

# GE90T03

## N-CHANNEL ENHANCEMENT MODE POWER MOSFET

BV <sub>DSS</sub>	30V
R <sub>DS(ON)</sub>	5mΩ
I <sub>D</sub>	75A

### Description

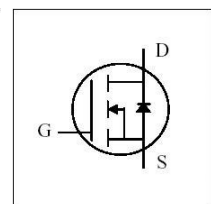
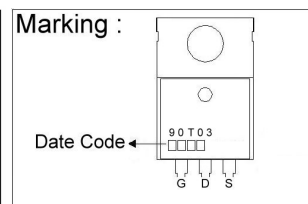
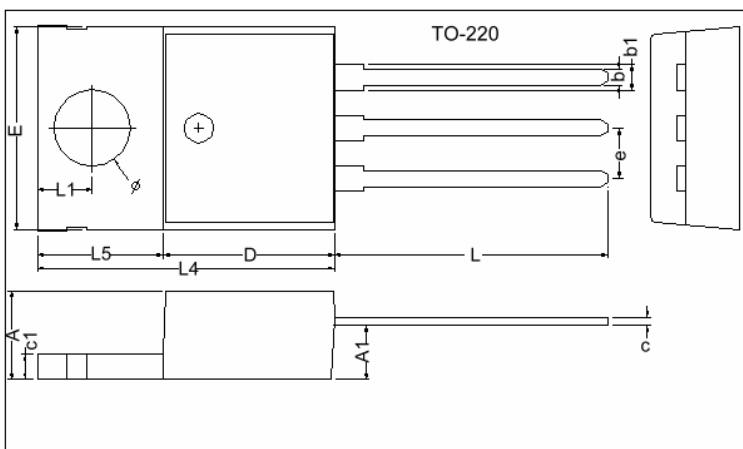
The GE90T03 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The through-hole version (TO-220) is available for low-profile applications and suited for low voltage applications such as DC/DC converters.

### Features

- \*Simple Drive Requirement
- \*Lower On-resistance
- \*Fast Switching Characteristic

### Package Dimensions



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.40	4.80	c1	1.25	1.45
b	0.76	1.00	b1	1.17	1.47
c	0.36	0.50	L	13.25	14.25
D	8.60	9.00	e	2.54 REF.	
E	9.80	10.4	L1	2.60	2.89
L4	14.7	15.3	Ø	3.71	3.96
L5	6.20	6.60	A1	2.60	2.80

### Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V <sub>DS</sub>	30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current, V <sub>GS</sub> @4.5V	I <sub>D</sub> @T <sub>C</sub> =25°C	75	A
Continuous Drain Current, V <sub>GS</sub> @4.5V	I <sub>D</sub> @T <sub>C</sub> =100°C	63	A
Pulsed Drain Current <sup>1</sup>	I <sub>DM</sub>	350	A
Total Power Dissipation	P <sub>D</sub> @T <sub>C</sub> =25°C	96	W
Linear Derating Factor		0.7	W/°C
Operating Junction and Storage Temperature Range	T <sub>j</sub> , T <sub>stg</sub>	-55 ~ +150	°C

### Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-case Max.	R <sub>thj-c</sub>	1.3	°C/W
Thermal Resistance Junction-ambient Max.	R <sub>thj-a</sub>	62	°C/W

**Electrical Characteristics(T<sub>j</sub> = 25°C Unless otherwise specified)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	$BV_{DSS}$	30	-	-	V	$V_{GS}=0, I_D=250\mu A$
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS} / \Delta T_j$	-	0.02	-	V/°C	Reference to 25°C, $I_D=1mA$
Gate Threshold Voltage	$V_{GS(th)}$	0.8	-	3.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Forward Transconductance	$g_{fs}$	-	55	-	S	$V_{DS}=10V, I_D=30A$
Gate-Source Leakage Current	$I_{GSS}$	-	-	±100	nA	$V_{GS}= \pm 20V$
Drain-Source Leakage Current(T <sub>j</sub> =25°C)	$I_{DSS}$	-	-	1	uA	$V_{DS}=30V, V_{GS}=0$
Drain-Source Leakage Current(T <sub>j</sub> =150°C)		-	-	25	uA	$V_{DS}=24V, V_{GS}=0$
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(ON)}$	-	-	5	mΩ	$V_{GS}=10V, I_D=45A$
		-	-	6		$V_{GS}=4.5V, I_D=30A$
Total Gate Charge <sup>2</sup>	$Q_g$	-	60	96	nC	$I_D=40A$ $V_{DS}=24V$ $V_{GS}=4.5V$
Gate-Source Charge	$Q_{gs}$	-	8.5	-		
Gate-Drain ("Miller") Charge	$Q_{gd}$	-	38	-		
Turn-on Delay Time <sup>2</sup>	$T_{d(on)}$	-	14	-	ns	$V_{DS}=15V$ $I_D=30A$ $V_{GS}=10V$ $R_G=3.3\Omega$ $R_D=0.5\Omega$
Rise Time	$T_r$	-	83	-		
Turn-off Delay Time	$T_{d(off)}$	-	66	-		
Fall Time	$T_f$	-	120	-		
Input Capacitance	$C_{iss}$	-	4090	6540	pF	$V_{GS}=0V$ $V_{DS}=25V$ $f=1.0MHz$
Output Capacitance	$C_{oss}$	-	1010	-		
Reverse Transfer Capacitance	$C_{rss}$	-	890	-		

**Source-Drain Diode**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward On Voltage <sup>2</sup>	$V_{SD}$	-	-	1.3	V	$I_S=45A, V_{GS}=0V$
Reverse Recovery Time	$T_{rr}$	-	51	-	ns	$I_S=30A, V_{GS}=0V$ $di/dt=100A/\mu s$
Reverse Recovery Charge	$Q_{rr}$	-	63	-	nC	

Notes: 1. Pulse width limited by safe operating area.

2. Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .

## Characteristics Curve

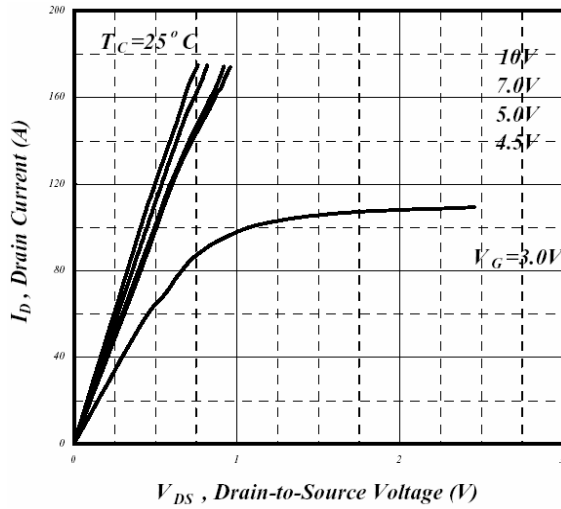


Fig 1. Typical Output Characteristics

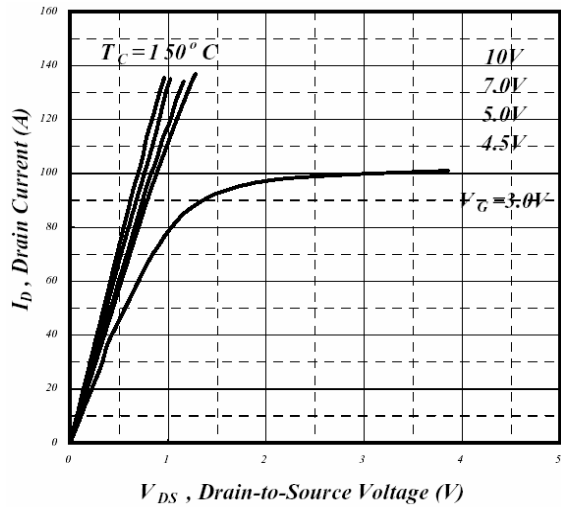


Fig 2. Typical Output Characteristics

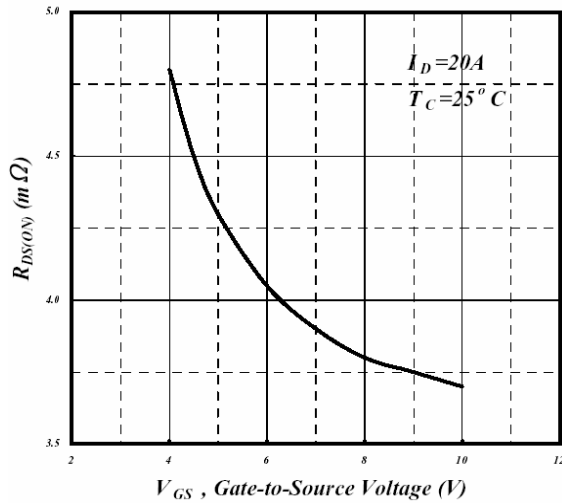


Fig 3. On-Resistance v.s. Gate Voltage

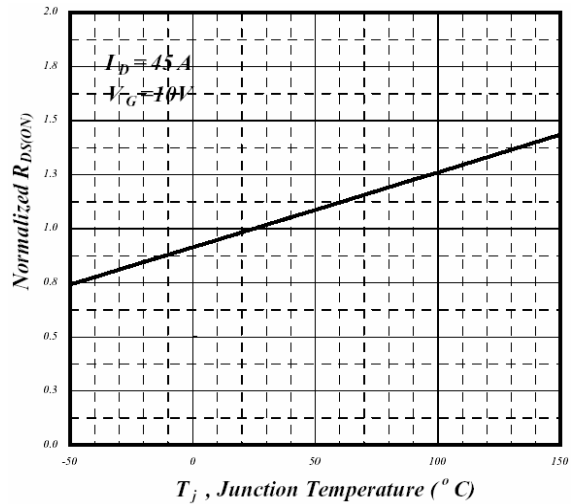


Fig 4. Normalized On-Resistance v.s. Junction Temperature

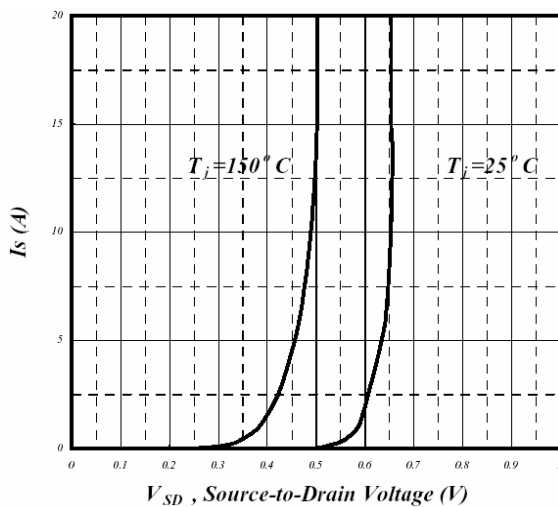


Fig 5. Forward Characteristics of Reverse Diode

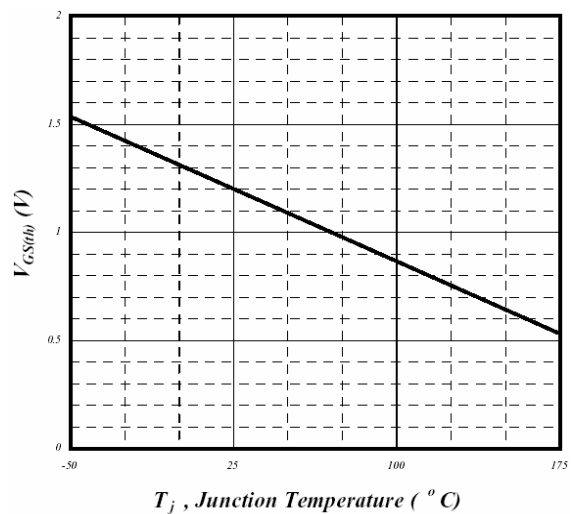
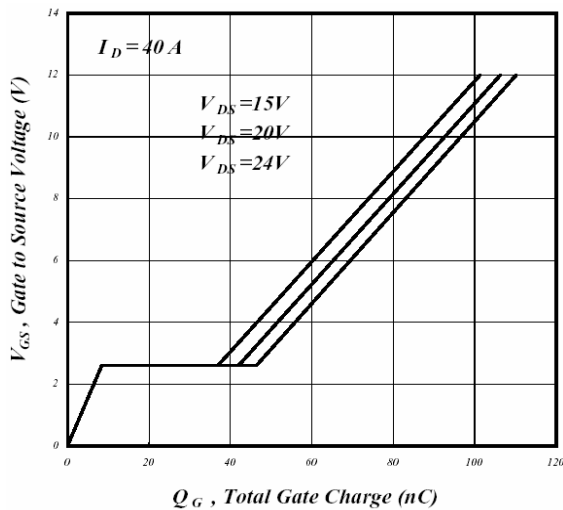
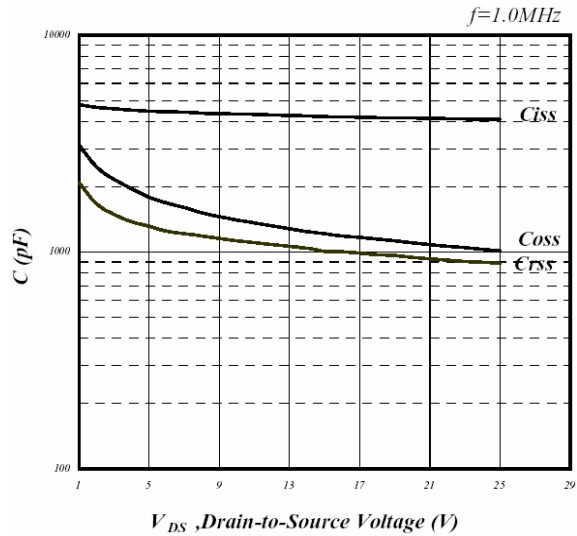


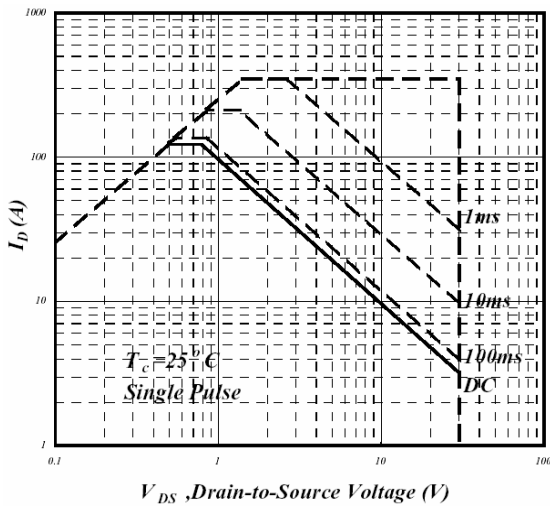
Fig 6. Gate Threshold Voltage v.s. Junction Temperature



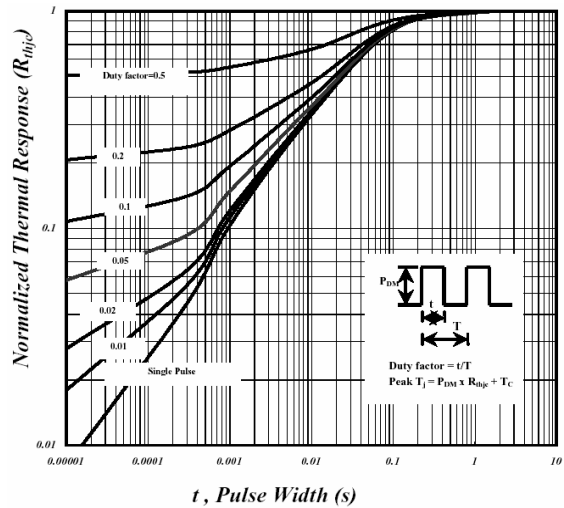
**Fig 7. Gate Charge Characteristics**



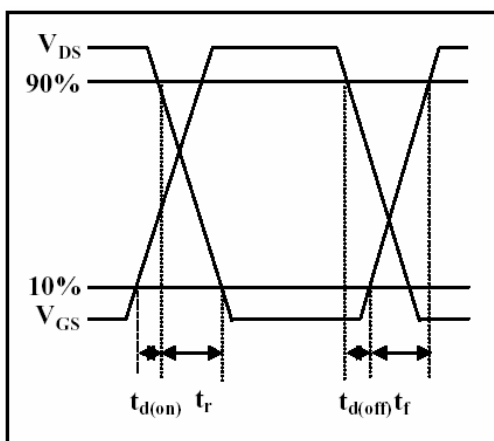
**Fig 8. Typical Capacitance Characteristics**



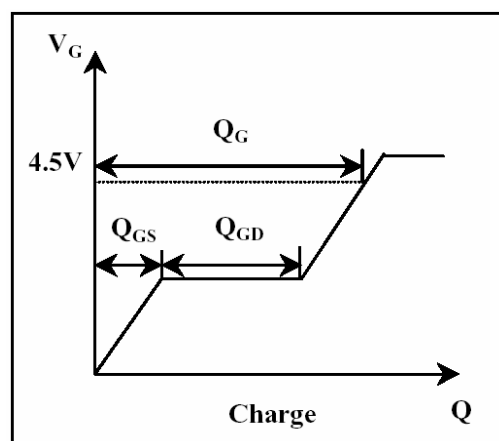
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**

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