

N-Channel Power MOSFET

40V, 157A, 3.5mΩ

FEATURES

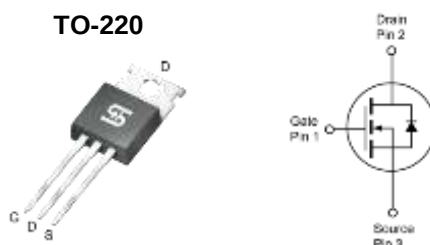
- Low $R_{DS(on)}$ to minimize conductive losses
- Logic level
- Low gate charge for fast power switching
- 100% UIS and R_g Tested
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

KEY PERFORMANCE PARAMETERS

PARAMETER	VALUE	UNIT
V_{DS}	40	V
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	3.5
	$V_{GS} = 4.5V$	4.2
Q_g	110	nC

APPLICATIONS

- BLDC Motor Control
- Battery Power Management
- DC-DC Converter



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current (Note 1)	I_D	$T_C = 25^\circ\text{C}$	A
		$T_A = 25^\circ\text{C}$	
Pulsed Drain Current	I_{DM}	628	A
Single Pulse Avalanche Current (Note 2)	I_{AS}	37	A
Single Pulse Avalanche Energy (Note 2)	E_{AS}	205	mJ
Total Power Dissipation	P_D	$T_C = 25^\circ\text{C}$	W
		$T_C = 125^\circ\text{C}$	
Total Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	W
		$T_A = 125^\circ\text{C}$	
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150	$^\circ\text{C}$

THERMAL PERFORMANCE

PARAMETER	SYMBOL	MAXIMUM	UNIT
Junction to Case Thermal Resistance	$R_{\theta JC}$	0.8	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	62	$^\circ\text{C/W}$

Thermal Performance Note: $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistances. The case-thermal reference is defined at the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.

ELECTRICAL SPECIFICATIONS (T _A = 25°C unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static						
Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	BV _{DSS}	40	--	--	V
Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 250μA	V _{GS(TH)}	1	1.7	2.5	V
Gate-Source Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Drain-Source Leakage Current	V _{GS} = 0V, V _{DS} = 40V	I _{DSS}	--	--	1	μA
	V _{GS} = 0V, V _{DS} = 40V T _J = 125°C		--	--	100	
Drain-Source On-State Resistance (Note 3)	V _{GS} = 10V, I _D = 18A	R _{DS(on)}	--	2.5	3.5	mΩ
	V _{GS} = 4.5V, I _D = 16A		--	3.2	4.2	
Forward Transconductance (Note 3)	V _{DS} = 10V, I _D = 18A	g _{fs}	--	64	--	S
Dynamic (Note 4)						
Total Gate Charge	V _{GS} = 10V, V _{DS} = 20V, I _D = 18A	Q _g	--	111	--	nC
Total Gate Charge	V _{GS} = 4.5V, V _{DS} = 20V, I _D = 16A	Q _g	--	56	--	
Gate-Source Charge		Q _{gs}	--	20	--	
Gate-Drain Charge		Q _{gd}	--	25	--	
Input Capacitance	V _{GS} = 0V, V _{DS} = 20V, f = 1.0MHz	C _{iss}	--	6350	--	pF
Output Capacitance		C _{oss}	--	659	--	
Reverse Transfer Capacitance		C _{rss}	--	388	--	
Gate Resistance	f = 1.0MHz	R _g	0.5	1.8	3.6	Ω
Switching (Note 4)						
Turn-On Delay Time	V _{GS} = 10V, V _{DS} = 20V, I _D = 18A, R _G = 2Ω	t _{d(on)}	--	12	--	ns
Turn-On Rise Time		t _r	--	68	--	
Turn-Off Delay Time		t _{d(off)}	--	71	--	
Turn-Off Fall Time		t _f	--	76	--	
Source-Drain Diode						
Forward Voltage (Note 3)	V _{GS} = 0V, I _S = 18A	V _{SD}	--	--	1	V
Reverse Recovery Time	I _S = 18A, dI/dt = 100A/μs	t _{rr}	--	28	--	ns
Reverse Recovery Charge		Q _{rr}	--	17	--	nC

Notes:

1. Silicon limited current only.
2. $L = 0.3\text{mH}$, $V_{GS} = 10\text{V}$, $V_{DD} = 25\text{V}$, $R_G = 25\Omega$, $I_{AS} = 37\text{A}$, Starting $T_J = 25^\circ\text{C}$
3. Pulse test: Pulse Width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
4. Switching time is essentially independent of operating temperature.

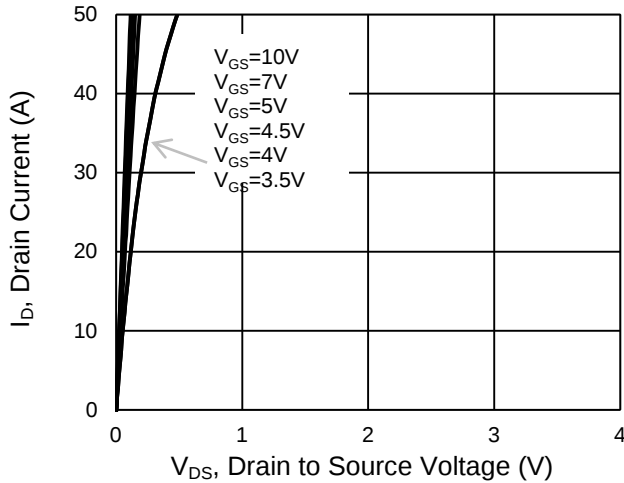
ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TSM035NB04LCZ C0G	TO-220	50pcs / Tube

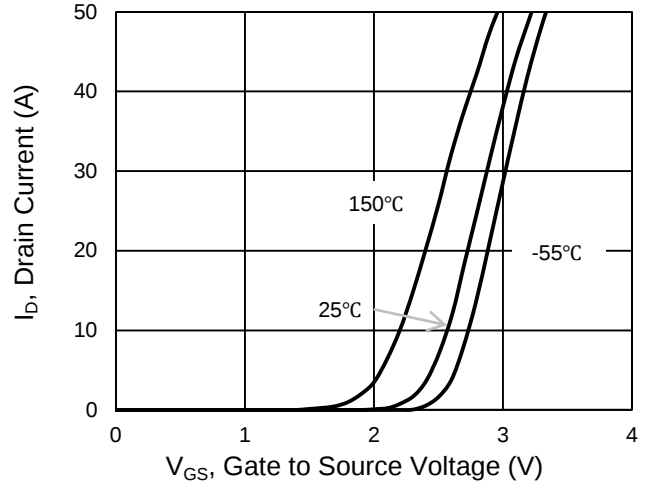
CHARACTERISTICS CURVES

($T_A = 25^\circ\text{C}$ unless otherwise noted)

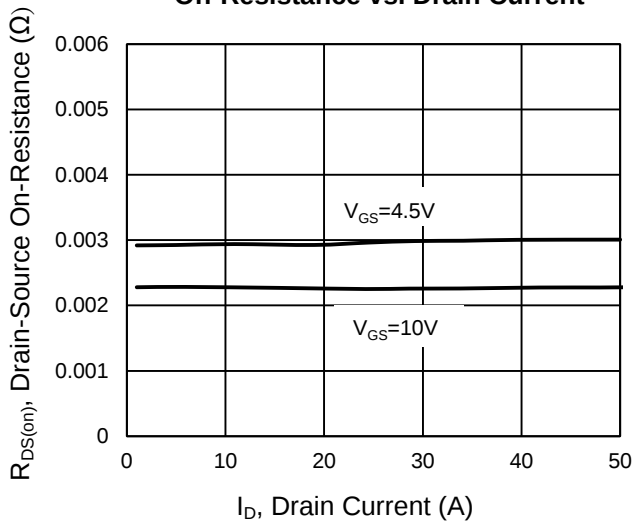
Output Characteristics



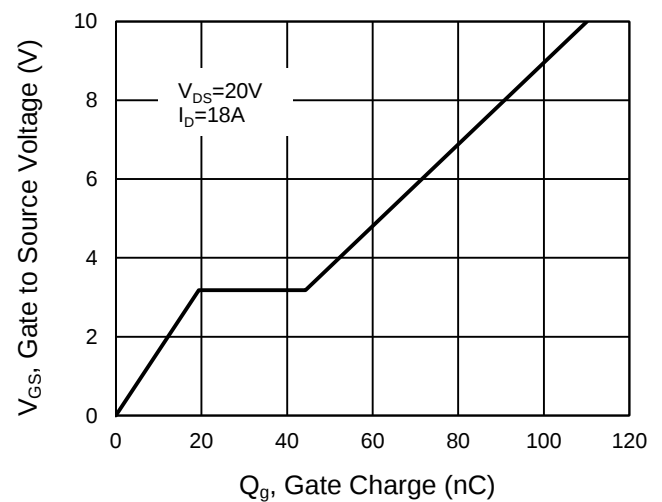
Transfer Characteristics



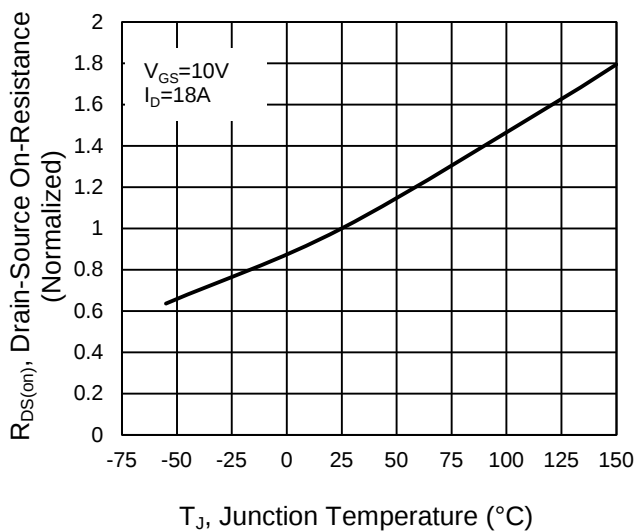
On-Resistance vs. Drain Current



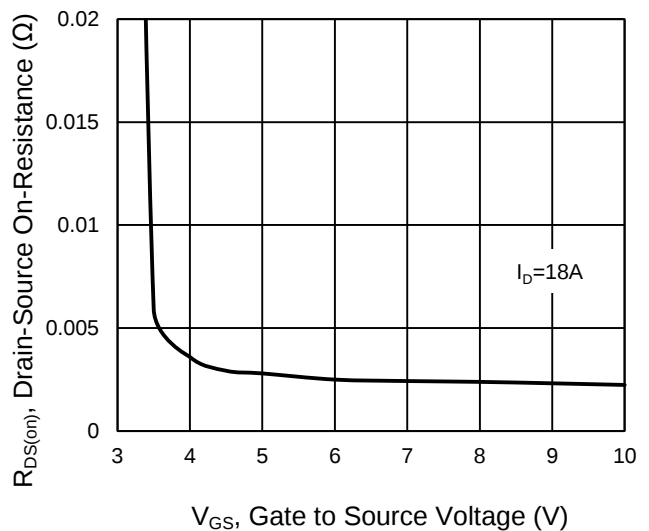
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



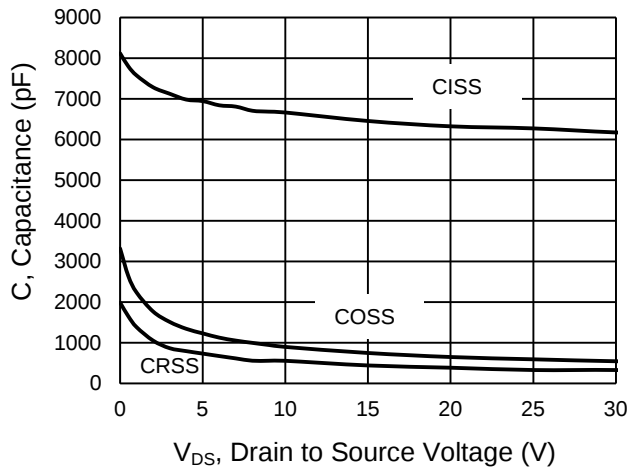
On-Resistance vs. Gate-Source Voltage



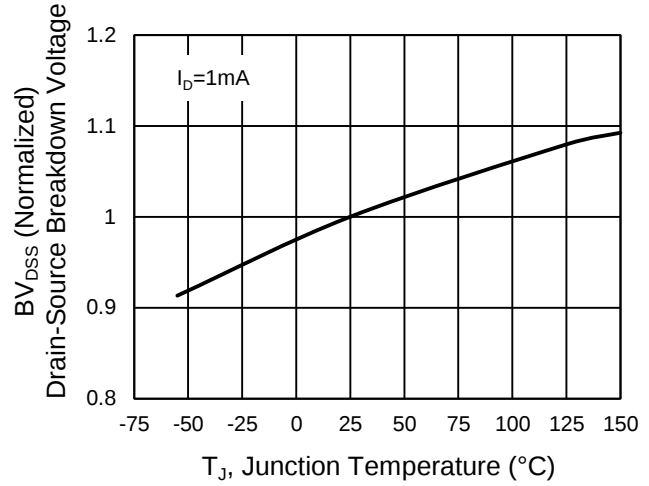
CHARACTERISTICS CURVES

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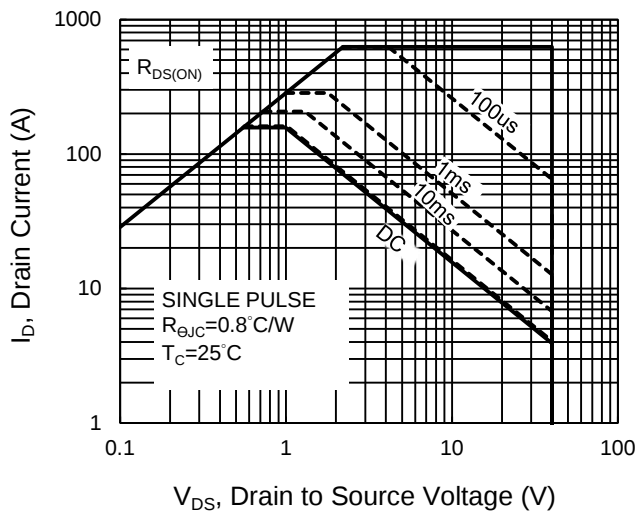
Capacitance vs. Drain-Source Voltage



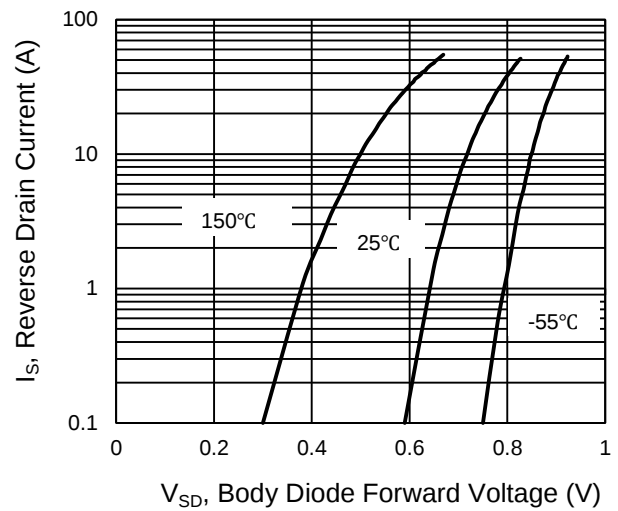
BV_{DSS} vs. Junction Temperature



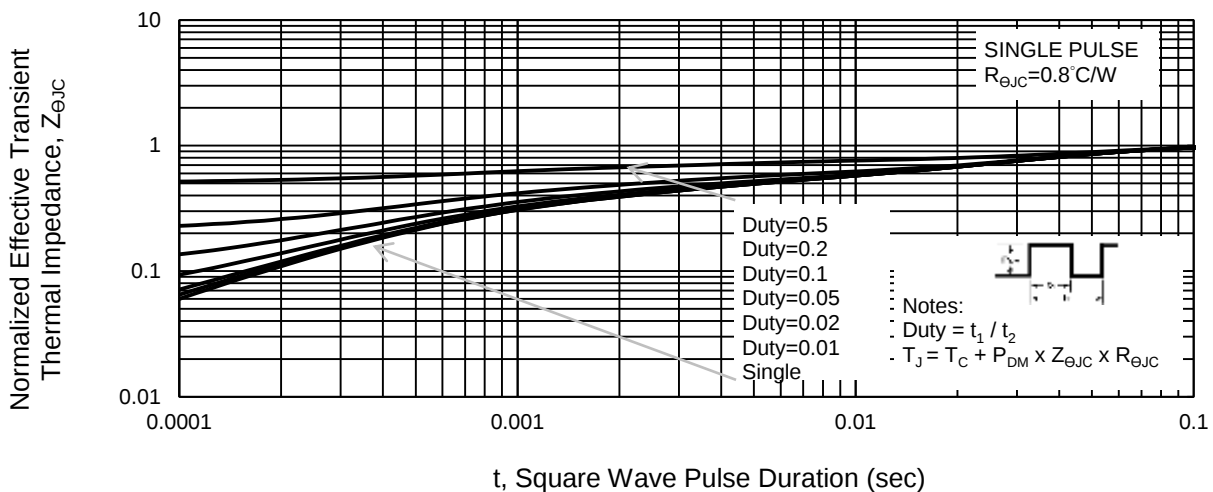
Maximum Safe Operating Area, Junction-to-Case



Source-Drain Diode Forward Current vs. Voltage

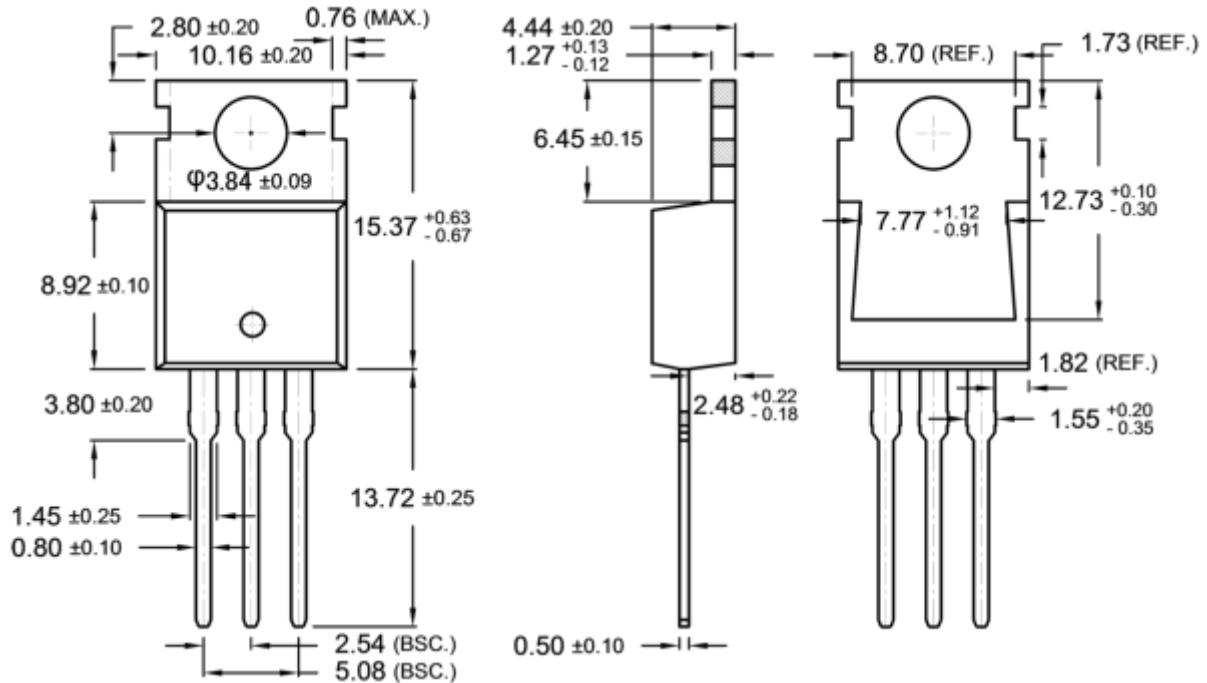


Normalized Thermal Transient Impedance, Junction-to-Case

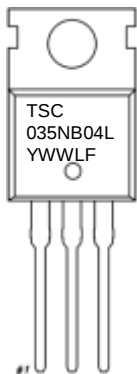


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-220



MARKING DIAGRAM



- Y** = Year Code
- WW** = Week Code (01~52)
- L** = Lot Code (1~9,A~Z)
- F** = Factory Code

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