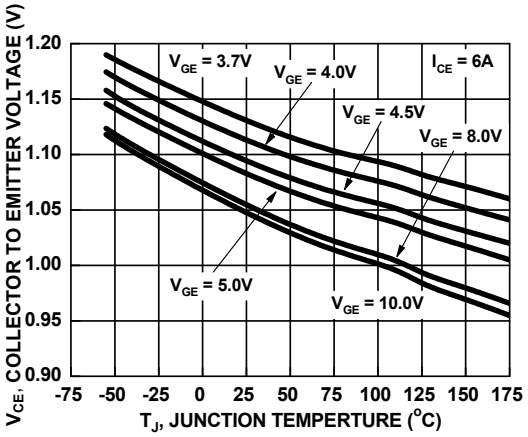


Figure 3. Collector to Emitter On-State Voltage vs. Junction Temperature

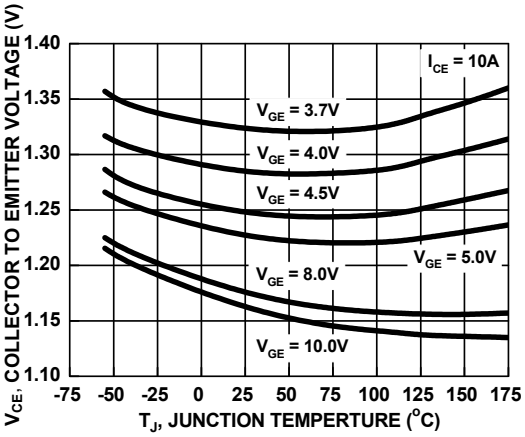


Figure 4. Collector to Emitter On-State Voltage vs. Junction Temperature

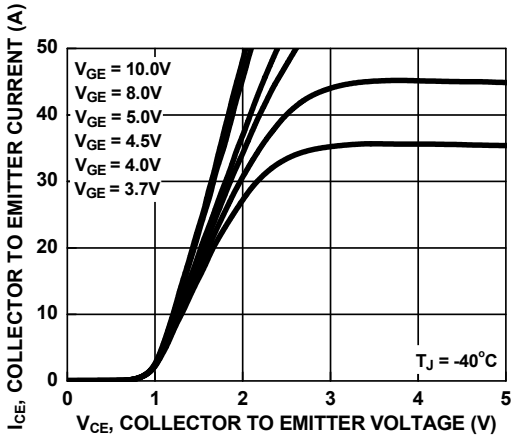


Figure 5. Collector to Emitter On-State Voltage vs. Collector Current

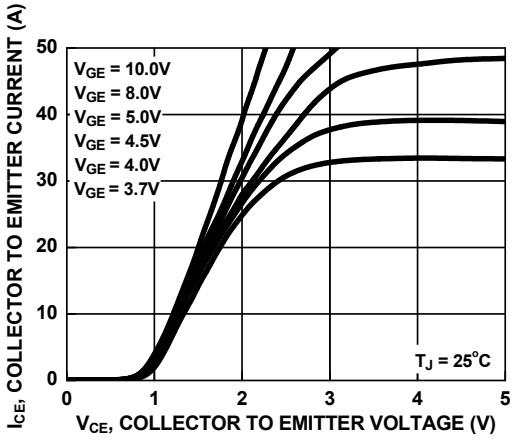


Figure 6. Collector to Emitter On-State Voltage vs. Collector Current

Typical Performance Curves (Continued)

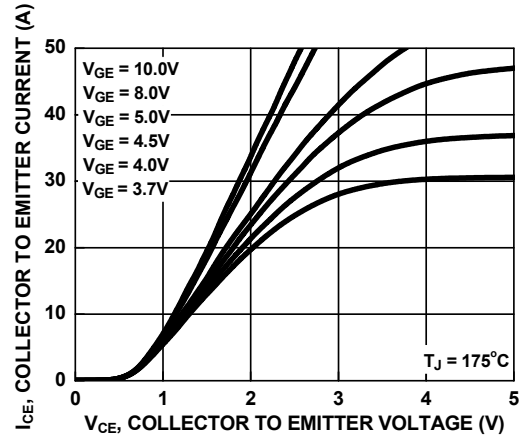


Figure 7. Collector to Emitter On-State Voltage vs. Collector Current

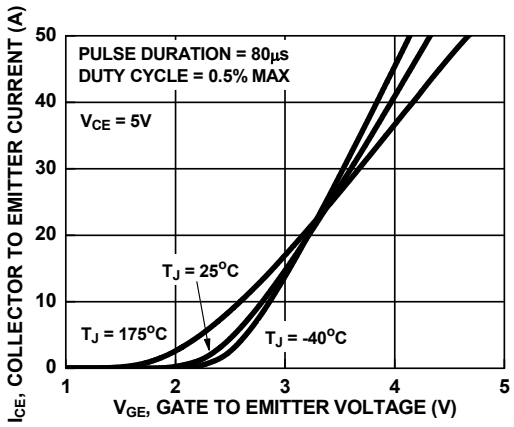


Figure 8. Transfer Characteristics

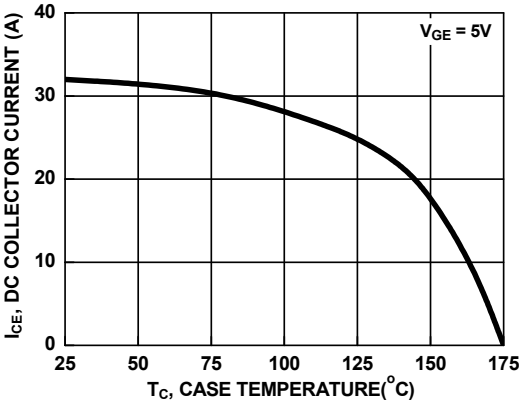


Figure 9. DC Collector Current vs. Case Temperature

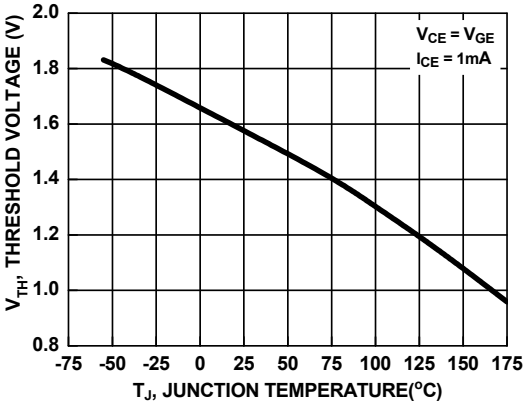


Figure 10. Threshold Voltage vs. Junction Temperature

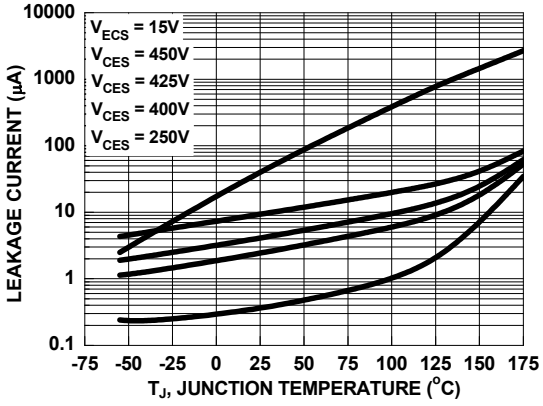


Figure 11. Leakage Current vs. Junction Temperature

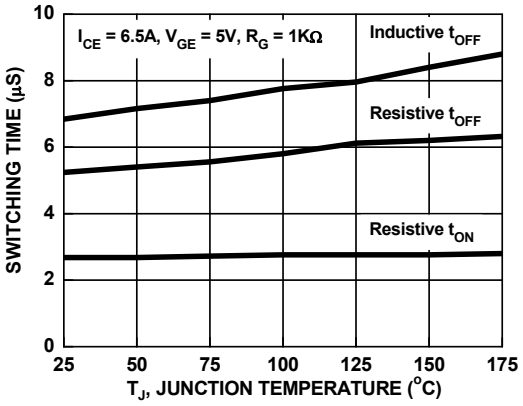


Figure 12. Switching Time vs. Junction Temperature

Typical Performance Curves

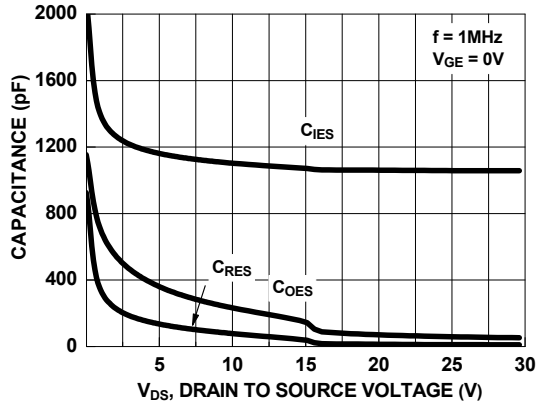


Figure 13. Capacitance vs. Collector to Emitter Voltage

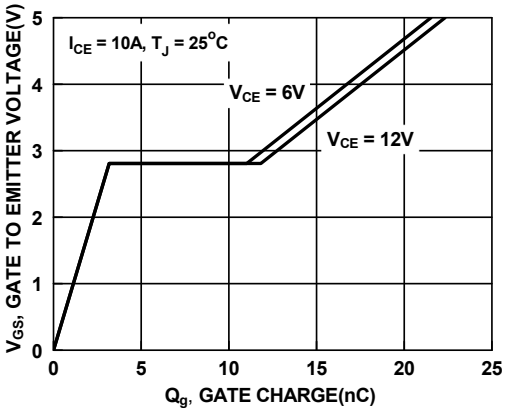


Figure 14. Gate Charge

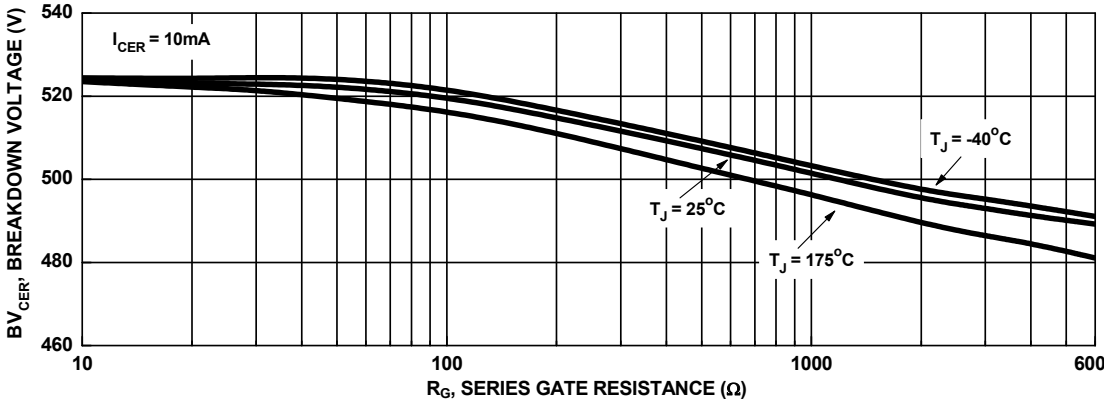


Figure 15. Break down Voltage vs. Series Gate Resistance

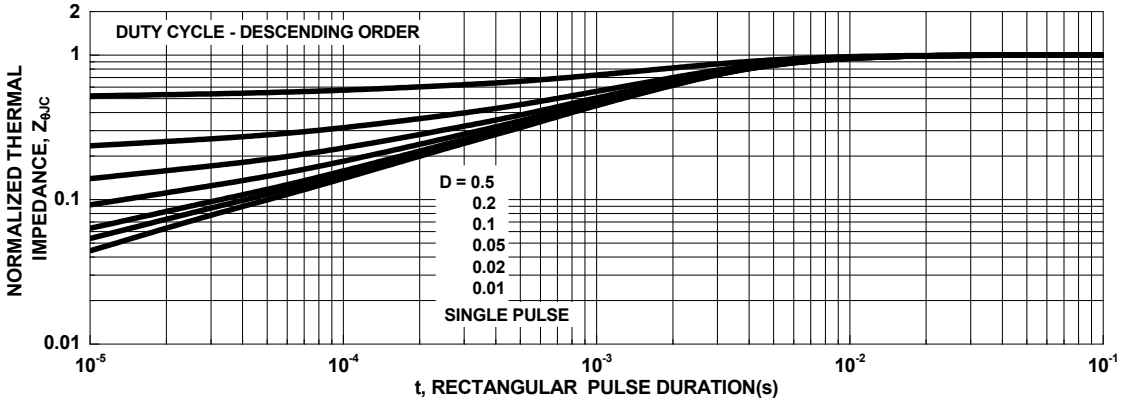
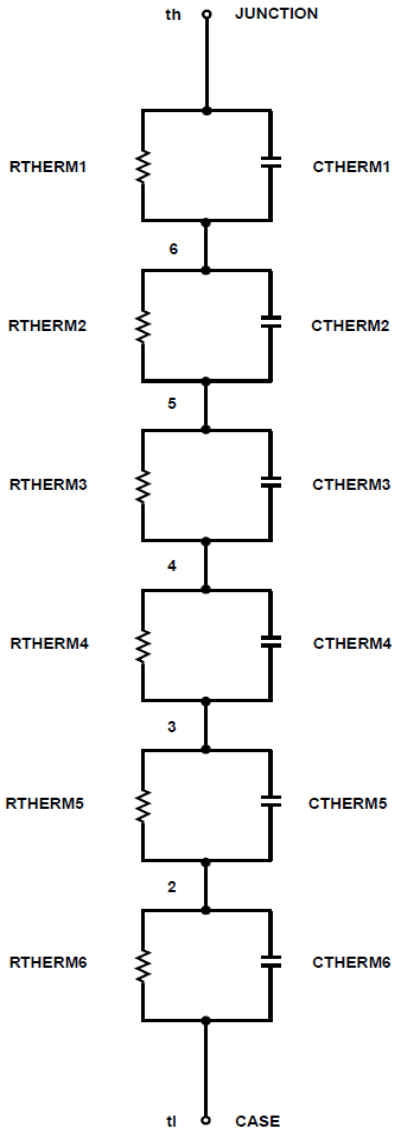


Figure 16. IGBT Normalized Transient Thermal Impedance, Junction to Case

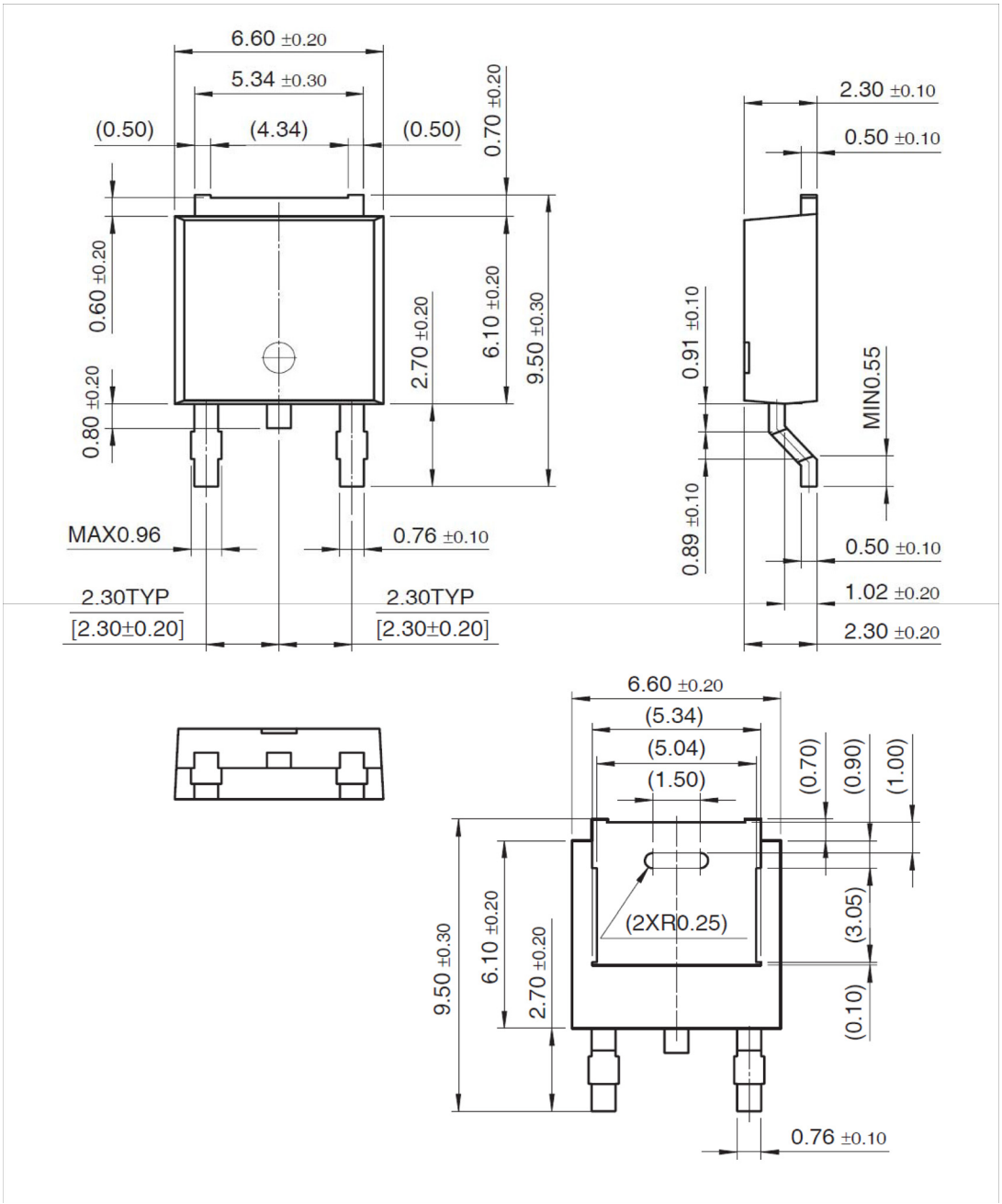
SPICE Thermal Model

CTHERM1 th 6 5.7337E-05
CTHERM2 6 5 5.3736E-03
CTHERM3 5 4 1.1141E-03
CTHERM4 4 3 2.8690E-04
CTHERM5 3 2 7.4429E-04
CTHERM6 2 tl 3.7019E-03

RTHERM1 th 6 6.6403E-03
RTHERM2 6 5 5.8449E-01
RTHERM3 5 4 5.3930E-02
RTHERM4 4 3 9.2492E-03
RTHERM5 3 2 1.5794E-02
RTHERM6 2 tl 1.7974E-01



Physical Dimensions



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