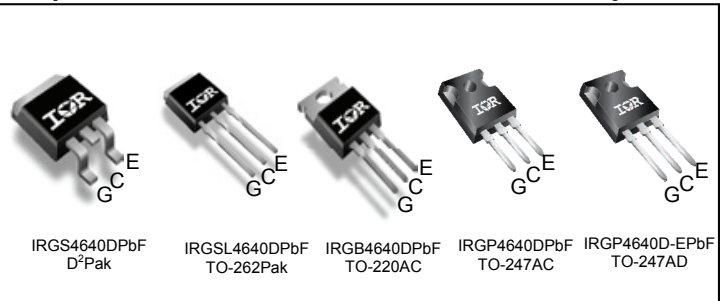
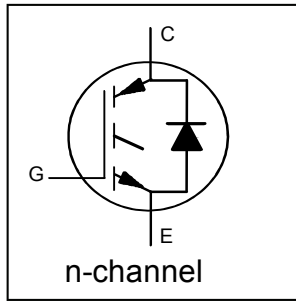


Insulated Gate Bipolar Transistor with Ultrafast Soft Recovery Diode

$V_{CES} = 600V$
 $I_C = 40A, T_C = 100^\circ C$
 $t_{SC} \geq 5\mu s, T_{J(max)} = 175^\circ C$
 $V_{CE(ON)} \text{ typ.} = 1.60V @ I_C = 24A$



Applications

- Industrial Motor Drive
- Inverters
- UPS
- Welding

G	C	E
Gate	Collector	Emitter

Features	Benefits
Low $V_{CE(ON)}$ and switching losses	High efficiency in a wide range of applications and switching
Square RBSOA and maximum junction temperature 175°C	Improved reliability due to rugged hard switching performance and high power capability
Positive $V_{CE(ON)}$ temperature coefficient	Excellent current sharing in parallel operation
5µs Short Circuit SOA	Enables short circuit protection scheme
Lead-Free, RoHS Compliant	Environmentally friendly

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRGS4640DPbF	D²Pak	Tube	50	IRGS4640DPbF
		Tape and Reel Right	800	IRGS4640DTRRPbF
		Tape and Reel Left	800	IRGS4640DTRLpbF
IRGSL4640DPbF	TO-262	Tube	50	IRGSL4640DPbF
IRGB4640DPbF	TO-220AB	Tube	50	IRGB4640DPbF
IRGP4640DPbF	TO-247AC	Tube	25	IRGP4640DPbF
IRGP4640D-EPbF	TO-247AD	Tube	25	IRGP4640D-EPbF

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{CES}	Collector-to-Emitter Voltage	600	V
$I_C @ T_C = 25^\circ C$	Continuous Collector Current	65	A
$I_C @ T_C = 100^\circ C$	Continuous Collector Current	40	
I_{CM}	Pulse Collector Current, $V_{GE} = 15V$	72	
I_{LM}	Clamped Inductive Load Current, $V_{GE} = 20V$ ①	96	
$I_F @ T_C = 25^\circ C$	Diode Continuous Forward Current	65	
$I_F @ T_C = 100^\circ C$	Diode Continuous Forward Current	40	
I_{FM}	Diode Maximum Forward Current ④	96	V
V_{GE}	Continuous Gate-to-Emitter Voltage	±20	
	Transient Gate to Emitter Voltage	±30	
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	250	W
$P_D @ T_C = 100^\circ C$	Maximum Power Dissipation	125	
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +175	C
	Soldering Temperature, for 10 sec. (1.6mm from case)	300	
	Mounting Torque, 6-32 or M3 Screw (TO-220, TO-247)	10 lbf·in (1.1 N·m)	

Notes ① through ⑥ are on page 8

Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
R _{θJC} (IGBT)	Thermal Resistance Junction-to-Case (D ² Pak, TO-220, TO-262) ②	—	—	0.60	°C/W
	Thermal Resistance Junction-to-Case (TO-247) ②	—	—	0.60	
R _{θJC} (Diode)	Thermal Resistance Junction-to-Case (D ² Pak, TO-220, TO-262) ②	—	—	1.53	
	Thermal Resistance Junction-to-Case (TO-247) ②	—	—	1.62	
R _{θCS}	Thermal Resistance, Case-to-Sink (flat, greased surface– TO 220, D ² Pak, TO-262)	—	0.50	—	
	Thermal Resistance, Case-to-Sink (flat, greased surface– TO 247)	—	0.24	—	
R _{θJA}	Thermal Resistance, Junction-to-Ambient (PCB Mount - D ² Pak, TO-262) ⑥	—	—	40	
	Thermal Resistance, Junction-to-Ambient (Socket Mount –TO-247)	—	—	40	
	Thermal Resistance, Junction-to-Ambient (Socket Mount –TO-220)	—	—	62	

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
V _{(BR)CES}	Collector-to-Emitter Breakdown Voltage	600	—	—	V	V _{GE} = 0V, I _C = 100μA ③
ΔV _{(BR)CES/ΔT_J}	Temperature Coeff. of Breakdown Voltage	—	0.30	—	V/°C	V _{GE} = 0V, I _C = 1mA (25°C-175°C)
V _{CE(on)}	Collector-to-Emitter Saturation Voltage	—	1.60	1.90	V	I _C = 24A, V _{GE} = 15V, T _J = 25°C
		—	1.90	—		I _C = 24A, V _{GE} = 15V, T _J = 150°C
		—	2.0	—		I _C = 24A, V _{GE} = 15V, T _J = 175°C
V _{GE(th)}	Gate Threshold Voltage	4.0	—	6.5	V	V _{CE} = V _{GE} , I _C = 700μA
ΔV _{GE(th)/ΔT_J}	Threshold Voltage Temp. Coefficient	—	-18	—	mV/°C	V _{CE} = V _{GE} , I _C = 1.0mA (25°C-175°C)
g _{fe}	Forward Transconductance	—	17	—	S	V _{CE} = 50V, I _C = 24A, PW = 80μs
I _{CES}	Collector-to-Emitter Leakage Current	—	2.0	25	μA	V _{GE} = 0V, V _{CE} = 600V
		—	775	—		V _{GE} = 0V, V _{CE} = 600V, T _J = 175°C
I _{GES}	Gate-to-Emitter Leakage Current	—	—	±100	nA	V _{GE} = ±20V
V _{FM}	Diode Forward Voltage Drop	—	1.8	2.6	V	I _F = 24A
		—	1.28	—		I _F = 24A, T _J = 175°C