



650V SuperJunction Power MOSFET

Features

- Extremely Low Gate Charge
- Excellent Output Capacitance (C_{oss}) Profile
- Fast Switching Capability
- 100% UIS Tested, 100% R_g Tested
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant

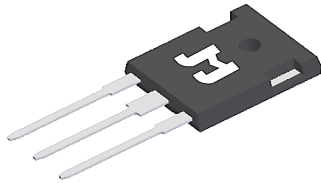
Product Summary

Parameter	Value	Unit
V_{DS}	650	V
$V_{GS(th)}_{Typ}$	3.5	V
I_D (@ $V_{GS} = 10V$) ⁽¹⁾	32	A
$R_{DS(ON)}_{Typ}$ (@ $V_{GS} = 10V$)	95	mΩ
$E_{oss@400V}$	7.8	μJ

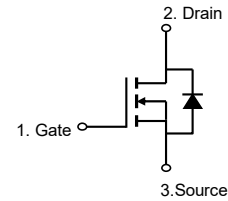
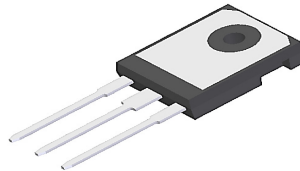
Applications

- Switching Applications

TO-247-3L Top View



TO-247-3L Bottom View

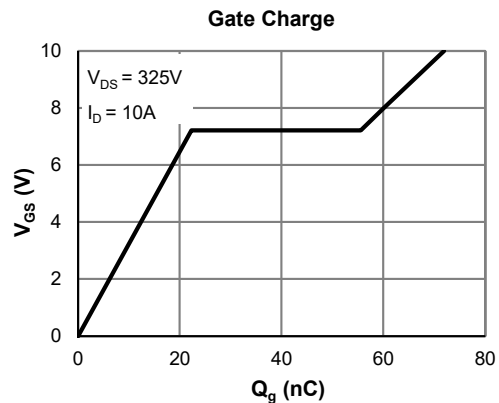
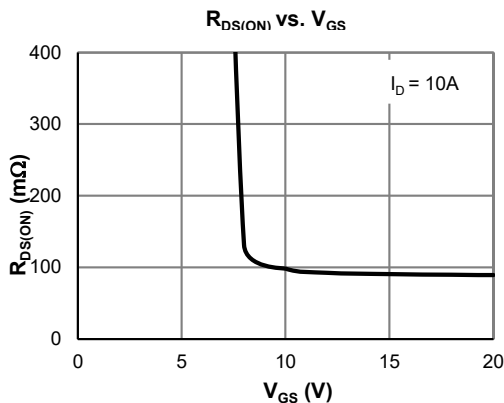


Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMH65R110ASFD-U	TO-247-3L	3	65R110AF	NA	-55 to 150	Tube	30

Absolute Maximum Ratings (@ $T_A = 25^\circ C$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	650	V
Gate-to-Source Voltage	V_{GS}	±30	V
Continuous Drain Current ⁽¹⁾	I_D	$T_C = 25^\circ C$	32
		$T_C = 100^\circ C$	19.0
Pulsed Drain Current ⁽²⁾	I_{DM}	137	A
Avalanche Current ⁽³⁾	I_{AS}	10.0	A
Avalanche Energy ⁽³⁾	E_{AS}	500	mJ
Power Dissipation ⁽⁴⁾	P_D	$T_C = 25^\circ C$	347
		$T_C = 100^\circ C$	139
Junction & Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C





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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	I _D = 250μA, V _{GS} = 0V	650			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 650V, V _{GS} = 0V			10.0	μA
Gate-Body Leakage Current	I _{GSS}	V _{DS} = 0V, V _{GS} = ±30V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2.5	3.5	4.5	V
Static Drain-Source ON-Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 10A		95	110	mΩ
Diode Forward Voltage	V _{SD}	I _S = 1A, V _{GS} = 0V		0.75		V
Diode Continuous Current	I _S	T _C = 25°C			10	A

DYNAMIC PARAMETERS ⁽⁵⁾

Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 100V, f = 1MHz		2869		pF
Output Capacitance	C _{oss}			93		pF
Effective output capacitance, energy related	C _{o(er)}	V _{GS} =0V, V _{DS} =0...400V		97		pF
Effective output capacitance, time related	C _{o(tr)}	ID=constant, V _{GS} =0V, V _{DS} =0...400V		410		pF
Reverse Transfer Capacitance	C _{rss}	V _{GS} = 0V, V _{DS} = 100V, f = 1MHz		5.4		pF
Gate Resistance	R _g	f = 1MHz		2.2		Ω

SWITCHING PARAMETERS ⁽⁵⁾

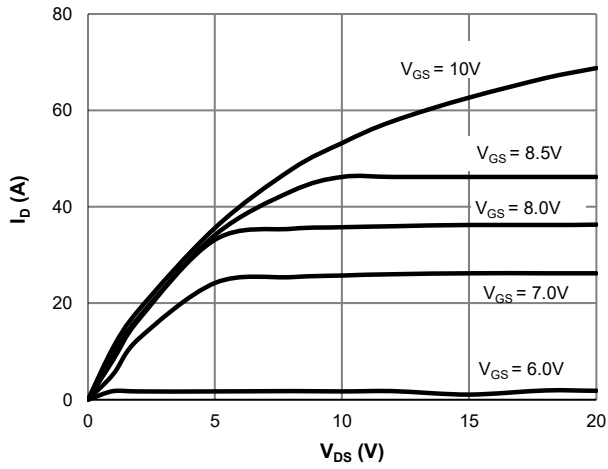
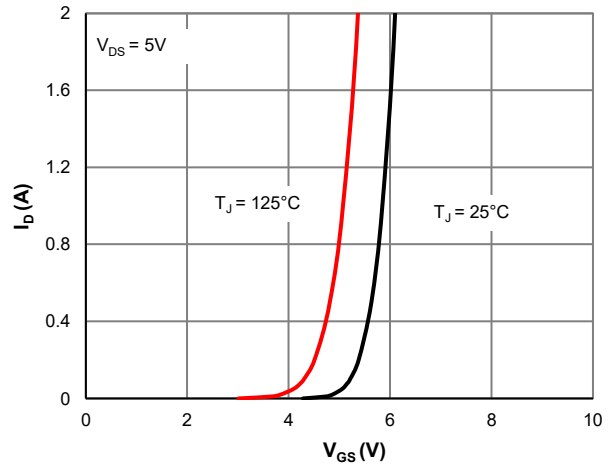
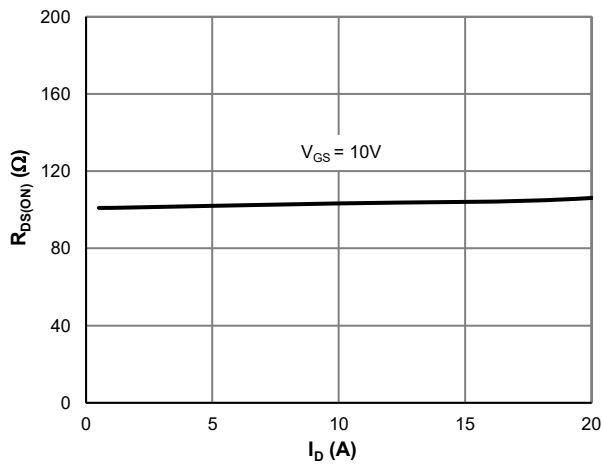
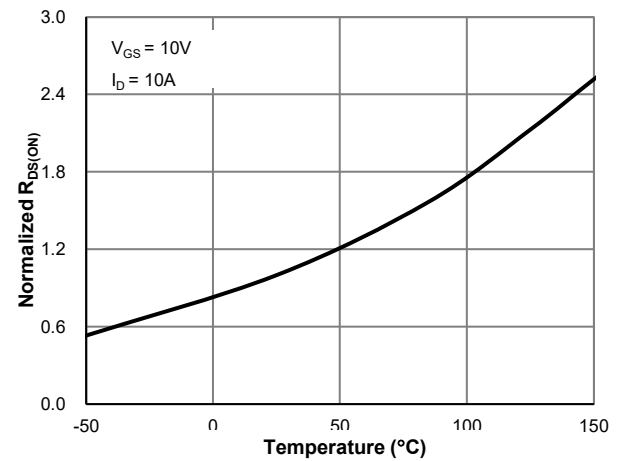
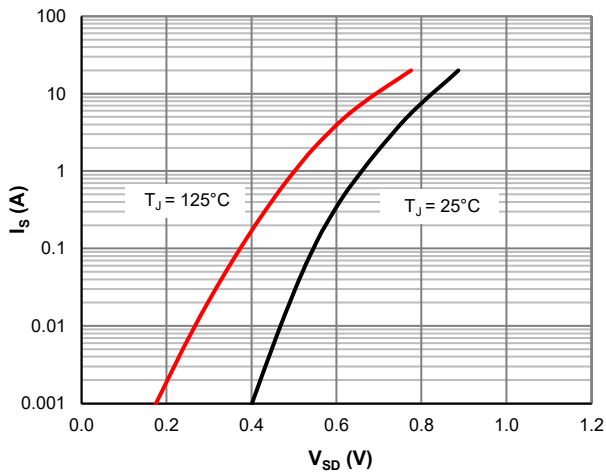
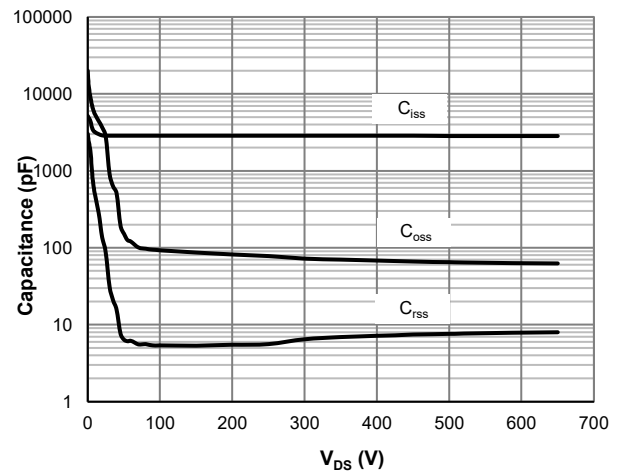
Total Gate Charge (@ V _{GS} = 10V)	Q _g	V _{GS} = 0 to 10V V _{DS} = 325V, I _D = 10A		72		nC
Gate Source Charge	Q _{gs}			22		nC
Gate Drain Charge	Q _{gd}			33		nC
Turn-On DelayTime	t _{D(on)}	V _{GS} = 10V, V _{DS} = 325V R _L = 32.5Ω, R _{GEN} = 6Ω		29		ns
Turn-On Rise Time	t _r			30		ns
Turn-Off DelayTime	t _{D(off)}			77		ns
Turn-Off Fall Time	t _f			17.4		ns
Body Diode Reverse Recovery Time	t _{rr}	I _F = 10A, di _F /dt = 100A/μs		152		ns
Body Diode Reverse Recovery Charge	Q _{rr}	I _F = 10A, di _F /dt = 100A/μs		2.5		μC
Peak Diode Recovery Voltage Slope	dv/dt	I _F ≤ 2A, di/dt = 200A/us, V _{DS} = 400V		15.0		V/ns
MOSFET dv/dt Ruggedness	dv/dt	V _{DS} = 0...400V		50		V/ns

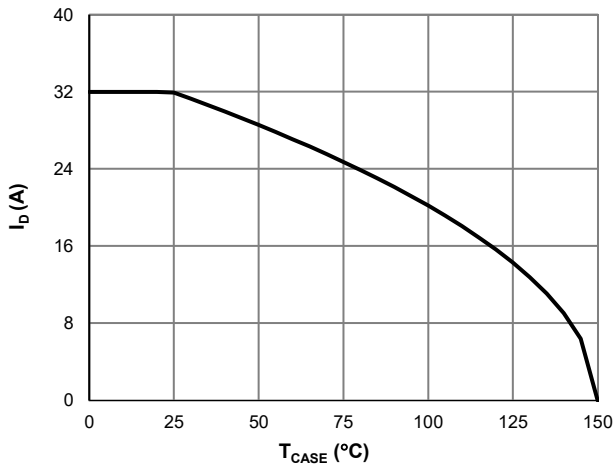
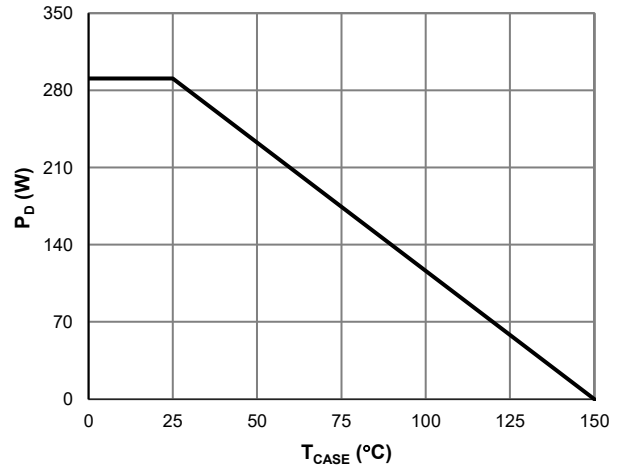
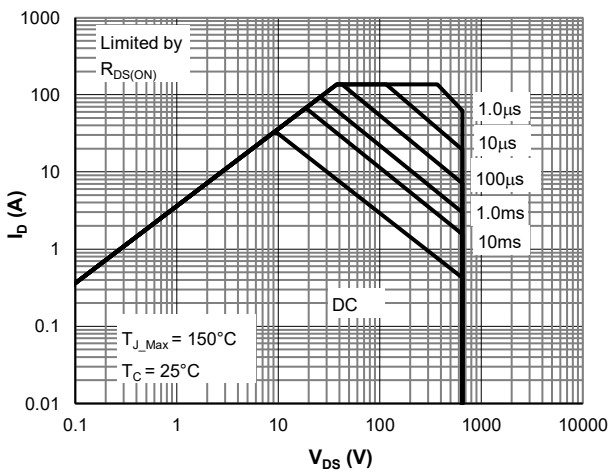
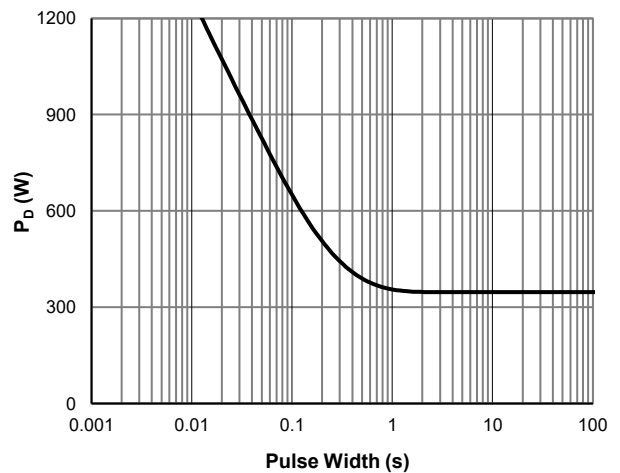
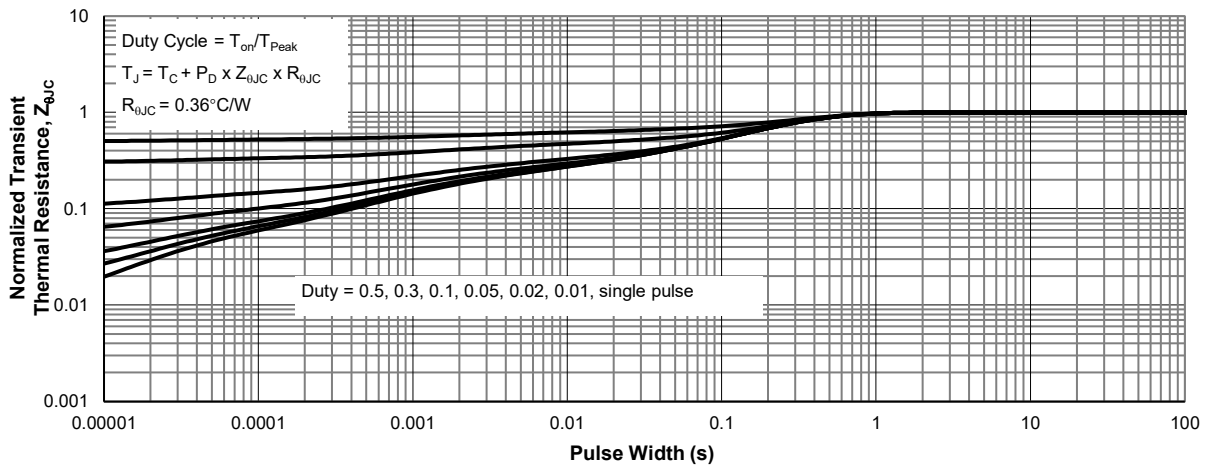
Thermal Performance

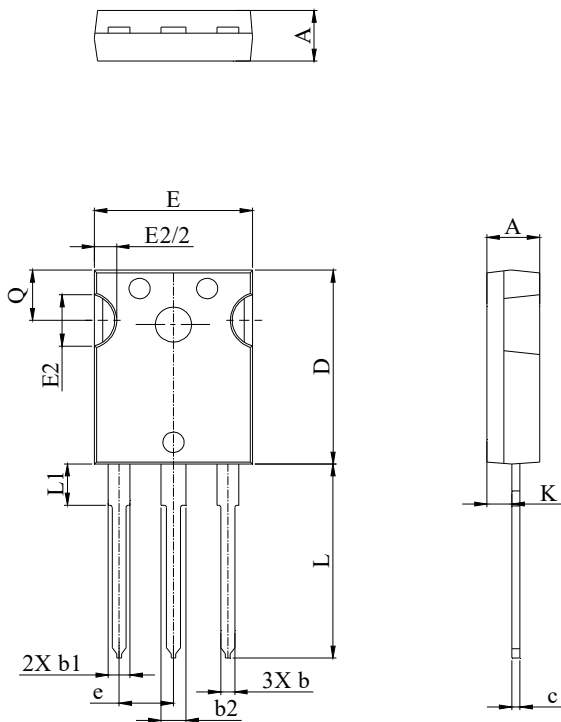
Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	R _{θJA}	43	53	°C/W
Thermal Resistance, Junction-to-Case	R _{θJC}	0.36	0.43	°C/W

Notes:

1. Computed continuous current assumes the condition of T_{J,Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under T_{J,Max} = 150°C.
3. This single-pulse measurement was taken under the following condition [L = 10mH, V_{GS} = 10V, V_{DD} = 50V] while its value is limited by T_{J,Max} = 150°C.
4. The power dissipation P_D is based on T_{J,Max} = 150°C.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical & Thermal Characteristics

Figure 1: Saturation Characteristics

Figure 2: Transfer Characteristics

Figure 3: $R_{DS(ON)}$ vs. Drain Current

Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

Figure 5: Body-Diode Characteristics

Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

Figure 7: Current De-rating

Figure 8: Power De-rating

Figure 9: Maximum Safe Operating Area

Figure 10: Single Pulse Power Rating, Junction-to-Case

Figure 11: Normalized Maximum Transient Thermal Impedance

TO-247-3L Package Information
Package Outline


DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	4.80	5.02	5.21
b	1.00	1.20	1.40
b1	1.90	2.00	2.39
b2	2.87	3.00	3.22
c	0.41	0.60	0.79
D	20.80	21.00	21.20
E	15.50	15.94	16.13
E2	4.32		5.49
L	19.70	20.07	20.32
L1	4.00		4.40
K	2.20		2.50
e	5.44 BSC		