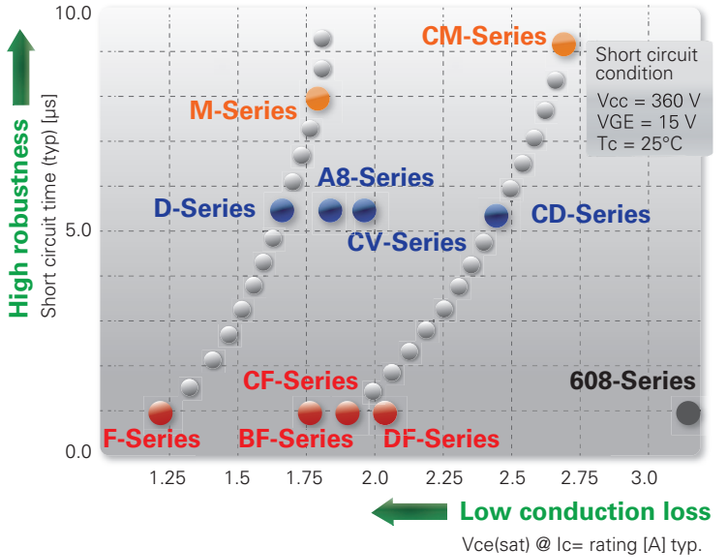
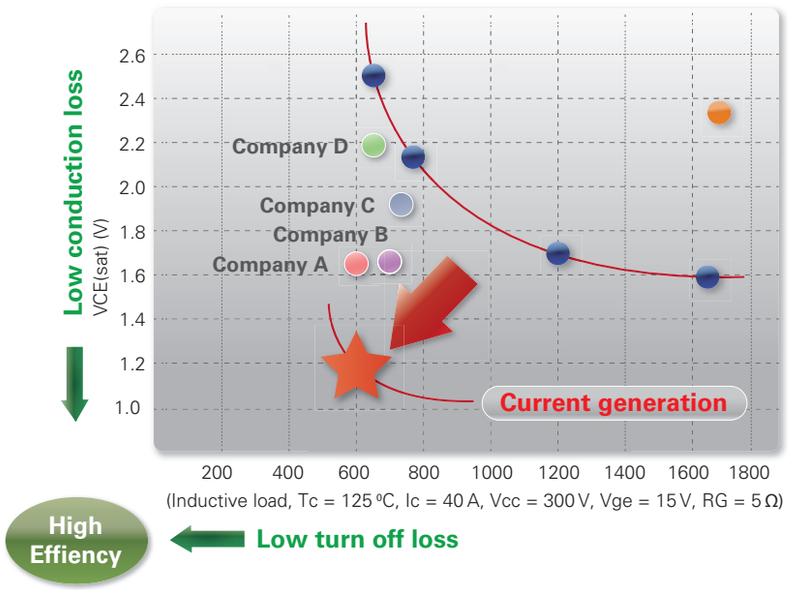


tsc vs. Vce(sat) for IGBT application optimized characteristics



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Document No. R07CL0007ED0500

Insulated-Gate Bipolar Transistor (IGBT)

Pocket Guide

Renesas Electronics
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2013.10

IGBT Devices (1/2)

Part Number	V_{CES} (V)	IGBT						Diode			Package	
		IC (A) @ 100° C	VCEsat (V) typ.	tf (ns) typ.	tsc (µs) typ.	Eoff (mJ) typ.	Rthj-c (° C/W)	FRD	Vf (V) typ.	trr (ns) typ.	Pc (W)	Type
RJH60A01RDPD-A0	600	5	1.9	85	5	0.07	4.25	RC	2.0	100	29.4	TO-252A
RJH60A81RDPD-A0		5	2.0	75	5	0.06	4.25	RC	1.9	100	29.4	TO-252A
RJH60V1BDPP-M0		8	1.6	110	6	0.11	4.10	Y	2.5	25	30.0	TO-220FL
RJH60V1BDPE		8	1.6	110	6	0.11	2.38	Y	2.5	25	52.0	LDPAK-S
RJH60M1DPP-M0		8	1.9	70	8	0.09	4.10	Y	1.4	75	30.0	TO-220FL
RJH60M1DPE		8	1.9	70	8	0.09	2.38	Y	1.1	100	52.0	LDPAK-S
RJH60A83RDPD-A0		10	2.1	45	5	0.16	2.45	RC	2.3	130	51.0	TO-252A
RJH60A83RDPE		10	2.1	45	5	0.16	2.38	RC	2.3	130	52.0	LDPAK-S
RJH60A83RDPN-E0		10	2.1	45	5	0.16	2.10	RC	2.3	130	59.5	TO-220AB
RJH60A83RDPP-M0		10	2.1	45	5	0.16	4.10	RC	2.3	130	30.0	TO-220FL
RJH60D1DPP-M0		10	1.9	90	5	–	6.00	Y	1.4	100	20.8	TO-220FL
RJH60D1DPE		10	1.9	90	5	–	2.40	Y	1.4	100	52.0	LDPAK-S
RJH60V2BDPP-M0		12	1.6	75	6	0.18	3.70	Y	2.5	25	34.0	TO-220FL
RJH60V2BDPE		12	1.6	75	6	0.18	1.98	Y	2.5	25	63.0	LDPAK-S
RJH60D2DPP-M0		12	1.7	80	5	–	4.60	Y	1.2	100	27.2	TO-220FL
RJH60D2DPE		12	1.7	80	5	–	1.98	Y	1.5	100	63.0	LDPAK-S
RJH60M2DPP-M0		12	1.9	45	8	0.18	3.70	Y	1.2	85	33.8	TO-220FL
RJH60M2DPE		12	1.9	45	8	0.18	1.98	Y	1.2	85	63.0	LDPAK-S
RJH60A85RDPE		15	1.5	110	5	0.30	1.11	RC	1.7	160	113.0	LDPAK-S
RJH60A85RDPP-M0		15	1.5	110	5	0.30	3.15	RC	1.7	160	39.7	TO-220FL
RJH60V3BDPP-M0		17	1.6	75	6	0.30	3.15	Y	2.8	25	40.0	TO-220FL
RJH60V3BDPE		17	1.6	75	6	0.30	1.11	Y	2.8	25	113.0	LDPAK-S
RJH60D3DPP-M0		17	1.6	80	5	–	4.17	Y	1.3	100	30.0	TO-220FL
RJH60D3DPE		17	1.6	80	5	–	1.11	Y	1.3	100	113.0	LDPAK-S
RJH60M3DPP-M0		17	1.8	70	8	0.29	3.15	Y	1.3	90	39.7	TO-220FL
RJH60M3DPE		17	1.8	70	8	0.29	1.11	Y	1.3	90	113.0	LDPAK-S
RJH60M3DPQ-E0		17	1.8	80	8	0.29	1.25	Y	1.3	100	100.0	TO-247
RJH60F3DPQ-A0		20	1.4	92	–	–	0.70	Y	1.2	90	178.5	TO-247A
RJP60V0DPM		22	1.5	70	6	–	3.125	N	–	–	40.0	TO-3PFM
RJP60D0DPP-M0		22	1.6	70	5	–	3.57	N	–	–	35.0	TO-220FL
RJP60D0DPE		22	1.6	70	5	–	1.02	N	–	–	122.0	LDPAK-S
RJP60D0DPM		22	1.6	70	5	–	3.125	N	–	–	40.0	TO-3PFM
RJP60D0DPK		22	1.6	70	5	–	0.89	N	–	–	140.0	TO-3P
RJH60D0DPM		22	1.6	70	5	0.29	3.13	Y	1.4	100	40.0	TO-3PFM
RJH60M0DPQ-E0		22	1.8	55	8	0.38	1.07	Y	1.4	100	116.8	TO-247
RJP60F0DPE		25	1.4	90	–	–	1.02	N	–	–	122.0	LDPAK-S
RJP60F0DPM		25	1.4	90	–	–	3.125	N	–	–	40.0	TO-3PFM
RJH60F0DPQ-A0		25	1.4	90	–	–	0.62	Y	1.2	90	201.6	TO-247A
RJP60F4DPM		30	1.4	80	–	–	3.03	N	–	–	41.2	TO-3PFM
RJP60F4DPQ-A0		30	1.4	80	–	–	0.53	N	–	–	235.8	TO-247A
RJH60F4DPQ-A0		30	1.4	80	–	–	0.53	Y	1.2	90	235.8	TO-247A
RJH60D5DPM		37	1.6	40	5	0.27	2.78	Y	1.4	100	45.0	TO-3PFM
RJH60D5BDPQ-E0		37	1.6	50	5	0.81	0.63	Y	2.5	25	200.0	TO-247
RJH60M5DPQ-E0		37	1.8	60	8	0.82	0.63	Y	1.4	100	200.0	TO-247
RJP60F5DPM		40	1.37	85	–	–	2.78	N	–	–	45.0	TO-3PFM
RJP60F5DPK		40	1.37	85	–	–	0.48	N	–	–	260.4	TO-3P
RJH60F5DPQ-A0		40	1.37	85	–	–	0.48	Y	1.2	90	260.4	TO-247A
RJH60D6DPM		40	1.6	50	5	0.60	2.50	Y	1.4	100	50.0	TO-3PFM
RJH60M6DPQ-E0		40	1.8	50	8	0.99	0.42	Y	1.3	100	298.0	TO-247
RJH60F6DPQ-A0		45	1.35	74	–	–	0.42	Y	1.2	90	297.6	TO-247A
RJH60F7ADPK		50	1.35	74	–	–	0.38	Y	1.6	140	328.9	TO-3P
RJH60F7BDPQ-A0		50	1.35	74	–	–	0.38	Y	2.5	25	328.9	TO-247A
RJH60F7DPQ-A0		50	1.35	74	–	–	0.38	Y	1.2	90	328.9	TO-247A
RJH60D7ADPK		50	1.6	50	5	0.60	0.42	Y	1.4	100	300.0	TO-3P

IGBT Devices (2/2)

Part Number	V_{CES} (V)	IGBT						Diode			Package	
		IC (A) @ 100° C	VCEsat (V) typ.	tf (ns) typ.	tsc (µs) typ.	Eoff (mJ) typ.	Rthj-c (° C/W)	FRD	Vf (V) typ.	trr (ns) typ.	Pc (W)	Type
RJH60D7DPM	600	50	1.6	50	5	0.60	2.27	Y	1.4	100	55.0	TO-3PFM
RJH60D7DPQ-E0		50	1.6	50	5	0.60	0.42	Y	1.4	100	300.0	TO-247
RJH60D7BDPQ-E0		50	1.6	50	5	1.40	0.42	Y	2.5	25	300.0	TO-247
RJH60M7DPQ-E0		50	1.6	45	8	1.20	0.42	Y	1.4	100	300.0	TO-247
RJP6085DPN		40	2.65	40	–	–	0.70	–	–	–	178.5	TO-220AB
RJP6085DPK		40	2.65	40	–	–	0.70	–	–	–	178.5	TO-3P
RJH1BF6RDPQ-80	1100	30	1.7	247	–	–	0.55	RC	3	–	227.2	TO-247
RJH1BF7RDPQ-80		35	1.6	208	–	–	0.50	RC	3	–	250.0	TO-247
RJH1CM5DPQ-E0	1200	15	2.1	100	10	0.70	0.51	Y	1.6	200	245.0	TO-247
RJH1CF4RDPQ-80		20	2.0	300	–	–	0.80	Y	4.2	–	156.2	TO-247
RJH1CM6DPQ-E0		20	2.1	120	10	0.90	0.43	Y	1.7	180	290.0	TO-247A
RJH1CF5RDPQ-80		25	1.95	272	–	–	0.65	Y	4.2	–	192.3	TO-247
RJH1CV5DPQ-E0		25	1.8	165	5	1.50	0.51	Y	1.8	170	245.0	TO-247
RJH1CM7DPQ-E0		25	2.1	105	10	1.30	0.39	Y	1.8	170	328.9	TO-247
RJH1CF6RDPQ-80		30	1.8	275	–	–	0.55	RC	3.0	–	227.2	TO-247
RJH1CG6RDPQ-E0		30	1.8	–	–	–	0.55	RC	2.7	–	227.2	TO-247
RJH1CV6DPQ-E0		30	1.8	120	5	1.70	0.43	Y	2.0	180	290.0	TO-247A
RJH1CF7RDPQ-80		35	1.85	250	–	–	0.50	RC	3.0	–	250.0	TO-247
RJH1CG7RDPQ-E0		35	1.85	–	–	–	0.50	RC	2.7	–	250.0	TO-247
RJH1CV7DPQ-E0		35	1.8	280	5	2.50	0.39	Y	2.1	200	320.0	TO-247A
RJH1DG7RDPQ-80	1350	35	1.95	170	–	–	0.50	RC	2.8	–	250.0	TO-247

IGBT Classes by Applications

Application/ Voltage	Induction Heating	Inverter	Small Motor Control	Big Motor Control	Power Supply Unit
600 V	F	D, (F)	A, D	D, M	608
1100 V	BF				
1200 V	CF	CV, CD	CV, CD	CD, CM	
1350 V	DF				