

N Channel Enhancement Mode Power MOSFET

GENERAL DESCRIPTION

The JY15M utilizes the latest trench processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

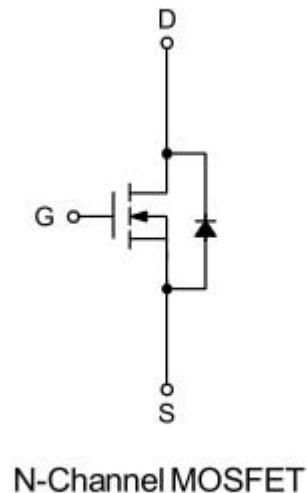
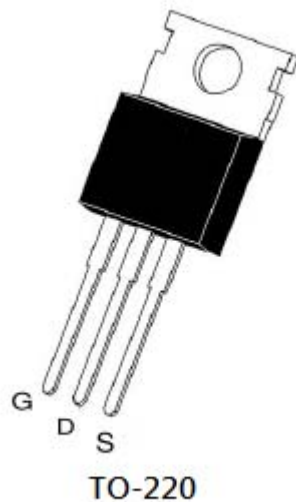
FEATURES

- 40V/130A, $R_{DS(ON)} \leq 3.1m\Omega @ V_{GS}=10V$
- Fast switching and reverse body recovery
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

APPLICATIONS

- Switching application
- Hard switched and high frequency circuits
- Power Management for Inverter Systems

PIN DESCRIPTION



JY15M

Absolute Maximum Ratings(Tc=25° C Unless Otherwise Noted)

Symbol	Parameter		Limit	Unit
V _{DS}	Drain-Source Voltage		40	V
V _{GS}	Gate-Source Voltage		± 20	V
I _D	Continuous Drain Current	Tc=25° C	130	A
		Tc=100° C	98	
I _{DM}	Pulsed Drain Current		300	A
P _D	Maximum Power Dissipation		125	W
T _J T _{STG}	Operating Junction and Storage Temperature Range		-55 to +175	° C
R _{θJC}	Thermal Resistance-Junction to Case		1.1	° C/W

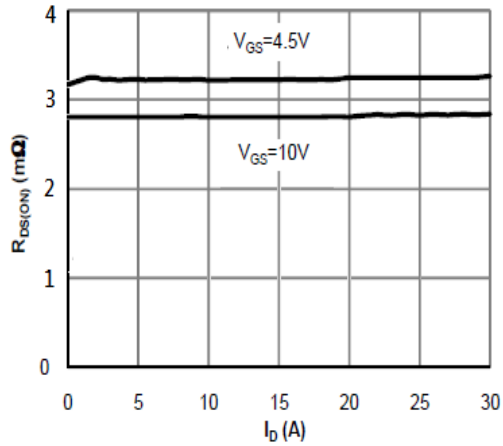
Electrical Characteristics(Ta=25° C Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V			1	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ± 20V, V _{DS} =0V			± 100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} =250uA	1.2	2.1	3.3	V
R _{DS(ON)}	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =30A		2.8	3.1	mΩ
		V _{GS} =4.5V, I _{DS} =30A		3.3	3.6	mΩ

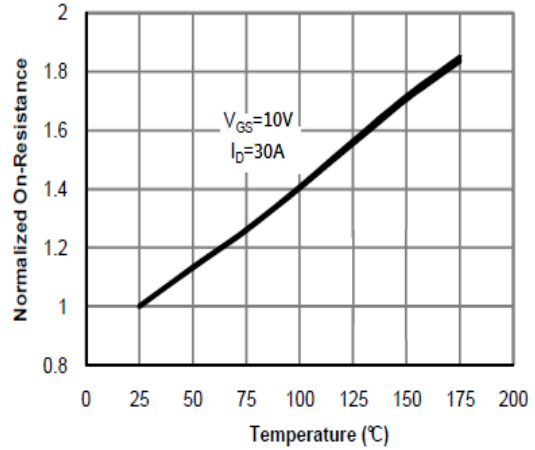
Electrical Characteristics(Ta=25°C Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_{SD}=30A$		0.9	1.3	V
T_{rr}	Reverse Recovery Time	$I_{SD}=30A$ $di/dt=100A/us$		52		ns
Q_{rr}	Reverse Recovery Charge			88		nC
Dynamic Characteristics						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V,$ $f=1MHz$		1.45		Ω
$T_{d(on)}$	Turn-on Delay Time	$V_{DS}=20V, R_G=6\Omega,$ $I_{DS}=30A, V_{GS}=10V,$ $R_L=28\Omega$		18		ns
T_r	Turn-on Rise Time			15		
$T_{d(off)}$	Turn-off Delay Time			62		
T_f	Turn-off Fall Time			35		
C_{ISS}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=20V,$ $f=1.0MHz$		4500		pF
C_{OSS}	Output Capacitance			790		
C_{RSS}	Reverse Transfer Capacitance			250		
Q_g	Total Gate Charge	$V_{DS}=20V, I_D=30A,$ $V_{GS}=10V$		78	85	nC
Q_{gs}	Gate-Source Charge			30		
Q_{gd}	Gate-Drain Charge			24		

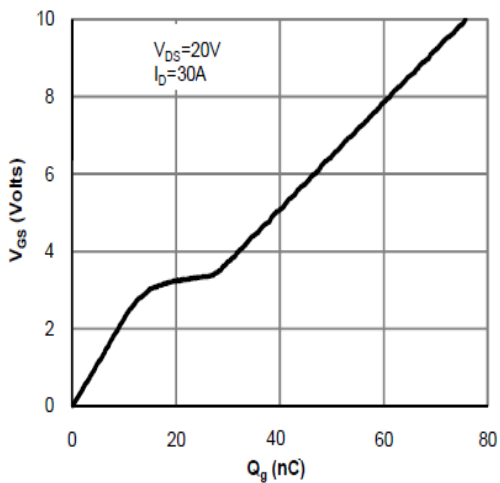
Typical electrical and thermal characteristics



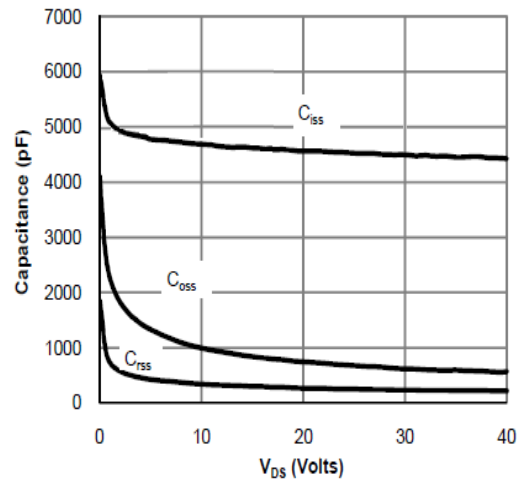
On-Resistance vs. Drain Current and Gate Voltage



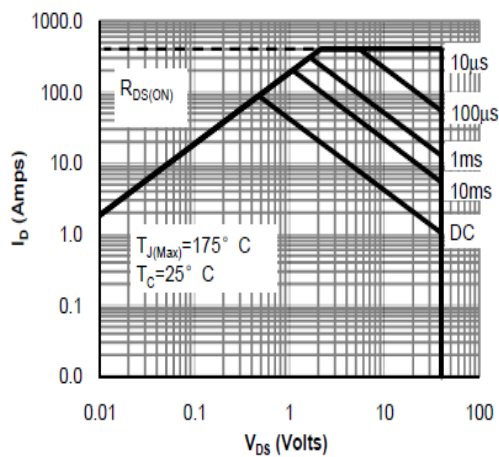
On-Resistance vs. Junction Temperature



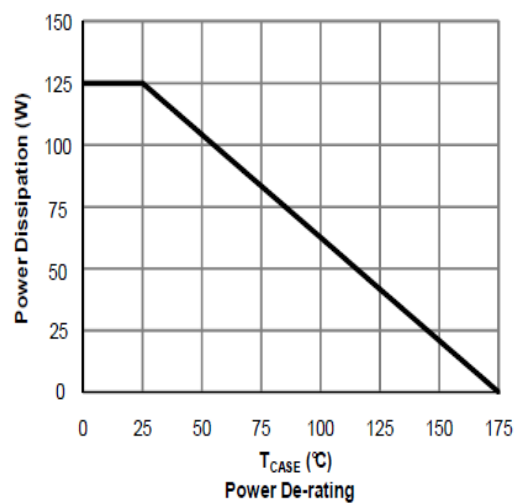
Gate-Charge Characteristics



Capacitance Characteristics

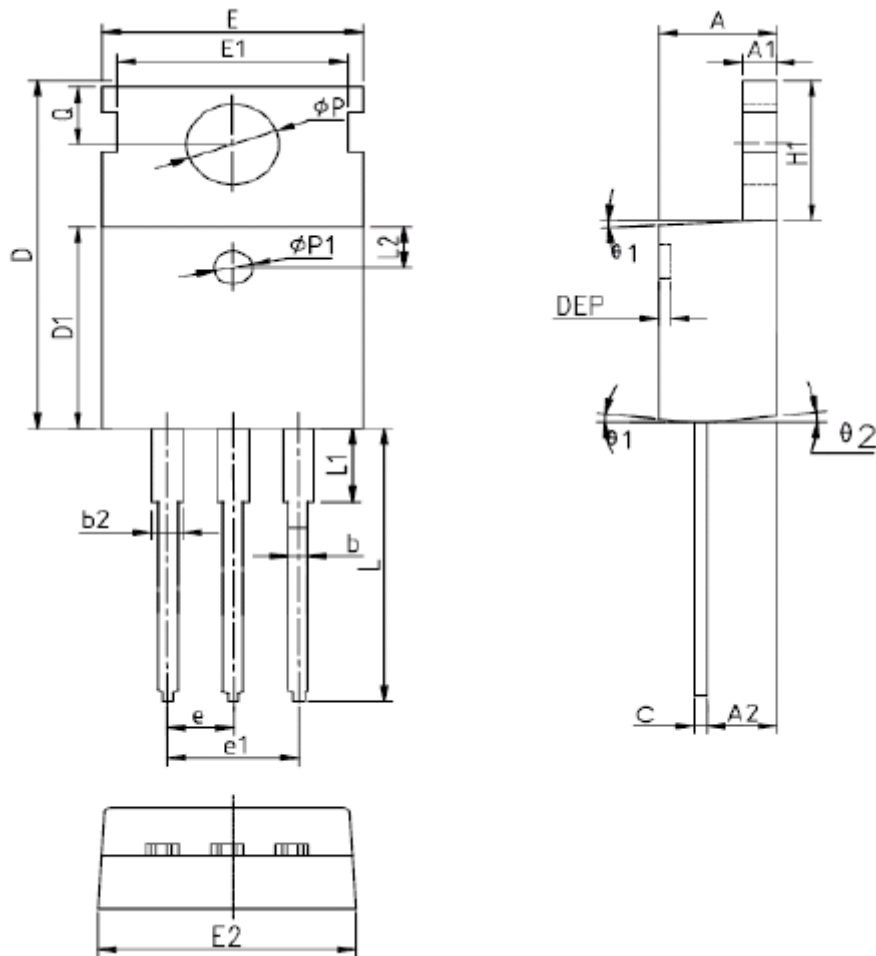


Maximum Forward Biased Safe Operating Area



Power De-rating

TO220-3 Package Outline



SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185	$\phi p1$	1.40	1.50	1.60	0.055	0.059	0.063
A1	1.27	1.30	1.33	0.050	0.051	0.052	e	2.54BSC			0.1BSC		
A2	2.35	2.40	2.50	0.093	0.094	0.098	e1	5.08BSC			0.2BSC		
b	0.77	-	0.90	0.030	-	0.035	H1	6.40	6.50	6.60	0.252	0.256	0.260
b2	1.23	-	1.36	0.048	-	0.054	L	12.75	-	13.17	0.502	-	0.519
C	0.48	0.50	0.52	0.019	0.020	0.021	L1	-	-	3.95	-	-	0.156
D	15.40	15.60	15.80	0.606	0.614	0.622	L2	2.50REF.			0.098REF.		
D1	9.00	9.10	9.20	0.354	0.358	0.362	ϕp	3.57	3.60	3.63	0.141	0.142	0.143
DEP	0.05	0.10	0.20	0.002	0.004	0.008	Q	2.73	2.80	2.87	0.107	0.110	0.113
E	9.70	9.90	10.10	0.382	0.389	0.398	$\theta 1$	5°	7°	9°	5°	7°	9°
E1	-	8.70	-	-	0.343	-	$\theta 2$	1°	3°	5°	1°	3°	5°
E2	9.80	10.00	10.20	0.386	0.394	0.401							