Features

- Ultra-low $R_{DS(ON)}$
- Low Gate Charge

Product Summary

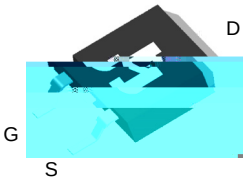
	Value	Unit
	100	V
	2.8	V
$_D$ (@ V_{GS} = 10V) (1)	284	A
$R_{DS(ON)}$ (@ V_{GS} = 10V)	2.2	m

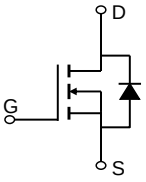
Applications

- Motor Driving in Power Tool, E-vehicle, Robotics
- Current Switching in DC/DC & AC/DC (SR) Sub-systems
- Power Management in Telecom., Industrial Automation, CE

TO-220-3L Top View

TO-263-3L Top View





Ordering Information

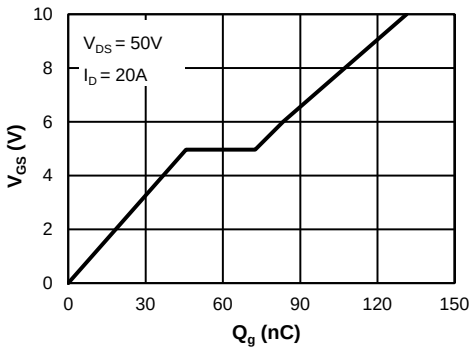
Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSH1002NC-U	TO-220-3L	3	SH1002N	N/A	-55 to 150	Tube	50
	TO-263-3L	3	SH1002N	1	-55 to 150	13-inch Reel	800

		Symbol		Unit
Drain-to-Source Voltage		V_{DS}	1 ~ ή Ω	erV
		V_{GS}		V
Continuous Drain Current (1)	T_C = 25°C	I_D	284	A
	T_C = 100°C		179	
Pulsed Drain Current (2)		I_{DM}	1136	A
Avalanche Energy (3)		E_{AS}	1350	mJ
Power Dissipation (4)	T_C = 25°C	P_D	416	W
	T_C = 100°C		166	
Junction & Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

$R_{DS(ON)}$ vs. V_{GS}

I_D = 20A

Gate Charge



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 = 250 A, V_{GS} = 0V		100	106		V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 80V, V_{GS} = 0V				1.0	A
			T_J = 55°C			5.0	
Gate-Body Leakage Current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V				±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 A		2.0	2.8	4.0	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 20A	TO-263-3L		2.2	2.8	m
			TO-220-3L		2.4	2.9	m
Forward TransconductanceM q	g_{FS}	V_{DS}=5V, I_D=20A" s p			67		S
Diode Forward Voltage	V_{SD}	I_S = 1A, V_{GS} = 0V			0.66	1.0	V
Diode Continuous Current	I_S	T_C = 25°C				284	A
DYNAMIC PARAMETERS (5)							
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 50V, f = 1MHz			9256		pF
Output Capacitance	C_{oss}				1318		pF
Reverse Transfer Capacitance	C_{rss}				30		pF
Gate Resistance	R_g	V_{GS} = 0V, V_{DS}= 0V, f = 1MHz			1.0		
SWITCHING PARAMETERS (5)							
Total Gate Charge (@ V_{GS} = 10V)	Q_g	V_{GS} = 0 to 10V, V_{DS} = 50V, I_D = 20A			131		nC
Total Gate Charge (@ V_{GS} = 6.0V)	Q_g				83		nC
Gate Source Charge	Q_{gs}				46		nC
Gate Drain Charge	Q_{gd}				27		nC
Turn-On DelayTime	$t_{D(on)}$	V_{GS} = 10V, V_{DS} = 50V, R_L = 2.5 , R_{GEN} = 3			33		ns
Turn-On Rise Time	t_r				33		ns
Turn-Off DelayTime	$t_{D(off)}$				63		ns
Turn-Off Fall Time	t_f				23		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F = 20A, dI_F/dt = 100A/ s			91		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F = 20A, dI_F/dt = 100A/ s			250		nC

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	R_{JA}	45	55	°C/W
Thermal Resistance, Junction-to-Case	R_{JC}	0.30	0.40	°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. E_{AS} of 1350 mJ is based on starting T_J = 25°C, L = 3.0mH, I_{AS} = 30A, V_{GS} = 10V, V_{DD} = 50V; 100% test at L = 0.3mH, I_{AS} = 62A. 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

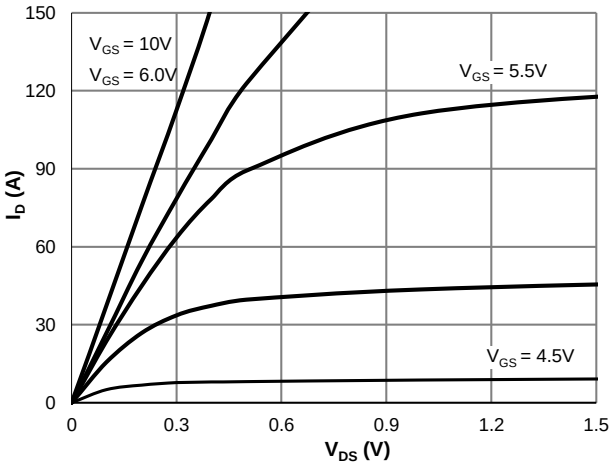


Figure 1: Saturation Characteristics

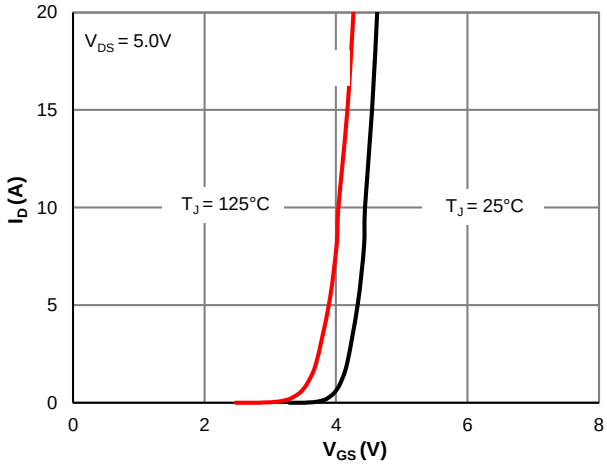


Figure 2: Transfer Characteristics

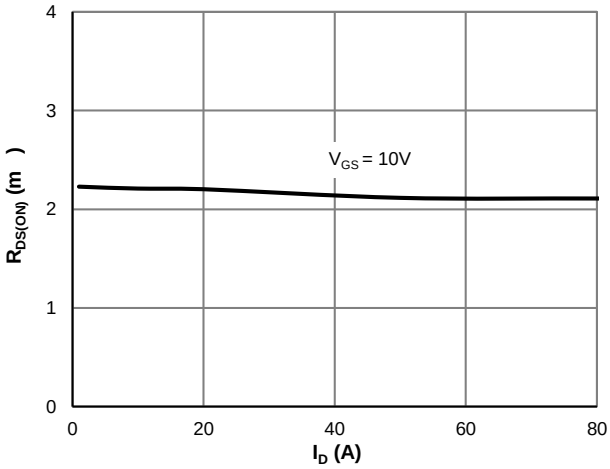


Figure 3: $R_{DS(ON)}$ vs. Drain Current

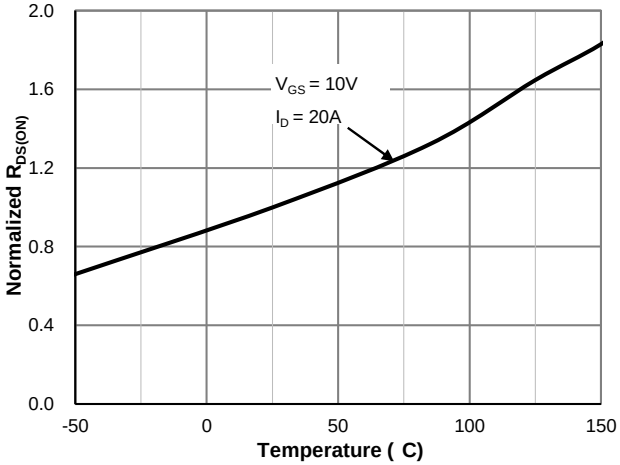
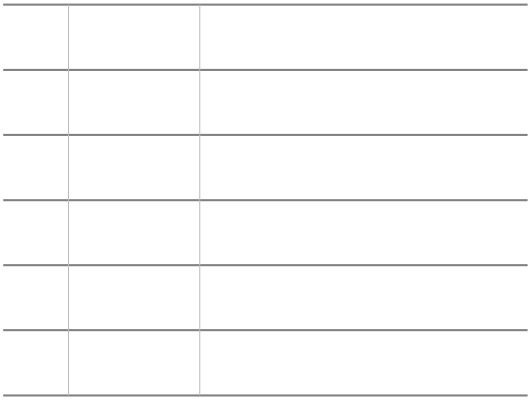


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature



Typical Electrical & Thermal Characteristics

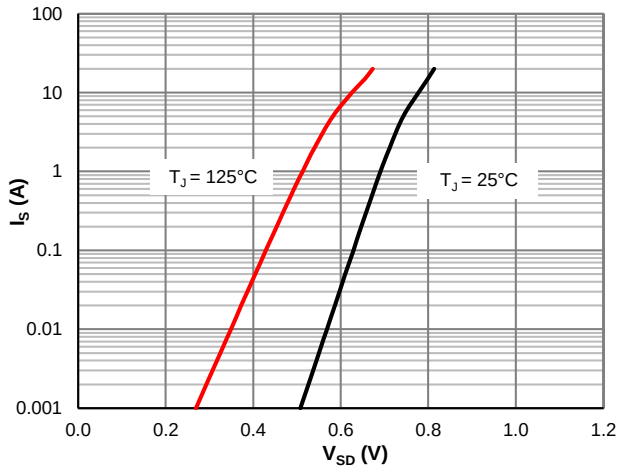


Figure 7: Body-Diode Characteristics

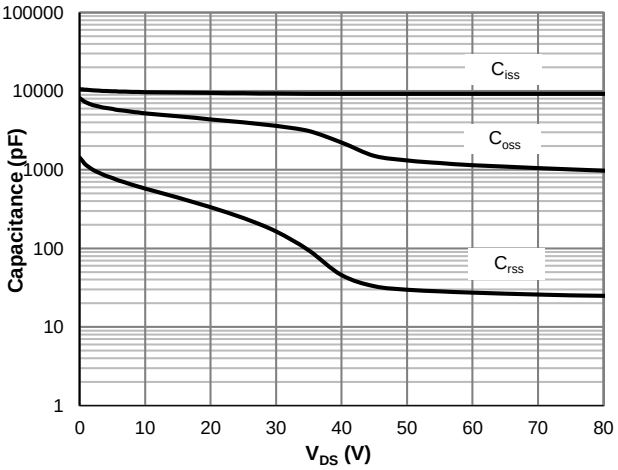


Figure 8: Capacitance Characteristics

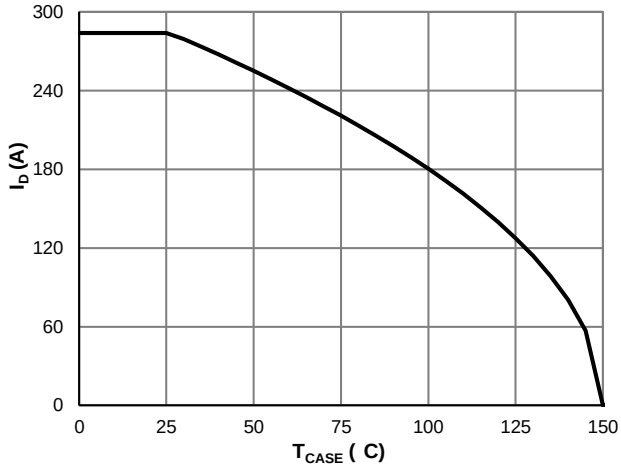


Figure 9: Current De-rating

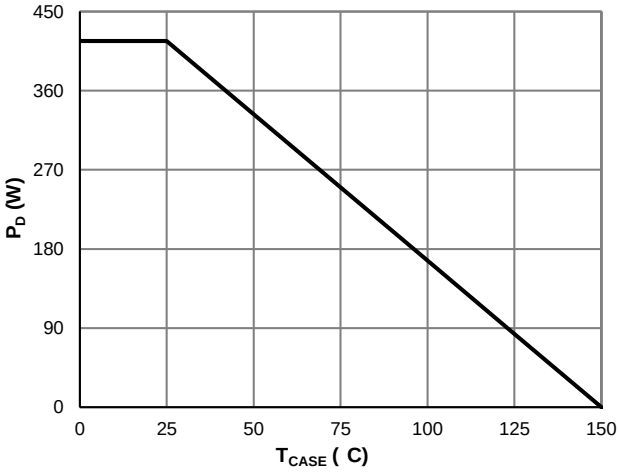


Figure 10: Power De-rating

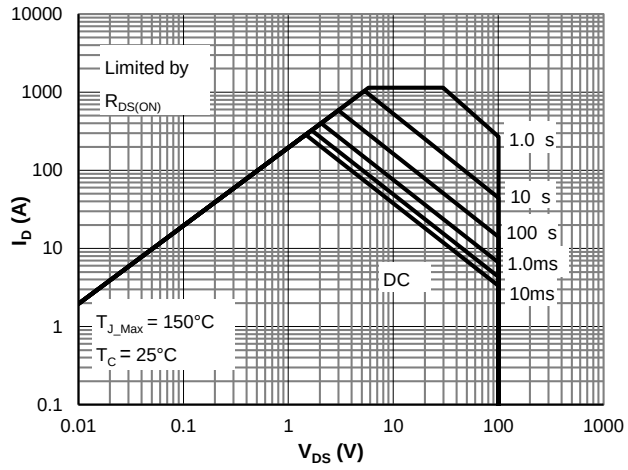


Figure 11: Maximum Safe Operating Area

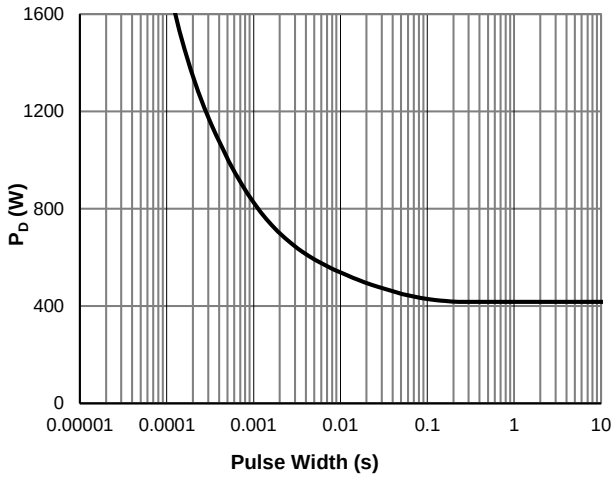
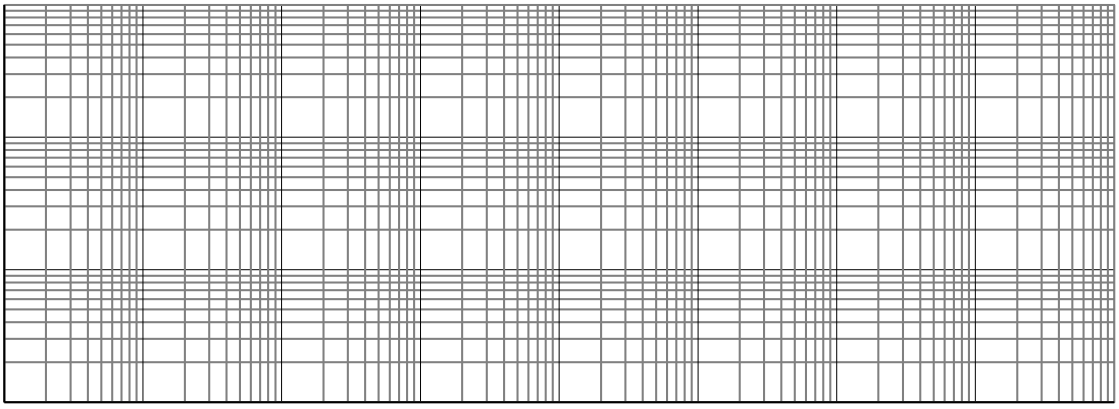
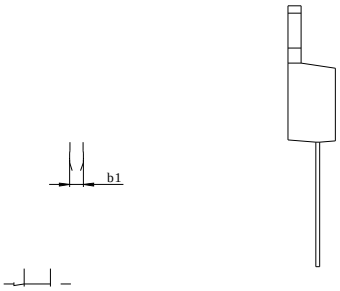


Figure 12: Single Pulse Power Rating, Junction-to-Case

Typical Electrical & Thermal Characteristics



TO-220-3L Package Information



TO-263-3L Package Information