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Using novel field stop IGBT technology, **onsemi**'s new series of field stop 4th generation IGBTs offer the optimum performance for automotive applications. This technology is Short circuit rated and offers high figure of merit with low conduction and switching losses.

Features

- Maximum Junction Temperature: $T_J = 175^{\circ}\text{C}$
- Positive Temperature Co-efficient for Easy Parallel Operation
- High Current Capability
- Low Saturation Voltage: $V_{CE(Sat)} = 1.6\text{ V (Typ.) @ } I_C = 50\text{ A}$
- 100% of the Parts Tested for I_{LM} (Note 2)
- High Input Impedance
- Fast Switching
- Tightened Parameter Distribution
- AEC-Q101 Qualified
- This Device is Pb-Free and RoHS Compliant

Typical Applications

- E-compressor for HEV/EV, PTC Heater for HEV/EV

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
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AFGHL50T65RQDN

THERMAL CHARACTERISTICS

Rating	Symbol	Min	Typ	Max	Unit
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ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
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SWITCHING CHARACTERISTICS, INDUCTIVE LOAD

Turn-on Delay Time	$T_J = 175^\circ\text{C}, V_{CC} = 400\text{ V},$ $I_C = 25\text{ A}, R_G = 2.5\ \Omega,$ $V_{GE} = 15\text{ V}, \text{ Inductive Load}$	$t_{d(on)}$	-	38	-	ns
Rise Time		t_r	-	27	-	
Turn-off Delay Time		$t_{d(off)}$	-	92	-	
Fall Time		t_f	-	165	-	
Turn-on Switching Loss		E_{on}	-	1.26	-	mJ
Turn-off Switching Loss		E_{off}	-	0.99	-	
Total Switching Loss		E_{ts}	-	2.26	-	
Turn-on Delay Time	$T_J = 175^\circ\text{C}, V_{CC} = 400\text{ V},$ $I_C = 50\text{ A}, R_G = 2.5\ \Omega,$ $V_{GE} = 15\text{ V}, \text{ Inductive Load}$	$t_{d(on)}$	-	45	-	ns
Rise Time		t_r	-	46	-	
Turn-off Delay Time		$t_{d(off)}$	-	86	-	
Fall Time		t_f	-	133	-	
Turn-on Switching Loss		E_{on}	-	3.5	-	mJ
Turn-off Switching Loss		E_{off}	-	1.84	-	
Total Switching Loss		E_{ts}	-	5.34	-	

DIODE CHARACTERISTICS

Diode Forward Voltage	$I_F = 40\text{ A}, T_J = 25^\circ\text{C}$	V_F	-	1.65	2.20	V
	$I_F = 40\text{ A}, T_J = 175^\circ\text{C}$		-	1.7	-	

DIODE SWITCHING CHARACTERISTICS, INDUCTIVE LOAD

Reverse Recovery Energy	$I_F = 40\text{ A}, dI_F/dt = 1000\text{ A}/\mu\text{s}$ $V_R = 400\text{ V}, T_J = 25^\circ\text{C}$	E_{rec}	-	43	-	μJ
Diode Reverse Recovery Time		T_{rr}	-	57	-	nS
Diode Reverse Recovery Charge		Q_{rr}	-	589	-	nC
Reverse Recovery Energy	$I_F = 40\text{ A}, dI_F/dt = 1000\text{ A}/\mu\text{s}$ $V_R = 400\text{ V}, T_J = 175^\circ\text{C}$	E_{rec}	-	215	-	μJ
Diode Reverse Recovery Time		T_{rr}	-			

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TYPICAL CHARACTERISTICS (Continued)

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TYPICAL CHARACTERISTICS (Continued)

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TYPICAL CHARACTERISTICS (Continued)

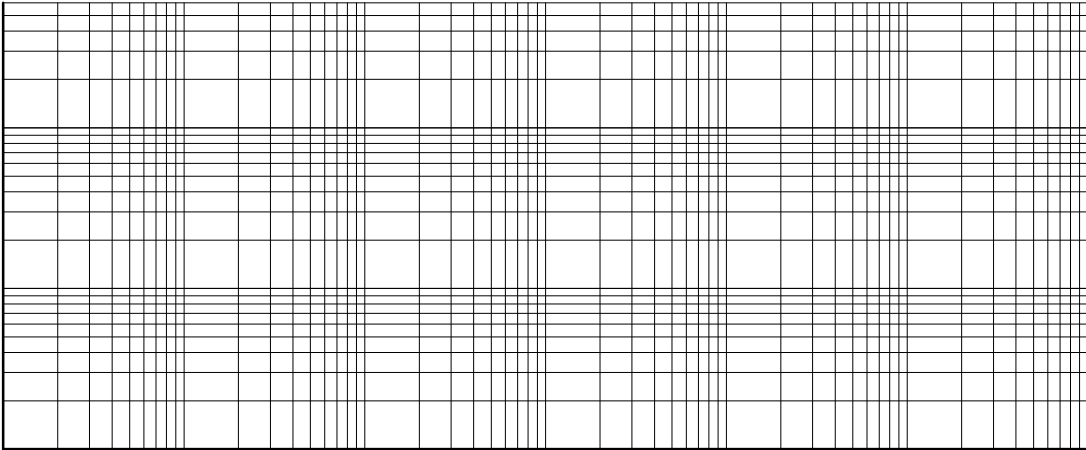
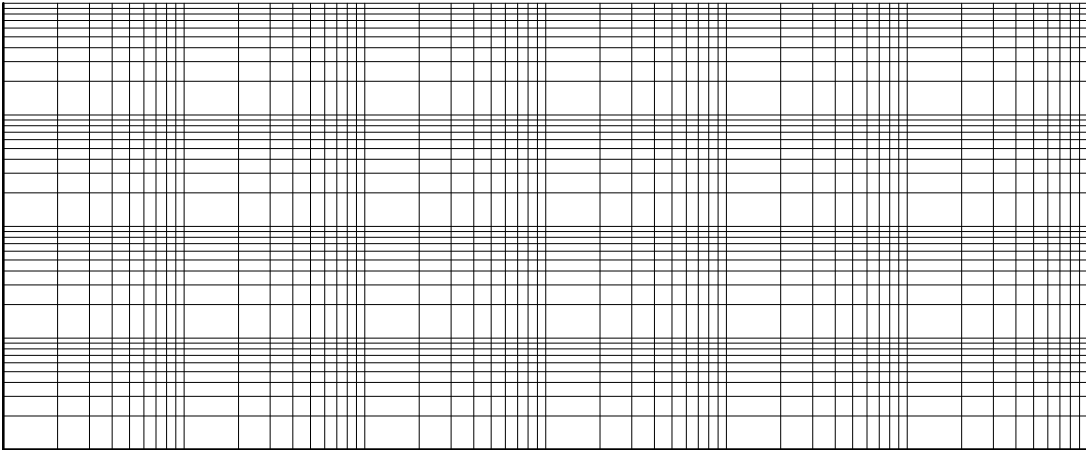


Figure 18. Transient Thermal Impedance of IGBT



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