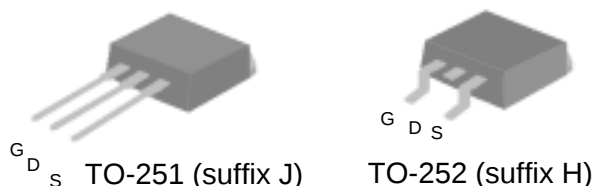


N-channel Insulated-Gate Bipolar Transistor

PRODUCT SUMMARY

V_{CES}	450V
$V_{CE(sat)}$	5V typ.
I_{CP}	130A

 **Pb-free; RoHS-compliant TO-251 (IPAK) and TO-252 (DPAK)**



DESCRIPTION

The SSM20G45E achieves fast switching performance with low gate charge without a complex drive circuit. It is suitable for use in short-duration, high-current strobe applications, such as still-camera flash.

The SSM20G45EGH is in a TO-252 package, which is widely used for commercial and industrial surface-mount applications.

The through-hole version, the SSM20G45EGJ in TO-251, is available for vertical mounting, where a small footprint is required on the board, and/or an external heatsink is to be attached.

These devices are manufactured with an advanced process, providing improved on-resistance and switching performance.

The gate has internal ESD protection.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Units
V_{CES}	Collector-emitter voltage	450	V
V_{GE}	Gate-emitter voltage	± 6	V
V_{GEP}	Pulsed gate-emitter voltage	± 8	V
I_{CP}	Pulsed collector current ¹	130	A
P_D	Total power dissipation, $T_C = 25^\circ\text{C}$	20	W
T_{STG}	Storage temperature range	-55 to 150	$^\circ\text{C}$
T_J	Operating junction temperature range	-55 to 150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Maximum thermal resistance, junction-case	6	$^\circ\text{C/W}$

Notes:

1. Pulse width must be limited to avoid exceeding the safe operating area.
2. Pulse width $< 300\mu\text{s}$, duty cycle $< 2\%$.

ELECTRICAL CHARACTERISTICS $T_j = 25^{\circ}\text{C}$ (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_{GES}	Gate-emitter leakage current	$V_{GE}=6\text{V}, V_{CE}=0\text{V}$	-	-	10	μA
I_{CES}	Collector-emitter leakage current	$V_{CE}=450\text{V}, V_{GE}=0\text{V}$	-	-	10	μA
$V_{CE(sat)}$	Collector-emitter saturation voltage	$V_{GE}=4.5\text{V}, I_{CP}=130\text{A}$ (Pulsed)	-	5	8	V
$V_{GE(th)}$	Gate threshold voltage	$V_{CE}=V_{GE}, I_C=250\mu\text{A}$	-	-	1.2	V
Q_g	Total gate charge	$I_C=40\text{A}$	-	51	-	nC
Q_{ge}	Gate-emitter charge	$V_{CE}=300\text{V}$	-	2	-	nC
Q_{gc}	Gate-collector charge	$V_{GE}=5\text{V}$	-	5.4	-	nC
$t_{d(on)}$	Turn-on delay time	$V_{CC}=200\text{V}$	-	5.5	-	ns
t_r	Rise time	$I_C=40\text{A}$	-	72	-	ns
$t_{d(off)}$	Turn-off delay time	$R_G=25\Omega$	-	640	-	ns
t_f	Fall time	$V_{GE}=5\text{V}$	-	2.6	-	μs
C_{ies}	Input capacitance	$V_{GE}=0\text{V}$	-	2095	-	pF
C_{oes}	Output capacitance	$V_{CE}=25\text{V}$	-	145	-	pF
C_{res}	Reverse transfer capacitance	$f=1.0\text{MHz}$	-	35	-	pF

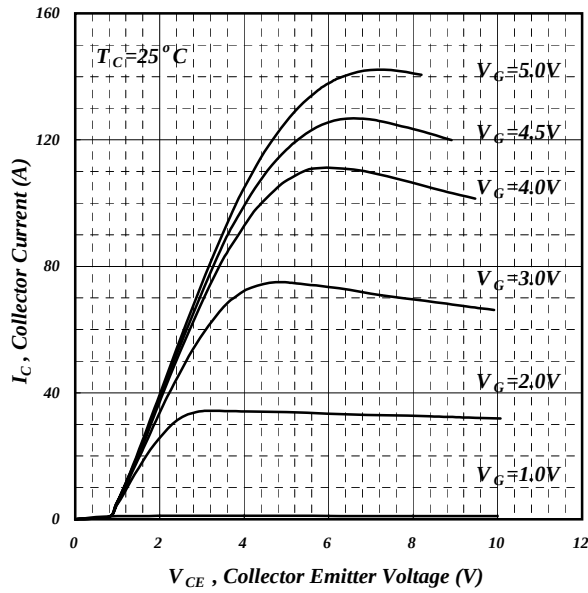


Fig 1. Typical Output Characteristics

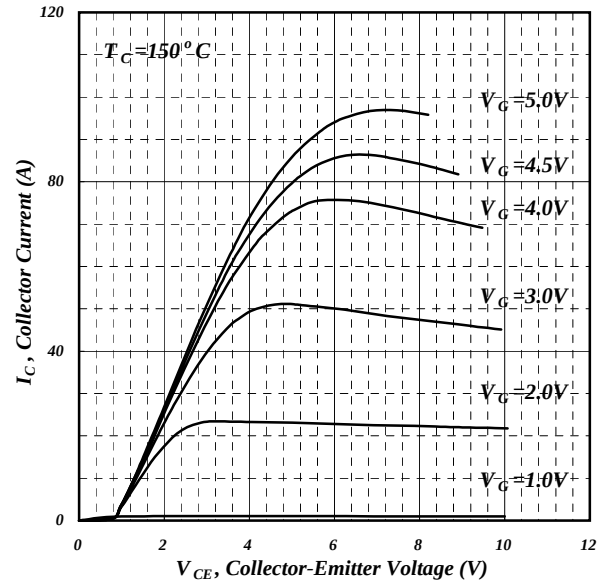
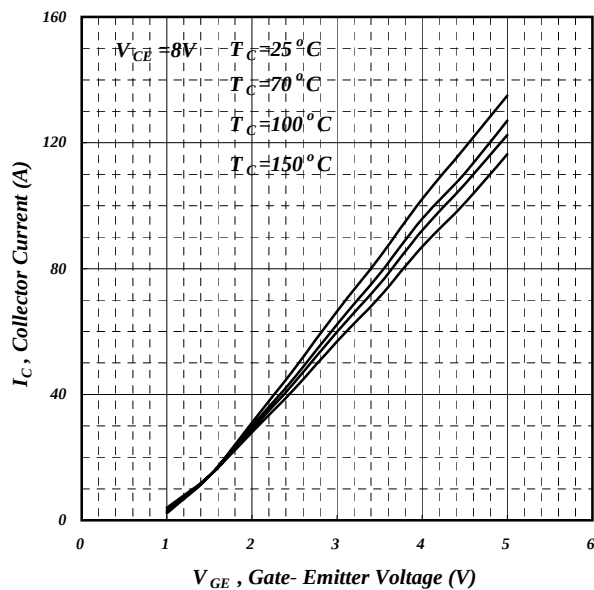
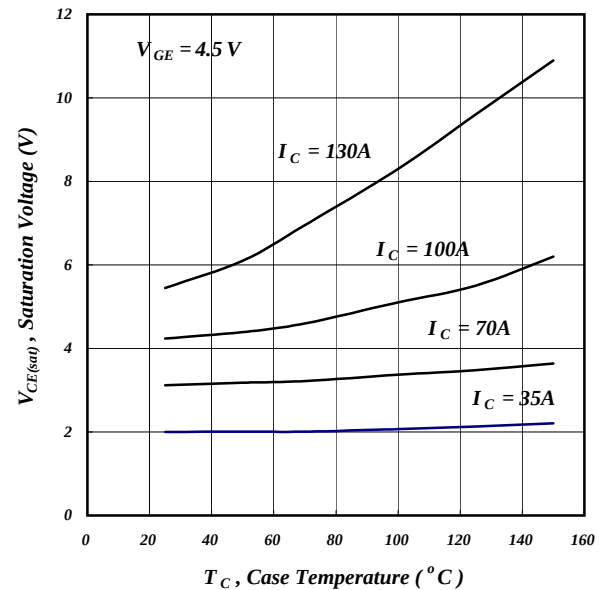


Fig 2. Typical Output Characteristics


 Fig 3. Collector Current vs.
 Gate-Emitter Voltage

 Fig 4. Collector- Emitter Saturation Voltage
 vs. Case Temperature

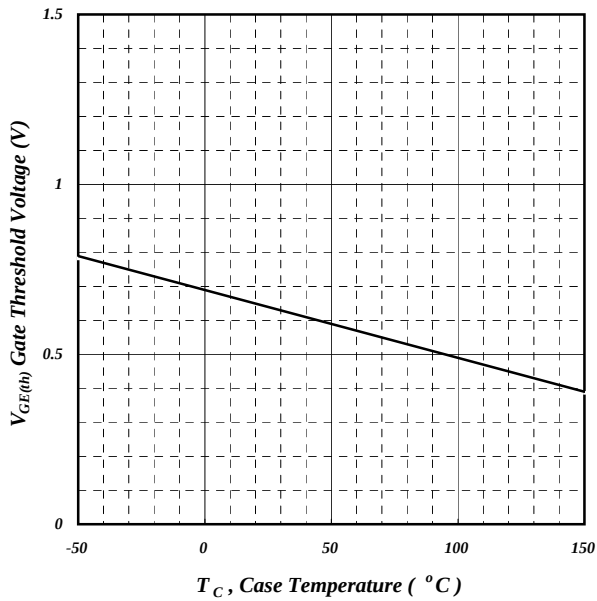


Fig 5. Gate-Emitter Cut-Off Voltage
vs. Case Temperature

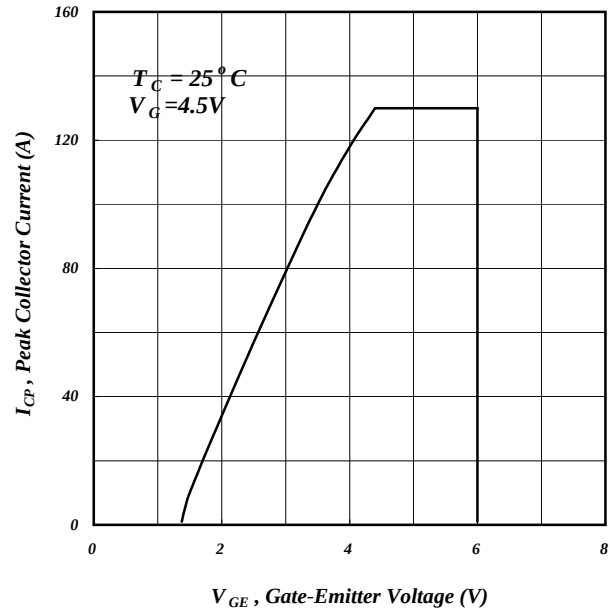


Fig 6. Safe Operating Area

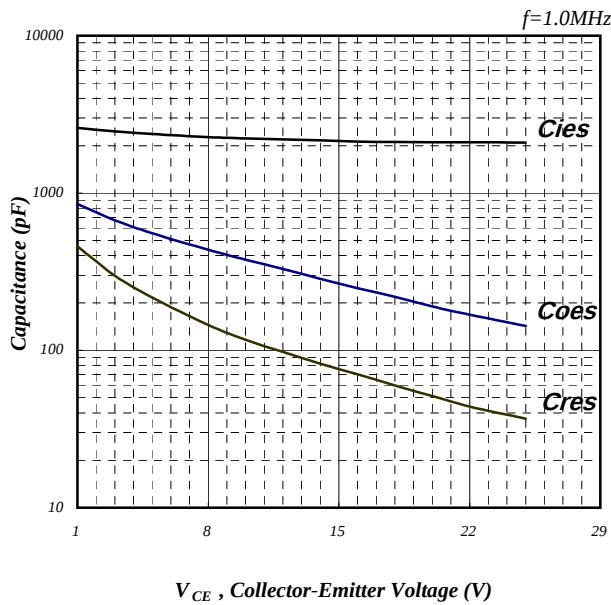


Fig 7. Collector vs. Collector-Emitter Voltage

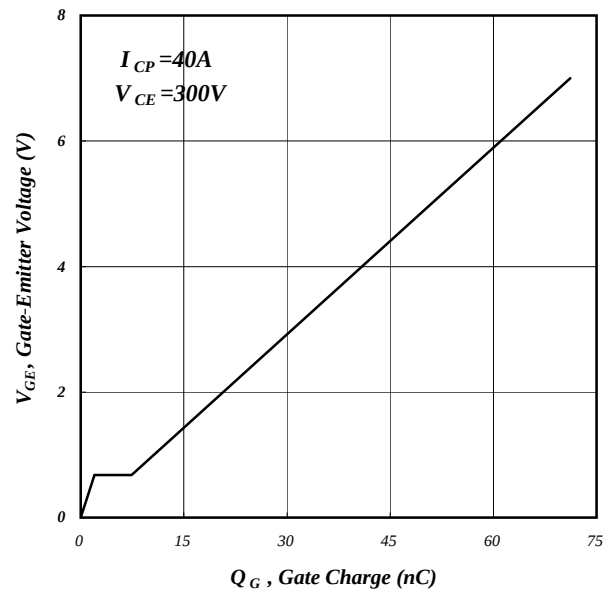


Fig 8. Gate Charge Waveform

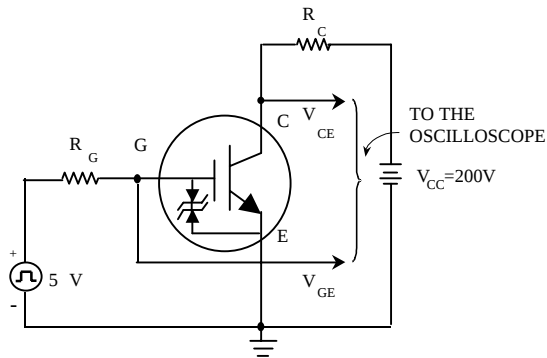


Fig 9. Switching Time Test Circuit

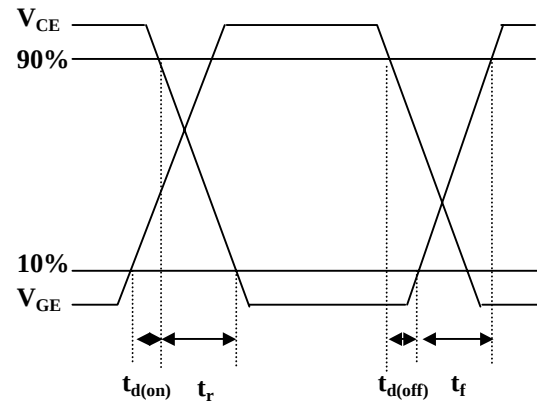


Fig 10. Switching Time Waveform

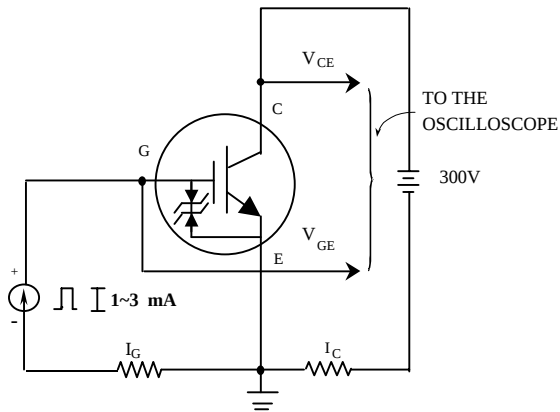


Fig 11. Gate Charge Test Circuit

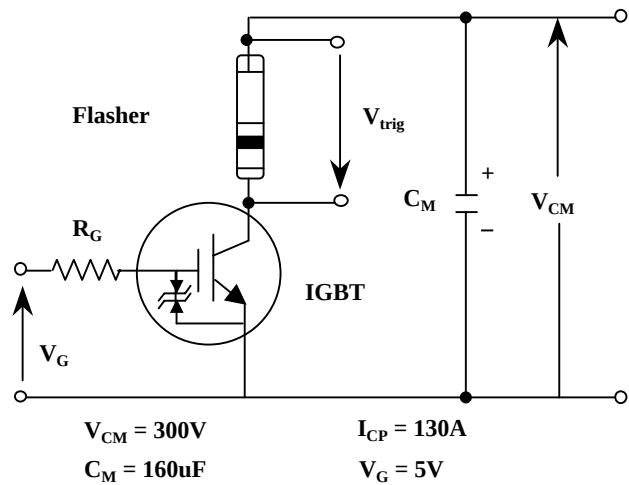
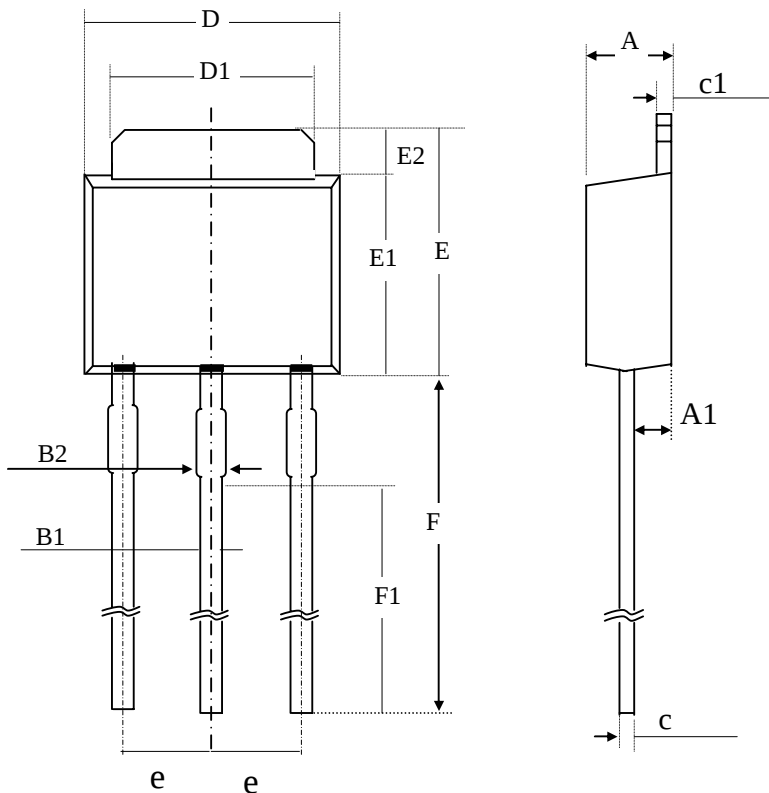
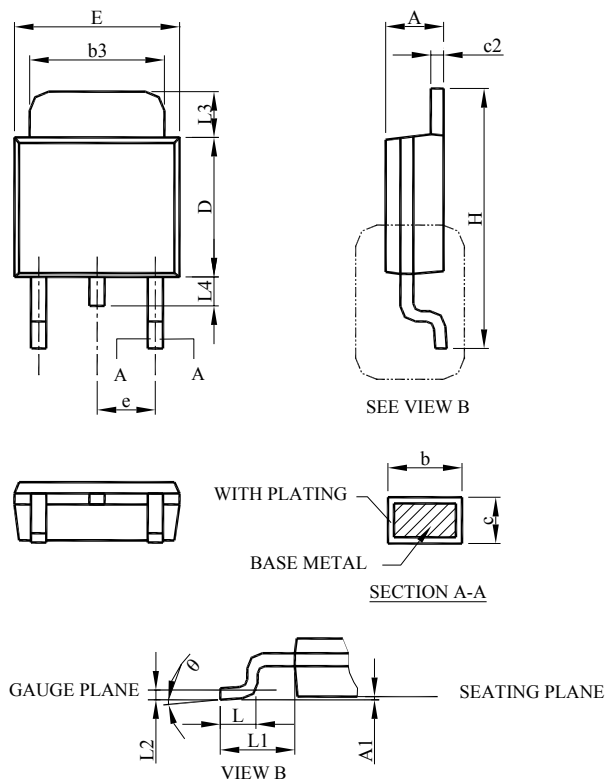


Fig 12. Application Test Circuit

PHYSICAL DIMENSIONS: TO-251 (I-PAK)


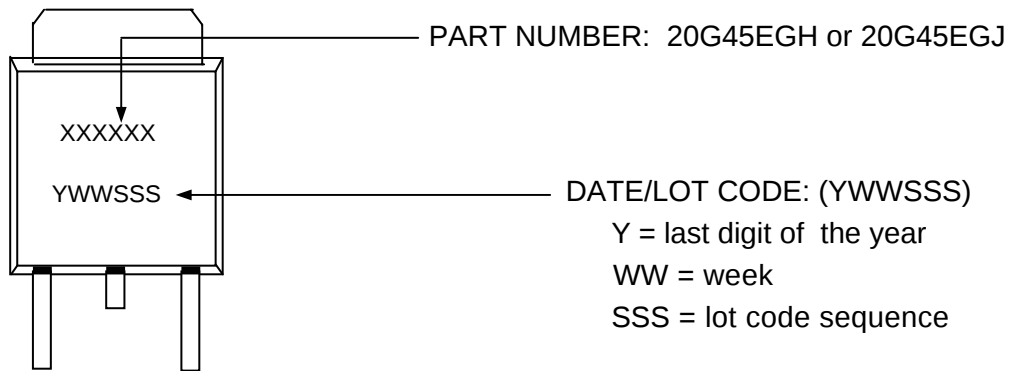
SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.90	1.20	1.50
B1	0.50	0.60	0.70
B2	0.60	0.72	0.90
c	0.45	0.50	0.60
c1	0.45	0.50	0.55
D	6.40	6.60	6.80
D1	5.20	5.35	5.50
E	6.80	7.00	7.20
E1	5.40	5.60	5.80
E2	1.40	1.50	1.60
e	--	2.30	--
F	7.20	7.50	7.80
F1	1.50	1.60	1.80

- 1.All dimensions are in millimeters.
- 2.Dimensions do not include mold protrusions.

PHYSICAL DIMENSIONS: TO-252 (D-PAK)


SYMBOL	TO-252-3L	
	MILLIMETERS	
	MIN.	MAX.
A	1.80	2.80
A1	0.00	0.13
b	0.40	1.00
b3	4.80	5.90
c	0.35	0.65
c2	0.40	0.89
D	5.10	6.30
E	6.00	7.00
e	2.30 BSC	
H	7.80	11.05
L	1.00	2.55
L1	2.20	3.05
L2	0.35	0.65
L3	0.50	2.03
L4	0.50	1.20
θ	0°	8°

PART MARKING



PACKING: Moisture sensitivity level MSL3

TO-252: 3000 pcs in antistatic tape on a reel packed inside a moisture barrier bag (MBB).

TO-251: 1000pcs in tubes packed inside a moisture barrier bag (MBB).

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